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Selecting a Project Manager from Multiple Alternatives

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Abstract: To reduce subjectivity in the choice of the project manager (and in a broader sense - the manager or specialist), proposed to use the analytic hierarchy process, Saaty proposed and widely used in various applications. The article details the procedure for selecting candidates for the position of alternative project manager. This article is intended for beginners and not very novice leaders.

Keywords: Criteria, Multiple Alternatives, Analytic Hierarchy Process (AHP)

1. Introduction

Analyzing the causes of failed projects, it can be concluded that all the causes of failures do not lie in the technology and in the social sphere. Moreover, these reasons are in the purview of the project manager. Competence is the project manager is so wide that it is impossible to confine a single list. That is, in case the project manager acts known law "immensity." This is determined by the nature of projects, their complexity and the influence on them of many factors.

You can define what should not be a project manager. "Five NOs" - five signs of what should not be a project manager. But this does not solve the problem of choosing a leader.

To reduce subjectivity in the choice of the project manager (and in a broader sense - the manager or specialist), proposed to use the analytic hierarchy process, Saaty proposed and widely used in various applications.

2. Selecting a Project Manager from Multiple Alternatives

Immeasurability extinguishes moons.
Alexander Blok
I

The author does not intend to study the problem in full. The intention is to define the existing problem, show its fundamental importance and outline possible solutions, as seen by the author. Perhaps, this may be useful for beginners as well as more advanced managers.

Unsuccessful, problem-ridden and failed IT projects (and projects in other spheres) are the subject of many studies, publications, articles and statistics. Overall, about 50% of all IT projects may be considered as failures to a varying degree [1]. This is a widely-recognized statistics hard to argue with. The reasons that cause these failures are also not disputed. Here are some of them [1]:

- poor communication management;
- poorly managed requirements;
- insufficient involvement of senior management;
- vaguely defined project completion success criteria, etc.
- Besides, other reasons are often quoted:
- chief ideologist of the project lacks leadership skills, political experience, time or energy to bring the project to fruition;
- project participants shying away from setting priorities;
- managers ignore difficulties;
- project participants lose interest in its completion, etc.

It is worth noting that all the above reasons that cause failures do not lie in the technology but in social domain. And this is also widely accepted.

A project manager's competencies cause most controversy. There is a great number of statements on this issue, with the range of opinions spanning from a taunting one by Bill Duncan –"what is common between a spouse, a parents and a project manager (PM)", to a rather effective formula of success by Daniel Goleman, who defines success as the sum of intelligence (IQ) and emotional intelligence quotients (EQ) [2].

Numerous articles and books are written about what a successful project manager should be. There are scores of

features that are put forward by human resources professionals to describe the so-called "effective project manager".They are often taken from nowhere and are not directly related to the category of project leaders, managers and supervisors.

There are standard managerial competencies defined for project and program managers and specialists, some of them internationally accepted and others applicable at a country- or specific model level. There are dozens of such "competency standards" in the field of project management, and corporate competency standards of all kinds are countless [3-6]. Even the PMBoK standard defines PM competencies [7].

How come the project management failures statistics are so nasty? It would seem sufficient to identify a good manager according to the necessary requirements and be prepared for success. But not everything is so simple.

The fact is that in case with a project manager we can observe a well-known "law of immeasurability". This means that the fulfillment of all your needs and requirements does not guarantee the success of your project. Even if you write down 100 qualities necessary for a successful manager, someone else will be able to add at least one more quality. And even if a PM meets all these requirements (even with the added qualities), this will not guarantee the success of your project.

This fact is determined by the very nature of projects, their complexity and by the influence of many different factors.

In such a situation of uncertainty it is proposed to use the method of proof by contradiction, meaning that we might better determine what a PM should not be [3].

The proposed 5 traits or "Five NOs" are based on the experience and practice of recognized professionals in project activities. They allow you not to waste the time on some candidates, because the presence of at least one such trait guarantees the failure of the project and occurrence of problems "out of the blue".

These traits reflect the dominant positioning of person's relationship with certain elements of a project context and represent the five features of professional incompetence in managing projects [3]:

- a negative world view / relation to reality;
- cynicism towards people and moral values;
- egocentrism;
- distorting facts and their interpretation;
- corrupt attitude towards values created and towards people.

These traits represent a certain system of values that hardly change. They are static and are formed over a long period of time and cannot be changed "on order" in an instant.

If you are aware of these traits and still assign a person to a project manager's position, you are likely to want (consciously or unconsciously) the project to fail. Therefore, you carry out a "covert operation" using the technique of "an agent of influence".

Using the "proof by contradiction" approach, we can identify those unsuitable candidates, whose appointment as a PM is likely to cause significant problems or even the failure of a project. Of course, the situation when no candidates will remain in your list is possible. Then, depending on your capabilities, you can add new candidates to your list and continue the selection or at least you will know what problems you may encounter if you appoint a candidate possessing at least one of the above traits, and be ready to take appropriate action.

But there are other possible scenarios. Your selection may result in the following cases:

a) there is only one candidate left;
b) none of the candidates were removed from the list;
c) some of the candidates were struck off the list, but 2 or more candidates remained.

In the first case, you may not need further analysis and chose the remaining candidate. Or you can add new candidates to the list and use the "proof by contradiction" analysis once again.

The cases b) and c) are similar for further analysis. However, we must admit that we are facing a choice once again. And if none of the candidates has a clear advantage over others or there is no strong arguments for selecting one of the candidates, we need some criteria for selection again. Yet, we have done a significant amount of work and we have prevented an appointment of a clearly disastrous candidate as a PM. Now, the task ahead is even more difficult: we have to select the best manager.

II

Making a choice, regardless of who or what is being selected, is always subjective and is based on priorities, tastes, and not always on reasoned decisions. Is it possible to reduce the subjectivity of choice and to increase the objective component of this process? Apparently, it is possible.

Our approach is based on the Analytical Hierarchy Process, introduced by Thomas Saaty [8-10]. This process isn't new and is widely used. Different methods of dealing with complex decision making are based on this Process ("Expert choice"). Let's consider applying this method in selection of a project manager.

Suppose that you have candidates A, B, C and D. referred to as Options in Saaty's method.

Criteria for evaluating the Options are taken from PMBoK standard (although other criteria may be adopted):

- knowledge;
- effectiveness;
- personal qualities.

Analytic Hierarchy Process (AHP) is based on hierarchy. For example:

Level 0: The Goal – to choose a project manager.

Level 1: Criteria:

- knowledge;
- effectiveness;
- personal qualities.

Each criteria may have an unlimited number of levels –2,3. n. For simplicity, we limit ourselves to the first level.

AHP is based on the principle of linear convolution. And weighted scores of criteria and options are received in a

particular way [11].

In order to use the AHP method it is necessary to obtain options scores and criteria weights. If a criterion has an objective evaluation, these evaluations are recorded in a table and are normalized so that their sum is equal to one.

To simplify the example we define the criterion of "Effectiveness" as a proportion of successfully completed projects. For our candidates this will be as follows: A-0.5; B-0.4; C-0.8; D-0,3.

A successful project is defined as a project executed within the prescribed period of time, with a predetermined budget, with the required quality and satisfying customers.

The resulting table for the criterion of "Effectiveness" will be as follows:

Table 1. *Evaluation of "Effectiveness" criterion for the selected alternatives.*

Options	Performance evaluation	Normalized values
A	0,5	0,250
B	0,4	0,200
C	0,8	0,400
D	0,3	0,150
Sum	2,0	1,000

We take the normalized value for the evaluation of each option.

Other criteria ("Knowledge" and "Personal qualities") have no objective evaluation and to simplify calculations in this case the Saaty method recommends to use pair-wise comparisons [11, 12].

To make such comparisons we need to develop a scale of comparison. The following fundamental scale is frequently used the way recommended by T.Saaty.[8]:

1 - equal importance;
3 - moderate importance of one over another;
5 - essential or strong importance;
7 - very strong importance;
9 - extreme importance,
while intermediate values – 2,4,6,8 – can also be used.

Pair-wise comparison of the options should be conducted according to this scale. The result of the comparison is recorded in the table. Suppose that a comparison of the criterion "Knowledge" brought the following results:

A vs B - 3/1 and, accordingly, B vs A - 1/3;
A vs C - 4/1 and C vs A - 1/4;
A vs D - 1/3 and D vs A - 3/1;
B vs C - 2/1 and C vs B - 1/2;
B vs D - 1/4 and D vs B - 4/1;
C vs D - 1/5 and D vs C - 5/1.

The following table results from the pair-wise comparison of the options:

Table 2. *Evaluation of "Knowledge" criterion by pairwise comparisons.*

	A	B	C	D
A	1/1	3/1	4/1	1/3
B	1/3	1/1	2/1	1/4
C	1/4	1/2	1/1	1/5
D	3/1	4/1	5/1	1/1

Then simple fractions are converted to decimals:

Table 3. *Evaluation of "Knowledge" criterion by pairwise comparisons in decimals.*

	A	B	C	D
A	1,00	3,00	4,00	0,33
B	0,33	1,00	2,00	0,25
C	0,25	0,50	1,00	0,20
D	3,00	4,00	5,00	1,00

Further, in accordance with the Saaty Process, the row sums are calculated (Table 4) and the table is normalized, by dividing the row sums by the total sum (Table 5):

Table 4. *The calculation of row sums.*

	A	B	C	D	Row sum
A	1,00	3,00	4,00	0,33	8,33
B	0,33	1,00	2,00	0,25	3,58
C	0,25	0,50	1,00	0,20	1,95
D	3,00	4,00	5,00	1,00	13
Total					26,86

Table 5. *The calculation of normalized row sums.*

	A	B	C	D	Row sum
A	1,00	3,00	4,00	0,33	0,310
B	0,33	1,00	2,00	0,25	0,133
C	0,25	0,50	1,00	0,20	0,073
D	3,00	4,00	5,00	1,00	0,484
Total					1,000

The normalized row sums (Table 5) are used for evaluation of the options.

In our example, similarly, we can calculate scores of the options evaluations based on "Personal qualities" criterion. Let's assume that the pair-wise comparison results are the following:

A vs B - 2/1 and B vs A - 1/2;
A vs C - 2/1 and C vs A - 1/2;
A vs D - 2/1 and D vs A - 1/2;
B vs C - 2/1 and C vs B - 1/2;
B vs D - 1/3 and D vs B - 3/1;
C vs D - 1/3 and D vs C - 3/1.

If we perform the AHP process, described above, we obtain the following options scores for the criterion "Personal qualities":

A = 0,339; B = 0,185; C = 0,113 and D = 0,363.

Similarly, one can calculate the weights of the criteria. It should be understood that performing pair-wise comparison, we set a priority of one criterion over the other one. Therefore, criteria weighing will be determined in accordance with our understanding of "importance".

Let’s suppose that we believe the criteria of "Effectiveness" and "Personal qualities" are slightly more preferable than the criterion"Knowledge" and the "Personal qualities" is more preferable than the "Effectiveness". We get the following pairwise comparisons:

"Effectiveness» vs «Knowledge" - 2/1;
"Effectiveness» vs «Personal qualities" - 1/2;
"Personal qualities» vs «Knowledge" - 2/1.

Then, the calculated row sums, translate into the respective criteria weights:

"Knowledge" - 0.190;

"Effectiveness" - 0.333;

"Personal qualities" - 0.477.

Thus, we have obtained the scores of each option based on all the criteria and we have also obtained the criteria weights:

Table 6. *Evaluation of alternatives for each criterion.*

	Knowledge	Effectiveness	Personal qualities
A	0,310	0,250	0,339
B	0,133	0,200	0,185
C	0,073	0,400	0,113
D	0,484	0,150	0,363

Further, applying a linear convolution (weighted sum), we obtain an integral evaluation of options. Such evaluation is called a utility function. The option, which has a greater evaluation, is preferable.

For our options we have:

A = 0.304;

B = 0.180;

C = 0.201;

D = 0,315.

Thus, in our example, the preferable option is D.

However, if cost of options varies (i.e., each of your candidates will be paid in different ways), the evaluation of "cost-effectiveness" should be performed. For this purpose a ratio between utility function (option evaluation) and normalized cost is used. The greater this ratio is, the more attractive is the option.

Assuming the following pay levels of our candidates:

A = 5000; B = 4000; C = 7000; D = 6000

Then, following simple calculations, we obtain:

Table 7. *Evaluation of alternatives, taking into account the ratio of "cost-effectiveness".*

	Cost	Normalized cost	Utility function	Ratio
A	5000	0,227	0,304	1,339
B	4000	0,182	0,180	0,989
C	7000	0,318	0,201	0,632
D	6000	0,273	0,315	1,154
Sum	22000	1,000	1,000	

In this case, Option A became more preferable.

Thus, we have got the solution of selecting a project manager using the AHP method. At first glance, this method seems to be ideal for dealing with a variety of multialternative. The method has such obvious advantages as a pair-wise comparison, possibility to change or supplement the criteria, criteria evaluation scale and some others [13]. However, it should be noted that the above method has, in turn, disadvantages. They usually include the necessity to fulfill inequalities: if A> B and B> C, then A> C. This assumption can work out well if all the traits can be evaluated to numerical values. If this can not be done, the method may give an incorrect result [13]. In addition, to obtain the right decisions it is necessary to comply with the rules of coherence, which basically means that the expert judgment should not go beyond the framework [13]. In order to verify the accuracy of the result, it is useful to identify the dependence between the results and expert evaluations. In practice this method is efficient if each level of the hierarchy has no more than seven or nine elements [12].

3. Conclusion

The work of a project manager is so versatile that it is difficult to formalize and make demands on his competence. You can determine the traits that a project manager should not have. However, this is often not enough. At the same time, the subjective assessment for appointment of a project manager increases the risk of a project failure. Therefore, in order to reduce the subjectivity of selecting a project manager, and, consequently, to reduce the risk of a project failure, it is required to use the AHP method. This method is based on expert judgment and obviously has both advantages and disadvantages. In order to obtain objective results it is necessary to control the expert judgments.

In conclusion, it should be noted that the above method does not eliminate the subjectivity in selection of a project manager, but significantly reduces it, because criteria weights and scores are not set arbitrarily, but are derived from objective evaluations and from pair-wise comparisons. Furthermore, it is obvious that this method can be applied to other similar problems.

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