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Ю. Коваленко, д-р екон. наук, доц.

Національний університет державної податкової служби України, Ірпінь

### ФІНАНСОВИЙ СЕКТОР ФІНАНСОВІЙ СИСТЕМІ ЕКОНОМІКИ: ТЕОРЕТИЧНИЙ АСПЕКТ

*Виділено широкий і вузький підходи до визначення фінансової системи. Показано різницю між фінансовою системою та фінансовим сектором (сектором фінансових корпорацій). Запропоновано організаційно-інституційну матрицю фінансової системи економіки. Проаналізовано ключові позиції Системи національних рахунків і Класифікації інституційних секторів економіки України щодо сектора фінансових корпорацій. Визначено сутність та структуру сектора фінансових корпорацій в Україні.*

*Ключові слова: фінансова система; фінансовий сектор; сектор фінансових корпорацій; інституційні одиниці; фінансові посередники.*

Yu. Kovalenko, Doctor of Sciences (Economics), Associate Professor  
National University of the State Tax Service of Ukraine, Kiev region, Irpin

### THE FINANCIAL SECTOR IN THE FINANCIAL SYSTEM ECONOMY: THEORETICAL ASPECTS

*Broad and narrow approaches of the financial system are obtained. The difference between the financial system and the financial sector (the financial corporations sector) is shown. Organizational and institutional matrix of the financial system of the economy is proposed. Key positions of institutional sectors classification of Ukraine's economy are analyzed, as well as the System of National Accounts with respect to the financial sector of corporations. The structure of the sector of financial corporations in Ukraine is defined.*

*Keywords: financial system; financial sector; financial corporations sector; institutional units; financial intermediaries.*

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JEL O15

G. Lozova, PhD in Economics, Associate Professor  
Taras Shevchenko National University of Kyiv, Kyiv

### USING HEURISTIC METHODS AND TECHNIQUES TO STIMULATE A COLLECTIVE CREATIVITY OF EMPLOYEES OF THE ENTERPRISE

*The article deals with the establishment and development of heuristic techniques of stimulating creative activity of enterprise personnel based on science achievements and experience analysis. The algorithm of forming a creative team of workers and realisation of creative project are proposed. A comparative analysis of basic heuristic methods and techniques for the phase of science research and development is conducted.*

*Keywords: heuristics, heuristic methods to stimulate creativity, enterprise innovative process, a creative project, stimulating of creative activity.*

**Problem statement.** In context of increasing competition and acceleration of scientific and technical process the problem of developing innovative enterprise potential through the disclosure of employee's creative skills acquires the priority nature. Creating free constructive enterprise atmosphere combined with proficient management and stimulation of creative collective work allows a company to gain appropriate competitive advantages and to get commercial success on the market.

While analyzing top-2000 most successful companies' ranking of the world according to FORBES, it is notably that among these enterprises there are those ones that either implement innovations or operate in the sphere of high technologies and deal with innovative products output. For instance, among 50 most profitable companies of the world in 2013, according to FORBES, the company Apple took the 2<sup>nd</sup> place, Samsung Electronics – the 12<sup>th</sup> place,

Microsoft – the 17<sup>th</sup> place, IBM – the 18<sup>th</sup> place, etc. The common attribute for all of these companies is a point that innovations development and intellectual products creation are actually put on a stream. Precisely innovative capital, in our opinion, allows these companies to grow on the market.

As the analyses show, a big number of leader-companies in innovative technology sphere are american. It largely happens because the USA managed to create an effective security system and an introduction of innovations, a peculiar innovations conveyor. Unfortunately, the innovation system in Ukraine is underdeveloped because of a gap in relationships between science, business and state. However the problem of establishing and further commercialization of innovations is critical, because ukrainian companies are forced to search new tools for growing in terms of economic crisis instability. Therefore ukrainian business has an important task to increase the part of innovative products

both in manufacturing structure entirely and in enterprise's structure individually. Experience shows, that enterprise personnel, clients, providers or competitors can be the origin of innovations in an enterprise. Moreover, leadership in this process, in our opinion, belongs to a creative team – the workers of the enterprise. Therefore stimulating of workers' creative activity, forming creative teams for solving current and strategical problems are important factors for providing competitiveness of a company. In this way a research of collective creative process, detection of techniques, that allow to increase the effectiveness of collective creative cooperation, including heuristic methods and techniques with the aim of providing enterprise's competitiveness on the market, acquire a special significance.

#### The analysis of recent research and publications.

The research of theoretical and methodological, scientific and practical problems of intellectual capital development, innovative thinking, the process of creating intellectual products and innovation analysis, searching methods to stimulate intellectual creativity in Ukraine are in the spotlight of such famous scientists as V. Basilevich, V. Ilyin, Y. Kapitsa, V. Kutsevich, P. Tsybuliov, O. Butnik-Siverskiy. For example, V. Basilevich in his works pays considerable attention to the development of intellectual capital in Ukraine. [1] V. Ilyin considers collective activity from a position of philosophical approach, in other words, awareness of self-fulfillment individual programs, a person's citizenship, determination of a the real sense and the purpose of creator's life. V. Kutsevich is interested in creating and protecting industrial property problems and accordingly development of collective creativity in relation to development of trade marks, industrial prototypes, know-how. [2] P. Tsybuliov's works are dedicated to the issue of intellectual property rights management on all phases of life cycle. [3] Y. Kapitsa as a director of The Intellectual Property Centre and one of the developers of the act project of Ukraine "About collective creations rights, implementations, phonograms, videograms rights management" makes an accent on the aspect of collective management of intellectual property objects and intellectual products rights. [4] The analysis of recent publications testifies that diverse aspects of creativity theory development interests such famous western scientists as E. de Bono, G. Bush, R. Yensen, G. Hemel, J.Luft, M.D.Shields, T.A.Scandura, E.A.Williams. The works of T.A.Scandura, E.A.Williams, J.Luft, M.D.Shields, who are the authors of unique techniques of creative thinking development at the same time, are dedicated to the problem of mentoring skills development, superthinking forming and organisation of mental activity. [6,10] The developments of London business school professor G. Hemel in the sphere of key competitions of innovative thoughts arouse a huge interest. R. Yensen's works explain the role of creativity in community's life, forming of so-called "dream society" in economic aspect and in context of modern world futurology basic tendencies. But the authors' points of view on the problem mentioned above can often differ because of the differences in their approaches to the innovative process structure and components, different approaches to innovative thinking in collective creativity. Therefore further research in collective creativity sphere is still actual.

The issue about the organisation on systematic workers' collective creativity scientific principles in context of forming of postindustrial society in Ukraine is open. The loss of intellectual potential of workforce cause serious risks, danger for the county's national security in future.

On the other hand, the motivation of young people, who aim to self-realisation and disclosion of creativity, is observed with a naked eye.

**The aim of the article.** To define and to discover priority heuristic methods, that allow to stimulate collective creative activity in an enterprise effectively and provide increasing of its competitiveness on the market in the future, on the basis of domestic practice analysis and learning international experience.

**The results.** It is well known that business is an economic activity directed towards systematic receiving of profit from manufacturing, selling goods, service rendering, etc. Moreover, the business sphere often differs by high standardization, availability of certain limitations and stereotypes. Therefore, a question raises immediately: does the modern world need creativity? Why is it so important to put systematic innovative and creative activity of enterprise personnel right? In our view, it is possible to distinguish a few reasons of necessity of innovative potential of enterprise workers development. Among them, in particular:

- Competition intensifying on the market, especially in the conditions of economic activity cutback and instability.
- Reduction of commodity life cycle on the market that is accompanied by high-rate updating of knowledge and technologies.
- The need in technologicalness and unicity for additional competitive edges acquisition on the market.
- Passing to the highly standardized systems of management and running business in conditions of globalization and eurointegration.
- The necessity of additional innovative competences development and creative realization of enterprise workers.

The development of human's creative activity, exposure of cognition and creativity methods characterize the level of civilization development. Life requires the regularities discovery and the creativity methods, study of creative activity and possibilities of its stimulation. And heuristics as science about human's creative activity can help in adjusting of the scientifically-reasonable system of creative activity which is able to create effective business-decision or intellectual products. The term "heuristics", (heureka in Greek means "to find", "to open") was invented by Archimedes Syrakuzskym (287-212 BC). The heuristic departmental teaching was widely used in Ancient Greece, in particular it was used by such known philosophers as Democritus, Socrates. In the epoch of middle Ages the interest in heuristics was practically lost through the idea about creativity's divine character and the impossibility of creative process cognition for a human. The new revival of science began in the epoch of active industrialization. Approximately in 20th, 30th of the XIX century, the row of the advanced works appear. In these works the authors expose the methods of creative tasks decision in the sphere of mainly technical work and constructing, and later corresponding works for solving humanitarian and social problems appear. In soviet scientific literature in 70-90th of XX century a number of the interesting works sanctified to the systematic heuristic for scientists and engineers appear, for example: works of Y. Amirov, P. Koch, I. Muller, V. Tsurikov, I. Blauberg. Corresponding GOST R 15.000-94. "The system of products development and its setting on manufacturing. Substantive provisions " was worked out. [8] However this normative document didn't take effect in Ukraine.

The essence of heuristic techniques use in human's creative activity consists more in preparation of human's psyche to the moment of "truth", so-called intuitional "afflatus", than in providing of direct decision of the put task

in establishing a connection between consciousness and subconsciousness.

Heuristics in our time is mainly used for increasing of human's creative potential, opening of her capabilities. The world experience of the heuristics practical usage proves convincingly, that the time of solving problems by the method of tests and errors passed a long time ago. It is possible to fully agree with this idea, since due to methodological developments in the creative thinking sphere and maintenance of knowledge for next generations there are native changes in development of society's productive forces, innovative "jumps" become possible in civilization development. While methodological and cognitive knowledge died together with a creator, technical progress took place very slowly. The protracted inhibition of scitech development in humanity history is largely explained by the denial of possibilities of creative process cognition and creation of creativity theory and its methodology, the absence of methodological errors analysis.

On our deep persuasion, creation, creativity is accessible to everybody, and the creative thinking, as well as any other skill, can be developed. To that end there are certain receptions, instruments and methodologies that allow to use this skill maximally useful and effectively. For times of humanity's existence various methods were invented in relation to the search of new ideas and stimulation of creative process. In this review an overview of the most effective and useful methods is made. These techniques, from our point of view, can be practically applied on a modern enterprise.

A creative team or creative collective on an enterprise is created, as a rule, on set time under a concretely certain project. In our work we suggest the next algorithm of creative team creation, determination of budget and realization of creative project on an enterprise:

- Determination of strategic and tactical aims of the company, innovative plan development.
- Project of aim and tasks forming, analysis of resources requirements for a specific creative project.
- Market, internal and external environment analysis: internal resource, consumers, suppliers, competitors.
- Determination of creative project conception.
- Determination of collective creative work of command estimation indexes.
- Determination of organizational project structure.
- Determination of heuristic methods that will be used for solving the tasks.
- Motivational determination of charts of employees, working on a creative project.
- Stowage of estimate on the material and technical project base.
- Previous calculation of hours and loadings of participants of project.
- Stowage and defence of budget.
- Realization of periodic estimation of participants of creative project work quality.
- Achievement of the creative project target, realization of tasks and implementation of results in manufacturing.

Consequently, the innovative process of creative collective activity on an enterprise takes place consistently, in a few stages, phases that is presented on Fig. 1.

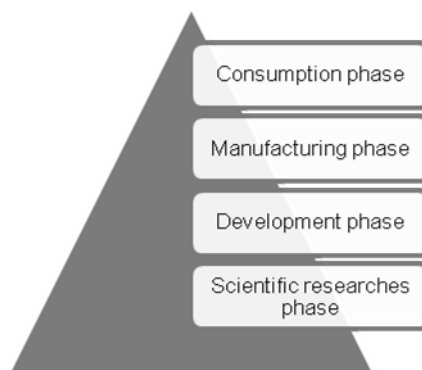


Fig. 1. Innovative process phases on an enterprise

Source: author's compilation

Each of these phases can take place consistently or both consistently and in parallel, moreover, on the first two phases external resources can be attracted additionally. For example, in form of specialists' involvement from consulting or outsourcing companies. It is clear that for each of the phases of innovative process heuristic methods and receptions will be effective. In this work we tried to be concentrated on the analysis of heuristic methods that can be applied by an enterprise in the phase of scientific research-and-developments.

There are collection and generalization of information on the first phase of scientific researches, applied and experimental researches are being conducted, experimental standards or models are being developed. For the first stage setting goals and tasks of creative project is extremely important. The purpose of the project must be formulated most deeply, but at the same time shortly. On this stage the criteria of decisions selection are determined and formalized. In the process of scientific researches the external and internal environment analysis is conducted. For this purpose next methods can be used:

- Questioning.
- Interview.
- Focus groups.
- "Field" researches or insight method.
- Supervision.
- Market review and tendencies determination.

Among these methods it would be desirable to be stopped on the method of focus groups and the insight method.

The method of *focus groups* is intended for the exposure of ideas on investigated issue spectrum, search of people's behaviour explanation in different spheres. The focus group research is the most widespread qualitative method of information collection. A term "focus group" is reduction from a concept focused interview", offered by R. Merton, M. Fiske and P. Kendall in 1946. In T. Grinbaum's (a specialist in focus groups known on the West) opinion, researches of this type include four general elements:

1. Involving of a few respondents collected in one place.
2. Co-operation of participants. If it is considered in many other types of researches that any discussion between participants distorts the cleanliness of answers, on focus groups meeting subjects are encouraged to co-operation with each other.
3. All motion of discussion comes true by a professional moderator. He directs the motion of group discussion in accordance with the goals set on the previous stage.
4. During realization of focus groups a certain scenario-guide-book is used. If in quantitative research during the collection of information the complete, formalized and structured tool is used, a guide-book usually has a form of

the uncompleted guidance. His basic purpose is a problem focusing, tuning on a certain theme. At the same time the guide-book must give an opportunity to make spontaneous expressions of participants, to provide a group dynamics.

While realizing the method properly better possibilities for getting deep information appear, than during individual interviews. According to the estimations of separate researchers, for example, Kutsevich, a group dynamics allows to define meaningfulness of such phenomenon, as group influence and collective mind [3]. In our view, it is possible to agree with high of this method at quality development of realization of focus group scenario.

The essence of the "field" researches or insight method consists in the fact that a researcher must submerge in a problem deeply, taking advantage of available experience.

For this purpose a researcher must appear directly in that place, where a problem appeared, and watching participants problems, for example by the consumers of product, must find those special factors that will help its solution, namely so-called "insight". This method needs time, attentiveness and concentration of researcher's efforts, but the results got during the "field" researches have an important value, especially in the conditions of new product development conducting.

Methods specified above can be attributed to preparatory, intended for collection of information. Heuristic methods that are directly used by a creative team in the process of intellectual product research-and-development we suggest to group as follows. Fig. 2

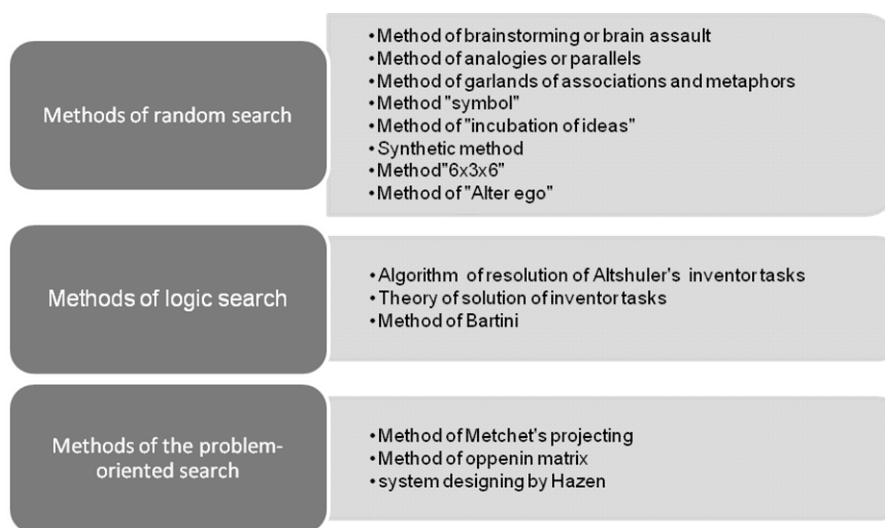


Fig. 2. Classification of heuristic methods

Source: author's compilation

Practical researches of author and questioning of 20 Ukrainian enterprise leaders prove, that the most common and used on domestic enterprises methods are the methods of the first group, which we discuss in details at this work, called methods of random search.

For the search of new ideas the most famous among heuristic methods is a method of brain assault or brainstorm. This method was offered in 1957 by Alex Osborn for solving creative problems of any complication in conditions of limit time but in case of high level of employee's intellectual potential. This method involves certain sequence of acts and compliance with certain rules. This method envisages the certain sequence of executions and observance of certain rules. In the other case session can grow into a guff and not to give necessary results. Let us consider these phases:

1. The gathering of participants, as a rule the most efficient group is from 6-7 individuals, and the announcement of problem, which we need to solve. Moreover, on this stage we need to determine distinct criteria for selection decisions.

2. The interaction of participants, so-called "assault". When all participants express any ideas and proposals of solution problems. At first sight these ideas can seem non-sensical. However it is important on this stage do not allow all the presenters to critic each other.

3. Common development of the selected idea of the participant of session. On this stage moderator forwards course of group discussion according to aims, put on the first stage. Participants try creatively develop and extend the idea-solution.

4. Suggestion of generalized recommendations concerning the solution of set problem.

Important at the use of this method is time durability of the session, which may not exceed 45 minutes. Because then the creative exhaustion comes and the subsequent work of participants is inefficient.

The next heuristic method, which we will review, is the method of analogies or the method of parallels. Heuristic properties of analogy are well-proven with inventor practice, beginning from the first inventions on the birth of humanity, when inventions appeared by an imitation the analogues of nature. An analogy is considered as a thinking process on parallel bases by establishment of the connections in brain with the selection of those properties, which are similar to each other by certain criteria, other properties of object are ignored by investigator. Scientists differently explained the concept of analogy: as an identity of relations, proportionality (Plato, Aristotle, Thomas Aquinas), as a high-quality similarity of relations (Harald Höffding), as accordance (Archimedes, J. Kepler, E. Rutherford), as similarity of functions and structures of objects (A. Wiener, L. Kuffin'yal, F. Rosenblatt), as similarity between the laws of two spheres of science (J.C. Maxwell), as the special case of induction (J.S. Mill), etc. In modern logic an analogy is usually understood as an unidentical similarity of properties or correlations. In the real scientific practice an analogy forms so-called "bridge" between the inductive and deductive ways of thinking. To the method of analogy inventors often came through reflections on observations. Heuristic analogies can be classified by various character-

istics. For example, for creative aims there is an analogy with alive, lifeless and socially-organized matter. The first group includes heuristic analogies with wildlife- its forms, constructions, functions, materials, processes and ratio between living organisms and their organs.

The second group includes analogies with physical phenomena, constructions and materials of inanimate nature.

The third group includes the analogies related to the artificial objects – technique, literature, works of art and also with public and social phenomena. All analogies can both bring as highly original ideas and give trivial ideas. Efficiency of application of analogies depends on not only ability of analyze, but also from features of inventors tasks, from the subjective capabilities of creator and row of other factors [2].

The third heuristic method is a method of garlands of associations and metaphors. To some extend, this method of creative search connected with the previous method. The point is that in creation the series generation method and recognition of association are successfully used with the purpose of searching solution for creative tasks. Famous expert in the field of heuristic G.Bush suggests to divide these techniques conditionally on two groups: techniques of free associations and techniques of the directed associations. The first and the second are based on the use of the words-irritants, which cause the fast response of the brain and removal other words from memory. Method of free associations includes method of generating associations with the help of key words-irritants in case of semantic and grammatical categories, which generate associations, not limited in any way. The method of the proceeding generating associations on one stimulant keyword is carried out in way that a separate man or a group of people commit the multiple search of associations on a the same word, moreover, usually every answer is limited in time, for example, during one minute. Technique is used for the detection of the primary associative field of word-irritant. The idea of generating free associations was shown by W. Wundt. Later C. Jung found some patterns of occurrence of free associations. It is appeared, that effective experience, deep emotion affect on the type of association, that generating with the help of suggestion of the key word-irritant. If the word-irritant do not affect on emotional sphere of individual, simple, trivial associations appear. In the other case, individual associations are more original, combine the idea, that because of the deep feelings of the personality form in certain complexes [3].

The next method is the method "symbol". Essentially, this method is continuation of previous method, that also provides the search of analogies but in the form of some symbol. Such method allows to turn on the subconscious of the personality. At the beginning of creative session the leader of creative group formulates a problem and suggests present to think of an analogy with a creative object in form of symbol, which meet the put task by its spirit and sense. Next step is compilation of the character attributes and suggestion of the use cases for the solution of the task. Each attribute considered as a source, tool for the improvement of selected creative object.

In practice of heuristic is widely used the method of "incubation of ideas", offered by H. Wallace in 1926. Later this method was successfully developed by H. Helmholtz and H. Poincare. This method provides that the researcher or creative group has enough time for searching the solution of the creative task. This method includes the followings stages:

1. Collection, generalization and systematization of the information about a given problem.

2. Analysis of the accumulated information. A complete concentration on the received knowledge about problem of research..

3. Incubation of the idea. It is necessarily to forget about the problem of research for a while. On thus stage the researcher is proposed to change the course of activity. It is helpful to do deals unconnected with a problem.

4. Stage of "brightening". If the previous stages were held in the right way, researcher is literally lit by the solution of the task. As a brain is concentrated on the solution of the task on the first and second stages, on the third stage of "incubation of idea" it continues the search of resolution, but already at the level of subconscious, that is why the solution of the problem comes to the researcher allegedly from inside. On this stage it is important not to forget an idea and have time to write down it.

5. Revision of the idea, its realization.

Quite interesting, but less widespread method of the solution of non-standard situations are the methods of "alter ego" and "6X3X6". Method of "Alter ego" suggests the search of solution by looking at it from the historical character, expert in some field, literary character, etc. The selection of the character depends on the specific of the selected problem. Preferably this person to be with the great communicative skills. Sometimes it is recommended to choose the character regardless of their professional qualities, but accidentally. For example, it is needed to increase the trust of consumers to the new product, suggest staff those characters as Mother Teresa, Woland or Steve Jobs and you will be affected by suggestions of your colleagues. Solving the problem and working in the creative groups goes as follows. The leader of project divides a creative group on teams, which will present selected character or offers to each of participants of creative group to choose the character. Then the group is shortly presented the biography of the character and emphasize the traits, by which he became famous or respected. After it a leader formulates a problem and every group has to think up as many as possible resolution of this problem, but from the position of its character. A session lasts 20-25 minutes, for this time a creative team has to formulate the concrete solution of the problem and justify their efficiency.

Method "6X3X6" is used, as a rule, in cases when it's necessarily to get many ideas from the creative group for the short period of time. A verbal discussion in a collective is not always so effective, because there are people that are afraid of expressing their thought in public. That is why this method provides a written form of the communication between the members of the team. The leader of the project gather a group of six people, each person are given 3 cards and one idea must be written on each card by the members of the team. Then cards in turn pass to all participants and it is suggested to write down an idea again. It can be both the continuation of the previous idea and quite another idea, which the participant of creative project encountered. As a result the leader of the project gets 108 new ideas [4].

In the process of entrepreneurial worker's creative activity is crucial their motivation and stimulation of personnel innovative development, which includes the continuous process of human resources adaptation on enterprises to the new conditions of production's functioning. In this aspect enterprise solves the next tasks: motivation of worker to gain new knowledge, abilities and skills in the field of direct professional activity, connected with the prospects of rising in carrier ladder; activation of employee work with exploitation of innovations in different spheres, increasing of worker's creative activity in the area of creation innovations. Structure of creative team worker's motivation can gain a next kind.



**Fig. 3. System of motivation of enterprise worker's creative activity**

Source: author's compilation

Moreover, correlation of monetary and non-monetary incentives of personnel in creative process must be in favor of the last. Company managers is needed always to mark in the work with the collective, that they encourages initiative and innovative of personnel. It is recommended to propagandize achievement of worker in the solution of the creative tasks set to enterprises, for example, to award the most prominent participants of creative command a rank of "Expert" and suggest them to perform with new ideas to colleagues. To hold competition of "the Golden fund of firms" and reward winners in public. Systematically conduct creative seminars, classes of masters, that would help to open creative potential of personnel. To give a worker, who is busy in the creative project, some additional fringe benefits, for example, free days for self-education or creative vacations and so on. To establish the system of the continuous education of personnel. To create on the enterprise the system of including of worker in reserve for advancement on leading position depending on his creative and professional achievements. At the same time it is possible to create a system of penalty approvals in case of failure of requirements connected with the development of professional level, what can be expressed in reduction of personal allowances or lowering of the position in company.

Among wage incentives it is better to establish payment of non-permanent bonuses to the worker in case of solution of difficult administrative tasks, receipt of patent, etc. To set the system of financial stimulation, payment of the personal allowances connected with passing of trainings and retraining of human resources. To establish on enterprise cash compensations and social payments, which would give possibility a worker to promote the qualification in the specialized educational centers and also take part in scientific conferences (also international), work on probation abroad.

Conclusions and discussion. Thus, it was in-process generalized and classified existent heuristic methods and approaches for stimulation of enterprise personnel collective creation and justify system of an enterprise worker's creative activity motivation, with the purpose of providing

his economic development and increasing part of innovative products as in the pattern of production.

Organization of enterprise personnel's collective creative activity needs careful preparation, which must necessarily include determination of strategic aims of the company, development of innovative plan and conception of creative project. An important step is forming of creative command for a project, in this sense it is needed to take into account not only professional qualities of workers, but their psychological portraits and psychological compatibility to each other. Mandatory is drafting of estimate on the material and technical base of the project and forming a budget of creative project, clear determination of evaluation criteria of efficiency and effectiveness of team participants. In this work it is offered the author's algorithm of creation of creative team, determination of budget and realization of creative project.

A scientific and practical value is presented by the classification of heuristic methods of research taking into account the phase of innovative process on enterprise.

Conducted analysis proves that for today the most widespread are methods of random search, which are in details described and compared to each other. In our opinion, the best method for receiving a great amount of creative suggestion from the enterprise personnel is the method "6x3x6", that allows effectively involve all members of creative team. If the task is to get highly non-standard resolution of the problem, better to use the method of "Alter ego". Extraordinarily useful from the practical point of view for activity of the creative team is a method of the field researches.

The use of heuristic methods in daily activity of enterprise in a prospect creates favorable conditions for the increasing of competitiveness, opening of creative potential of personnel and self-realization of personality.

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Г. Лозова, канд. екон. наук, доц.

Київський національний університет імені Тараса Шевченка, Київ, Україна

### ВИКОРИСТАННЯ ЕВРИСТИЧНИХ МЕТОДІВ І ПРИЙОМІВ ДЛЯ СТИМУЛЮВАННЯ КОЛЕКТИВНОЇ ТВОРЧОСТІ ПЕРСОНАЛУ ПІДПРИЄМСТВА

У статті розкривається проблема становлення і розвитку евристичних методів стимулювання творчої активності персоналу підприємства на основі аналізу наукових досягнень та практичного досвіду. Запропоновано алгоритм формування творчої команди працівників та реалізації творчого проекту. Проведено порівняльний аналіз основних евристичних методів і прийомів для фази наукових досліджень і розробки.

Ключові слова: евристика, евристичні методи стимулювання творчої активності, інноваційний процес на підприємстві, творчий проект, стимулювання творчої активності.

А. Лозовая, канд. экон. наук, доц.  
 Киевский национальный университет имени Тараса Шевченко, Киев, Украина

### ИСПОЛЬЗОВАНИЕ ЭВРИСТИЧЕСКИХ МЕТОДОВ И ПРИЕМОМ ДЛЯ СТИМУЛИРОВАНИЯ КОЛЛЕКТИВНОГО ТВОРЧЕСТВА ПЕРСОНАЛА ПРЕДПРИЯТИЯ

*В статье раскрывается проблема становления и развития эвристических методов стимулирования творческой активности персонала предприятия на основе анализа научных достижений и практического опыта. Предложен алгоритм формирования творческой команды работников и реализации творческого проекта. Проведен сравнительный анализ основных эвристических методов и приемов для фазы научных исследований и разработки.*

*Ключевые слова:* эвристика, эвристические методы стимулирования творческой активности, инновационный процесс на предприятии, творческий проект, стимулирования творческой активности.

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Г. Мельник, канд. экон. наук  
 Чернівецький національний університет імені Юрія Федьковича, Чернівці

### МОДЕЛЬ ОЦІНЮВАННЯ РІВНЯ ІНФОРМАЦІЙНИХ РИЗИКІВ В КОРПОРАТИВНИХ СИСТЕМАХ

*Проаналізовано особливості та світовий досвід інформаційного ризик-менеджменту. Обґрунтовано необхідність комплексного підходу до аналізу та управління інформаційними ризиками в корпоративних системах, в якому б із системних позицій розглядалися усі складові якості і безпеки інформації, що впливають на ефективність використання засобів та механізмів захисту безпеки інформації в корпоративних інформаційних системах (КІС). Розроблено економіко-математичну модель із застосуванням теорії та інструментарію нечітких множин і нечіткої логіки, що дозволяє більш точно оцінювати ступінь інформаційних ризиків на підприємстві.*

*Ключові слова:* інформаційний ризик, корпоративна інформаційна система, аналіз чинників інформаційних ризиків, вразливість, рівень загроз, дієвість засобів захисту інформації.

**Вступ.** Сучасні підприємства мають складну структуру, що зумовлена багатoproфільною діяльністю, територіальним розміщенням підрозділів, чисельними корпоративними зв'язками з партнерами. Корпоративними, зазвичай, називають системи управління підприємством, що враховують особливості структуризації та наявності окремих органів управління. Серед корпоративних систем виокремлюють організаційні, інформаційні, тощо. Більшість бізнес-функцій та управлінських процесів підприємств і організацій охоплюють корпоративні інформаційні системи (надалі КІС).

Впровадження нових інформаційних технологій завжди пов'язане з новими ризиками. Чим складнішою є структура корпоративної системи, тим вищим є ступінь ризику здійснення стосовно неї загроз: проникнення ззовні чи несанкціонований доступ зсередини підприємства, зокрема з метою фінансового шахрайства або розкриття комерційної таємниці, викривлення чи знищення інформації тощо. Створення розвиненого і захищеного інформаційного середовища є неодмінною умовою розвитку суспільства та держави.

Існуюча методологія інформаційного ризик-менеджменту не передбачає комплексного підходу до управління інформаційними ризиками в корпоративних системах і не дозволяє встановити взаємозв'язок інформаційних та інших видів економічних ризиків. Використання економіко-математичних моделей управління інформаційними ризиками не завжди узгоджене та зорієнтоване на досягнення кінцевого результату бізнес-процесів, що призводить до зниження ефективності управління ризиками всього підприємства.

Потребує належної уваги використання сучасних математичних методів в моделюванні процесу управління інформаційними ризиками. Можна дійти висновку, що, відповідно до цих об'єктивних вимог, зросла актуальність економіко-математичного моделювання процесів оцінювання та управління інформаційними ризиками в корпоративних системах.

Метою статті є розробка системи економіко-математичних моделей оцінювання загального рівня інформаційних ризиків в корпоративних системах. Предметом

дослідження є методологія та інструментарій економіко-математичного моделювання у процесах управління інформаційними ризиками в корпоративних системах.

**Аналіз останніх досліджень та публікацій.** У науковій літературі, національних і міжнародних стандартах [1] приділяється велика увага проблемам управління ризиками, що пов'язані з використанням інформації в діяльності підприємств. Вчені Бернстайн П., Бланк І.А., Вітлінський В.В., Луман Н., Марковіц Г., Найт Ф.Х., Самуельсон П. та інші розробили загальні принципи та інструментарій управління економічними ризиками. Математичні методи та інструментарій економіко-математичного моделювання представлені в роботах Клейнера Г.Б., Кульби В.В., Матвійчука А.В. [2], Сігала А.В. та інших. Статистичні методи моделювання можуть використовуватися для вивчення інформаційних ризиків в комбінації з неформальними методами досліджень [2, 3]. Управління інформаційними ризиками в умовах невизначеності може здійснюватися з використанням методів м'яких обчислень, таких як інтервальний метод, нейронні мережі, генетичні алгоритми, а також нечіткі множини та нечітка логіка.

Інформаційні ризики як різновид економічних ризиків розглядаються, зокрема, в працях Вертузаєва М.С., Загороднього В.І. [3], Ліпаєва В.В. [4]. Найбільш близьким до поняття "інформаційний ризик" є поняття "загроза безпеці інформації". Ліпаєв В.В. вкладає в поняття "інформаційний ризик" наступний зміст: це можлива подія, в результаті якої несанкціоновано знищується, спотворюється інформація, порушується її конфіденційність або доступність [4]. Причому частина авторів такого трактування інформаційного ризику під захистом інформації розуміють захист в основному від зловмисних дій.

Проблеми оцінювання якості інформації і надійності апаратних і програмних засобів розглядаються в працях Байхельта Ф., Зегжда П.Д., Муна С., Стенга Д.І., Франкена П. та інших. Стенг Д.І. ще більшою мірою звужує поняття інформаційного ризику [5] і розглядає в його межах тільки загрозу безпеці інформації в комп'ютерних системах. Прихильниками таких підходів до розуміння категорії "інформаційні ризики" є, як правило,