

# Economic Mechanisms Of Formation And Use Of Intellectual Capital In The System Of Innovative Cooperation Of Education, Science And Production

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**Abstract:** *Currently, a synergistic approach is gaining more and more popularity in the study of socio-economic systems, according to which an enterprise is an open self-organizing (self-developing) system, and also at the present stage of social development, the role of intellectual capital in the country's economy requires careful and in-depth study. The quality of intellectual capital depends on many aspects, the most important of which are the conditions and methods of its formation. Thus, the integrated mechanism of self-organization of an enterprise is a multi-level system of interrelated mechanisms (organizational, economic, informational, motivational) differentiated by elements. The article reveals the content of economic mechanisms for the formation and use of intellectual capital in the system of innovative cooperation between education, science and production; its goals, subjects, objects, principles, methods, tools and resources are considered.*

**Keywords:** *integrated mechanism, intellectual capital, self-organization mechanism, economic mechanism, intellectual resources, enterprise, stages of intellectual capital formation, self-developing system, socio-economic system, individual intellectual capital, innovative development, synergistic management, self-organizing system, adaptive management.*

## 1. INTRODUCTION

In search of effective tools for the development of modern organizations, scientists and practitioners are increasingly turning to the synergistic concept of management, which considers an enterprise as a self-organizing (self-developing) socio-economic system. The management of such systems is based on the coordinated use of targeted action methods and natural processes of self-organization. The complexity of such adaptive management, the need for a comprehensive application of various methods make it urgent to form an integrated mechanism for the development of an enterprise as a self-organizing system. The

integrated mechanism of self-organization of an enterprise is a set of methods of interaction of internal elements and subsystems that ensure optimal coordination of the processes of organization and self-organization at various stages of enterprise development through: synchronization of internal processes and their coherent behavior;

- selection of optimal management influences depending on the stage of the enterprise's life cycle;
- initiation and maintenance of self-organization processes;
- combinations of different types of homogeneous mechanisms.

The complexity of the mechanism being formed, the variety of methods and tools have led to the selection of certain types of mechanisms: organizational, informational, economic and informational, differentiated by elements. The economic mechanism of self-organization of an enterprise, which forms the basis of an integrated mechanism, is a set of elements (objects, subjects, principles, methods, tools and resources) that provide production, marketing and financial activities of the organization and the commodity-money relations arising on this basis. The purpose of the economic mechanism is to achieve financial and economic goals, both in the external environment, where the enterprise acts as a subject of market relations, and in the internal environment, where intra firm economic relations arise.

The category of "intellectual capital" today occupies an important place in the system of economic sciences. To improve and strengthen the country's position in the world community, an in-depth study of the formation of the considered category is necessary. Many scientists are studying the conditions that influence the formation and development of intellectual capital. Intellectual capital is formed in the structure of social relations, and the main role is played by training and education, which mainly takes place in a team. The accumulation of intellectual capital is inseparable from the development of the individual. Considering the two concepts as complementary, we should note that there are two ways of forming the studied category: independent, without the purposeful influence of the individual, and purposeful, which can be defined as education by influencing a person with the help of pedagogical tools. In other words, the first method is passive personality development, which occurs in the process of communicating with peers, watching films, reading fiction, and participating in social events. We will characterize the second method as an active influence on the individual in order to increase his educational, intellectual and general cultural level. Here, pedagogical workers begin to play an important role - kindergarten teachers, school teachers, coaches of sports, dance sections, teachers of institutions of additional and higher education. Children spend more time in the family, in this regard, parents can not be attributed to either the first or the second group - not always their impact is both purposeful and passive. Active upbringing plays the main role in the formation of intellectual capital. Purposeful impact allows you to more clearly organize educational activities and control the learning process. By using special educational technologies, it is possible to set learning goals, predict results and make adjustments in case of error. Based on the foregoing, we can conclude that the formation of intellectual capital is most associated with education and, accordingly, with such sciences as pedagogy, psychology and sociology. Studying the development of individual individuals, as

components and at the same time carriers of intellectual capital, we identified four stages, each of which corresponds to different factors and conditions that contribute to its most effective formation.

The first stage of accumulation of individual intellectual capital occurs in the early years of a child's life in an actively influencing social environment - 4-7 years. At this moment, in the physiological sense, all subsystems of the body are formed. At this stage, the basics of culture and life principles of behavior and communication are mastered, the stability of the nervous system is formed. In this period, the parents bear the greatest responsibility for the development of this resource. The state, however, influences education through a network of municipal kindergartens. It is possible to trace the relationship between the existing problem of the lack of a sufficient number of preschool institutions and the formation of communication skills in children, the ability to objectively perceive the surrounding reality. The consequence of this problem will be not fully developed socialization and, as a result, the lack of necessary intellectual resources at this stage.

The next stage - from 7 to 18 years old - children study at school. The school lays down the basic volume of knowledge in the field of natural, social and humanitarian sciences. The quality of the knowledge gained is directly proportional to the quality of the professional skills acquired subsequently. Secondary general education in relation to intellectual capital participates in the formation of the foundations of cultural and moral perception, the identification of interests and the consolidation of individual abilities and orientation of children. At this stage, the socialization of the individual is completed, the awareness of civic obligations, rights, freedoms, norms of public morality and the rules of life in society. The negative consequences of the ineffective work of the education and training system are manifested in the forms of crime, the creation of protest youth organizations and groups, and contribute to an increase in the number of drug addicts. The third logical stage is getting professional education through training in secondary and higher educational institutions. This stage is especially important, since in the process professional competencies are formed and the basis of intellectual resources is accumulated, from which there will subsequently be an increase in highly specialized knowledge. The main problem of higher education is the lack of professional orientation of school graduates, as a result of which the majority of university graduates work in spheres that do not correspond to the received specialties. Here there is an opportunity for retraining or advanced training in postgraduate educational institutions.

And the fourth, last, stage lasts throughout the rest of a person's life. This includes various institutions of postgraduate education, institutions for continuing education and retraining, all kinds of trainings, courses, seminars organized by the employer, and, of course, self-education as a component of lifelong learning.

During the period of obtaining higher and postgraduate education, the formation of organizational and entrepreneurial capital takes place, in connection with which a propensity for business and entrepreneurship is revealed. Entrepreneurial ability is revealed in a very small number of graduates.

In the same vein, the formation of intellectual capital is also heterogeneous. All manifestations of creative work, abilities for intellectual work and the formation of intellectual products are the main goal of training a person and his main value in the system

of social relations. Career guidance occupies a special place in the system of formation and development of intellectual capital. Currently, there is a problem of unsuitability of university graduates due to low interest in professional activities in the chosen specialty. This is due to the fact that at the age of 17-18, not every graduate can choose the correct future profession that corresponds to his interests and life goals. The solution to this problem was found not so long ago. Since 2000, the development of vocational guidance programs for high school students began, however, the active introduction of such programs was developed only 3-4 years ago, but even now they are not sufficiently effective. In this regard, we are talking specifically about Russia, since in most European countries such programs are very widely used. The solution to this problem will bring us closer to the formation of a self-sufficient, information-developed society with a large amount of intellectual resources and will allow us to restore the status of a powerful state.

The development of intellectual capital is a process of all-round movement of human abilities as a concentrated expression of knowledge, abilities, skills of a person, as well as his competencies and level of motivation. This movement is based on the expanded reproduction of abilities within the framework of one or another type of activity, leading to the improvement of a person as a subject of this type of activity: productive and consumer activities are fundamentally significant, while creative and "social" activities of an individual species, rather, as their most important attributes<sup>4</sup>.

The internal content of the development of intellectual capital is a change in the properties and structure of the constituent components of human capital.

The development of intellectual capital requires the fulfillment of certain conditions, among which two conditions of reproduction are fundamentally significant: the conditions of accumulation and the conditions for the use of intellectual resources.

The subjects of the economic mechanism in the internal environment of the enterprise are owners, shareholders, managers of all levels, i.e., persons interested in the competitiveness of the enterprise, capable of influencing its production and economic activities and participating in management. A feature of the stage of dynamic equilibrium is the inclusion in the process of self-organization of all personnel of the enterprise. In the external environment, the subjects influencing the economic policy of the enterprise are suppliers, consumers, competitors, creditors, contact audiences (elements of the macro environment of direct influence).

Moreover, the strongest influence of environmental factors is observed at the stage of bifurcation; during self-organization at the stage of mobile equilibrium, the enterprise has a sufficient margin of safety and is able to compensate for external influences. The objects of the economic mechanism include capital, assets, costs, dividends, financial flows, accounts payable and receivable, and the results of financial and economic activities. At different stages of self-organization, certain objects of the economic mechanism are prioritized. The criteria for management and the choice of financial and economic decisions are considered in works [1–5]. The authors differentiate the composition of management criteria by stages of the organization's life cycle. The stage of inception is characterized by insufficient cash flow, high financial risks, investments in non-current assets, and high costs for product promotion. At this stage, such indicators as the dynamics of profit from sales, the ratio of equity and borrowed funds, liquidity ratios, market share growth, indicators of the current

business value, capital structure, etc. are monitored. At the stage of growth, the company, as a rule, reaches the threshold of profitability, attention is paid to the adequacy of economic potential to ensure high growth rates. Of paramount importance, according to A. S. Makarov [1], is the policy of managing working capital, costs, financial results.

At the stage of stabilization, all aspects of the company's activities are controlled: the processes of marketing research, maintaining market share and competitive advantage, investment activities, production and sales, working capital management, financial results, including business value. The economic relations of enterprises and organizations are based on certain principles that regulate production, economic and financial activities at all stages of the life cycle. The principles of the economic mechanism include the following.

- The principle of financial independence - independence in terms of the choice of areas of financial and economic policy: funding sources, resource allocation, areas of use of funds.
- The principle of self-sufficiency - the implementation of entrepreneurial activity is based on full reimbursement of costs for the production of goods (services) and making a profit, maintaining the repeatability of production at a constant or increasing scale.
- The principle of efficiency (economic feasibility) - the activity of the enterprise is aimed at exceeding the results over costs, making a profit, achieving high profitability.
- The principle of responsibility - the existence of a certain system of responsibility for the results of economic activity, violation of contractual obligations and legal requirements. At the same time, enterprises, in addition to material (fines, penalties, forfeit), also bear social responsibility, which consists in creating high-paid jobs, ensuring decent working conditions, developing social infrastructure, and carrying out charitable activities.
- The principle of ensuring financial reserves - the need to create financial reserves in order to cover the risks of entrepreneurial activity.
- The principle of economic control - manifests itself in the need for periodic monitoring of financial and economic indicators, performance indicators of structural units, audit of accounting and tax reporting.
- The principle of interest is the creation of an effective system for stimulating the activities of an individual employee, team, divisions, the enterprise as a whole.
- The functioning of the economic mechanism, in addition to the highlighted principles, is based on the principles of self-organization described in [6].

The goals and objectives of the economic mechanism are realized by influencing the control objects of certain methods. In contrast to the organizational mechanism, in which mainly direct organizational methods of management are implemented, in the economic mechanism to regulate self-organizing processes, economic methods are used that are of an indirect nature. Management using economic methods is aimed at regulating business processes, observing the principles of self-organization in the implementation of economic activities by an enterprise.

The study of the economic and financial-credit policy of the enterprise allows us to identify the following groups of methods of the economic mechanism.

*1. Methods of economic planning and forecasting.* The methods are aimed at determining the goals and objectives of the enterprise for a certain perspective, analyzing the ways of

their implementation and resource provision. The tasks of this group of methods include: forming a business portfolio, developing an assortment policy, determining the need for material, financial, labor resources, reducing the cost of production, increasing labor productivity, ensuring a decent level of wages and working conditions. These tasks are implemented by developing plans for production and sales of products, organizational and technical development, material and technical support, labor and wages, cost and profit, development of an investment and business plan for the organization.

*2. Methods of marketing activities.* This group of methods serves as the basis for the interaction of an enterprise with the external environment through the implementation of a marketing mix. The traditional marketing concept is to form the “4P” complex, the purpose of which is an effective communication, product, pricing and sales policy.

*3. Methods of economic diagnostics.* Methods include both internal and external monitoring, evaluation, analysis and control systems.

Internal diagnostic methods are aimed at the activities of individual employees, departments, the enterprise as a whole, as well as internal business processes. They are implemented using methods for analyzing the internal environment of the organization, as well as various forms and methods of internal audit.

External diagnostic methods are aimed at researching the position of an enterprise in the market, searching for strategic directions, competitive analysis, opportunities and threats; this group includes the methods of strategic analysis of the external environment of the enterprise.

Diagnostics allows you to identify deviations in the activities of the socio-economic system, to establish the order parameter, to determine the indicators that require adjustment.

*4. Methods of financial and credit policy of the enterprise.*

The combination of these methods is aimed at effective management of the financial resources of the enterprise.

The strategic goal in the financial policy of the organization is to ensure financial stability, optimize the capital structure, and achieve profit maximization. Methods of financial and credit policy of the organization include: formation of accounting policy, development of credit policy, management of accounts receivable and payable, development of depreciation policy, management of working capital, risk reduction, cost optimization, development of dividend policy, investment management.

*5. Methods of economic incentives.*

This group of methods consists in mobilizing the labor potential of the enterprise through meeting the material needs of the personnel. As a result, economic methods of influencing the collective and the individual employee perform a stimulating function and also act as one of the elements of the motivational mechanism for the self-development of the enterprise.

Methods, in contrast to administrative ones, are of an indirect nature of influence and include: the formation of forms and systems of remuneration, ensuring the participation of the team in profits and capital, establishing a system of material sanctions and incentives.

The efficiency of the enterprise on the principles of self-organization is determined by the choice of adequate management methods, and also substantially depends on the correct selection of tools.

The set of methods of the economic mechanism contains tools for influencing production, financial and marketing processes, including the material needs of employees, aimed at achieving the ultimate goals of the organization.

Economic planning and forecasting methods are implemented through a system of tools:

- balance sheets (material, cost, labor balances);
- regulatory (cost, labor, production, environmental standards and norms);
- economic and statistical (correlation and regression analysis, extrapolation, time series analysis, construction of matrices, calculation of indices);
- expert (brainstorming, paired comparisons, individual survey, vectors of preferences, Delphi method);
- graphical (network diagrams, Gap analysis, bar charts).

Methods of analysis, assessment are implemented using a wide arsenal of tools for strategic analysis, analysis of financial and economic activities, methods of diagnostics of operational activities. The choice of marketing tools is justified by the communication, commodity, price and sales policy of the enterprise. Economic incentives are implemented using various instruments of monetary and non-monetary material incentives. The ratio of methods and tools of the economic mechanism of self-organization of the enterprise is presented in table. 1.

Table-1

Methods and tools of the economic mechanism of self-organization of an enterprise

Methods	Instruments
Methods of economic planning and forecasting	Balance of income and expenses, working hours, trade balance of the enterprise. Extrapolation, time series analysis, index method, correlation and regression analysis. Expert assessments, Delphi method, brainstorming. Network planning, bar charting, PERT network charts. Budgeting. GAP analysis, PIMS-analysis, SMART theory
Methods of marketing activity	Advertising, PR, sales promotion, personal sales. Assortment policy, customer service, services and guarantees. Pricing, discount system. Marketing research, sales, development of new markets
Economic diagnostics methods	SWOT analysis, competitive analysis, benchmarking, resource analysis, Porter's 5 forces competitive analysis, functional cost analysis, benchmarking, learning curve method, life cycle model, portfolio analysis, model McKinsey, I. Ansoffa, balanced scorecard, KPIs, business metrics dashboards
The methods of financial and credit policy are acceptance	Management and accounting, financial planning and budgeting, financial control and regulation ration, dividendpolicy, hedging
Economic incentive methods	Various forms and systems of wages, bonuses, participation in profits and capital

Table-2

Elements of the economic mechanism at various stages of the self-organization process

Mechanism elements	Self-organization stages	
	Dynamic equilibrium stage	Stage of bifurcation and birth of a new structure
Subjects	All categories of personnel	Founders, owners, shareholders, managers of all levels. Factors external environment of direct influence
Objects	Profit from sales, equity / debt ratio, liquidity ratios, growth in market share, current value indicators business, capitalstructure	Financial stability, debt indicators, structure of assets, costs, cash flow, share of borrowed funds
Principles	Financial independence, self-sufficiency, self-financing, economic viability, responsibility, financial reserves, economic control, interest	
Methods	Economic methods: planning and forecasting, marketing howling policy, diagnostics, financial and credit policy	
Instruments	Corresponding mechanism methods (see table 1)	
Resources	Components of economic potential	

The resource that ensures the functioning of the mechanism is the economic potential. A number of authors [7; 8] understand the economic potential as the totality of all resources (labor, financial, material) that ensure the implementation of the goals of the organization. In this study, the economic potential is understood in a narrower sense - as a set of resources in terms of the financial and production capabilities of an enterprise that allows you to get maximum income through the production and sale of goods and services required by the market. Consequently, the components of the economic potential are the aggregate of fixed and circulating assets (inventories, work in progress, finished goods, cash, funds in accounts, securities, accounts receivable and payable; buildings, structures, machinery and equipment, tools, etc. ). The information content of the elements of the economic mechanism varies depending on the stage of self-organization (Table 2).

A feature of the economic mechanism, as a subsystem of the integral mechanism of self-organization, is the identity of principles, methods and tools at all stages of self-organization. This is due to the breadth and variety, at the same time, the universality of the methods of economic impact at any stage of self-development of the enterprise. Organizational, economic, motivational, informational mechanisms are interconnected and interdependent. The rules, principles, methods of economic interaction are enshrined in the relevant organizational documents. Certain components of the motivational mechanism are implemented through economic management methods in terms of material incentives for personnel. [9;10] Economic diagnostics cannot be implemented without an appropriate information mechanism that ensures the collection, processing and storage of data. The formation and implementation of a comprehensive mechanism for the development of an

enterprise as a self-developing socio-economic system makes it possible to implement the concept of synergistic management, providing an optimal response to changes in the external and internal environment of the enterprise.

## 2. CONCLUSION

The formation of intellectual capital occurs from a very early age, when a person receives primary knowledge about the world and acquires physical skills. However, the most important contribution to the formation and further development of intellectual capital occurs during vocational training, when a person is studying in secondary and higher educational institutions. The development of intellectual capital is carried out throughout the entire life cycle as a result of advanced training and in the conditions of everyday life. Government policy is also one of the most important factors influencing the formation and development of intellectual capital.

The formation and implementation of a comprehensive mechanism for the development of an enterprise as a self-developing socio-economic system makes it possible to implement the concept of synergistic management, providing an optimal response to changes in the external and internal environment of the enterprise.

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