

Prioritizing Project Stakeholders

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Abstract

The companies use competitive-oriented principles in their activities and implement project-oriented methods and tools for increasing competitiveness. For using both client-oriented and project-based approaches, it is necessary to consider all stakeholders of the company's projects as clients. The stakeholder assesses the degree of homeostasis of the satisfaction level of values with the received products and given resources when it deciding to participate in the project. Project teams should involve stakeholders in the project to gain access to and use their resources in the project. It is possible to attract a stakeholder to the project by offering them an interesting product that has parameters important for the stakeholder. Determining the optimal parameters of the project product makes it possible to attract the necessary stakeholders. The difficulty in determining the optimal parameters is that the project may include many stakeholders and their requirements for the product can vary significantly. In this case, when creating project products, it is should focusing on priority stakeholders. Stakeholder priority is determined by the uniqueness and importance of the resources that the stakeholder passes to the project. The article proposed a method for determining the priority of a stakeholder due to the importance of the resource for the implementation of project objectives. The use of a stakeholder prioritization method is possible in different phases of a project. At the initiation phase, it is possible to prioritize the types of stakeholders, taking into account the planned requirements from their side to the product project. The planning and implementation phase clarifies the list of stakeholders, their product requirements and the importance of the resources they provide. The paper also presents an example of the implementation of the method for determining the priorities of project stakeholders at the initiation phase. As a result of the research, we can conclude that the successful implementation of a project in current conditions requires meeting the requirements of priority stakeholders.

Keywords 1

Project stakeholder management, homeostasis in management, stakeholder priority.

1 Introduction

The growth of competition and the dynamics of external facts that effect on the markets and the company activities lead to the need to introduce client-oriented and project-based approaches. The introduction of these approaches allows the company to create and sell competitive products. By introducing a client-oriented approach, the company receives a tool for monitoring constantly changing requirements for the parameters of its products. The implementation of the project approach allows us to manufacture products taking into attention constantly changing requirements.

Using the project approach, we focus on the satisfaction of not only the main consumers of products, but also all stakeholders involved in the project [1-2]. According to the Japanese project management methodology, when analyzing stakeholders, we should focus not so much on the needs of stakeholders as on their values [3]. By shaping a product based on values, it allows to create a product

Proceedings of the 2nd International Workshop IT Project Management (ITPM 2021), February 16-18, 2021, Slavsko, Lviv region, Ukraine

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CEUR Workshop Proceedings (CEUR-WS.org)

that will be in demand for a long period. Focusing on products, the company forms a portfolio of projects for various products with the ability to develop not only the parameters of the products, but also the technology of their production [4].

The difficulty with stakeholder value orientation when creating project products is that projects with a high level of complexity may have many stakeholders. Respectively, the requirements for the project products are increasing many times. Moreover, during the implementation of long-term projects, stakeholders can change their vision of products and as a result, the project team should make changes fast to the configuration of the part of the product that has not been implemented yet.

Should also consider that the requirements of stakeholders may contradict each other. Consider requirements of all project stakeholders, of all project stakeholders significantly complicates the product. Respectively, the project team needs to determine the requirements of which stakeholders to consider when formulating the requirements for the product. Since the list of project stakeholders may change at each phase of the project implementation, it is necessary to take these specifics into attention when determining the priorities of the project stakeholders.

The objective of the research is to describe the approaches and method for prioritizing project stakeholders.

Research tasks include:

1. Analysis of the principles by which the stakeholders are guided when making a decision to participate in the project.
2. Development of a method for prioritizing stakeholders.
3. To analyze the use of the stakeholder prioritization method at each stage of project implementation.

2 Homeostasis of project stakeholder participation

The attitude of clients to the company's products and projects is not constant, it depends on the needs and their priority [5]. To maintain a positive attitude of customers towards products is necessary to monitor the changing levels of customer satisfaction [6]. The value of a project product is determined by the value of the resources that stakeholders pass to the project [7-8]. The more the value of the product for the stakeholder, the more resources it is ready to offer to participate in the project.

The priority of a project for a stakeholder is determined by the ratio of the values of the project's products to the values of the resources that the stakeholder passes to the project. The more values of this ratio, the higher the stakeholder interest to participate in the project [9-10]. If the stakeholder has to give more valuable resources than the products that it will receive as a result of the project, it will not participate in the project.

The stakeholder makes the decision to participate in the project by assessing the level of ensuring its values. If the value of the stakeholder, at whose satisfaction the product is aimed, will be provided, then the decision to participate in the project will be negative [11-12].

The provision level of stakeholder values can change as new information appears that affects the level of values satisfaction. It can be both analytical and advertising information about new technologies and new product capabilities. The influence of new information leads to the fact that the satisfaction degree with the values of the stakeholder leaves homeostasis and a decision is made to exchange less valuable resources not a new more valuable product [13-15].

Since each stakeholder takes part in the project with the aim of exchanging less valuable resources for more valuable project products, the project leader must also provide homeostasis in the project [16]. The use of the homeostatic approach in project management involves considering the project as a homeostatic system. When defining the list of stakeholders in the project, the project team should consider the degree to which the values of the stakeholders are being satisfied and the exchange of resources between them. Each of the interested parties is a homeostat, while the control team accord-

ingly performs the role of a controlling homeostat. Each stakeholder in the role of a homeostat makes a decision in accordance with their goals, namely increasing the level of satisfaction of their values. The project team, performing the role of the managing homeostat, makes sure that the system does not leave the state of homeostasis and that key stakeholders do not leave the project before reaching their goals [17-18].

Depending on the level of complexity and uniqueness of the project product, as well as the technologies used in the project, the number and list of stakeholders may vary. From the transition from phase to phase, not only the list of stakeholders changes but also the degree of satisfaction with their values. Projects with high complexity and uniqueness are implemented with the involvement of a large number of stakeholders with varying degrees of participation and interest in the products of the project. Respectively, it is necessary to form project products that can satisfy the various requests of the project stakeholders.

Accordingly, within the framework of project management processes, it is necessary to regularly monitor the satisfaction of stakeholders and revise their level of priority for the project. The specifics of working with stakeholders in the framework of changing external conditions is possible with the use of flexible project management methodologies [19]. When planning an iteration, the project team determines the level of satisfaction of stakeholders and updates their priority for the project within the iteration. Based on the results of the analysis of the priorities and values of the stakeholders, the project team has the opportunity to adjust the project products. The configuration of the project products is corrected which will be created within the iteration. This approach allows you to create a product that will meet the constantly changing requirements of stakeholders. In addition, using flexible project management methods, the company saves time and resources for the implementation of work on changes.

The use of flexible project management methodologies in conjunction with the use of methods for assessing the satisfaction of stakeholder values allows you to create innovative products that are most consistent with the customer's requirements. Using a homeostatic approach, the project team focuses on creating a product that meets the requirements for the product while meeting all the expectations of the stakeholders.

Ensuring constant homeostasis in the project The project team needs to monitor the level of priorities of stakeholders. For this purpose, a method for determining the priorities of the project stakeholders will be proposed in the future.

3 Method for prioritizing project stakeholders

Based on the proposed concept, we note that the priority of the stakeholder depends on the need for resources that it transfers to priority stakeholders. Existing methods were analyzed and the recursive method was chosen as the basis for the implementation of the method of determining the priorities of stakeholders [20-33]. The priority of each subsequent group of stakeholders providing resources for the implementation of the tasks of the current group will be halved.

The method of determining the priorities of project stakeholders is used to determine the priority of artifacts of products to be created during the project and to determine the priority of artifacts of resources. Multiple stakeholders with the same priority value are allowed.

We describe the sequence of steps to implement the method of determining the stakeholders priorities:

1. The highest priority of the project management team is assigned to the internal stakeholder, who implements the top management of the organization implementing the project.

Mathematically describe this step as follows:

$$p^z_i = 1, s = p^z_i, Z_i \in Z' \quad (1)$$

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where Z_i – i project stakeholder,

p_{zi} – priority indicator of i project stakeholder,

Z_v – the list of project stakeholders which have identified a priority.

2. The list of tasks for the creation of project products that implement the identified stakeholders is determined.

Mathematically describe this step as follows:

$$\exists Fri \in Fr \quad (2)$$

where: Fr_i – the list of tasks for the creation of project products that implement the i project stakeholder,

Fr – the list of tasks for the creation of project products.

3. Analyzing the list of tasks, the list of resource artifacts that are necessary for the implementation of this list of tasks is determined.

Mathematically describe this step as follows:

$$\exists Ari \in Ar, \exists Fri \in Ari \quad (3)$$

where: Ari – the list of resources artifacts necessary for the implementation of tasks for the creation of projects products implemented by i stakeholder,

Ar – the list of resources immaterial artifacts necessary for the implementation of tasks for the creation of projects products.

4. The list of the task on creation of products of the project which forms the necessary list of artifacts of resources is defined.

Mathematically describe this step as follows:

$$\exists Fr_j \in Fr, A^p_i = A^r_i \quad (4)$$

where: Fr_j – the list of tasks for the creation of project products implemented by the j stakeholder,

A^p_i – the list of material artifacts of products that are necessary for the implementation of tasks for the creation of projects product that implement the i stakeholder.

5. Stakeholders implementing a defined list of tasks are assigned a priority value twice less than the priority of pre-defined stakeholders.

Mathematically describe this step as follows:

$$p^z_j = p^z_i/2, s = s + p^z_j, Z_j \in Z^v \quad (5)$$

where: Z_j – j project stakeholder,

p_{zj} – priority indicator of the j stakeholder project.

A^p_i – the list of material artifacts of products that are necessary for the implementation of tasks for the creation of projects product that implement the i stakeholder.

6. If there are stakeholders for whom priorities are not defined, the implementation of the method continues. The stakeholder to whom the priorities have been assigned is defined as the initial one, after which we turn to point 2.

Mathematically describe this step as follows:

$$Z_j \cap Z_i \neq 0, Z_j = Z_i \quad (6)$$

7. We will reduce the priority indicators to the relative value for this value of the priorities of stakeholders, divide by the sum of all priorities.

Mathematically describe this step as follows:

$$p^z_i = p^z_i/s \quad (7)$$

To ensure the homeostasis of the project information module, the identification of stakeholder priorities should be carried out when changing the list of stakeholders or the list of tasks for the creation of project products.

4 Implementation of the method of determining the stakeholders priorities within the project stages

The peculiarity of the implementation of the method of anticipating the priorities of project stakeholders at different stages of the project is that the list and level of description of stakeholders at different stages differs. Consider the three main stages of a project: initiation, planning and implementation.

At the initiation stage, there is only preliminary information on project stakeholders. Based on the experience of similar projects in the past, it is possible to suggest which stakeholder groups may participate in this project. Based on this information, the organizational structure of the project stakeholders is formed. It is also necessary to form the structure of project products on the basis of available information. In addition, having the information of analogue projects, the structure of project resources should be formed. By comparing the structure of stakeholders with the structures of products and resources, it is possible to find a correspondence between which resources are used by stakeholders and which products are created.

The steps for describing the project stakeholders include creating a stakeholder structure. This structure should include not only external, but also internal stakeholders, in particular, heads of departments and employees. Initially, the stakeholder structure can only include a description of the roles and types of stakeholders. By describing the stakeholders in this way, it is possible to initially set the key parameters of the stakeholders. Based on these parameters, it is possible to determine which of the stakeholders are suitable for the project and why. Any differences between the selected stakeholders and the values of the role parameters determined at the initiation stage can be put as a subject for analysis and determination of possible conflict situations. Depending on the level of development of the corporate management system, the company can develop typical stakeholder structures for projects of different types. Based on the analysis of the results of project implementation, the PMO regularly updates the structure of stakeholders, and also updates the parameters for describing typical stakeholders that may be allowed to implement the company's projects. This approach allows you to significantly save time and labor costs and planning projects in the company's portfolio.

Structures describing products and resources are well described in existing standards [1,3] and are widely used in planning and project management. But often these structures are considered separately. When implementing complex projects with the participation of a large number of stakeholders, the project product obtained from the previous task is transferred to resources for the implementation of subsequent tasks. Thus, there is a change in the state of resources in the product and back. In this regard, it is proposed to use a single structure for describing the resources and products of projects. By combining the two structures, we will be able to clarify which resources or products are provided and which stakeholders in our project.

In addition to the formation of a single structure of products and project resources, it is necessary to allocate which of the project's resources are material and which are non-material. The implementation of modern innovative projects using classical project management methodologies is complicated by the fact that most of the priority resources and expected products of projects are intangible. A distinctive feature of non-material from material resources is the ability to easily duplicate resources. The intangible resource created as a result of the implementation of tasks and received from the interested party can be used immediately in all work that needs it. Intangible resources do not require optimization of their use in the project. At the same time, the complexity of working with intangible resources

is the need for a clear description of the requirements. Multivariance in the formation of an intangible product or the choice of intangible resources creates a certain complexity for the project team.

At the initiation stage, the project team determines the structure of the products and resources of the future project. If information is lacking, the project team must determine the types of resources or products for the project. During the implementation of projects, the description of the types of resources or products will be replaced with a more accurate description. This approach allows you to determine which products will be acceptable as project products and what parameters the required resources should have.

The structures obtained as a result of the analysis (the structure of the stakeholders and the structures of the products and resources of the project) are combined into a single table, where the stakeholders are represented vertically, and the resources and products of the project are represented horizontally. The table cell lists the resource requirements and products being renewed.

By analyzing the resulting table, the project team can find inconsistencies in the existing structures. There may be presence or absence of stakeholder groups whose products or resources are redundant or missing for the project. The result of this analysis will be recommendations for the change and development of stakeholder structures, product structures and project resources. Consistency in structures will speed up planning work and avoid mistakes in the future. Having determined the structure and formed a table of relations, a method for determining the priorities of stakeholders is implemented. At the initiation stage, the level of detail of structures may be low, respectively, the priorities of stakeholders with a similar list of product groups and resources in the project may coincide.

At the planning stage, detailed work is carried out to clarify the list of project stakeholders. A necessary condition for describing the interested parties is the establishment of the decision makers directly. An organization identified as one stakeholder can have multiple decision makers. Having specified the list of stakeholders, it is worth clarifying their participation in the project and, accordingly, the lists of resources and products of the project. A more detailed study of the resources and products of the project also requires clarification of the compliance of the list of stakeholders. After decomposing the products, resources, and project stakeholders, the project team uses a stakeholder prioritization method.

During the implementation phase, the stakeholder prioritization method must be implemented when key changes are made to the product or project implementation technology. A change in the terms of reference and, accordingly, in the structure of the project product changes the table of correspondence of the interested parties. Also, a change in the implementation technology can lead to changes in the demand for resources; it can affect the demand for resources in the correspondence table. And of course changing the list of stakeholders requires a revision of their project priorities.

It is also possible to apply the described approach when implementing projects using flexible management techniques. By dividing the project into separate iterations, the project team identifies the stakeholders who will be involved in the iteration, as well as the products that will be created. By identifying stakeholders, it is possible to immediately identify groups of participants and describe their degree of participation. Also, when describing a product, you should pay attention to the products in which the iteration participants are interested. By describing both internal and external stakeholders as stakeholders, the need for resources will be generated. By implementing a stakeholder prioritization method, it is possible to clarify the importance of the project product requirements.

For projects with a high degree of complexity, it is possible to implement a project iteration, the results of which will be the described structure of stakeholders, the structure of products and resources, as well as the correspondence table described above. Members of the project team are members of this iteration. In addition, by implementing a stakeholder prioritization method, project iterations can be planned to create a core product.

Maintaining homeostasis in the project at any of its stages is the main task of the project team. Any inconsistency in structures or the appearance of unclaimed products or resources leads to conflict situations in the project and, as a result, to its failure. The prioritization method allows the project team to

focus on the priority project stakeholders. Accordingly, by creating a product that satisfies the values of the priority stakeholders, the project team provides access to critical resources for the project.

5 Example of using the method for prioritizing project stakeholders

The initiation phase was chosen as an example of research. The peculiarity of the implementation of the prioritization method in the initiation phase is that the project team works with different types of stakeholders. By analyzing the products and resources of the stakeholders, the project team determines the relationship between the stakeholders and the parameters for their selection. The input information for the implementation of the method is the stakeholder participation table. An example of a table is shown in Table 1.

Table 1
Table of stakeholder participation

Stakeholder name	Stakeholder tasks	Products	Resurses
Company management	Project management tasks	Management decisions	Financial resources
Investors	Project financing tasks	Financial resources	Financial assets, Management solutions
Banks	Project financing tasks	Financial resources	Financial assets, Management solutions
Clients (individuals)	Tasks for accepting project products	Financial resources	Project Products, Management solutions
Clients (legal entities)	Tasks for accepting project products	Financial resources	Project Products, Management solutions
Design contractors	Design tasks	Project Products	Financial assets, Management solutions
Construction contractors	Construction tasks	Project Products, Materials, Equipment, Mechanisms	Financial assets, Management solutions
Material Suppliers	Material Supply Tasks	Materials	Financial assets, Management solutions
Equipment Suppliers	Equipment supply tasks	Equipment	Financial assets, Management solutions
Mechanism suppliers	Tasks for the supply of mechanisms	Mechanisms	Financial assets, Management solutions

Based on the resource requirements, we calculate the absolute priorities of the stakeholders. Using the stakeholder prioritization method, we will calculate the relative priorities.

The results of the implementation of the stakeholder prioritization method at the initiation stage are presented in Table 2.

Table 2
Project Stakeholder Priorities

Stakeholder name	Absolute priorities	Relative priorities
Company management	1	25,8

Investors	0,5	12,9
Banks	0,5	12,9
Clients (individuals)	0,5	12,9
Clients (legal entities)	0,5	12,9
Design contractors	0,25	6,5
Construction contractors	0,25	6,5
Material Suppliers	0,125	3,2
Equipment Suppliers	0,125	3,2
Mechanism suppliers	0,125	3,2
Priorities		100,0

Since the method is implemented at the initiation stage, the priorities of adjacent stakeholder groups show the same values. The highest priority was initially assigned to the company's management, since they are the key customers of the project team. The next priority project investors and clients who are consumers of the project's products. The above method allows you to calculate the absolute and relative values of the priorities.

When implementing projects within a company, company management should always have the highest priority. The priority of stakeholders that are on the role of investors depends on the financial condition of the company. For a young, actively developing company, financial resources are critical, and therefore investors can have a priority next to investors. In the context of the capture of new markets by a large, financially secured company, customers (end users of the main product of the project) receive a higher priority. Suppliers and contractors often have lower priority over customers and investors. The priority of the supplier and contractors depends on the uniqueness of the products or services provided. The higher the uniqueness and the need on the part of the project team for the services and products supplied, the higher the priority of the supplier and contractor.

The above example is developed for a typical construction project being implemented by a private company. For government or community organizations, stakeholder priorities will vary significantly.

A deeper description of the stakeholders and the products and resources of the projects will help to refine the priorities of the stakeholders. Any changes in the market or in the technology of project implementation change the need for resources and, accordingly, the priority of the project stakeholders. Stakeholder priority tracking allows you to focus on priority project stakeholders and requests without being distracted by minor tasks and requirements.

6 Conclusions

As a result, of the research carried out, we can draw the following conclusions:

1. Implementation of a client-oriented and project-based approach in a company requires continuous analysis of stakeholders of all company projects.
2. The choice of a company's product configuration depends on the requirements of the priority stakeholders. Changing the requirements of product parameters on the part of interested parties requires an early update of the configuration of the products being implemented.
3. Determining the stakeholder's priority allows you to determine which of the requirements are key in determining the product parameters. Stakeholders are prioritized through an analysis of the resources they pass to the project.

7 Acknowledgements

The research in this article was driven by previous research in homeostatics, value-based management, and agile project management.

The complex combination of approaches and methods allows us to develop new flexible methods for managing innovative projects and makes it possible to create complex products in conditions of high risks and limited budgets.

The author is grateful to the leading scientists in the fields for the fundamental research.

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