

ABSTRACT
of the thesis submitted for the degree of Doctor of Philosophy (PhD)
majoring in “6D051800 – Project Management”
by Satybaldiyeva Dinara Orazovna on
“Improving methods for developing a balanced scorecard in project
portfolio management”

Relevance of research. In the Address to the People of Kazakhstan dated September 1, 2020, the Head of State K. Tokayev stated the need to move from long-term state programs with “a large number of targets and indicators” to “concise national projects that are understandable to all citizens”. The main conceptual difference between national projects and state programs are approaches that solve problems in new ways through clear priority-setting for measures, using project management tools and digital transformation. The main reasons for the transition are certain difficulties within the framework of financing, inefficiency of state programs, lack of personal responsibility, an excessively large number of performance indicators.

However, the need to revise the objectives and key performance indicators of portfolio companies is also provided within the framework of Samruk-Kazyna Sovereign Wealth Fund transformation program. The results of the Fund analysis showed that the current key performance indicators system of portfolio companies has several disadvantages since portfolio companies have too many indicators that lead to an excessive focus on problem areas.

F. U. Taylor noted that “we cannot manage what we cannot measure”, therefore managers, one way or another, need specific measurement indicators that they use in the management process. The set of these indicators is always individual, the number and content are unique for each project in the company's portfolio.

Accordingly, for implementation of company projects main indicators and values should be highlighted. It is easier to manage a business if the company uses measurable targets. When developing performance indicators project portfolio management processes, it is proposed to use a system of balanced indicators, that will bring company's indicators to a strategic fit.

The basis and initial data for the development of the topic. The founders of the concept of balanced scorecard are R. Kaplan and D. Norton (1992). This concept has become very popular in the West is widely used in many companies. Balanced Scorecard, a determiner of the company's success, in turn, should be measured by the subject of the result of using it as well as built around predetermined indicators or objectives. Balanced Scorecard (BSC) is based on so-called “effective indicators” and strategically critical objectives. The main difference between a balanced scoreboard and an arbitrary set of indicators is the all indicators included in a balanced system, firstly, are aimed at company's strategic objectives, and, secondly, are interconnected and grouped by certain features.

When developing BSC it is important not only to create and implement system of balanced indicators in the company, but also to select effective indicators, as well as to select strategically critical objectives to implement company's projects.

Multi-criteria decision-making methods deal with the decision-making process where there are several indicators. And the decision makers (DM) must choose between measurable or immeasurable and multiple indicators. One of the approaches of the multi-criteria decision-making method is the analytical hierarchical process (AHP). It was defined as a tool that will help in decision making on several indicators. But the problem with the conventional AHP is its incapacity to handle with inaccuracies and subjectivity in the pair-wise comparison of indicators. To overcome this difficulty, the fuzzy set theory is used. With fuzzy AHP optimistic and pessimistic attitude of decision makers is taken into consideration, linguistic values, which are usually characterized by triangular fuzzy numbers (Chang method), are recommended for preference assessments instead of conventional numerical equivalence method. The use of linguistic expressions simplifies evaluation for persons making decisions.

Based on the above, the relevance of this research increases due to the fact that an integrated approach to the effective selection of indicators for the implementation of the company's projects is proposed. The greatest significance of the proposed integrated method is that it will provide a structure that helps decision makers navigate the process of selecting indicators.

The above predetermined the need for further research and an integrated approach to effective selection, and also determined the purpose, objectives, form, subject, logical structure and content of the thesis.

The purpose of this thesis research is to develop tools and methods of project portfolio management based on strategic alignment in the selection of strategic objectives and balanced scorecards.

The achievement of the main purpose led to the setting and solution of the **following tasks**:

- study of theoretical and methodological background of project portfolio management in the company;
- determining the place and role of the balanced scorecard in project portfolio management;
- analysis of modern methods and tools for developing a system of balanced indicators;
- analysis of the current system of indicators of AirAstana;
- development and presentation of an algorithm for the airline's BSC forming, and a comprehensive methodology, and scientific rationale;
- development of proposals to ensure the effective operation of project portfolio management in the airline;
- development of a dashboard that monitors balanced indicators.

Object of research. The object of the research is AirAstana international airline.

The subject of the research is methods and tools of project portfolio management.

Hypotheses of research.

The first working hypothesis of the research is the method of selecting important strategic objectives based on the use of the expert method, which allows for continuous alignment of the portfolio content.

The second assumption is based on the use of an integrated approach based on the analytical hierarchical method and the fuzzy set theory, which will allow selecting

important effective indicators to achieve the goals of the project portfolio.

The third hypothesis is that the use of the correlation analysis method will reveal strong causal relationships between the indicators.

During the research, these three hypotheses were confirmed by quantitative calculations.

The following research **methods were used to perform the tasks of the thesis:** the method of expert evaluation, the method of coordination (coefficient of Concordance), the method of hierarchy analysis (T. Saati), methods of fuzzy set theory, methods of fuzzification and defuzzification, center of gravity method, triangular Chang method, correlation analysis method (Pearson coefficient), plan-fact analysis of indicators, growth rates of indicators.

When developing the research materials, Microsoft Office Excel software packages were used.

Scientific novelty of thesis research In the course of the thesis research, the author obtained the following scientific results:

- the author's definition of the balanced scorecard is given;
- an algorithm for building a system of balanced airline indicators has been developed;
- the names of the perspectives of the balanced scorecard have been expanded and changed;
- strategic objectives for the project portfolio were selected on the basis of expert evaluation and ranked in order of importance;
- a comprehensive method has been developed based on the hierarchy analysis method and the fuzzy hierarchical analysis method, with the help of which effective indicators have been selected;
- the strongest causal relationships between the selected effective indicators have been established by the correlation analysis method;
- a document called "Dashboard" has been developed to monitor effective indicators and monitor the causal between indicators.

The main provisions submitted for defense:

- the author's interpretation of the economic significance of the concept of "balanced scorecard", the expansion of the concepts that make up the concept of a balanced scorecard, the role of BSC in project portfolio management;
- the perspective of "Customers" has been expanded to "Customers and competitiveness", and the perspective of "Internal business processes" has been renamed to the perspective of "Internal operational processes";
- developed block diagram of the AirAstana strategic map;
- selected the most important strategic objectives for project portfolio management by the method of expert evaluation, ranked by their importance;
- the developed comprehensive method for selecting the most effective indicators, perspectives by integrating the hierarchy analysis method and fuzzy hierarchy analysis method and the calculations carried out using these methods;
- found the strongest and weakest causal between indicators based on the correlation analysis method;
- a developed document called "Dashboard" for company executives to track and

monitor company performance through effective indicators.

The practical significance of the research is the development of a comprehensive method for selecting effective indicators to achieve the airline's goals. The methodological developments of the BSC obtained during the research can be used in practice when selecting indicators, goals, perspectives, projects, suppliers, etc. in companies.

Testing the results of the study. Nine papers by the author have been published on the materials of the research. Four of them have been published at international scientific conferences, 3 articles have been published in publications recommended by the Control Committee in Education and Science under the Ministry of Education and Science of the Republic of Kazakhstan and 2 articles have been published in the journal included in the Scopus international database.

The volume and structure of the thesis. The solution of the tasks set in the thesis formed the logic and structure of the work. The thesis paper consists of an introduction, three chapters, a conclusion, a list of references and an appendices. The total volume of the paper is 174 pages, the paper contains 62 tables, 37 figures, 24 formulas and 14 appendices.

The main content of the thesis.

The introduction presents the relevance of the thesis and its main provisions.

In the first chapter of the thesis a theoretical review of portfolio management and balanced scorecard is carried out, the place and role of SCB in project portfolio management is determined, and foreign experience of SCB implementing with the integration of multi-criteria decision-making methods in various companies in various countries was studied.

In the second chapter, the results of Air Astana's activities are analyzed, the growth rates of indicators are calculated, a step-by-step algorithm for building a strategic map of the company is developed, strategic portfolio objectives are selected in accordance with their importance.

In the third chapter, a developed comprehensive method for selecting effective indicators is proposed, which is fully calculated for all indicators, causal relationships between indicators are identified, which are presented in the form of a strategic map, a mechanism for interrelationships and feedback mechanism in the BSC is proposed, a dashboard or an electronic “desktop” is developed to monitor the performance of effective indicators.

In conclusion, the main results and conclusions of the thesis are presented.