CONCEPT OF PROJECT SELECTION AND ITS FORMALIZATION IN THE ABSENCE OF COMPLETE INFORMATION (p. 4-10)

Sergey Rudenko, Vera Andrievska

The basic object of the proposed approach is the "project map", which is a set of project characteristics that are important for decision-making on the project selection in a particular situation. The "project map" is formed of the following blocks of project characteristics: enterprise objectives, cost-effectiveness, resources, risks, project potential, value, time. Each block contains a list of characteristics, typical examples of which are presented in the paper and can be extended. In particular, integrated project estimates, developed by modern researchers are shown in the "value" block.

The conceptual model of the "project map – criteria – restrictions" system, which can serve as a universal basis for the formalization of the decision-making processes on the project selection under various conditions of information provision, taking into account possible modules of project characteristics is developed. Under this concept, the "project map" structure is reflected in the sets of restrictions and criteria for the selection procedure. This approach is versatile and allows forming the basis for subsequent selection considering project specifics and requirements.

According to this model, the project selection procedure is formalized based on the possibility theory. The proposed approach involves "filtering" of projects using the confidence levels specified for the considered conditions, which reduces the volume of the operated information at subsequent stages. Also, in the framework of a unified scheme, the options of the project selection by one or more criteria are coordinated.

Keywords: project map, criteria, conceptual model, selection, possibility theory

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DEVELOPMENT OF A METHODOLOGY FOR CHOOSING CONDITIONS OF INTERACTION BETWEEN HARVESTING AND TRANSPORT COMPLEXES (p. 11-21)

Dmitriy Muzylyov, Andrey Kravcov, Mykola Karnayh, Natalija Berezhnaja, Olesya Kutiya

The study suggests a method of forming the structure of harvesting and transport complexes by an example of the most common models of combine harvesters, means of mechanization as well as machines and technologies used in harvesting grain crops. The optimum stock of harvesting machinery and vehicles was determined by using a complex nomogram of their interaction conditions. An integral criterion of forming the structure of the complex was based on the measure of the technical features of an agricultural enterprise, the technological parameters of harvesting machinery, as well as the technical and economic performance of harvesting machines. A nomogram was built to determine the minimum cost of transporting one ton of grain, taking into account not only the operating costs but also the principle of logistics performance of both the combine har-

vester and the correctly chosen truck. The nomogram was developed to ensure complete coordination in the work of the whole harvesting and transport complex.

The structuring of the existing classes of combine harvesters was substantiated to categorize them into three groups, taking into account the working width of the header and the area of agricultural land. The suggested classification can be used to choose from a set of alternatives one of the considered transport-technological complex patterns on the basis of minimum costs.

Keywords: interaction, transport, grain, method, complex, harvester, technology, scheme, performance,automobile.

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DEVELOPMENT AND IMPLEMENTATION OF FORMALIZED MODEL OF MENTAL SPACE OF PROJECT OR PROGRAM ENVIRONMENT (p. 21-31)

Olena Verenych

Formalization of the mental space of the environment based on improving the concentric model of the mobile context that does not depend on the subject area of the project or program is proposed. It is shown that the space has four sets: global context, state context, industry context and organization context. Each set includes seven subsets: political, economic, legal, infrastructural, scientific-technical, social, natural and ecological. The content of each subset depending on the set it belongs to is investigated. It is shown that each set has a different capacity (34–80 elements), which in practice amounts to the fact that project manager considers a number of factors of the surrounding impact on the project or program.

Expert methods and techniques that allow ranking the influence of the subset elements in each set are proposed for the management of the mental space of the environment. Using these methods and techniques, the expert survey, best practices, creativity methods and analytic hierarchy process are selected. Application of the analytic hierarchy process is shown on the example of the project to create the first multimedial distance learning courses for the second higher education program. The example shows the ranking of sets, subsets and elements of the mental space of the environment (mobile context) to determine the relevant elements for developing measures to

manage the environment (mobile context) for the successful project implementation.

Keywords: project, program, mental space, mobile context, environment, analytic hierarchy process.

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APPLICATION OF THE PROJECT MANAGEMENT METHODOLOGY SYNTHESIS METHOD WITH FUZZY INPUT DATA (p. 32-39)

Igor Kononenko, Ahmad Aghaee, Svetlana Lutsenko

The definition of a "project management methodology" is clarified. A method of the project management methodology synthesis for a particular project with fuzzy input data is proposed. The method involves the development of a generalized project management methodology. Based on the information presented in the generalized methodology, an expert or a group of experts selects policies, rules, processes, practices, life cycle and organizational structure of a particular project, assign roles and responsibilities in the project. The experts have the opportunity to set several combinations of the generalized methodology components, which are the most relevant to the project. The problem of selecting the best methodology for a particular project is solved according to the criteria of laboriousness, cost of management operations and associated risks. Optimization is carried out with the fuzzy input data. The operation of the given method is shown on the example of the project on the "PTCQR ProjectScopeOptimization" software development for project scope optimization.

Keywords: project management, methodology, definition, synthesis method, mathematical model, fuzzy data.

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OPTIMIZATION OF REGIONAL PROJECT PORTFOLIO BY THE CLUSTER ANALYSIS METHOD (p. 40-49)

Ihor Osaulenko

In view of the need to provide specific content to existing regional development strategies, theoretical and practical aspects of the development and implementation of relevant projects are becoming increasingly important. Regional development projects have a number of differences from corporate, which requires the development of specific models for their selection and portfolio optimization. The paper analyzes the main factors influencing the regional project portfolio content. The project initiation procedure is investigated. It is found that the main methods of generating ideas for future projects are brainstorming, expert evaluation and e-mail survey.

It is hypothesized that in the case of significant increase in the number of proposed projects, the best solution may be to combine some of them. The project comparison criteria, including goals, project product users, performers, territory, duration, cost and funding sources are identified. Partial similarity criteria for the selected group of projects are designed by the cluster analysis methods. The generalized criterion, which allows concluding about the possibility of project clustering, is singled out among the partial criteria. On the basis of the data obtained, a hierarchical cluster tree, the depth adjustment of which allows the optimum number of projects in the regional portfolio is constructed.

Project clustering allows solving several problems: avoiding the dissipation of resources on smaller projects, considering the constructive ideas of the project community representatives; increasing the stakeholders' satisfaction with the results of joint work.

Keywords: project portfolio, regional development, optimization, cluster analysis.

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MAINTENANCE PROGRAM MANAGEMENT OF NPP EMERGENCY PROTECTION SYSTEMS (p. 49-56)

Oksana Saveleva, Iraida Stanovska, Tymofiy Bibik, Ekaterina Berezovska

It is found that the maintenance of a specified performance of NPP emergency protection systems is a risky program which consists

of individual projects in accordance with the maintenance plan. To prevent risk situations and reduce their negative consequences, a mathematical model of the probability of catastrophic events at NPP is constructed. In accordance with the Shewhart – Deming cycle, a plan of project activities in case of risk events that may lead to an emergency is developed.

It is also found that the main attributes of the qualification maintenance program of the NPP EPS equipment are the mission and goal of the program management, as well as time and resources of the projects that make up the program. The sensitivity of the goals to uncertainties (risks) that accompany the program life cycle is confirmed.

A master plan of project activities in accordance with the Shewhart – Deming cycle is developed and supplemented by the extraordinary stage "Action", the transition to which can occur from each of the four "normal" stages, namely from the stage of the cycle at the beginning of the negative external event.

Keywords: program and project management, NPP safety, emergency protection systems, risk management.

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DEVELOPMENT OF QUANTITATIVE EVALUATION METHOD OF SOCIAL EFFECT OF SOCIO-TECHNICAL PROJECTS (p. 56-62)

Valentin Chimshir

The key indicators of social effect are determined, which are the basis for the quantitative evaluation of social changes in the region, where the socio-technical project is implemented. These include raising the employment rate, improving housing provision, increasing the availability and quality of services, and increasing the availability of active and cultural recreation.

The factors affecting the manageability of the socio-technical project, which should form the basis of accounting the risks of the socio-technical project are identified. These are high project risks, a high probability of project scope changes, elongated project execution phases, participation of unique resources in the project.

The formation mechanism of the social effect, showing its nature is developed. This mechanism helps to understand the importance of prioritization when planning the social outcomes in the implementation of socio-technical projects. The essence of this mechanism is to transform the needs and resources into the positive and negative social effect.

The model for simulating the size of the social effect, depending on the needs of a social group and the value of the project output generated in a social group is developed. This model is a graphical interpretation of the social effect formation process.

The mathematical model for the quantitative evaluation of the social effect is developed. This model allows obtaining an integral indicator of social changes in the consumer's interaction with the project output. The resulting quantity is dynamic and distributed in time, its numerical value can be both positive and negative.

Quantitative evaluation of the social effect of the socio-technical project allows understanding how deep changes occurred in the social life of the territory, what principles should form the basis of new management methodologies, and what results are not achieved. It should be considered that the social effect indirectly contributes to economic efficiency, since the socio-technical system usually increases the attractiveness of the territory in which it is located.

Keywords: socio-technical projects, socio-technical systems, social effect, value, project management effectiveness.

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THE RESEARCH ON ROLE DIFFERENTIATION AS A METHOD OF FORMING THE PROJECT TEAM (p. 63-68)

Olga Sherstyuk, Tatyana Olekh, Kateryna Kolesnikova

According to the basic principle of self-developing systems, the interaction parameters of two opposing tendencies of the system operation can be distinguished – the conservative tendency and the changing tendency. It explains the balance of the two activity tendencies of team members – the ability to conserve and the ability to change.

On the basis of the Belbin's model, each participant's role structure is determined by means of which the participants' activity tendencies are determined with use of Lotka, Volterra and Gause's self-developing systems. This system is considered according to the types of interactions such as "cooperation" and "competition".

The equilibrium point of role activity trends is determined to have the most minimal impact that determines the subsequent state of the system maximally. It is shown that the role differentiation of the effective team does not always depend on the number of participants. Each participant may combine the multiple roles that can lead to the balance of conservative and changing tendencies. It defines the conditions of effective work in operational and development in management of project operation and development.

Keywords: project, management, operation, development, role activity, cooperation, competition, equilibrium point.

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