

INTELLECTUAL CAPITAL AS A BASIS FOR COMPETITIVENESS AND STABLE FUNCTIONING OF ENTERPRISES OF DOMESTIC MACHINE-BUILDING ENTERPRISES: ORGANIZATIONAL AND ECONOMIC MECHANISM OF ITS CREATION AND APPLICATION

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Abstract

The importance of intellectual capital as a basis for ensuring the competitiveness and stable functioning of domestic machine-building enterprises is explained, and the organizational and economic mechanism of its creation and application are outlined. The purpose of this research is to determine the essence of intellectual capital and its importance as a basis for ensuring competitiveness and stable functioning of domestic machine-building enterprises at the present stage of development under transformational conditions of Ukrainian post-industrial society. Intellectual capital and the ability of its application determine the successful development of the enterprise, its stable competitive position both at the domestic and foreign markets on the basis of ensuring long-term competitiveness and stable functioning. In this case, intellectual capital means not only tangible or intangible resources which are used in the manufacturing process of a machine-building enterprise. First of all, intellectual capital should be attributed to enterprise personnel special abilities and its competences, based on knowledge, skills and experience, as well as providing valuable information for the enterprise, which is the basis of significant competitive advantages at internal and external markets in post-industrial conditions. The analysis of foreign and domestic scientists researches on the interpretation of "intellectual capital" and "intellectual capital of the enterprise" concept is conducted. Modern ideas about the structure of intellectual capital and interrelation of its elements are analyzed. The problems of the intellectual capital components' determination are investigated. Own interpretation of the intellectual capital of the enterprise is formulated. Basic approaches to the allocation of intellectual capital elements of the enterprises of domestic machine-building are offered. The necessity to consider all components of the intellectual capital of the enterprise involved in the processes of its creation and use is substantiated. Functions of domestic machine-building enterprises' intellectual capital are formulated. Features and characteristics of enterprise intellectual resources are defined. Approaches to formation of organizational and economic mechanism of creation and use of intellectual capital that influence changes in the structure of enterprise management are revealed. The key tendencies of organizational and economic development of intellectual capital as an opportunity to ensure the competitiveness and stable functioning of domestic machine-building enterprises are outlined.

Keywords: intellectual capital, enterprise intellectual capital, competitiveness, innovation process, stable functioning.

INTRODUCTION

Today, industry plays a leading role in supporting the growth of the country's economy. Industrial production of Ukraine is the basis for creation of scientific, technical, economic and social progress. Domestic machine-building is one of the leading industries in Ukraine and basis of its economic development. The state of Ukraine social and economic development highly depends on the efficiency level of machine-building enterprises activities. Therefore, the study of state and tendencies

of machine-building complex development in Ukraine is relevant nowadays [6, p. 444].

Mechanical engineering is one of the types of economic activity that determines the competitiveness of Ukraine's economy and its place in the world. Today, the state of the machine-building industry of Ukraine does not meet the features of sustainable development. It is characterized by physical and morally worn fixed assets, low share of innovatively active enterprises, low implementation of low-waste and resource-saving processes, low level of investments, difficult political and economic situation in the country, high cost of energy resources, poor interaction between production and R&D sphere [7, p. 88].

The machine-building complex of Ukraine covers more than 20 specialized industries, that is, practically all branches of mechanical engineering. Depending on which market the products manufactured by machine-building enterprises are oriented, they can be grouped into five groups (Table 1).

Table 1. Grouping of Ukraine machine-building complex branches

No.	Group name	Brief description of the group
1	Investment (heavy) machine-building	A group of industries whose development is determined primarily by the investment activity of metallurgical, construction, energy and transport complexes
2	Tractor and agricultural machine-building	A group of industries whose development depends on the solvency of agricultural producers and processors of agricultural products, as well as partly on the population demand
3	Railway machine-building	Designed to meet the demand of country's railways
4	Automotive machine-building	The production of products is focused on the demand of end consumers (production of cars), as well as needs of enterprises, firms and executive bodies (production of trucks and buses)
5	Electrical engineering, instrumentation, machine-tooling	A group of high-tech industries, so-called industries which produce components parts for others, which means following the needs of all other industries, including the engineering itself

Source: [2, p. 76]

The main location centers of machine-building branches are given in Table 2.

The most powerful machine-building enterprises of Ukraine are situated: Azovmash (Mariupol); State Enterprise "Electrotyazhmash Plant" (Kharkiv); Kremenchug Automobile Plant (Kremenchuk); Lvivsilmas (Lviv); "Lviv Bus Factory" (Lviv); Nikopol Crane Building Plant (Nikopol); Southern Machine Building Plant (Dnipro); "Poltava Turbomechanical Plant" (Poltava); Sumy Machine-Building Research and Production Association (Sumy); Turboatom (Kharkov); "Kharkov Tractor Engine Plant" (Kharkiv); Kharkiv Tractor Plant (Kharkiv); Kherson Machine-Building Plant (Kherson) [5].

Table 2. The main location centers of machine-building branches

Industry	Territorial location
Heavy machine-building	Kharkiv, Dnipro, Kryvyi Ri, Mariupol, Kiev, Lviv, Drohobych
Electrical Industry	Zaporizhzhia, Kharkiv, Odessa, Kiev, Khmelnytsky, Berdyansk, Poltava, Kamianets-Podilskyi
Transport machine-building branches	Kharkiv, Dnipro, Kremenchug, Mariupol, Nikolaev, Kherson, Kiev, Zaporizhzhia, Lviv, Odessa, Lutsk, Melitopol
Machine tools	Kharkiv, Kiev, Berdychiv, Odessa, Cherkasy, Dnipro
Instrumentation	Kiev, Kharkiv, Ivano-Frankivsk, Lviv, Sumy, Cherkasy, Zhytomyr, Lutsk
Agricultural Engineering	Kharkiv, Dnipro, Ternopil, Kherson, Odessa, Kiev, Berdyansk, Uman, Novograd-Volynsky, Nizhyn, Kolomyia

Source: [1, p. 94]

Main problems of modern engineering development in Ukraine are as following:

- obsolescence of enterprises fixed assets, which negatively affects the competitiveness, quality and cost of engineering products;
- insufficient level of producers solvency, which adversely affects the financial and economic conditions of machine-building enterprises;
- limited domestic demand for domestic products;
- low level of innovation activity of domestic enterprises;
- significant dependence of domestic enterprises on the supply of components from other countries;
- inefficient policy of the state on the activity of monopolists and intermediaries, which leads to an increase in the cost of materials and energy resources [3, p. 24].

The competitiveness of an enterprise is a complex characteristic that is determined by factors and components. Such components were first considered by M. Porter and called “competitive advantages”. According to M. Porter's definition, “competitiveness is the feature of a commodity, service or enterprise to perform on the market on equal basis with similar goods, services or enterprises present there” [9]. Competitive advantage is an economic category, which means that enterprise has unique characteristics that distinguish a given enterprise from other similar ones at the market. Enterprise's position within the industry is determined by its competitive advantages, which are broadly divided into two main types:

- lower prices for manufactured products;
- creation of quality goods.

The first researches of the essence of enterprise's and country's competitiveness were made by M. Porter, A. Marshall, L. Walras, E. Chamberlain, J. Robinson, and J. Schumpeter.

Advantages in the field of intellectual component of enterprise activity are its basis – technology, business processes, knowledge, competence of employees, ability of the enterprise to learn and quickly respond to market demand changes.

For further researches of the competitiveness assessment, it was determined the essence of competitiveness at different levels of study (Table 3) [9, p. 46].

Table 3. The hierarchy of market players' competitiveness concepts

Level of hierarchy	The concept of competitiveness
Country Competitiveness	Country's ability: - to produce products and services that meet the requirements of world markets; - to create conditions for increasing state resources
Ensure sustainable GDP growth and quality of life at world level	Regional competitiveness: - to produce goods and services that meet the requirements of domestic and world markets; - to create conditions for increasing regional resources to ensure the growth of potential competitiveness of economic entities; - to ensure steady GDP growth and quality of life of the region's population at world level
Industry competitiveness	Industry ability: - to produce products and services that meet the requirements of world and domestic markets; - to create conditions for increasing the competitiveness of enterprises in the industry on the basis of basic macro technologies
Competitiveness of the enterprise (according to M. Porter)	"Competitiveness is the feature of a commodity, service or enterprise to perform on the market on equal basis with similar goods, services or enterprises present there" [9]

Source: [9, p. 46]

To our mind, it is most accurate to determine those definitions of competitiveness essence, which are based on the description of internal and external activities of the enterprise because these definitions emphasize the ability of the company to act in a competitive environment and have several advantages over other market representatives.

The economic development of the last two decades has shown that the intellectual capital of the enterprise is the basis of its competitiveness at different levels, both at external and internal markets [8, p. 76].

The category "capital" is one of the most used in economic science and at the same time has no generally accepted definition due to the variety of forms of capital and its manifestations. According to traditional economic definition, capital is understood as a dynamically accumulated economic resource, which is reproduced through the conversion of its forms (production, commodity, monetary) and acts as an age-old value. Capital key feature in such a definition is liquidity, which means the ability to convert directly or indirectly, regardless of its forms, into monetary form. The diversity of capital theories is grounded by the process of roductive forces development. At various stages of economic development, the leading role belonged to material, financial and, finally, intellectual capital. The general essence of capital, as reflected in all theories, is that capital must be invested in economic work which, in the process of continuous movement, generates income. This essence is preserved regardless of the forms of capital.

In the innovation economy, the capital intangible forms come to the forefront. Finding a specific medium and/or legal status, intangible forms of capital are

converted into intellectual capital, which enables them to be attracted to business and transformed into various forms of tangible and financial capital for profit aim. Such process is called cognitive capitalization. According to Polls B., cognitive capitalism should be understood as kind of capitalism in which knowledge is the main source of value, and hence its opposition to industrial capitalism.

Beginning of the XXI century in domestic economic science is characterized by an increase of attention to the problem of intellectual capital, identification of its structure and processes of its management. However, today it can be stated that the vast majority of domestic researchers rather actualize the results mentioned in the researches of E. Brooking, T. Stewart, L. Edinson, M. Castels and other foreign scientists. Meanwhile, in the context of the emergence of an information economy as a support for the global socio-economic system, such situation cannot in any way be considered satisfactory. The necessity of developing an original scientific approach to intellectual capital is determined by at least one of the following reasons. First, intellectual capital is increasingly determining the level of national security and competitiveness. Secondly, the existing approaches in Western scientific thought are more likely to capture the presence of a leading role for intellectual capital within the existing economy than to give it a deep economic and theoretical substantiation.

A coherent system of interdependent categories should be organized in the following order: information and knowledge, information resource, capital in general, human and intellectual capital.

The problem of understanding information as an economic category, especially in the context of its correlation with knowledge, has recently been given great weight in a number of works (J. Hodgson, M. Castels, R. Crawford, J. Sapir, etc.), in which three basic points of view were identified:

- knowledge as a product of information use;
- information as an external form of knowledge;
- knowledge and information are closely related to the positions of economic science, these are identical phenomena.

Having analyzed these approaches, it is defined that it is not easy to give a clear definition of what “knowledge” is. The fact is that, firstly, this concept is one of the most common, and such terms are always difficult to be determined. Secondly, there are many different types of knowledge, and it is difficult to combine them into one synonym. Although it was given an attempt to find out the specific essence of this phenomenon. Knowledge is a way of consciousness existence. Knowledge can also be defined as a form of existence and systematization of the results of human cognitive activity. This most general formulation allows to combine into several synonyms several terms that express the specific types of knowledge that are found in social practice. Knowledge is information learned in a person's mind. This information is absorbed (recorded) in a spiritual form. Information that accumulates in the mind, along with its spiritual understanding, is recorded materially, primarily in natural, spoken language. But knowledge can be fixed with the help of other material signs: with the help of written formulas, mathematical graphs and tables, diagrams, drawings. All these forms of knowledge fixation are called written language (sometimes called symbol language, artificial language).

Being materially fixed, knowledge can be passed on to other people. As a result, it acquires social characteristics and social significance. That is, the essence of knowledge cannot be understood without revealing the socio-historical conditionality of human activity. Knowledge crystallizes, accumulates and objects the social experience of people. A person in the context of real social relations begins to accumulate historically developed conceptual and categorical apparatus. All knowledge that is present in the socio-economic system can be divided by the criterion of their acquisition at home, obtained from direct experience and based on common sense, and scientific obtained through the use of special procedures. In the researches of V.I. Vernadsky, N. Bohr, and K. Marx it is shown that science, as the most advanced instrument of acquiring new knowledge in every particular historical moment, is the sole mean of evolution of human society intellectual sphere.

Based on researches of M. Polanyi, I. Nonak, and X. Takeuchi, it can be distinguished another, equally important classification of knowledge by owner's nature. It allows to distinguish individual and collective knowledge. This allows also to assert that if information is a certain amount of symbols, data, in a certain way organized and transmitted, then knowledge is some intangible object that acts as the dialectical unity of the source and result of the transmission of information. Principle in the generation of knowledge is the participation of individual, as well as his evolutionary character. In this regard, knowledge is always determined by social and technological development of the system. In the context of the information economy, the role of knowledge both – as an economic resource and as a commodity is constantly increasing. Today this process is as follows:

- knowledge becomes more quantitatively and qualitatively more important economic resource in comparison with material resources and physical capital;
- the diversity of knowledge forms as an economic good and growth of sectors related to the market nature of its reproduction (research and development sector, various types of consulting, programming, etc.) are increasing;
- incorporation of codified knowledge into the structure of the production function;
- formation of the telecommunication-information sector of the socio-economic system that transforms the processes and conditions of knowledge transfer between its elements.

Under modern conditions, when the formation of information economy is on the agenda of economic development, the dependence of socio-economic relations on the process of transformation of knowledge into a special kind of capital - intellectual, is more evident. Despite the relatively short history of this concept, it is now clear that intellectual capital is a complex and multi-level phenomenon. At the same time, it is also the greatest success modern science has achieved in the study of intellectual capital at enterprise level.

In a number of works, intellectual capital is regarded as the intellectual activity of a person in the socio-economic system. In this approach, there is virtually no distinction between revenue-generating and cost-effective intellectual activity and other types and forms of intellectual activity. In our deep conviction, the fundamental heuristic value of the concept of intellectual capital lies precisely in the allocation of

a particular element of socio-economic relations, that is, the analysis of intelligence as a factor of economic development. In this sense, the distinction between intellectual capital as income-generating knowledge and other types of knowledge of, for example, purely scientific, technical or cultural-historical significance must be understood. In this sense, intellectual capital is a form of knowledge that is used in the production process and generates additional revenue. Hence the fundamental difference between intelligence and intellectual capital is that intelligence is a collection of human intelligence and accumulated knowledge, and intellectual capital is that part of the intellect that is able to generate income. Thus, intellectual capital is a special part of intelligence.

One can fully agree with a vision of intellectual capital as a multi-level phenomenon that is capable of providing competitive advantages to individuals, firms and nations. Indeed, intellectual capital is manifested at three levels – individual, corporate and social. Moreover, each of these levels corresponds to its special form: on the individual – it is the intellectual capital of the individual; at the firm level – the intellectual capital of the enterprise; at the level of national economy – public intellectual capital.

The prevailing intensive type of economic development characteristic of the information economy is information, knowledge and intelligence that act simultaneously as sources of economic growth and as limiting factors. At the same time, their reproduction and storage are directly related to the person, his level of qualification and cognitive abilities. Under these circumstances it is determined the increase of role of skilled, scientifically trained personnel in ensuring economic development.

The above mentioned allows to define the intellectual capital of an individual as a set of cognitive and spiritual capabilities that provide an increase in the level of income in terms of labor costs. Its structure includes knowledge, experience, skills and abilities of an individual economic agent, as well as the results of his creative activity, which are realized in economic activity.

Objective basis for the increase of intellectual capital is the following characteristics of a person: natural qualities (health, psychophysiological stability, etc.); appropriate upbringing, as well as a high cultural level. The main methods of increasing the intellectual capital of the individual are to increase the level of education and training, which is combined with the continuous work on its increase and the search for new solutions. In parallel with the acquisition of knowledge and the expansion of horizons, a person changes the purpose to which he or she strives, together with the methods of their achievement. Today, the use of high technology requires renewal of knowledge for most specialists once every 5-7 years. All these methods collectively create a certain mentality, which is an integral driving force of human intellectual capital.

There are defined the following features of intellectual capital:

- within the information economy it acts as a limiting factor for economic growth;
- it has the property of storage and accumulation;
- it is combined with a high level of costs for its reproduction;

- it has cultural, historical and institutional conditioning;
- investments in intellectual capital have the effect of multiplier and accelerator of socio-economic development.

From mentioned above it follows that individual intellectual capital largely acts inalienable from the individual. However, it should not be forgotten that in practice it is realized only when it becomes part of the total intellectual capital of the enterprise. It becomes an element of socio-economic relations and in one way or another objective.

The intellectual capital of the enterprise, in turn, is a collection of individual intellectual capital, the integrating factor of which is the level of entrepreneurial capabilities of the enterprise, which allows it to be combined both within it and with other factors of reproduction. This allows to agree with T. Stewart's position, which defines it as the sum of knowledge of all company employees, which ensures its competitiveness. It is safe to say that it is the intellectual capital of the enterprise that determines the shift of the curve of its production capabilities and ensures the dynamics of technological development. Moreover, provision of technological and organizational competitive advantages is the main function of this type of the capital.

T. Stuart and other scholars consider the intellectual capital of an enterprise as an integrated learning and propose to distinguish it into three components - human capital, structural capital (intellectual property and information resources) and consumer or client capital. Accordingly, the structure of an enterprise's intellectual capital can be represented as follows.

All three components of intellectual capital are in constant interaction with each other. Therefore, investing in each of them requires a systematic approach to the development of the intellectual capital of the enterprise, which would provide mutual encouragement. Thus, one of the classic concepts of intellectual capital is L. Edvinson's which suggests to calculate intellectual capital as an effect of multiplying human capital on structural capital.

At the same time, each element differs in quality characteristics from the another one and is determined by different factors. Thus, an important indicator of the human capital of the enterprise, its ability to innovate is the proportion of new products in the total volume of sales. For example, it should be emphasized that in the effective management of an enterprise, maximum amount of return on investment in human capital can be several times higher than the return on investment in machinery.

In turn, public intellectual capital is an aggregate indicator, which includes two previous levels, which function is to ensure the sovereignty of the state, the innovative trajectory of its development, as well as a steady pace of economic development [4].

Based on this we conclude that as the level increases, the category of intellectual capital gains its importance. So, if for an individual economic agent intellectual capital appears as a reproduction factor, which acts alongside and in combination with other factors, then for the national economy it is already the potential for economic development, a reserve for improving the quality of life. In this sense, the concept of intellectual capital and intellectual resources goes beyond

the economic sphere inherent in society.

There are different perspectives on understanding of intellectual and human capital and their relationship with each other. In our view, despite the undeniable closeness, these concepts should not be identified as same. And if at the enterprise level human capital is seen as one of the constituent parts of the intellectual, then at the society level their relation is different.

In the domestic literature, intellectual capital refers to a set of intellectual assets (experience, knowledge, skills of people, enterprise personnel, other results of their creative intellectual activity, used in economic practice and capable of generating income in business), which may include:

- human assets, as the most important intangible capital (joint collective knowledge of employees of the enterprise, the totality of their creative abilities, ability to solve business and management problems, etc.);
- market assets (intangible assets related to market operations);
- intellectual property as legal knowledge that can generate additional income (patents, copyrights, licenses, trademarks of goods and services, know-how, trade secrets, etc.);
- infrastructure assets (processes, technologies, methods that allow the efficient operation of the enterprise);
- a system of stable business relationships between manufacturers, suppliers and customers, reducing transaction costs for their interaction with each other and with the end consumer;
- brands that reduce engagement costs at the expense of customer confidence as a purchased product. A brand owner can earn extra revenue by reducing customer service and maintenance costs or by high prices.

If the term “human capital” is to be understood only as the knowledge and creative abilities of workers, then this term is the same as the term “intellectual capital”. The fundamental feature of human capital is that it includes not only the spiritual but also the physical abilities (properties) of a person. However, it should be emphasized that the greatest interest in economic research is caused not by the physical properties of the individual, population or nation, but by the spiritual qualities of human capital.

It seems appropriate to consider 2 major groups of intellectual resources in the structure of intellectual capital: personnel resources and non-tangible assets. To our opinion it is inappropriate to include market (client) capital in intellectual capital. This conclusion can be drawn from the analysis of the scheme interaction of intellectual capital elements of the enterprise presented in Figure 1.

As can be seen in Figure 1, it is the resources of the staff as the basic element of the enterprise intellectual capital, which forms and organizes information flows in the group of business process resources and creates the results of intellectual activity, which, in turn, form the basis of innovation - competitive product. All these elements create a certain reputation among enterprise clients and partners, which form the so-called market capital, which determine the place of the enterprise in the market. Although based on the definition of intellectual capital, the reputation of the enterprise is the result of the activity of intellectual capital, and therefore cannot be

part of it.

It is recommended to split the entire set of resources that make up intellectual capital into two large groups of intellectual resources: personnel resources and non-tangible resources consisting of the results of intellectual activity (RID) and the potential of business processes. The cornerstone of the enterprise's intellectual resources structure are the resources of company's personnel such as: ideas of executives, specialists, including R&D divisions, that boost new strategies to appear, projects, developments, inventions and patents, which make it possible to improve enterprise reputation to attract customers; ideas of functional managers which help to build optimization systems of enterprise processes (quality management systems), human resources management, inventory management, corporate databases etc.).

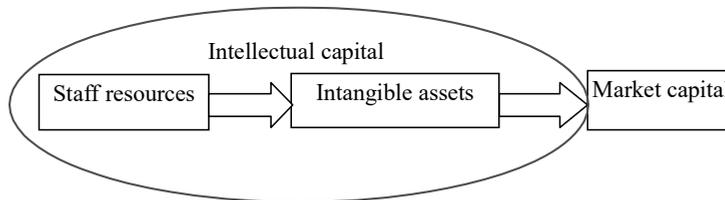


Figure 1. Relationship between intellectual capital elements

Without knowledge, experience and ideas of entrepreneurs and specialists, it is impossible to transform intellectual resources into enterprise capital.

However, it should be noted that not all staff resources are part of intellectual capital. In our opinion, personnel resources are primarily formed by those employees who are directly involved in the development of the enterprise, in other words, planning, creating or improving the company's products, technologies and business processes.

This category includes:

- staff engaged in research and development activities, in management projects of all types;
- managers who determine enterprise strategy and policy;
- personnel management department, which develops and implements a policy of selection, development and motivation of the personnel;
- marketing department, which studies the market conditions and develops options for market strategies and technologies;
- units engaged in organizational development, organizational design, risk management;
- staff involved in creating and maintaining information networks and databases, etc.

According to the author, staff resources include some of their intellectual resources:

- knowledge, competences, experience, set of knowledge, skills, abilities, business contacts of employees who directly design new products and technologies that introduce innovations, organize and carry out business processes in the

enterprise;

– staff attitude to work, motivation – this resource is characterized by staff motivation to effectively carry out, improve their activities, involvement and loyalty to the enterprise. Demotivation significantly reduces the productivity and in some cases can lead to the dismissal of key employees who depend on the development and efficiency of the enterprise.

CONCLUSION

The results of intellectual (creative) activity are intangible in nature – they can only be understood, intellectually or emotionally perceived, but not tangible. However, they also receive real embodiment in different material forms – in the form of product, drawings, device, model, prototype, documents, files, reports, programs, local regulations of the enterprise, etc.

First group:

1. Industrial property is the result of intellectual activity and the means of individualization of legal entities, goods, works, services and enterprises to which legal protection is afforded. In essence, it is the institutionalized knowledge that can be used in production, which gives unique consumer properties to a product, and without which it is impossible to manufacture certain goods.

2. Unregistered results of intellectual activity or know-how. This group includes technologies, inventions, utility models, blend recipes, technologies and business process management techniques whose patenting is impossible or impractical because of the high risk of disclosing their substance in the absence of a real opportunity to control their misuse.

The second group of non-tangible intellectual resources includes potential of business processes. This group includes the capabilities of structural units to manage innovation at the enterprise. This group includes the following intellectual resources.

1. The potential of R&D units represented by the ability to carry out research and development work at the enterprise, the availability of advanced technologies or the possibility of their acquisition, organizational and technical level of production.

2. Enterprise information systems – a set of hardware and software that allow you to automate procedures and processes in the daily activities of the enterprise, improve employee productivity and enable managers to quickly make adequate decisions on the management and planning of the enterprise. Modern information systems are an integral part of the enterprise management infrastructure and contain various tools for providing and managing business processes.

3. Innovative activity of the staff. This refers to the design, research and scientific activities of staff not included in their job responsibilities (as a manifestation of employees' excess activity). For example, work in projects, innovation activities, invention, publication of articles, work in scientific and technical communities. This resource is one of the most important intellectual resources in the potential of business processes, because it allows to change the enterprise from the bottom up and improve those processes and products that are not often taken into account by enterprise management and specialists of functional units.

By analogy with the structure of intellectual capital at the enterprise level there

are identified two main groups of intellectual resources:

1. Human resources – they represent the population that, by their skills knowledge form regional GDP. The formation of human resources of the region are based on two main institutes: the labor market – this institute allows to rationally involve, distribute, regulate and use work in the territory of the region, also by ensuring a normal level of income and well-being of people, allows to achieve a stable level of reproduction of workers' abilities to work; system of higher and secondary education - this institute allows to provide training of highly skilled personnel in all major professions, directions of activity and maintenance of their competence at the modern level, thus significantly improving the quality and efficiency of human resources of the region.

2. Innovative activity of the region – a complex of scientific, organizational, technological, financial and commercial activities at the regional level, aimed at commercialization of the accumulated and generated knowledge in the region. This group includes the following 3 types of intellectual resources:

– the intellectual property market. This institute is responsible for the state of registration, renewal and sale of intellectual property results of the subjects of the region. The condition of this institute is characterized by a close connection between the entities engaged in innovation activity and the state authorities, which provide mutually beneficial cooperation in the legal field;

– innovative infrastructure of the region include scientific, technical, informational and financial resources of the enterprise, which ensure the implementation of regional enterprises innovative activity. This resource group may include both state-owned innovation infrastructure facilities and commercial organizations providing access to innovation infrastructure (technoparks, business incubators, technopolis, venture funds, etc.), as well as non-profit organizations.

– innovative activity of the enterprise which includes the results of innovative activity of organizations located in the region with the aim of development and implementation of new technologies. This resource is one of the most important in this group because its activity determines both the state of the intellectual property market and the necessity for innovative infrastructure.

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