ABSTRACT AND REFERENCES

CONTROL PROCESSES

## DEVELOPMENT OF THE CONCEPT AND METHOD OF BUILDING OF SPECIFIED PROJECT MANAGEMENT METHODOLOGIES (p. 6-16)

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The article is devoted to solving the scientific problem of formation of the project management meta-level – the level of creation and implementation of project management methodologies (PMM) focused on the conditions of specific project-oriented enterprises. It was shown that the implementation of project management methodologies in the practice of project-oriented enterprises should be considered as a project that requires management in accordance with a specific methodology, project management meta-methodology. The concept of the meta-methodology of project management is proposed. The concept is based on the "POTOC" model (project-oriented technological organization of companies). The method of forming the configuration of the project management meta-methodology under the conditions of a specific project-oriented enterprise was developed. The method is based on the estimation of the deviation in the conditional probabilities of forming the target values of the project parameters without and with using the tools of the specified project management methodology.

Applying the presented scientific results in the process of creating specified project management methodologies for domestic companies, it was determined whether the use of PMM tools is feasible: in TOV Karbon (Ukraine) – resource management tools for the construction of mobile base stations; in PAT Tutkovsky (Ukraine) – information management tools for geological projects; in ICD Investments (Ukraine) – tools for administering development projects. The practical results of the formation of a specified project management methodology for TOV Karbon are presented. The successful creation of the project management system at Karbon Company demonstrates the validity and reliability of the obtained results and their importance for project management practices.

**Keywords:** project management meta-methodology, specified project management methodology, project management tools.

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# DEVELOPMENT OF A METHOD FOR THE PROBABILISTIC INFERENCE OF SEQUENCES OF A BUSINESS PROCESS ACTIVITIES TO SUPPORT THE BUSINESS PROCESS MANAGEMENT (p. 16-24)

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Models of temporal rules of execution of the business process actions were proposed for the use in absence in the process model of complete information on the reasons for execution of these actions caused by interference of the work executors. The rules are formed on the basis of analysis of the sequence of events in the business process log which makes it possible to determine temporal conditions and constraints on execution of the corresponding actions. The rule models can be applied as an element of knowledge representation for the process management system since they reflect experience of the business process execution recorded in the log. The use of rules allows one to limit the number of possible versions of execution of the business process taking into account its current state. As a result, the time of making decisions on the process management is reduced for the case of contradiction between the current version of the business process and the model.

A new method of probabilistic inference was proposed that uses the presented rules to form new, admissible sequences of actions in an atypical situation that arose as a result of adjustment of the business process by its executors. The method applies knowledge representations based on the Markov logic network which makes it possible to arrange new sequences of actions according to the probability of their execution using weighed temporal rules. Use of a combination of rules for pairs of sequential and spaced in time actions ensures higher accuracy of calculating the probability of execution of new business process versions. The proposed method takes into account information from the event log when rules are supplemented. This enables continuous supplementing of rules in execution of the business process. The above enables practical real-time application of the method in automated formation and expansion of knowledge bases for the process management systems.

**Keywords:** business process, Markov logic network, probabilistic inference, constraints for execution of actions, event log.

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# COMPARATIVE ASSESSMENT OF THE COMPETENCE OF EXPERTS IN THE FIELD OF HIGHER EDUCATION BY DIFFERENT METHODS (p. 25-32)

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The methods and means of assessing the competence of experts in the field of higher education are explored. An assessment of the competence of experts in the field of higher education using the

methods for assessing the competence of experts, taking into account data uncertainty and on the basis of the analytical hierarchy process according to established criteria was carried out. The results are processed by specialized software "Competence DU 2.1" and "Competence of AHP 1.0". Specialized software takes into account data uncertainty and applies the analytical hierarchy method. The ratio of the averages for the criteria used to assess the competence of experts in higher education was estimated.

The comparative analysis of the obtained data was carried out. The results of the analysis showed the convergence and correlation of the obtained data, and also confirmed the suitability of methods for assessing the competence of experts in the field of higher education. The obtained results showed a small dispersion of average values for the criteria for assessing the competence of experts in the range from 3.7 to 6.6, which indicates a balance. The comparative analysis showed a high coincidence of the results of quantitative assessment of the competence of experts using specialized software, which is based on different methods of evaluation. The scatter of the values obtained by the applied methods indicates the presence of a correlation.

The methods for assessing the competence of experts, taking into account data uncertainty and on the basis of the analytical hierarchy, are useful for comparative evaluation of the competence of experts in the field of higher education. This will allow rejecting insufficiently competent specialists, forming competent groups of experts, obtaining more reliable group expert assessments or ensuring the qualified work of agencies, specialized commissions and councils.

**Keywords:** competence, expert, evaluation criteria, higher education, data uncertainty, analytic hierarchy.

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**ASSESSMENT OF CAPABILITIES OF MILITARY GROUPINGS (FORCES) BASED ON THE FUNCTIONAL GROUP "ENGAGE" (p. 33-44)**

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An approach to assessing the capabilities of groupings of troops (forces) based on the use of the combinatorial method with the limited base of arguments on the example of the functional group of capabilities "Engage" was proposed.

Assessment of capabilities of groupings of troops (forces) is carried out within the framework of defense planning, with the aim of determining the prospective structure of the Armed Forces of Ukraine (defense forces). The current Order of evaluation of capabilities of groupings of troops (forces) in the Armed Forces of Ukraine is based on the expert methods of evaluation. The shortcomings of the particular Order are: subjectivity, long duration and personnel involvement (periodic distraction of specialists from performing their functional duties). Therefore, the development of new approaches to assessment of the capabilities of groupings of troops (forces) based of modern scientific analytical methods is a relevant scientific challenge.

According to the NATO standards, capabilities are divided into nine functional groups that contain 464 capabilities. To develop the method for capabilities assessment with the use of the analytical methods taking into consideration the existing regulatory framework, the analysis of the existing Order of evaluation of capabilities of groupings of troops (forces) in the Armed Forces of Ukraine was carried out. The analysis revealed that the functional groups are of different levels. It is appropriate to group them into three classes: the class of technical equipment, the class of personnel training and the class of institutional capabilities. In this case, it was determined that the capabilities carriers depending on the level of functioning are different in nature. That is why it is necessary to evaluate them by different components. It is proposed to distinguish between elementary (armament and military equipment) and group capabilities (subdivisions, military units, formations, and groupings).

The research revealed the analytical dependence of the impact of elementary carriers of capabilities on the effectiveness of task execution by group carriers of capabilities. The specified approach will be implemented in the automated decision support system during capability-based defense planning.

The application of this approach will make it possible to reduce the impact of the subjective factor and reduce the time to make a reasonable decision on the required structure of a grouping of troops (forces) to execute the set tasks, to estimate a sufficient number of options for its application. In addition, the implementation of the proposed approach will offer an opportunity to identify: the quantitative and qualitative demand of the Armed Forces of Ukraine (defense forces) in provision with the samples of armament and military equipment, the necessary amount of resources for the development of the Armed Forces (defense forces). The proposed analytical method will make it possible without involving experts to assess the role of each military formation from the defense forces, determine the priority plan for the development of the capabilities of the Armed Forces of Ukraine (defense forces).

**Keywords**: capability-based defense planning; capabilities carriers; functional groups of capabilities; grouping of troops (forces).

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**DEVELOPMENT OF AN INTEGRATION-ANALYTICAL METHOD FOR THE INITIATION OF CONSTRUCTION PROJECTS OF INDUSTRIAL OBJECTS (p. 45-58)**

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We studied management processes of initiation of industrial projects. We considered the specific features of industrial objects construction projects that affect a structure of a project life cycle and a timetable for its financing. Technological parameters of a new construction object determine the specific features of project of construction of industrial objects. We determined that the modern toolkit for management of projects initiation processes is not able to provide a full pre-project analysis of alternative options for industrial objects construction projects. This justifies a need to create a comprehensive method for analysis of projects of construction of industrial objects at the initiation stage, which will take into consideration the specifics of projects and meet needs of initiators.

We developed the integration-analytical method for initiation of project of construction of industrial objects, which has a complex nature and takes into consideration the specifics of a life cycle of such projects. It has high level of innovation and a need for specific resources. The proposed method has a step-by-step procedure of execution, it provides an iterative process of analysis of projects of construction of industrial objects, and gives possibility to make an informed decision to refuse to implement a project, which does not perform all steps of the method. This reduces time required for the pre-project analysis of alternatives and the amount spent if implementation of projects of construction of industrial object is inexpedient.

The advantage of implementation of the integration-analytical method for initiation of projects of construction of industrial objects is to save time and resources necessary for management of initiation of projects of construction of industrial objects. We achieved this through integration and adaptation of existing analytical tools into a comprehensive method by elimination of cases of double consideration of similar indicators, and those that are not of key importance at this stage. But due to formation of the procedure for implementation of the method, which corresponds to a specific life cycle of projects of construction of industrial objects.

**Keywords**: industrial object, life cycle of a project, specific resources, innovativeness.

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## EXAMINING THE EFFECT OF PRODUCTION CONDITIONS AT TERRITORIAL LOGISTIC SYSTEMS OF MILK HARVESTING ON THE PARAMETERS OF A FLEET OF SPECIALIZED ROAD TANKS (p. 59-70)

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We have studied the influence of changing production conditions and components of transportation processes on the need in specialized vehicles in the milk harvesting systems. Based on the prediction of the daily volumes of milk harvesting from family dairy farms, it was found that there are two periods of milk delivery over a calendar year – the intensive (from May to September) and non-intensive (remaining months of the year). Based on timing the transportation processes using the road tanks Hyundai HD-65 STD+G6-OTA-3.9, we performed production experiments. It was established that the durations of transportation operations are described by the Weibull distribution law. Specific durations of loading the road tanks Hyundai HD-65 STD+G6-OTA-3.9 at family dairy farms and their unloading at a processing plant have a mathematical expectation of 0.92 and 0.52 h/t of milk, respectively, and their mean deviation – 0.018 and 0.008 h/t of milk.

Using production conditions at Brodovskyi Region in Lvov Oblast, Ukraine, as an example, we conducted the simulation of transportation processes of milk delivery from producers to a processing plant taking into consideration the changing production conditions and the components transportation processes. It was established that an increase in the daily volumes of milk harvesting from 6 to 66 tons/day leads to an increase in the estimates of mathematical expectation of the total daily quantity of routes traveled by the road tanks Hyundai HD-65 STD+G6-OTA-3.9, in line with a linear dependence. The mileage of these road tanks and the duration of their utilization grow at an increase in the daily volumes of milk harvesting according to the polynomial dependences of second power. The cargo turnover varies partially discretely from 820 to 4,610 t·km, due to a change in the technological need in road tanks.

It was established that a need in the specialized vehicles Hyundai HD-65 STD+G6-OTA-3.9 over a calendar year changes from 1 to 4 units. In this case, execution of transportation processes from January to March and from October to December within a separate calendar year should be organized in one shift, and from April to September, in two shifts. The derived distributions of the changing components of production conditions and transportation processes, as well as the dependences of road tanks utilization on the volumes of milk harvesting, underlie the creation of an information decision support system in the milk harvesting systems. In addition, they form the basis for planning the work of a fleet of specialized vehicles and for designing the systems of milk harvesting.

**Keywords:** effective management decisions, optimal control, logistic systems, milk harvesting, a fleet of vehicles.

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This study proposes using a new criterion for assessing the effectiveness of a transportation system that takes into consideration fluctuations in the level of the rolling stock load along the same transportation system. The criterion evaluates the level of gain in the added value of goods as a result of the delivery of goods within a retail network under condition of minimizing the cost of transporting one ton. We have designed an extreme plan for the full-factor experiment with three levels of parameter variation. It was determined that demand for transportation within a retail chain in a big city is discrete in character. A statistical analysis of the volumes of a transportation order has allowed us to draw a conclusion on the possibility to describe a given magnitude using a binomial distribution law. An experiment was conducted using a service polygon of the retail chain's customers in a large city. Based on 9 constructed alternative last mile logistics systems, we investigated the influence of transportation demand variability on forming the levels of vehicles' load along routes. The statistical data received provided the basis for calculating the cost of transporting one ton of cargo and estimating the size of the excessive added value to goods. We have assessed the level of variability in the size of the total and the mean added value of goods. It was determined that the transportation process within a

retail chain can generate a gain in the total added value across the entire chain amounting to 444.5 percent (12 routes within a transportation system) with the mean value for one multi-stop route of 37.03 percent. We present assessment of the effective area of the last mile logistics, which is guaranteed under condition for a slight fluctuation in the level of vehicles' load. This corresponds to the value for a variation coefficient of the rolling stock load in the range from 0 to 10 percent. Along with this, it has been established that the most sensitive to fluctuations in the volume of order is the rolling stock of small and medium cargo capacity.

**Keywords:** last mile logistics, transportation route, transportation cost, added value, variability.

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## ANALYSIS OF TECHNOLOGICAL INNOVATIONS IN DIGITAL MARKETING (p. 80-91)

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The main technological innovations in digital marketing as a specific form of marketing under conditions of the informatization of society have been examined. It has been substantiated that the principal direction of digital marketing is the personalized attitude to users. It has been proven that the personalized relationship with a potential customer becomes the essence of marketing, the core of its effectiveness. It is shown that digital methods for processing and using information becoming the main source for improving marketing efficiency.

The need for a comparative analysis of the technological innovations of digital marketing is predetermined by the fact that the scientific and technical development stimulates the emergence of a significant number of methods that have an influence on the consumer. Studying these methods makes it possible to identify their strengths when devising the marketing strategy and tactics of enterprises.

The study highlighted a system of classical tools of digital marketing – search engine optimization, contextual advertising, social media marketing, technology of Big Data, retargeting, emailing. The essence, content, purpose, and scope of application of digital marketing tools were defined, which have emerged as a result of the latest technological innovations – native content, artificial intelligence, integration of marketing technologies, virtual and augmented reality, the Internet of Things, voice bots, voice, video and mobile marketing, affiliate marketing. Five strategies for the monetization of applications in mobile marketing have been identified. We have performed analysis of CPI-networks with a focus on mobile and non-motivated user traffic. We constructed a model of interaction between counterparties and the principles of an integrated approach to affiliate marketing projects, in particular, the need to find a reasonable, substantiated compromise plan has been shown. In this case, the task on choosing the optimal variant of a project is stated as a multicriteria optimization problem. We have analyzed methods for solving this problem and provide appropriate recommendations related to the choice of the most efficient method.

The significance of the results obtained is predetermined by the fact that they could form a theoretical base for improving the effectiveness of marketing activity under conditions of the informatization of society through the use of appropriate strategies for monetization, better interaction between counterparties in affiliate marketing, identification of conditions for using the advantages and disadvantages of technological innovations of digital marketing. In contract to known methods for improving the effectiveness of marketing activity, the proposed approaches provide a basis for profitable work under conditions of digital economy.

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