

EFFICIENCY OF DECISION-MAKING METHODS IN PROJECT MANAGEMENT**Natalia Bahashova**

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Abstract. The research contains analysis and characteristics of existing decision-making methods applicable to project management theory. It is aimed at determining appropriate decision-making methods for various objects of a project manager.

Keywords: decision-making, project manager, project.

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Introduction

Making decisions in project management has a direct impact on expected results. Decision quality depends on the choice of appropriate methods in particular circumstances. Investigating and improving decision-making methods in project management will allow managers to make more qualitative and efficient decisions.

Research papers by Portny, Heldmann, Lapyhin, Mazur, Shapiro and Rach laid the foundation of decision-making principles. Issues of improving approaches to making project decisions are presented in the researches by Goodpasture, Poveda-Bautista, Pidashti, Harcia-Melona and Ghadi. Among national researchers dealing with the problem, one should mention Myroshnychenko, Tryfonov, etc (*Bessonova, 2012*).

The present research deals with determining appropriate methods of decision-making for project managers' objects.

Since inception of a project and till its termination, managers have to make decisions without which it is impossible to proceed. A company's efficiency depends on the quality of managerial decisions. Decisions made during project planning and implementation vary in both complexity and scale of resources engaged. As a rule, decisions are options or alternatives chosen. Each alternative involves greater or minor risks of failures, wasted resources, efforts and time. Therefore, project managers' and team members' activity is aimed at assessing alternative decisions both in terms of their resource and time parameters and risks of failures or unsuitably performed work.

Application of decision-making methods to project management

In the course of project management, a great variety of decisions are made. They can be divided into two groups (*Tryfonov, Korkhyna, 2017*). The former group includes the decisions associated with current issues and unrelated to the project implementation. The latter includes the decisions affecting efficiency of project performance. These are decisions made by a project leader (manager) and they have a direct impact on achieving project objectives. A project manager has to make decisions on a permanent basis at any stage of the project lifecycle. There are 25 methods of decision-making applied to projects. It is essential to determine which of them are reasonable to be applied to making decisions in project management. We distinguish formal and informal (logical-intuitive) methods (*Tryfonov, Korkhyna, 2017*).

Management practice affirms that while making and implementing decisions, some executives use informal methods based on analytical abilities of people making managerial decisions. They include logical methods and techniques of choosing efficient decisions by comparing alternatives theoretically and considering previous experience.

Most informal decisions are based on a manager's intuition. Their advantage implies rapid decision-making, yet they cannot guarantee avoidance of mistaken (inefficient) decisions as managers' intuition can play them false.

Here is a table revealing application of decision-making methods to project management.

Methods of project manages enable:

- determining project objectives and substantiating a project;
- specifying a project structure;
- identifying necessary amounts and sources of funding;
- choosing project executives through tenders;
- preparing and signing contracts;
- fixing project deadlines and schedules considering required resources;
- making an estimate of project costs and budget, planning and considering risks;
- controlling project implementation.

To successfully perform projects, it is reasonable to apply the mentioned methods, network planning being the most famous and widespread globally. A network diagram is an information-dynamic scheme that connects various activities required for implementing project objectives. Events and activities are the primary elements of a network diagram. Network diagrams are applied to solving management problems associated with various resources and time management (*Kochkina, 2015*).

A Gantt chart is a diagram of resource consumption or a resource bar chart depicting project demands in resources at the time moment. Project management is implemented through redistributing time and resource reserves revealed while using these methods.

A decision tree is an important project management method. Efficient management accompanied by obtaining necessary results is possible only when one of the management functions is based on the five activity types which are conditionally independent of each other - control, planning, coordination, activation and organization.

Table 1

Application of decision-making methods to project management

No.	Classification of decision-making methods to management	Method	Essence of methods	Area of application
1	2	3	4	5
1. Formal methods				
1	Expert methods	Expert methods	enable forecasting and assessing results of actions on the basis of specialists' predictions	Management of time, costs, resources and risks
2		Questionnaire method	enables decision-making based on analyzing respondents' opinions	
3		Diagnostic method	enables predicting probable deviations from a plan by determining and analyzing signs characterizing the system condition	
4	Economic and mathematical methods	Methods of economic analysis	(general economic, statistical and mathematical) enable investigating and describing a company's economic activity in its progress	Management of time, costs, results, during the project lifecycle, risk assessment and planning
5		Factor analysis	(determined, scholastic, direct, reverse, one-step, multi-step, static, dynamic, retrospective, perspective) is a complex and systemic study of measuring the impact of factors on the value of result indices. A managerial decision is determined by the type of the factor analysis applied	
6		Method of chain substitution	is one of the methods of solving the problems of factor analysis by determining the impact of separate factors on changes in the result index values by step-by-step replacement of the basic value of each factor index for the actual one in the period under review	
7		Game theory	enables recommendations on efficient actions of conflict parties by creating a mathematical model that formalizes the content description of collision of interests	
8		Optimal linear programming	enables finding an admissible solution with the target function reaching its extremum	
9		Functional and value analysis	is used to assess a real value of a product irrespective of a company's structure	
10		Factual methods	(extrapolation, interpolation, trend-analysis) are based on extrapolation of trends, regularities in some period ahead, their past development being well known	
11	Method of hierarchy analysis	Method of hierarchy analysis	is a mathematical tool of the system-based approach applied to solving complex problems of decision-making. The method enables structuring a complex problem in the form of a hierarchy, comparing and quantitatively assessing alternative variants of a solution in a reasonable and efficient way	Management of integration

Table 1

1	2	3	4	5
12	Graphical methods	Method of multidimensional scaling	is an alternative of factorial analysis, visualizes data by placing points corresponding to objects to be studied (scaled) in the space of a smaller size than that of objects' properties	Planning of time, resources, costs
13		Ishikawi graph	graphically demonstrates interrelation between the problem under study and the causes affecting its appearance	
14		Method of work breakdown structure	enables dividing a project into components and creating a hierarchical work breakdown	
15		Network planning	enables determining interrelation of project calendar plans through time	
16		Gant chart	illustrates plans, work schedules according to the project	
17		Resource histogram	illustrates resource needs, use and availability	
2. Informal (logical and intuitive) methods				
18	Methods based on creativity stimulation	Case method	enables finding the best solution out of suggested ones while analyzing a certain situation	Choosing the content of a project portfolio, concept development, planning of resources
19		Brainstorming method	implies presenting a great number of options and choosing the best one among them	
20		Method of associations and analogies	implies using a person's associative thinking to compare the studied process with similar ones, generate new ideas and make decisions	
21		Method of interactive planning	enables determining actions required to achieve a desirable result in future, responding to changes which are difficult to control in a quick and adequate way	
22		Belbin method	is a test to determine the role of each member of a project team	
23	Methods based on logical thinking	Logical and structural approach	reveals logics of implementing projects and programmes by presenting their key components in a concise and logical form	Efficiency assessment, monitoring of projects, planning of changes
24		Cause-and-effect analysis	enables planning changes and improvements due to detecting cause-and-effect relations between conditions and events	
25		Method of decomposition	implies dividing a large task into several minor, probably interrelated tasks to simplify managerial decision making	

Notes: composed by the author

Control implies monitoring step-by-step performance of all project stages, finding deviations from designed results of performed activities. Control provides connection between lower-level employees (performers) and top management (executives) and enables applying mechanisms of activation and coordination to preventing negative consequences of observed deviations.

Planning means determining a plan of operations for lower-level subsystems to achieve longer-term objectives. Planning is conditioned by product quality, costs and deadlines. In other words, planning determines who should perform what, in what quantity and when.

Coordination is interaction of various project participants allowing them to avoid problems and conflicts of lower-level management and ensure high quality performance to achieve efficient results.

Activation denotes encouraging project participants to carry out set tasks more efficiently.

A labour distribution method is considered the most efficient. A highly qualified and cohesive team of specialists is required to create a project plan and implement it successfully. A client alone cannot work out a project plan and realize it as it is actually impossible. Labour distribution is intended to do this. It implies existence of departments or subdivisions of professionals specializing in this or that area. For example, the marketing department deals with studying demands for the product required for the project. A programmer deals with developing a software package. The method of labour distribution enables improving efficiency, which is a top priority of a project, and employees' and project developers' working capacity (*Kochkina, 2015*).

The Japanese management model is different from the European and American ones by its prioritized improvement of efficiency of a project or a company due to intensified performance standards. P2M is another efficient project management method developed in Japan. It prioritizes implementation of the most complicated project processes. At the beginning of this project a mission is specified, unlike other methods highlighting project objectives and tasks. Next, a mission is described in the form of various scenarios resulting in project objectives and tasks. A mission enables avoiding uncertainty. Every scenario should be clear and understandable. It is thoroughly developed by professionals, strategic solutions, project architecture (identification and ordering) and implementation being specified. This method is extremely convenient as a project originator is able to determine various risks and ways of the most efficient project implementation due to multiple scenarios developed during the initial stage of the method.

Each management method is efficient in its way having its own advantages and disadvantages. However, studying and analyzing as many methods as possible enable successful and efficient project implementation.

The table demonstrates that all groups of methods are applicable to project decision-making.

Economic and mathematic methods and those based on encouraging creativity can be applied to various objects of project management.

The method of hierarchy analysis and the methods based on logical thinking call for their improvement to be used in projects.

Graphical methods are not applicable to managerial decision-making in programmes and projects requiring control over several projects that makes graphical presentation of a management object more complicated.

Application of methods based on logical thinking to managerial decision-making in project portfolios is associated with some problems. For instance, if there are many projects in the portfolio, it will be very difficult to make a managerial decision by a single logical way, its adequacy being very low.

Conclusions and suggestions

The article analyzes current decision-making methods applied to the theory of project management. It is suggested dividing all the mentioned methods into two basic groups, their

potential application for various projects being assessed. It is revealed that not all the methods are suitable for all management objects. It is indicated which methods are applicable to all management objects, and which ones are inefficient for certain objects. There arises a necessity of their improvement and adaptation to a particular management object. Further research of decision-making problems in project management should be focused on improving current methods in terms of their application to various management objects.

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