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## Abstracts and Keywords

*G.E. Albegov, I.L. Abramov*

### **Approaches to the Development of the Organizational and Technical System for the Construction of a Complex of Industrial Buildings**

*Keywords:* organizational and technical system; construction; industrial buildings; approaches; development; project; plan; methods.

*Abstract.* The article describes approaches to the development of an organizational and technical system (OTS) for the construction of a complex of industrial buildings. Industrial construction requires a high degree of organization and coordination of functional, technological and managerial interaction between customers, contractors, investors and other interested parties. The OTS is a set of methods, procedures and technologies that ensure the efficient construction of industrial facilities.

The purpose of the article is to form the main approaches to the development of the OTS for the construction of a complex of industrial buildings. The objectives are to ensure effective systematization of the construction of industrial facilities and reduce the cost part of the project by applying basic approaches to the development of the OTS, including analysis of project requirements, selection of the optimal construction strategy, development of a project plan, organization of communication and coordination, use of modern information technologies, risk and security management. The study resulted in the formation of approaches to the development of the OTS that will allow industrial facilities to optimize the construction process, reduce time and financial costs.

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*K.R. Bitkulov, Ye.A. Zaliznaya, S.A. Zaliznyy, D.D. Umurzakov*

### **A Description of a Power Transformer Model Based on a Combination of White and Black Box Methods**

*Keywords:* modeling; power transformer; gray box.

*Abstract.* Transformer models which taking into account their capacitive behavior are necessary for calculations of power system transients. In order to develop such models classical low-frequency models of transformers was extended to take into account capacitances. As a result, expressions were determined to take into account the capacitive behavior of transformer. Parameters of the model are proposed that provide reasonable accuracy, including the first resonance point, but with too low damping without proper adjustments.

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*E.V. Gorynya, E.P. Kolpak, N.A. Gasratova*

### **A Competition Simulation Model**

*Keywords:* survival; competition; mathematical model; population; niche; stationary state; stability.

*Abstract.* The hypothesis of competitive exclusion of species does not explain, as a rule, the disappearance of individual species from ecosystems. The existing diversity of species in nature speaks of their stable coexistence. One of their theoretical tasks, as a consequence of the diversity of living matter observed in nature, is to search for conditions for the coexistence of numerous biological species using the same trophic resource. An explanation of the survival of numerous competing species can be obtained on the basis of simulation modeling of the competition of a large number of species. For this purpose, a competition model has been developed and simulation modeling has been carried out. The paper proposes a variant of the mathematical model of competition. The interaction of individual groups of populations is taken into account, leading to the formation of common competition zones. For the case of two populations, their stable coexistence in stationary states is proved. For a larger number of populations, the asymmetry of paired interactions is taken into account; an environmental factor is

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introduced that affects the formation of realized niches. Probabilistic distributions of population numbers are constructed.

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*Ya.V. Zhilkina, T.G. Dolgova, T.V. Solovieva*

### **Stages of the System Development for Trade and Economic Organizations Based on Customer Requirements**

*Keywords:* system; system development; development phases; trade; trade organization; requirements.

*Abstract.* This paper considers the stages of development of an automated information system for a trade organization, the purpose of which is to solve problems in business processes, which will increase the efficiency and competitiveness of the organization.

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*E.A. Zayats*

### **The Role of Artificial Intelligence in Software Testing**

*Keywords:* software; artificial intelligence; requirements development; software engineering; design; testing.

*Abstract.* The article discusses the possibilities of finding effective ways to use artificial intelligence in the marketing analysis of unstructured data. The process of development and support of software systems with elements of artificial intelligence AI has been studied. The classification of sources for obtaining unstructured data has been carried out. The tools for aggregating information for collecting unstructured data are defined. The description of the business process of unstructured data analytics based on the Microsoft Power BI platform is given.

The purpose of the study is to increase the reliability of the process of diagnosing software products by identifying hidden errors by re-testing the software. The scientific task is to increase the reliability of software testing. It is solved by using software systems with elements of artificial intelligence AI.

The research objectives are formed in the article as follows:

- 1) to analyze methods and approaches to software testing and identify areas for their improvement, including through the search and identification of hidden errors;
- 2) to form a generalized conceptual model of the software testing process for solving unstructured data that is difficult to formalize in marketing analysis.

The hypothesis is as follows: one of the main components of software diagnostics is testing as a process of detecting defects in programs. Its role is all the more growing due to the fact that the software of modern computer systems is quite complex and, therefore, cannot be defect-free. The reason for not detecting defects in the software being developed should most often be considered the imperfection of the tests, and not the flawlessness of the program, therefore, the qualifications of the developers of test programs should be sufficiently high, and in some cases even higher than the qualifications of the developers of the software itself.

The research methods are based on the main technical provisions of diagnostics and the theory of artificial intelligence and neural networks, which are decisive in achieving the goal of the study. The conceptual model for increasing the reliability of software testing by identifying hidden errors is based on modeling theory, heuristic estimates. A categorical model of the software retesting process and a method for identifying latent errors based on artificial intelligence and neural networks were defined using set theories, artificial neural networks, principles of building knowledge bases and forming a conclusion.

The results are as follows:

- 1) a conceptual model for increasing the reliability of software testing has been further developed by detecting hidden errors of different types by re-testing software using software systems with elements of artificial intelligence AI and assuming that a certain number of errors of the previous severity category leads to the appearance of certain types of errors of the next categories;

2) the need to apply a software retesting process model based on software systems with elements of artificial intelligence AI is determined, which differs from the known ones in that it takes into account the influence of hidden errors of different types of the previous category on the occurrence of errors of the next category, which makes it possible to assess the total impact of errors of this categories for software quality and conclude that it is necessary to retest the software in order to eliminate errors of the previous, subsequent or considered category.

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*A.Yu. Tumanov*

### **Improving the Quality of the Local Automated Radiation Monitoring System in the Admiralteysky District of St. Petersburg**

*Keywords:* system; monitoring; measurements; quality.

*Abstract.* The aim of the paper is to improve the quality of the local radiation monitoring system in the Admiralteysky district of St. Petersburg. The research methods are operations research methods, quality management methods. The hypothesis of the study is the assumption that the introduction of the requirement of embedding "intelligence" into all levels of the system as the main requirement that a local system must meet will improve the quality of the system. The result of the study is the developed element of the intelligent system – an external local radiation monitoring post.

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*A.Yu. Tumanov, M.V. Kalashnikova*

### **Improving the Quality of the Geoinformation System of Radon Hazard on the Territory of St. Petersburg Using the Kriging Interpolation Method**

*Keywords:* radon; geoinformation system; program; model.

*Abstract.* The aim of the research is to improve the quality of the geoinformation system (GIS) for potential radon hazard in Golden Software Surfer. The research method is the Kriging interpolation method. The hypothesis of the study is that the application of the method makes it possible to estimate the level of radon hazard of the city based on the minimum number of measurements of the equivalent equilibrium volumetric activity of radon and thoron daughter products in the air. The result is a developed GIS of potential radon hazard.

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*A.A. Chepiga, S.V. Petrenko*

### **Estimation of the Exact Position of the Rotary Device for the Aerial Surveillance Device Using a Sinc-Filter**

*Keywords:* sensorless control; observer; electromotive-force; sinc-filter.

*Abstract.* Sensorless control systems use observers for rotor position estimation. One of the commonly used methods for determining the rotor position is an observer based on the EMF estimation. However, accuracy of this observer depends on the filter type used to calculate the EMF, which causes a phase delay in position estimation. The purpose of this article is to obtain a higher accuracy of position estimation using a third-order sinc-filter. The OSR oversampling coefficient was selected experimentally, which was 6 and allowed to reduce the maximum absolute error by 10 %, as well as the amplitude of the noise introduced by the relay element by 50 %. The proposed algorithm was tested in SimInTech and showed better accuracy compared to the classical method.

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*K.F. Bagdasaryan, D.A. Golovchenko*

### **The Role of User and Entity Behavior Analytics Systems for Detecting Abnormal Actions and Recommendations for their Use**

*Keywords:* security approaches; UEBA systems; user behavior analytics; real-time mode.

*Abstract.* Companies of various sizes invest heavily in protecting their information resources. New approaches to security include the use of machine learning and statistical analysis to detect attacks in real time.

The study highlights the weaknesses and strengths of solutions. The results will be used to formulate recommendations.

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*E.V. Leukhin*

### **Developing a Test Data Management Strategy**

*Keywords:* quality assurance; test data; data storage; quality control automation; software testing.

*Abstract.* The article aims to address issues related to improving system quality, reducing costs in software development phases, and decreasing the time spent on quality control while accelerating product delivery to the industrial environment. The tasks tackled in this article revolve around the challenges faced by IT departments during the development, enhancement, and maintenance of information systems. These challenges aim to ensure high-speed changes, maintain a high level of quality, and reproducibility of results at each subsequent development stage.

The research hypothesis is formulated as follows: when working in extensive and complex IT landscapes, with a large number of specialists involved in system development, there is an increasing need to establish a data ownership process and create data management tools. In such conditions, there arises a necessity to organize a test data management strategy, which is driven by the importance of using highly representative data for system testing before deployment into the production environment. The proposed methodology for organizing a test data management strategy allows for the creation of environments geared towards proactively enhancing quality and expediting change implementation. The methods employed consist of practices and approaches that enable handling non-consistent systems with increased complexity in anomaly investigation, where the root cause is often related to data, its volume, and quality. Such anomalies can only be reproduced on a specific dataset, which may not be available in a non-permissive environment for testing. The methodology includes the development of tools to improve the quality of data used in non-production environments to enhance the quality of the systems being examined at a functional level.

The achieved results demonstrate the high effectiveness of these approaches in solving tasks related to working with non-production environments. These results were obtained through real-world usage in IT departments dedicated to system development.

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*N.M. Galchenko*

### **The IDEF0 Model of an Information System to Manage the Register of Serialized Items Based on a Cloud Service**

*Keywords:* information system; IDEF0-diagram; honey; cloud service; unique item number.

*Abstract.* The goal is to develop IDEF0 models for the subsequent design of an information system for managing the register of serialized products, namely bee honey, using a cloud service. The principles of construction and features of the information system are considered, the existing cloud services are investigated. An IDEF0-diagram of an information system for managing the register of serialized items based on a cloud service has been developed, on the basis of which a software product will be designed.

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*N.S. Gumberg*

### **On the Design of an Information System for Warehouse Logistics Using RFID Tags**

*Keywords:* information system; warehouse; logistics; product; RFID tags; diagram; functional structure.

*Abstract.* The purpose of this research is to develop an information system for warehouse logistics using RFID tags. The information system will be designed to automate the activities of the warehouse and reduce the time spent on searching for goods through the introduction of RFID tags. The main activity of the warehouse is warehousing, storage, inventory management, as well as their placement on the shelves and removal from them. Within the framework of this article, the main aspects of accounting for warehouse logistics are considered and the functional structure of the warehouse is developed.

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*A.V. Knyazev, A.M. Khafizov*

### **Improvement of the Automatic Control System of Oil Refining Plants Based on Yokogawa Centum VP**

*Keywords:* automation; catalyst; control; reactor; Matlab; Centum VP.

*Abstract.* In the article, the authors consider the installation of selective gasoline hydrotreating, which is designed for deep purification of gasoline mixtures of catalytic cracking, characterized by a high content of olefins, from sulfur compounds with minimal loss of octane number. The purpose of the study is to determine the optimal parameters of the technological process. For this purpose, the integration of Matlab software product algorithms into the existing control system is proposed. The use of Matlab software capabilities will allow us to determine the optimal process mode, which will lead to an increase in the quality of the product.

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*A.M. Lankin*

### **Development and Research of a Unit for Measuring and Stabilizing the Temperature of the Furnace Table**

*Keywords:* measurement; converter; temperature; circuit; stabilization; thermo-EMF.

*Abstract.* The purpose of the research was to develop electrical circuits for the unit for measuring and stabilizing the temperature of the furnace table. For the furnace table, temperature is an important parameter; it must be measured and controlled according to the principles of automatic control. Structural and functional diagrams of the block for measuring and stabilizing the temperature of the furnace table were developed. The performance check of the circuit showed that the indicators obtained during the measurement and the control parameters correspond to the terms of reference.

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*I.M. Lankin*

### **Simulation of the Problem of Heat Transfer When Testing Specimens from Ferromagnetic Materials with a Shape Memory Effect**

*Keywords:* measurement; magnetic characteristics; ferromagnetic materials; shape memory materials; COMSOL Multiphysics.

*Abstract.* Intelligent memory materials have great potential for use in the field of microelectromechanical systems, for the implementation of actuators, valves of very small sizes. Further study of the properties and parameters of shape memory alloys requires the development of devices for the study and measurement of these parameters. The aim is to develop a device for determining the magnetic characteristics of ferromagnetic materials with a shape memory effect. Investigate the magnetic

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and thermal properties of shape memory alloys. The magnetic and thermal properties of shape memory alloys have been studied in the COMSOL Multiphysics, multiphysics simulation software package. The results obtained can be used in the design of new actuating and measuring devices based on intelligent materials with a shape memory effect.

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*I.M. Lankin*

### **A Device for determining the Magnetic Characteristics of Ferromagnetic Materials with a Shape Memory Effect**

*Keywords:* measurement; magnetic characteristics; ferromagnetic materials; shape memory materials; COMSOL Multiphysics.

*Abstract.* Shape memory materials can be effectively used in microelectromechanical systems to create extremely compact actuators and valves. For a deeper understanding of the properties and parameters of shape memory alloys, it is necessary to develop a device for studying and measuring these parameters. Thus, the goal is to develop a device for determining the magnetic characteristics of ferromagnetic materials with a shape memory effect. Electrical circuits of a device for determining the magnetic characteristics of ferromagnetic materials with a shape memory effect have been developed. The results of the study can be applied to the development of new devices using smart materials with shape memory properties as actuating and measuring components.

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*M.V. Lankin*

### **A Device for Magnetization of High-Coercivity Magnets by Pulsed Current**

*Keywords:* measurement; pulsed magnetization; high coercivity magnets; Rogowski coil; COMSOL Multiphysics.

*Abstract.* The aim of the work was to develop the principles of operation of a device for magnetizing high-coercivity magnets, which would make it possible to measure the characteristics of a magnet by the magnetizing current pulse and supply voltage. This article presents the developed electrical circuits of a device for pulsed magnetization of high-coercivity magnets. The results obtained can be used in the production of high-coercivity magnets, as well as in the development of new devices for pulsed magnetization.

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*S.O. Morozov*

### **The IDEF0 Model of the Information System for Data Analysis of Electronic Operational Documentation**

*Keywords:* operational documentation; information analysis; information system; IDEF0.

*Abstract.* The purpose and objectives of the research are to increase the efficiency of a complex organizational and technical system of operational documentation based on the use of situational and intelligent models, reduce the time for making analytical decisions, increase the level of training of system users; ensuring the efficiency of storage of operational documentation, reducing the time spent on processing various types of data in the system. IDF0 models of the information system for data analysis of electronic operational documentation have been developed, the main purpose of which is the storage, collection and analysis of information, as well as the formation of an expert decision and forecasting to improve the quality of user work and the speed of processing large amounts of information.

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*N.D. Narakidze*

### **The Development of a Displacement Transducer with a Differential Plunger Inductive Sensor**

*Keywords:* measuring transducer; microcontroller; signal; circuit; differential plunger inductive sensor.

*Abstract.* The aim was the development of a displacement measuring transducer with a differential plunger inductive sensor. The features of inductive transducers are considered. Structural and functional diagrams of a displacement measuring transducer with a differential plunger inductive sensor have been developed. The metrological characteristics of the device have been evaluated. The measurement channel error was 3,45 %.

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*Sh.M. Akhunov, I.F. Gareev, A.A. Zalyatdinov, S.L. Sabanov*

### **Manufacturing Technology of Couplings from Pump-Compressor Pipes**

*Keywords:* tubing; coupling; forging induction furnace; punch; die; billet.

*Abstract.* When operating oil and gas wells, a huge amount of underground and surface equipment is used. Tubing (tubing) is an integral part of well design. Since oil and gas fields are located deep underground, it is necessary to use a tubing tool by screwing them together through a sleeve. In this article, the author considers the implementation of the manufacture of a sleeve from tubing of a larger diameter for tubing of a smaller diameter. The purpose of this paper is to determine the use of tubing for the manufacture of sleeves, as well as search methods, the search for participants in search technologies.

When solving this problem, on the basis of the available data on the standard sizes of the used tubing and couplings, the authors designed stamping equipment with which it is possible to manufacture a coupling. Currently, there is no technology for manufacturing sleeves from tubing, therefore, at the first stage, scientific works related to the manufacture of sleeves in the traditional way, their testing, the removal of residual radiation from pipes, as well as the technology of the stamping process, were studied.

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*Sh.A. Klebleev*

### **Smart Parking for Regional Development**

*Keywords:* smart parking; infrastructure; modern technologies; sensors; transducers.

*Abstract.* The paper considers smart parking for the development of the region. The aim of the study is to create a modern and innovative parking lot equipped with smart technologies that will contribute to the development of the region. To achieve the goal, the following tasks were set: development and implementation of automated parking systems that will optimize the use of space and improve mobility in the city; deployment of touch sensors and surveillance cameras; creation of an application and a navigation system that will help drivers quickly find free parking spaces; developing a parking payment system that is user-friendly and works based on collected data; ensuring security in the parking lot with the help of video surveillance systems and motion sensors that will detect adverse situations and automatically report this to the appropriate services; using the collected data to optimize parking and city infrastructure, such as decisions to expand or reduce the size of a parking lot or improve road safety. Research methods were applied, data analysis by collecting data from existing parking lots, economic analysis of the effectiveness of smart parking, smart parking modeling, and pilot projects of smart parking. The hypothesis of the study is the use of a modern model of smart parking, which will solve the problems with the congestion of city streets and reduce car exhaust emissions. The result of the study was the developed model of smart parking for the development of the region.

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*V.A. Vasileva, V.V. Kukartsev, M.K. Kobelev*

### **Industrial Automation and Data Management**

*Keywords:* American linguistic personality; picture of the world; concept; culturally marked vocabulary; linguistic personality.

*Abstract.* This article is devoted to the study of the linguistic personality, the national mentality, and the national character of the modern American person in the "letters to editor" column of American newspapers. The objective of our study is to examine the phenomenon of culturally marked vocabulary in letters to the editor of American newspapers using a continuous sampling method. The American press reflects the current interests and problems of society. It is a source of national concepts in which the representation of the worldview realized by linguistic means.

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*A.A. Sobin*

### **Financial Risks of Financing a Leasing Company**

*Keywords:* automation; information system; aluminum industry; development; architecture.

*Abstract.* In the emerging aluminium industry, compliance with high efficiency and environmental standards is becoming a priority. The development of an automated information system for aluminum component production management not only optimizes processes, but also contributes to accurate inventory control and financial stability of the company, which makes this system an important tool for successful development and compliance with industry standards.

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*Ya.V. Zhilkina, K.Y. Lobkov, E.L. Vaitekunene*

### **Project Management of the Implementation of an Automated System for Supply Chain Planning**

*Keywords:* logistics; optimization; system; system implementation.

*Abstract.* This paper discusses the introduction of an automated information system in logistics, which is a key factor in increasing the competitiveness of companies. The purpose of the paper is to solve problems in logistics processes, which will allow synchronizing and coordinating the work of suppliers, warehouses and transport services, reducing delays and additional costs.

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*A.M. Malinin, T.M. Belova*

### **Assessment of the Social Effectiveness of the Recreational Cluster**

*Keywords:* recreational cluster; social efficiency; service level; Delphi method; synergetic effect.

*Abstract.* The main purpose of the study is to develop and test a methodology for assessing the social effectiveness of a recreational cluster through a superposition of assessments of the degree of satisfaction of recreants with the level of service provided by cluster participants. The social effectiveness of a recreational cluster can be assessed as a result of the activities of enterprises and institutions that are part of the cluster to improve the quality and adequacy (targeting and demand) of the services provided. A methodology for assessing the social effectiveness of a recreational cluster has been developed and tested on the material of a specific recreational cluster, which is evaluated through the degree of satisfaction of recreants with the level of services provided.



### **Digital Innovation in Credit Institutions Sustainability**

*Keywords:* banking innovation; banking; biometrics; big data; artificial intelligence; distributed registry technology; sustainability; digital technology.

*Abstract.* In modern conditions, one of the factors ensuring the stability of credit institutions is the ability of the latter to competently use digital solutions in their activities. The article is devoted to assessing the capabilities of the banking sector to implement digital innovations.

The purpose of the article is to assess the possibilities of introducing digital solutions by financial institutions. Achieving this goal predetermines the need to solve a number of the following tasks: substantiation of the role of innovative solutions in increasing the sustainability of financial institutions; study of the factors that predetermined the desire of financial market institutions to introduce digital innovations; analysis of basic digital solutions in terms of their implementation in the activities of financial institutions.

In the course of the research, the following methods were used: a systematic approach and such general scientific methods of cognition as scientific abstraction, a combination of historical and logical, analysis and synthesis, a method of comparison and comparison.

The obtained results: it is proved that innovative solutions play a significant role in increasing the stability of financial institutions; the factors that predetermined the desire of financial market institutions to introduce digital innovations were studied; the analysis of basic digital solutions in terms of their implementation in the activities of financial institutions was carried out.

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L.A. Poroshina, A.N. Matafonova

### **Some Aspects of the Development of Innovative IT-Products**

*Keywords:* information products; software products; IT products; innovation; digital economy.

*Abstract.* This scientific article discusses the concepts used in the digital economy: information product, software product, IT-product. The variety of terms of the digital economy in terms of defining the objects of the IT sphere indicates the lack of a common understanding of the essence of the terms. The paper substantiates the author's position on the use of the term IT-product in the scientific research literature, as corresponding to the current stage of development of the economy. The purpose of the paper is to formulate the principles for the development of an innovative IT-product. The research hypothesis is as follows: determining the principles for developing IT-products will increase the efficiency of the process of developing and implementing them in enterprises. The study resulted in the development of principles of innovative IT-product. The research methods are comparison, analysis, and synthesis.

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E.D. Fedorova, T.R. Mkrtchyan

### **Adaptation System as a Tool to Improve Human Resource Management Efficiency**

*Keywords:* competitiveness; production; efficiency; human resource management; multivariate regression; human resource system; human resource adaptation.

*Abstract.* This article considers the possibility human resource adaptation process impact on the effectiveness of the human resource system of an enterprise and the improvement of the overall level of the company's competitiveness. To analyze the possibility of such an impact, a multivariate regression model was developed that describes the impact of current adaptation system processes on the output of finished products. To achieve this goal the main adaptation processes/events were considered and selected, statistical data were collected and econometric tools to build a regression model were used. The resulting multivariate regression equation can be considered as the result of the work, which allows

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predicting and adjusting production (adaptation) indicators and calculating the desired output volume.

*О.В. Чепик, И.В. Рыжов, В.К. Спильниченко*

### **Развитие финансовых экосистем: этапы выбора стратегических бизнес-партнеров негосударственных пенсионных фондов**

*Ключевые слова:* выбор бизнес-партнеров; конкурентоспособность; негосударственные пенсионные фонды; стратегия; экосистема; экосистемные сервисы.

*Аннотация.* Целью научного исследования явилось изучение системы негосударственных пенсионных фондов (НПФ). В статье проанализированы основные существующие подходы к оценке бизнес-партнеров. Определены и систематизированы этапы, влияющие на оценку бизнес-партнеров при включении их в экосистему негосударственных пенсионных фондов в современных рыночных условиях.

Применялся метод анализа результатов теоретико-прикладных исследований в области анализа конкурентоспособности предприятия с учетом высокой степени изменчивости внешней среды.

В результате исследования проанализированы основные существующие подходы к оценке бизнес-партнеров.

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*N.E. Chumachenko*

### **Heterogeneity in Network Structures**

*Keywords:* heterogeneity; network; network structures; information-network economy; self-organization.

*Abstract.* The purpose of the article is to draw attention to the manifestations of the heterogeneity of network structures. The task is to identify and systematize the manifestations of heterogeneity in networks, network structures. A hypothesis has been put forward that manifestations of individuality in network structures are a significant indicator that determines their functioning. When writing the article, general scientific methods were used: analysis, synthesis, comparison, and deduction. It was revealed that the uniformity of the network serves as a guideline for the formation of the qualitative characteristics of the network, which allows you to adapt to the range of tasks to be solved. Heterogeneity is an update, but does not require a condition for the formation of new knowledge. The planes of consideration of networks, where individuality manifests itself, are determined. The structural plane of the presented components: topology, asymmetric load of network nodes; a variety of possible options for the formation of groups of nodes. The subjective flatness of the manifestation of heterogeneity focuses on the qualities of actors and the same parameters of their interaction. A number of network autonomy parameters can be exposed in the managerial world.

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*V.Yu. Kireev*

### **On the Issue of Environmental Safety in the Context of the Current State and Trends in the Development of the Petrochemical Industry on a Global, Western European and Russian Scale**

*Keywords:* petrochemical industry state; trends in the petrochemical industry development; environmental safety of petrochemical enterprises; key principles of environmental safety; objectives of production strategies to ensure environmental safety.

*Abstract.* The article is devoted to the issues of environmental safety in the context of the current state and trends in the development of the petrochemical industry on a global, Western European and Russian scale. The study aims to characterize and analyze the main aspects of the problem of environmental safety of petrochemical industry enterprises, based on generalized statistical conclusions

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about the current state and trends in the development of the industry on a global scale. The objectives of the article are generalization of statistical data and consideration of the current state and trends in the development of the petrochemical sector around the world and, in particular, Western Europe and Russia; scientific and theoretical analysis of the problem of ensuring environmental safety of petrochemical industry enterprises, taking into account the current state and prospects for the development of the industry. The hypothesis is based on the assumption that the petrochemical industry on a global scale is one of the most dynamic and has a tendency to rapid development, which can potentially lead to an increase in the environmental burden, therefore, the tasks of effectively ensuring the environmental safety of petrochemical industry enterprises, as a factor of their competitiveness, are actualized, requiring a systematic and integrated approach to implementation. The novelty of the research lies in the fact that the author conducts a systematic analysis of diverse sources of literature and up-to-date statistical data on the current state and trends in the development of the petrochemical industry on a global scale, focusing special attention on individual regions, and, based on scientific and theoretical analysis and practical experience, identifies key aspects related to the problem of environmental load, offering key recommendations for its resolution, systematizes the goals and principles of improving the environmental safety of industry enterprises.

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*Yan Zhen, Wang Huan*

### **The Study of Measures to Promote Russian-Chinese Cooperation in the Field of Energy in the Arctic in the Context of the "Ice Silk Road"**

*Keywords:* Arctic energy development; Russian-Chinese cooperation; "Ice Silk Road".

*Abstract.* The Arctic region is rich in energy resources, such as oil and natural gas, especially the huge reserves of Arctic oil and natural gas in Russia. It is regarded as an important component of the global energy strategy and has enormous economic potential. Due to the growing global demand for energy, the development of energy in the Arctic is of great importance. Since the reduction in the area of Arctic ice caused by climate warming has increased the availability of shipping lanes in Arctic waters, the Ice Silk Road opens up new opportunities for cooperation between Russia and China in the development of resources in the Arctic region. This study analyzes the concept and prerequisites of the "Ice Silk Road", as well as the current situation, difficulties and problems of energy cooperation between China and Russia in the Arctic in the context of the "Ice Silk Road". The paper examines the strategies of Russian-Chinese energy cooperation in the Arctic against the background of the "Ice Silk Road" in order to offer ideas for more effective and unhindered cooperation between the two sides.