Application of improved PESTLE analysis of the environment of an organizational project in the field of aircraft maintenance

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Abstract. It is proposed to identify the stakeholders of the organizational project in the field of aircraft maintenance and analysis of factors that may have a positive or negative impact on its realization. For this purpose the author proposes to use an improved PESTLE analysis by way of introduction of the BE factor, presents the scheme-algorithm of PESTLE analysis and the stages of its carrying out. It is proved the results of this analysis will allow the project manager and his team to react promptly and efficiently in case of emergent factors.

Keywords: project approach, organizational project in the field of aircraft maintenance, stakeholders, PESTLE analysis, factor, behavioral economics.

Introduction. Project management is widely used in many industries in the world that is why it is worthy to serve as a tool in realization of organizational projects in the field of aircraft maintenance. There are the projects for the creation and opening of new aircraft maintenance companies. These projects are partly organizational, partly technical. In the process of implementing such a projects, there are many issues of both legal and organizational nature that are related to the owners of such contracts.

Therefore, there is a need for a more detailed analysis of the external and internal environment of these projects.

A brief overview of publications on the issue. The current state of the development of the project management methodology [1] suggests managing the human resources and stakeholders of the project, and within the framework of that management certain procedures are being carried out for the identification, analysis, development of monitoring, control and response measures, but still there is a need for a more detailed analysis of the project environment.

In [2] the author divided the perception of the firm into an internal and an external one, in other words these are stakeholders whose interests and requirements should be satisfied. This work provides an opportunity to carry out analysis of the internal and external environment and can be used to plan and implement an organizational project in the field of aircraft maintenance.

S. D. Bushuev [3] proposed models and methods for creative project management based on the creativity of project team members that allow use human potential efficiently, but this is not enough for management of external stakeholders of an organizational project in the field of aircraft maintenance.

In the work [4] an algorithm for identifying of project stakeholders that describes the sequence of this process and that can serve as a basis for stakeholder analysis of any project is proposed.

The authors in a piece of work [5] conducted a research on understanding the nature of stakeholders and their groups, particularly in determining the need for stakeholder analysis as a means of mitigating of conflicts, risks, conducting of a dialogue and enhancing the sustainability of a company, and as a consequence, the structural and logical sequence of stakeholder analysis is proposed.

This study can also be the basis for an analysis of stakeholders of an organizational project in aircraft maintenance.

In the work [6] the authors conducted a preliminary assessment of the stakeholders of organizational projects in the field of aircraft maintenance aimed at taking into account their both positive and negative influence in the process of planning and implementation of these projects. Taking into account of this information enables the project manager and his team to ensure the effective and timely implementation of this project in order to meet the needs of stakeholders.

The author [7] proposed to consider factors influencing stakeholders in an organization project in the field of aircraft maintenance, and may represent potential risks that might negatively affect the implementation of this project by way of conducting a PESTLE analysis of the principles of behavioral economics.

Thus, the review of publications showed that, to date, there is a need for a more detailed analysis of stakeholders of organizational projects in the field of aircraft maintenance, taking into account the principles of behavioral economics.

Goal. The purpose of this study is to improve PESTLE analysis by taking into account of the principles of behavioral economics in the process of implementation of the organizational project in the field of aircraft maintenance that henceforth will let perform a more detailed analysis of the environment of the project.

Materials and methods. Carrying out of any project, including the organizational project in the field of aircraft maintenance, is accompanied by satisfaction of the needs of its stakeholders. At the same time, it is possible to put in a position of determination of certain needs of a stakeholder and of the work of the project that ensure the fulfillment of this need.

Each project has its stakeholders that might be affected by the project and might have a positive or negative impact on the project [1]. Some stakeholders may have a limited ability to influence the work or final result of the project, while others may have a significant impact on the project or its expected results. Research and analysis of emergencies in projects that received a wide response indicate the importance of a structured approach to identification, setting of priorities and stakeholders' engage-

ment. The ability of a project manager to identify properly and manage correctly all stakeholders determines a success or a failure of the project. To increase the chances of success in the process of identifying and involvement of stakeholders, it is necessary to proceed immediately after the approval of the statute, appointment of a manager and commencement of the project team formation.

Stakeholders' satisfaction must be identified and managed as one of the project objectives. The key to effective stakeholders' engagement is to focus on continuous communication with them, including team members, to understand their needs and expectations, resolving of issues when they arise, management of conflicts of interests and encouragement of stakeholders' involvement in the decision making process and project work.

The process of identifying and engaging of stakeholders for the benefit of the project is iterative, because the operations concerning their identification, setting of priorities and engagement should be reviewed and updated on a regular basis and, at a minimum, during the following periods of time when:

– the project passes through different phases during its life cycle;

– the existing stakeholders complete the project or new stakeholders become a part of the stakeholders' community;

– in the organization or in the wider community of stakeholders significant changes are happening.

The process of stakeholders' identification comprises their regular identification, analysis and documenting of the relevant information on their interests, involvement, interconnection, present and potential impacts on success of the project. The key benefit of the process is that it gives the project team the opportunity to identify a specific focus to attract each stakeholder or stakeholders' group.

The following methods can be used to collect data on project stakeholders:

– questionnaires and surveys present written sets of questions designed to collect quickly information from a larger number of respondents. This method is best suited to work with different audiences in situations where rapid collection of information is required when respondents are geographically distributed and when statistical analysis might be appropriate;

– brainstorm is used to create in a short period of time a list of ideas, it is carried out in a collective environment and under the guidance of a moderator. This method consists of two stages: the collection of ideas and their analysis.

The following methods can be used to analyze the information about the stakeholders:

– stakeholders' analysis, that discloses a list of stakeholders and information concerning them, in particular their position in the organization, their role in the project, rates, expectations, attitudes (level of project support), and their interest in project information. Stakeholders' stakes may include the following: interest (level of interest in the final product of the project), rights (legal, moral or property), knowledge (experience), contribution (financial, material);

– analysis of existing project documents and lessons learned from previous projects for identifying stakeholders and identifying other supporting information.

Project stakeholders can be divided into internal and external. For a more accurate and weighted assessment of the environmental factors (opportunities/threats) of an organizational project in the field of aircraft maintenance it is proposed to use the PESTLE analysis that is a modified version of the PEST analysis [7, 8, 9].

Results and their discussion. PESTLE analysis shows how political (P), economic (E), social (S), technological (T), legal (L) and environmental (En) factors may and (or) do affect realization of projects, particularly an organizational project in the field of aircraft maintenance [8, 9].

The main purpose of PESTLE analysis is to determine the factors that satisfy two criteria [9]:

– they are beyond project management;

– they have a certain level of influence on the project.

All factors shall be to be thoroughly analyzed and their possible impact on the project shall be assessed. To get the most complete picture of impact of external factors on the project experts of the project team with different functional responsibilities should be included in the process of their determination.

The algorithm for PESTLE analysis includes the following steps [9]:

Step 1. Identification of factors that may have an impact on the project environment (P, E, S, T, L, E). To accomplish this task it is necessary for each identified project stakeholder to make a list of factors that may have an impact on the project. At this stage project experts can work independently or in groups. Brainstorming may also be organized to identify and compile a list of factors. Information and understanding of the situation in the project is the most important stage of any analysis. To obtain a realistic picture of the variability of the environment of the project it is necessary to carry out a survey of experts from the project team that have different roles. All open information about the project should be explored. After allocation of the factors it is necessary to combine them into six standard groups: political (P), economic (E), social (E), technological (T), legal (L) and environmental (En).

Step 2. Collection of information on the dynamics and nature of change of each factor (P, E, S, T, L, E). After all factors that may have impact on the project have been identified and classified, it is necessary to assess the probability of change and occurrence of a factor according to a five-point grading scale, where 1 means the minimum probability of a factor change and 5 is the maximum probability of change, in particular, they can be estimated as follows: 1 – from 0 to 20%; 2 – in the range of 20-40%; 3 – about 40-60%; 4 – about 60-80%; 5 – from 80 and close to 100%.

The assessment is better done not individually, but among the group of experts. According to the results of the expert survey the average score for each factor is derived, which depends on expert estimates.

Step 3. Analysis of significance and degree of influence of each factor (P, E, S, T, L, E). After all factors that may have impact on the project are identified and classified, one must assess the level of impact of each of the factors.

The assessment of the "power" of any factor is a subjective expert evaluation according to a grading scale from 1 to 3, where 1 means the influence of the factor is inconsiderable, *i. e.* any change in the factor practically does not affect the project; 2 means the influence of the factor is moderate: only a significant change in the factor affects the project; and 3 means the factor influence is critical (high): any fluctuations cause significant changes in the project.

The assessment of the degree of influence of each factor is based on expert evaluation, based on statistical processing of each individual expert.
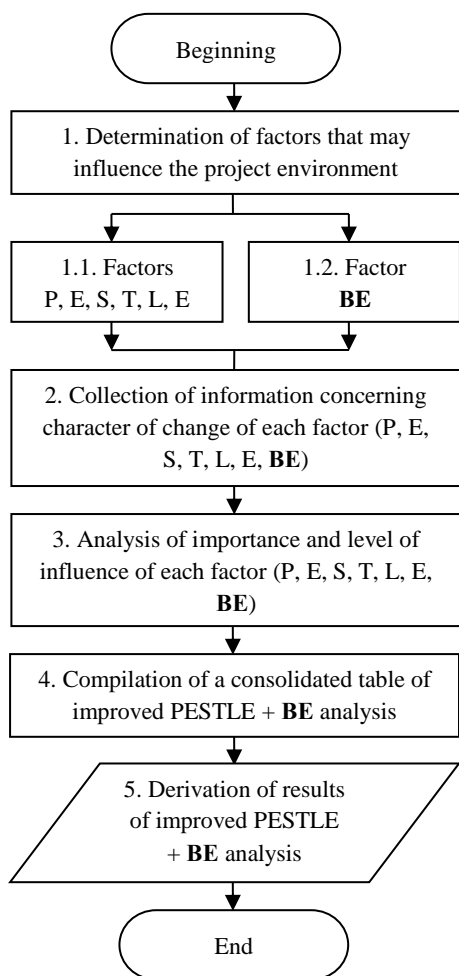
Fig. 1 The algorithm of improved PESTLE analysis due to the introduction of the BE factor

Step 4. Compilation of a consolidated table of improved PESTLE analysis. The next step is to calculate the impact of the factor on the basis of the probability of its change – this demonstrates the real significance of each factor for the project among all the factors affecting the project. This indicator allows assess how much the project team should pay attention to and control this factor of the project environment change. It is calculated as the probability of change of the factor, weighted by the force of

influence of this factor in the total amount of influence of factors. The higher the actual significance of the factor is, the more attention and effort should be given to reduce the negative impact of that factor on the project.

Step 5. Derivation of the results of the improved PESTLE analysis. In order to complete the analysis, it is necessary to draw conclusions: for each factor to show the influence of the factor on the project and plan the measures to be taken to reduce the negative impact of the factor and maximize the positive impact of the stated factor on the project. In addition, it is necessary to identify who from the project team members will supervise the factor changes, the frequency of that supervision and the thresholds for the factor change.

The author proposes to improve the PESTLE analysis by incorporating a separate factor – the environment of behavioral economics [10], which we will call the BE factor (Behavioral Economics), where the stakeholders of the project are characterized by irrationalism, which, however, may be controlled due to the existence of certain laws, in accordance to with the irrational – in terms of the traditional economy – behavior can be explained and even predicted.

The algorithm of the improved PESTLE analysis by introducing of the BE factor is given in the form of a block diagram (Fig. 1) [8].

Consequently, the algorithm for carrying out of improved PESTLE+BE analysis includes the following steps [8]:1. Determination of factors that may influence the project environment: 1.1. Factors P, E, S, T, L, E; 1.2. BE factor. 2. Collection of information concerning character of change of each factor (P, E, S, T, L, E, BE). 3. Analysis of importance and level of influence of each factor (P, E, S, T, L, E, BE). 4. Compilation of a consolidated table of improved PESTLE+BE analysis. 5. Derivation of results of improved PESTLE+BE analysis.

Conclusions. The author proposes to improve PESTLE analysis by way of studying of the principles of behavioral economic (BE factor), as well as its application in planification of an organizational project in the field of aircraft maintenance. With the PESTLE + BE analysis the project manager and his team cannot only identify factors and assess their possible impact on the project in the future, but also appoint the persons responsible for control and monitoring of unfavorable change of factors and development of measures to be taken in advance to tackle these planification changes. Despite of the fact that preparation of some measures may take a long time, change of factors will no longer be a problem for the project team. The project team will be ready in advance for many future events. And this, in turn, will allow faster reaction and greater flexibility – in fact by way of mobility increasing by simply using of improved strategic analysis tool.

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