THE FORMATION OF THE SYSTEM OF INTELLECTUAL CAPITAL MANAGEMENT AT ENTERPRISES

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1. Introduction

Administration activity is based on the classic set of common (universal) functions of administration: planning, organization, motivation, and control that become special (or specialized) according to:

– hierarchical level of the company: strategic, tactical, operational;
– functional blocks of intellectual activity;
– objects of management.

Strategic planning and control of intellectual activity is a prerogative of directors. Stakeholders are entrepreneurs (owners), competitors, consumers and business partners. Information support of strategic management refers to the tasks of an appropriate functional unit. Manager with special expertise implements strategic circulation of documents. At the tactical level management is based on investment planning and directors of enterprises and leading experts in economics and finance are responsible for determining the objects and sources of investment. An economist develops investment plans and implements investment circulation of documents.

2. The object of research and its technological audit

Presently, in Ukraine the issue of the nature and system of intellectual capital is controversial. In the available studies the formation of system of intellectual capital management and its development is not enough substantiated. Among domestic and foreign scientists some aspects of intellectual capital are covered in the works by [1–7]. The bulk of administrative activity is performed at the operational level where general functions of management are particularized regarding the tasks of production units of intellectual activity of the company [8].

3. The aim and objectives of research

The aim of research is analysis of system of intellectual activity of the company in the current economic situation.

To achieve the aim, the following scientific research tasks are solved:

1. To investigate the function of planning in the management of intellectual activity in the company, which includes training for the four types of plans.
2. To review function – the organization that is proposed to be used for: setting up, organizing, regulation processes of intellectual activity, their technical equipment and software, intellectual creation of the organizational structure of the company.
3. To identify the function of motivation, realizing the needs of workers in novelty, personal development, professional growth, creativity, recognition, power expert.
4. To make recommendations regarding the structure formation system of intellectual activity in the company by means of functional blocks which will be periodic and random testing.

4. Research of existing solutions of the problem

Terminological analysis shows that the term «human capital» that was formerly used, in the middle of the XX century was replaced with the term «intellectual capital» due to technological progress, scientific researches, informatization of a society. One of the first who gave definition to the intellectual capital was L. Edvinsson. He considered it as «a set of human capital, organizational (or structural) capital and client capital, each of them can be borrowed or their own» [2]. G. Bilov and P. Tsybuliov used this definition in their works [2]. Much different from the above interpretation of intellectual capital, the opinion of E. Brooking, given from the standpoint of practice, which actively uses in its work the results of intellectual work [9]. She believes that «intellectual capital is a term used for denoting intangible assets, without which the company cannot exist and strengthen competitive advantages. The components of intellectual capital are: human assets, intellectual property, infrastructure and market assets. Human assets mean the set of collective knowledge of employees, their creativity, problem-solving skills, leadership skills, entrepreneurial
and managerial skills» [8]. In general, the position of scholars and experts are very different. Intellectual capital is defined as:
- the complex of intellectual assets and workforce [5];
- intangible assets that increase competitive advantages [9];
- scientific and everyday knowledge of workers, communication and organizational structure, intellectual property and experience, information networks and company image [10];
- the complex of human, organizational and client capital [2].

5. Methods of research

For solving the tasks the following methods were used:
- dialectical method that was caused by the need to analyze and summarize certain aspects of scientific knowledge that examines the evolution of scientific views on the nature of the intellectual capital of the company;
- structurally-functional analysis using the principle of systematic study of economic phenomena and processes of dismembered structural integrity;
- system-analytical method, according to which by researching the functioning and development of intellectual capital at the enterprise, modern functional blocks are proposed with the help of which periodic and selective control will be carried out.

6. Research results

Thus, when planning the training of the company personnel four types of plans are used:
1. Thematic plan identifies the directions of training in accordance with identified needs of the whole organization and employees separately.
2. Plan-program forms the structure of theoretical and practical training, the structure of issues studied within the subject (course), acquired skills.
3. The plan of methodological support creation: lectures, practical tasks, case studies, and tests.
4. Current schedule that divides classes in time, in space (in classrooms, workplaces and departments).
   The participation of staff in the process of planning is defined in a responsibility assignment matrix.
   Thus, three types of plans are developed for this block:
   - plan of designing information system;
   - plan of information system development (introduction to exploitation);
   - current plan of information system exploitation.
   The system of planning cognitive and creative activity of the enterprise should provide the implementation of related activities:
   1) determination of directions (topics) of researches;
   2) design of the methodology of researches;
   3) design of software and technical equipment for researches;
   4) research conducting;
   5) design of new systems based on research results.
   Accordingly, there are three types of planning:
   1) thematic planning of studies;
   2) planning of the preparatory work;
   3) current planning of research and project work.

The types of control in the management of intellectual capital:
1. Administrative, financial, technical control of plans implementation.
2. Evaluation of a staff as a synthesis of analytical research and control.
3. Assessment of intellectual property objects in order to determine the degree of their innovation, observance of technical, environmental, legal regulations, the possibility of their practical use, patenting, determination of value, copyright protection.
4. Accounting of non-material assets that permits to add the results of intellectual activity of the enterprises to the fixed assets for their accounting, amortization and commercial use.
5. Management accounting which allows to evaluate all intellectual capital of the enterprise, not just the one defined by valid law.

In accordance with the levels of the hierarchy the following types of control are distinguished [1]:
1. Control of enterprise interaction with the subjects of external environment and, above all, with customers, in other words, control of marketing (market) intellectual capital.
2. Control of employees’ intellectual activity, their results for the company as a whole and its departments, in other words, control of organizational intellectual capital. This type of control is designed and organized similarly to planning tasks of functional blocks of intellectual activity.
3. The control of intellectual activity of an employee, its results, in other words, control of human capital.
4. Self-control of employees as knowledge bearers, i.e. their self-esteem as an individual human capital. The objects of self-control are work, its intermediate and final results, psychophysical processes and the state of an employee (reflection). The most important factor of an employee’s personal and overall success is the positive result of their activities. The efficiency of their achievements is provided by the external management impact.

It is proposed to bring the concept of the control system in accordance with the content of the functional blocks of the enterprise intellectual activity. The following independent subsystems are proposed:
- «educational activity» block – previous, current and final control of classroom training;
- self-control of learning; control of knowledge acquired at conferences, seminars, workshops;
- monitoring learning outcomes (knowledge replenishment) of an employee who participates in the work of creative groups;
- «information ensuring» block – control of the use of internal and external information resources and technical means;
- previous, current and final control of designing, assimilation and exploitation of specialized information systems;
- self-control of individual database of an employee;
- «cognitive and creative activity» block – control of the process and result of the identification and formalization of personal knowledge of experts;
- previous, current and final evaluation of projects of research and development works;
- control of the work of small creative groups regarding problems solution, improvement of business processes;
– «economic and legal activity» block – registration of the results of employees' intellectual activity; control of the life cycle of knowledge and intellectual capital of the company;
– monitoring the efficiency of knowledge usage in economy of enterprises; control of investments in intellectual activity;
– accounting of non-material assets. Evaluation and analysis of the structure and value of intellectual capital of a company;
– control of information security and protection of intellectual property rights objects.

Such characteristic of control as the totality loses its value because total control «weighs down» creative process. Control is conducted periodically and selectively, control points are set for this, e. g. as the transition from one stage to another stage of work or at regular intervals of time along the production or management process.

Transparency and truthfulness of test results is very important. For example, researchers (analysts, scientists) must not misunderstand themselves and directors during self-control, overestimating intermediate and final results. Difficulties of reliable test results are caused by the complexity and subjectivity of evaluation. There is also the risk of understating the results of cognitive and creative activity when it is difficult to determine its practical application or the result.

Another peculiarity of the control of intellectual activity of the company that must be taken into account when creating a control system is the lack of cash-based norms and standards. In this regard, the results of control are often necessary to adjust plans, but not the current activity. Motivation is another function that should be added to the system of management of intellectual capital of the company. It is essential to use all kinds of motivation of employees, but, compared to the production of material products, motivation of intellectual activity has peculiarities.

Self-motivation is very important for motivation as it implements the needs of employees as bearers of knowledge for:
– novelty – new knowledge, working conditions, means of production, social environment;
– personal development – expanding social, psychological and, above all, intellectual abilities;
– professional development – acquisition of new theoretical and practical knowledge;
– creativity – getting creative results and emotional experience associated with the very process of creative work (inspiration) and its outcomes (joy of new birth);
– recognition – the assessment of the employee as a creative professional for colleagues, managers, partners’ part;
– expert power based on knowledge.

External motivation (stimulation) which manifests itself in material production activities through:
– administrative stimuli – officials' authority, planning and control system;
– organizational stimuli – organization of processes, workplace, schedule and daily routine, teamwork;
– economic stimuli – remuneration system;
– social and cultural stimuli – ethical standards, standards of behaviour, principles of relationships, organizational rituals and traditions, psychological climate and common values.

The peculiarity of administrative motivation of staff intellectual activity is caution (or even the complete unacceptability) in the use of authoritarian management styles. Excessive centralization of decision-making, domination and uncompromising director's opinion, intolerance to mistakes, low rates of staff work can lead to opposite results – stoppage of creative process, «deadlock» solution, providing with false information by employees who endeavour to avoid punishment. It should be guided by the rule: «creative worker has a right to make a mistake». Moreover, the probability of a mistake is high in the early stages of intellectual activities.

Organizational motivation has difficulties due to the fact that current processes, especially of cognitive-creative block are poorly formalized. But the strongest organizational stimulus (or rather complex – social and organizational) is teamwork, group dynamics. People involved in creative organizational environment «looking round» on others, work close to the limit of their capabilities. It is stimulated by the presence of an informal leader, cognitariat, employee's inclusion in group methods of work – joint debate, discussion, and brainstorming, role-playing and simulation business games.

The economic motivation plays a special role in the management of knowledge. As man-made intellectual product has consumer's value, then it is possible for its creator to extract business income.

Hence there are two options for organising the system of economic motivation of intellectual resources of the company:
1. Traditional – is characterized by a constant and variable component of remuneration system and an additional one-time payment for intellectual product produced on the basis of the efficiency of its use.
2. Entrepreneurial – stimulating officials’ entrepreneurial interest based on the results of the usage of the intellectual products created by them. They are considered as their intellectual property. In this case, organization of intracompany economic and legal system of intellectual property management of the company and its employees is necessary.

Socio-cultural motivation creates a common background of intellectual activity through the adoption of corporate principles and values by the staff. They are transformed into individual mental models and determine the behaviour of the individual. These values are: commitment to continuous improvement of professional activity; openness and willingness to share the information, knowledge and skills with colleagues; focus on achieving results; realization of the necessary organizational changes; honesty in relationships with colleagues, subordinates, leaders. These values are declared in the Code of Corporate Culture and are kept, especially the by the authorities of the organization.

A complex method of encouraging staff to active cognitive and creative activities can be a system of in-house (corporate) titles and academic degrees of the employees who possess knowledge. It will supplement the conventional system of job categories, providing wages increase, freedom to use working hours (flexible hours), more comfortable and technically equipped working conditions, recognition by colleagues, internal satisfaction [4].

In accordance with the presented concept, the motivation system should be brought into conformity with the content of the functional blocks of enterprise intellectual
activity. We offer to distinguish the following independent subsystems:

- «educational activity» block – motivation for perpetual learning (self-learning), advanced training of staff; their participation in internal and external seminars, conferences;
- «information ensuring» block – motivation of communication between employees of the company;
- their participation as experts in creating corporate information systems; openness of individual database to all employees;
- «cognitive and creative activity» block – motivation to create new knowledge as intellectual products; participation in collective creative work, rationalizing and innovative movements; providing personal knowledge for their formalization and replication;
- «economic and legal activity» block – motivation of staff entrepreneurial activity aimed at maximum efficient use of existing knowledge; creating new ways of transforming information and knowledge into intellectual capital of the company;
- shortening the cycle of intellectual innovative activity (turnover of knowledge); increase its efficiency.

The organization as a management function is used for:

- adjustment, ordering, regulation of processes of intellectual activity, their technical equipment and software;
- creating organizational structure of intellectual activity of the enterprise.

Group intellectual activity has two forms: group and individual. Group intellectual activity is based on communications between group members forming process of group thinking, self-teaching group. The basic elements of its organization are:

- team selection is based on professional and sociopsychological assessment of a person as a potential member using sociometric methods;
- delegation of authority and responsibilities to team members, determination of the connections and relationships between them;
- organization of the workplace (areas), its software and technical equipment;
- development of methods and technologies of fulfilling processes of joint intellectual activity and teaching group members to use them [6].

Individual intellectual activity is based on processes of perception and presentation of information (attention), its storage (memory), information processing and decision-making (thinking). Basic elements of individual intellectual activity organization are:

- evaluation of individual characteristics of an employee;
- assignment of tasks corresponding to the level of the intellect;
- organization of individual workplace, its software and technical equipment;
- development of methods and technologies of mental processes using methodologies of cognitive psychology, heuristics, «theory of the resolution of invention-related tasks» (TRIZ).

The organization will have peculiarities associated with the functional blocks of intellectual activity, but it is based on the following general elements for all types of processes:

1) concept of process:
   a) consumers of a process, their needs;
   b) purpose of a process;

2) methodology and technology of a process:
   a) objects, means and products of a labour process;
   b) performers of a process (departments and personnel);
   c) information resources of a process (essential information and knowledge);
   d) stages of the lifecycle of a process – preparatory, basic, and final;
   e) independent parts of the process and its stages, obtained decomposition – fragments of the process: subprocesses, operations, and actions;

3) situational state of a process:
   a) characteristics of a process expressed by quantitative parameters;
   b) factors of impact on the state of a process;
   c) logical transitions of a process;
   d) formalization of the information (circulation of documents) of a process;
   e) social and psychological components of a process:
      a) social environment;
      b) psychophysical characteristics and the state of process performers;
   c) rules (principles, products) that determine the nature and logic of behaviour, relationship between members of operating processes, priorities of their activity, etc.

To manage the intellectual processes it is also necessary to highlight their characteristics and display them in specific indices: effect (result), costs, efficiency, labour intensity, duration, workforce productivity and quality.

Formalization of intellectual processes can be carried out in various ways: as text descriptions, in the form of a table, in the form of algorithms, process models performed with CASE-tools [4] and other methods. Formalized processes of intellectual activity of the company are incorporated into its organizational intellectual capital in the form of know-how and have the status of a trade secret.

It is necessary to determine the place of intellectual processes in general activity of a company, their connections with the production of material goods. If to imagine present operations of industrial enterprises in an abstract form, then it is possible to extract several levels of the activity. There is production of the first order product at the lower level that requires methodological knowledge – «how to produce». This methodological knowledge is the product of the second order product and is higher in the hierarchy. Similarly, other methodological knowledge may be required for their production that will be placed even higher – the third order product.

The lower level of the pyramid is current activity of material goods production. Non-material products (information and knowledge), in this case, are technological projects and methodologies (enterprise standards or automated systems) for technological projects designing are produced at two other levels.

Two levels are sufficient to produce non-material products. For example, the development of the production program (plan of production and sales) is the first order product and the development of methodology for the production program is the second order product.

Considering an abstract two-level model, it should be noted the presence of a learning process between the levels that provides the company with qualified personnel for the production of the first order product, and using methodological knowledge – the second order product. The learning process allows to move from theoretical to
practical knowledge, and then to «live» activity (based upon a conceptual model DIKW (data, information, knowledge, wisdom)).

7. SWOT analysis of research results

Strengths. The most optimum is the creation of scientific-financial-business groups that provide «flow» and augmentation of three kinds of capital: financial, intellectual and material within the external approach of integration. Financial institutions carry out the functions of economic and legal block and invest in the creation of intellectual capital that generates scientific institutions, production company, which implements its materialization and commercialization. To coordinate an enterprise headquarters, structures together with organizations that form the infrastructure of intellectual activity are created within the approach based on cooperation of intellectual activity. The coordinators are managers as knowledge bearers of the company. Joint project teams are created to implement intellectual activity. The interaction with the participants of the joint intellectual activity is proposed to make combining legal mechanisms of cooperation and financing mechanisms based on the concept of real options.

Weaknesses. In accordance with the conceptual principles of «combination of mass and individual character, professional and amateur character», «empirical and social-oriented intellectual activity», «intellectual activity» use of any type of organizational structure requires massive labour-saving and innovative work involving all categories of personnel; identification and formalization of implicit knowledge of highly skilled specialists – experts; on-going training and improvement of personnel; transformation of knowledge into the intellectual capital of the company. Consequently, positions of analyst (analytical service), teacher (teaching service), economist and patent engineer (service of invention and rationalization) are mandatory. Designing organizational structure is completed by the development of typical organizational documents (provisions for department and job instructions etc.) that capture the existing system of management of intellectual capital in the overall system of enterprise management to ensure its sustainable operation for a certain period of time and is, thus, an administrative incentive.

Opportunities. It is offered to develop a nationwide standard of system of intellectual capital forming, internal legal framework (the system of intra-company legislation), system of evaluation of intellectual capital in the company, typical examples of best foreign and domestic practices that are presented as a situation (case study) in order to create a common economic, legal, methodological and socio-cultural space for those Ukrainian companies that have direction of strategic development which is based on the use of higher-order competitive advantages.

Threats. When building the organizational structure of managing intellectual capital of the company between its elements (management departments and specialists in management) and the elements of production structure links are created: linear – connections between direct subordination and direct management impact; functional – links of regulatory nature, which are caused by technology of work. In the presence of headquarters staff relations of recommendatory nature are formed. They ensure the coordination between departments and their interaction.

At the same time linear-functional structure doesn’t provide sufficient flexibility and adaptability if the environment is changeable. Therefore, its use is restricted by the following external and internal conditions: relative stability, predictability of external macro environment; industry life cycle during the phase of maturity; stable markets for products selling; director is a leader who can inspire staff solve problems creatively, set up a creative corporate culture.

Building organizational structure based on divisional type creates opportunities to improve the efficiency of intellectual activity of the enterprise by specialization, but there is a duplication of departments. However, this disadvantage can be turned into a strong side of intellectual activity of a company; if we use the approach of internal organizational benchmarking, that is, comparing technologies of intellectual activity, used by different departments, and provide search for «best practices» with the assessment and promotion of best departments and employees.

8. Conclusions

1. The function of planning in the system of management of intellectual activity at a company involves four types of plans for the training of the company personnel: thematic plan, plan-program, plan of methodological support creation, current schedule that divides classes in time, and in space (in classrooms, workplaces and departments).
2. The function – organization in the system of the management of intellectual activity in the company is studied. It is offered to be applicable to: adjustment, ordering, regulation of processes of intellectual activity, their technical equipment and software; creation of an organizational structure of intellectual activity of the enterprise.
3. The paramount meaning of the motivation in the system of managing intellectual activity is highlighted. It implements the needs of employees for: novelty, personal development, professional development, creativity, recognition, expert power.
4. It is proposed to organise in the structure of intellectual activity management the following functional blocks to carry out periodic and selective control: «educational activity», «information ensuring», «cognitive and creative activity», «economic and legal activity». The place of general intellectual processes in general activity of the company, their relationship with the production of material goods is determined. Modelling of advantages and disadvantages according to different types of organizational structure in the system of managing intellectual capital is made. We have determined that information as to the content of the functional tasks of intellectual activity on the formation and usage of intellectual capital, management functions, structure and characteristics of the professional roles of staff as knowledge bearers and specialists in management, their relationships, content and building operational processes of intellectual activity allows to proceed to constructing organizational structure.

According to our concept intellectual activity is considered as a separate activity that produces intellectual (non-material) products. Consequently, production subsystem (production structure) is distinguished in the organizational structure. It aims to achieve the mission
of intellectual activity of the enterprise, defined by the managers, carrying out the tasks of functional blocks. To systematise and optimize the production intellectual activity superstructure – management subsystem is created. It is based on an organizational structure of management in which management functions are implemented.

References

Formirovaniye systemy upravleniya intellektualnym kapitalom na predpriyatiyakh

Исследована функция планирования в системе управления интеллектуальной деятельностью на предприятии, которая включает в себя обучение персонала по четырем видам планов. Рассмотрена функция – организация в системе управления интеллектуальной деятельностью на предприятии. Выделено первостепенное значение функции мотивации в системе управления интеллектуальной деятельностью на предприятии.

Ключевые слова: интеллектуальный капитал предприятия, подразделения интеллектуальной деятельности, функциональные блоки интеллектуальной деятельности.

Analysis and Estimation of Effectiveness of Investment Projects

Проведено анализ стану розвитку інвестиційних проектів в Україні. Представлена загальна характеристика міжнародної практики існуючих методів оцінки ефективності інвестиційних проектів/програм. Подано обґрунтування доцільності прийняття інвестиційних рішень щодо обранних проектів/програм. Представлений етап розробки та впровадження інвестиційних проектів, який включає: організаційно-підготовчий етап; етап безпосередньої розробки проекту/програми; етап узгодження й затвердження проекту/програми; етап пропаганди проекту/програми та контролю за його виконанням.

Ключеві слова: інвест-проекти, методи оцінки ефективності інвест-проектів, етапи розробки інвест-проектів/програм.

1. Introduction

The relevance of research is due to existing political and socio-economic problems in Ukraine, a significant drop in production in certain sectors of the national economy and, as a consequence, a decrease in investment activity both among many enterprises and among individual investors. At the same time, the imperfect legal field and the ineffectiveness of the existing investment mechanisms also determine the creation of an unfavorable investment climate in all sectors of the domestic economy, in turn, does not encourage domestic and foreign investor to further conduct investment activities.

Increased competition in the world and domestic markets, rapid development and change of production technologies, diversification of production, and new criteria for assessing the effectiveness of business projects – all this led to new requirements for the financial analysis of investment projects/programs in building sector.

In this regard, the role of an effective analysis of financial and economic activities and the calculation of investment efficiency in the work of building companies...