Proficiency Level Adjustment Approach for Human Resources in Professional Networks

Mikhail Petrov

SPC RAS

St. Petersburg, Russia

mikhail.petrov@iias.spb.su

Abstract—**The competencies of specialists are critical in human resources and project management in organizations. Professional networks include information about specialists and their competencies, which is used to assign performers to a particular project. If the team is chosen incorrectly, the project results will be unsuccessful. Keeping the proficiency level of specialists up to date in professional networks is an important task in human resource management. The approach presented in this paper addresses this challenge. Within the framework of the approach, an analysis of the project implementation results is proposed. The proficiency level of the project participants increases or decreases based on these results. The paper presents a conceptual model developed within the framework of the approach and an algorithm for the proficiency level adjustment for human resources.**

I. INTRODUCTION

The reliability of group projects in organizations directly depends on the level of trust in employees and managers, that is, in human resources. To ensure the project's success, its performers must be competent [1]. Effective human resource management requires an accurate assessment and presentation of existing competencies, as well as an effective comparison of the required competencies and specific jobs and positions. The use of professional networks in competency management provides opportunities for this [2].

Since the information on the competencies of employees, contained in professional networks, is used for the effective management of projects and human resources, it is also important for the effective management of the company. Besides, this information must be up-to-date, otherwise, the project management loses its effectiveness. If due to inconsistency in the data on the competencies of specialists, the project team is assigned incorrectly, the project may be unsuccessful. Therefore, an approach is needed to automate the task of maintaining the relevance of the proficiency levels in professional networks. Analysis of the project implementation results is one of the possible solutions to this problem. Project success data provide information on the competence of its participants. This information should be used to adjust the proficiency level of competencies of the project participants.

Analysis of the work shows that the relationship of the project with the implementation results and the competencies of the participants is well studied. However, a methodology that takes these relationships into account to adjust the level of

performers' competence has not yet been developed. This paper presents an approach to proficiency level adjustment for human resources competencies in professional networks. It includes a conceptual model for proficiency level adjustment in human resources competencies and an algorithm for proficiency level adjustment in competencies, which allows keeping information on the competencies of specialists up-to-date.

II. PROFICIENCY LEVEL ADJUSTMENT FOR HUMAN RESOURCES

The description of the proficiency level adjustment algorithm is shown in Fig. 1.
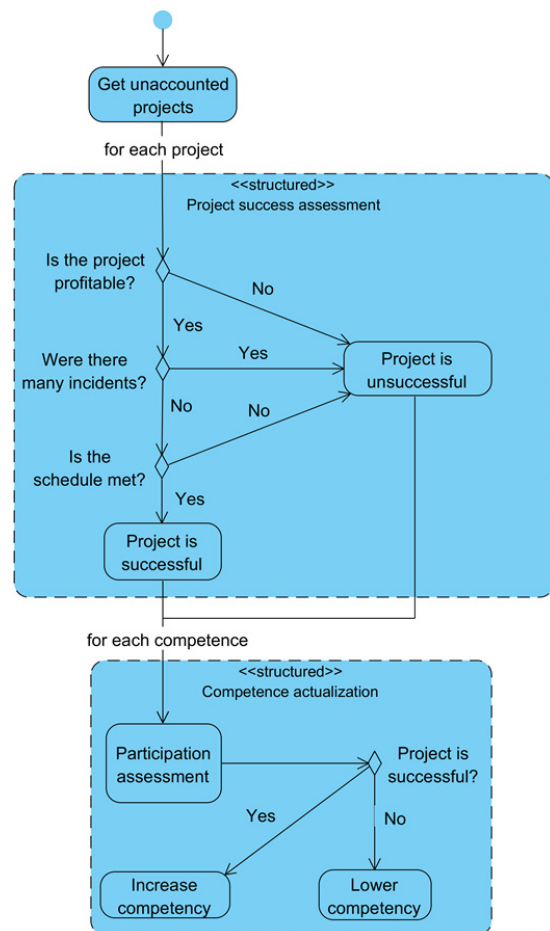

Fig. 1. Proficiency level adjustment algorithm

The algorithm consists of two stages. The first stage is the project success assessment. Each completed project must be assessed for its success. To do this, the project success coefficient is calculated based on the factors specified in the project report. This coefficient is compared with the acceptable value determined by the project manager. If the coefficient is below the acceptable value then the project is unsuccessful, otherwise, it is successful.

The values indicated for each factor in the report are used to calculate the project success coefficient:

$$S = \sum_{i=1}^{f} \left(\frac{I(F_i)}{100\%} * \frac{E(F_i)}{100\%} \right) * 100\%, \qquad (1)$$

where S is the project success coefficient; f is the number of factors defined for this project; F_i is the i th factor in the project report; I(F) is the degree of project impact of factor F; E(F) is the degree of factor F fulfillment. Thus, the project success assessment considers each factor's importance and fulfillment.

The second stage is the proficiency level adjustment. Proficiency levels' changed values are proposed for each competency of each project participant.

First, the degree of influence of this competency on the project result is determined. It depends on two indicators, see (2): the required proficiency level relative to other requirements, the expert's proficiency level relative to other participants.

$$d = \frac{1}{2} \left(\frac{p}{P} + \frac{r}{R} \right), \qquad (2)$$

$$P = \sum_{i=1}^{n} p_i, \qquad (3)$$

$$R = \sum_{i=1}^{m} r_i, \qquad (4)$$

where d is the degree of influence of the competency on the project result; p is the proficiency level of the competency; r is the required proficiency level for this competency; n is an amount of the project participants; p_i is the proficiency level for this competency of i th participant; m is an amount of the project requirements; r_i is the required proficiency level for i th competency. Thus, the degree of influence of the competency considers the uniqueness of competency among other project participants and its importance for project performance.

Proficiency level adjustment for performer's competencies depends on d and on whether the project is successful:

$$C_a = \min \{C + M * d * s, M\}, \qquad (5)$$

where C' is competency's proficiency level after adjustment; C is competency's proficiency level before the adjustment; M is maximal competency's proficiency level; s is 1 if the project successful, -1 otherwise. If C' is more than 0 and less than 1, then C' = 1. If C' is less than 0, then the competence is removed. Thus, competency's proficiency level decreases or increases relative to the maximum level of the competency, taking into account the degree of influence of the competency on the project

III. Conclusion

The approach to proficiency level adjustment in the competencies of human resources in professional networks, presented in this paper, allows maintaining the relevance of information about the competencies of specialists by analyzing the results of project implementation. The conceptual model used in the approach contains the concepts and relationships necessary for human resource management and proficiency level adjustment. The algorithm used in the approach is capable of analyzing each project in a professional network. It takes into account all the factors and competencies of the participants. The evaluation of the algorithm showed that the result of its execution corresponds to the expected results, that is, the proficiency levels in the competencies of specialists are adjusted in accordance with the amount of work assigned to them.

Further work involves the implementation of the approach and its testing on real data. At the same time, adjustments and additions to the algorithm are possible.

References

[1] A.A. Chigrina, O.S. Volkov, K.A. Bagrationi, A.G. Prilipko, "Organizational Determination of the Collective Mindfulness of It Projects' Team Members", Journal of Information Technologies and Computing Systems, vol.2, 2019, pp. 62-74.

[2] M. Bohlouli, N. Mittas, G. Kakarontzas, T. Theodosiou, L. Angelis, M. Fathi, "Competence assessment as an expert system for human resource management: A mathematical approach", Expert Systems with Applications, vol.70, 2017, pp. 83-102.