

# The intellectual capital of an enterprise: the innovative aspect

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*The interpretation of the category "intellectual capital" and approaches to determining the structure of intellectual capital have been considered in the study. The innovation capital, the use of which can increase the company's competitiveness in the domestic and foreign markets, takes an important place in the structure of intellectual capital. The article contains analytical results of the innovation activity of Ukrainian enterprises. The prime factors limiting the innovation activity of Ukrainian enterprises have been defined. Consideration has been given to the features of financing innovation activities in Ukraine. The suggestions, the implementation of which at the state level shall promote the effectiveness of innovation activity of Ukrainian enterprises, have been put forward.*

**Key words:** intellectual capital, innovation, innovation activity, enterprise

## Introduction

At the present stage of economic development, the success of a company depends on the level of its intellectual capacity, which is determined by the efficient usage of intellectual capital as one of the main resources of modern enterprises. In addition, the development and intake of intellectual capital are inextricably linked to the information flows in the process of information exchange among the various elements of business management systems, as well as to the interaction of the company with its environment.

Formation and development of knowledge-based economy in the early 90s of the last century have largely contributed

to updating the matters related to the interpretation of the category of intellectual capital, the definition of the structure and value of intellectual capital. It should be noted that the issue of the existence of intellectual capital has already been touched upon in 1964 in the work of the management guru Peter Drucker "The Concept of the Corporation" (Drucker, 1993) in which he spoke about the "knowledge workers". The term "intellectual capital" has been introduced into the scientific environment by the American scientist Galbraith (2004) in 1969. In a letter to the economist Michael Kalecki (1969) Galbraith wrote: "I wonder if you realize how much those of us in the world around have owed to the

intellectual capital you have provided over these past decades” (Feiwei, 1975). In the 90s of the 20<sup>th</sup> century, thanks to the works by Stewart (1997), the term “intellectual capital” gained ground. Stewart (1997) defines intellectual capital as the intellectual material (knowledge, information, intellectual property and experience) that can be used to create wealth. Theoretical and methodological studies of intellectual capital are also introduced in scientific works by Edvinsson and Malone (1997); they emphasize the importance of intellectual capital in organizations, paying attention to the matters of measuring and management approaches of intellectual capital; Brooking (1996), who considers the processes of identifying, documenting, and measuring intellectual capital; Saint-Onge, who has created the concept of “customer capital”; Sveiby (1997); Bontis (1998); Knigh (1999); Roos, Pike and Fernstrom (2005) and other scientists. By its nature, intellectual capital is a complex of non-material components promoting the innovation scope of the activities of an enterprise. The ability to provide innovations is one of the core competencies of the successful activity of a company. There is a vast number of researches showing that innovation exerts a markedly positive influence on the productivity of a company (Schumpeter (1934, 1942), Romer (1990), Grossman and Helpman (1991), Cameron (1998), Aghion, Bloom, Blundell, Griffith and Howitt (2005), Bazylevych (2008) and others).

### **Definition and structure of intellectual capital**

The specific feature of intellectual capital management is manifested in the fact that

it is a product of intellectual activity and creative efforts. Information and knowledge are in its core. Knowledge can be defined as the information stock obtained in the course of training, research and by other means; this is in privacy of a person, company, and society as a whole.

Intellectual capital can be expressed in monetary terms by determining the cost of intangible assets of the company, its product innovation. The ability to form the intellectual capital defines the intellectual potential of the company, and the knowledge appears as a result of the intellectual potential. The table below illustrates the definitions and elements of intellectual capital.

Intellectual capital is an agglomerative category. Most scientists (Saint Onge, 1996; Sveiby, 1997; Bontis, 1998; Roos, Pike and Fernstrom, 2005) indicate three elements as its components: human capital, structural capital, and customer capital.

Staff, which has some knowledge and experience, professional skills, values and heritage, represent human capital at the enterprise level. Human capital includes both the innate and acquired qualities of a person: his/her level of education, skills received in the course of employment, etc. Human capital has also been defined on an individual level as a combination of these four factors: genetic inheritance, education, experience, and attitudes to life and business (Hudson, 1993). Human capital cannot be owned by a company.

Structural capital means a technological, informational and organizational support of implementing the staff capacities in the enterprise. It ensures the effective usage of human capital, contributes to the accumulation and acquisition of new knowledge, perfection of staff competencies

*Table 1. Definitions and elements of intellectual capital*

<i>Authors</i>	<i>Definitions and elements</i>
Galbraith (Feiwei, 1975; Bontis, 1998)	It is more than just “intellect as a pure intellect” but rather incorporates a degree of “intellectual action”. In this sense, intellectual capital is not only a static intangible asset <i>per se</i> , but also an ideological process, a means to an end.
Saint-Onge (1996)	It is composed of human capital, structural capital, and customer capital.
Brooking (1996)	It is a term given to the combined intangible assets which enable the company to function. Intellectual capital is comprised of four types of assets: market assets, intellectual property assets, human-centred assets, and infrastructure assets.
Stewart (1997)	It is intellectual material – knowledge, information, intellectual property and experience – that can be put to use to create wealth. It is a collective brainpower. It’s hard to identify and still harder to deploy effectively. But once you find it and exploit it, you win.
Edvinsson and Malone (1997)	They describe intellectual capital as a knowledge that can be converted into value. It equals the sum of human and structural capital. It encompasses the applied experience, organizational technology, customer relationships and professional skills that provide the company with a competitive advantage in the market.
Sveiby (1997)	It consists of three parts: individual competence (employees’ skills and abilities), internal structure (the organisation’s processes and procedures), external structure (the organisation’s image and relationship with its customers).
Bontis (1998)	It consists of three elements: human capital (human intellect), structural capital (organizational routines), customer capital (market relationships).
Stewart (2002)	It is just that: a capital asset consisting of intellectual material. To be considered intellectual capital, knowledge must be an asset able to be used to create wealth. Thus, intellectual capital includes the talents and skills of individuals and groups, technological and social networks and the software and culture that connect them, and intellectual property such as patents, copyrights, methods, procedures, archives, etc. It excludes knowledge or information not involved in production or wealth creation. Just as raw materials such as iron ore should not be confused with an asset such as a steel mill, so knowledge materials such as data or miscellaneous facts ought not to be confused with knowledge assets.
Roos, Pike and Fernstrom (2005)	It can be defined as all nonmonetary and nonphysical resources that are fully or partly controlled by the organization and that contribute to the organization’s value creation. Intellectual capital is divided into three categories: relational, organizational, and human.

through the usage of modern techniques of collaboration, business management principles, systems, training of specialists, communication systems, principles of organizational culture. Structural capital can be owned by a company and thereby

traded. Structural capital is also referred to as organizational capital.

The structural capital of a company consists of four elements (Saint-Onge, 1996):

- systems – the way in which the organization processes (information, com-

munication, decision-making) and outputs (products/services and capital) proceed;

- structure – the arrangement of responsibilities and accountabilities, which defines the position of and relations among members of an organization;
- strategy – the goals of an organization and the ways it seeks in order to achieve them;
- culture – the sum of individual opinions, shared mindsets, values, and norms within an organization.

Structural capital comprises everything (from computer software to policies, procedures, and business practices) that allows the human capital to be its best (Saint-Onge, 1996).

Customer capital is referred to also as relational capital and external capital. Customer capital defines the image of a company; brands and the customer database of the company belong to it. It consists of bonds and strong relationships with customers, suppliers, and competitors. One of the main purposes of customer capital formation is the creation of an effective structure of the interaction of consumers and company personnel.

The components of customer capital include (Knigh, 1999):

- supplier capital – the mutual trust, commitment, and creativity of key suppliers;
- alliance capital – reliable and beneficial partners;
- community capital – organization capabilities and reputation in its surrounding community;
- regulatory capital – knowledge of laws and regulations as well as lobbying skills and contacts;

- competitor capital – critical understanding and knowledge about competitors.

Saint-Onge (1996) said: “If the structural and human capitals are not minimally aligned, it is the customer who loses. Customer capital is the clients or customers that pay us for what we do and produce – they are our lifeline to the future.”

According to Edvinsson and Malone (1997), intellectual capital is a combination of two components: human capital and structural capital. Structural capital also includes customer capital, relationships developed with key customers, and organizational capital. Organizational capital consists of two elements: innovation capital and process capital. Innovation capital indicates how well a company is preparing itself for the future. Process capital indicates the efficiency of the work processes and the commitment of the company to improve the quality of these processes (Stam, 2006).

Four elements (human capital, customer capital, innovation capital, and process capital) when added together form intellectual capital. This structure of intellectual capital is represented by the non-financial building block together with the financial building block of the Swedish Insurance Company “Skandia” value scheme to estimate the company’s market value.

The formation and operation of intellectual capital in a company is affected by many factors. These factors can be divided into two groups: environmental factors and factors of internal environment. The first group (environmental factors) includes the company’s image, relationships with contractors, the level of competition in the market, the saturation of the existing and potential markets, the

availability of communication links with outside agencies, their intensity and effectiveness of legislative and regulatory control, the political situation in the country. The second group – the internal environment factors – includes the financial and economic factors and the level of business activity, production and economic factors, organizational methods of enterprise management, the level of research intensity of its products, the availability of specialized software, the development of internal communication systems, the intellectual capacity of the personnel in the enterprise, its psychological compatibility, the level of conflict in the team.

Managing intellectual capital at the micro level provides the formation and development of its every component, its usage for the development and production of high technology products, innovative services.

### **Innovation activity of enterprises in Ukraine**

Intellectual capital can improve the efficiency of a company through the development and use of innovations. One of the first scientists to emphasize the importance of innovation was the Austrian economist Schumpeter (1942) who described innovation as “creative destruction” essential for economic growth. Schumpeter pointed out five forms of innovations (Schumpeter, 1934):

- new product or service;
- new method of production;
- new source of supply;
- new market or application;
- new method of organising your firm or industry.

The World English Dictionary (Collins, 2009) describes innovation as: 1) something newly introduced, such as a new method or device; 2) the act of innovating.

The Law of Ukraine “On the innovation activity” (2002) defines innovation which is used with the following meanings: innovations are newly created (applied) and (or) improved competitive technologies, products or services, as well as organizational and technical solutions of manufacturing, administrative, commercial or other nature, which significantly improve the structure and quality of production and (or) of the social sphere.

According to the legislation of Ukraine, the innovation activity means all scientific, technological, organisational, financial, and commercial actions that indeed lead to the implementation of innovations or design for this purpose. In Ukraine, the innovation activity includes researches and developments not directly associated with the preparation of a specific innovation.

Today, Ukraine has more than 100.000 industrial enterprises. In terms of the total volume of natural resources, Ukraine is one of the top performers in the world for coal, metals, uranium ores, and minerals. Ukraine’s exports largely consist of metal-lurgy products (more than 35%). Statistics in Ukraine show that only 12.8% of enterprises have introduced innovations; 16.2% enterprises have engaged in innovative activity, and the share of innovation products sold in industrial output was 3.8% in 2011 (Table 2).

In 2011, the most frequently mentioned type of innovation was a purchase of equipment and software, comprising 73.2% of all types of innovation. In 2011, every sixth industrial enterprise in Ukraine

**Table 2. Innovations in industrial enterprises of Ukraine**

	Share of enterprises which introduced innovations	Share of enterprises which engaged in innovative activity	New technological processes put into service	Of them economic and resource savings	Innovative types of products put into production*, names	Of them new types of technique	Share of innovation product sold in industrial output, %
2000	14.8	18.0	1403	430	15323	631	6.8
2001	14.3	16.5	1421	469	19484	610	6.8
2002	14.6	18.0	1142	430	22847	520	7.0
2003	11.5	15.1	1482	606	7416	710	5.6
2004	10.0	13.7	1727	645	3978	769	5.8
2005	8.2	11.9	1808	690	3152	657	6.5
2006	10.0	11.2	1145	424	2408	786	6.7
2007	11.5	14.2	1419	634	2526	881	6.7
2008	10.8	13.0	1647	680	2446	758	5.9
2009	10.7	12.8	1893	753	2685	641	4.8
2010	11.5	13.8	2043	479	2408	663	3.8
2011	12.8	16.2	2510	517	3238	897	3.8

\* Till 2003 new kinds of products.

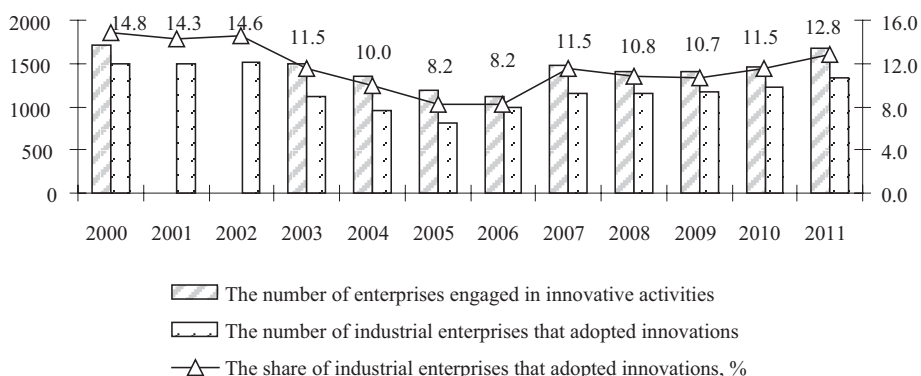
Source: the State Statistics Service of Ukraine.

was engaged in innovative activities, and only one per eight has adopted innovations in its activity (Fig. 1).

The number of innovatively active industrial enterprises in 2011 was largest among the companies producing coke and refined petroleum products (34.9%), machine-building enterprises (24.5%), chemical and petrochemical industry (24.0%).

With regard to the above mentioned, enterprises producing high-tech products make about 5% of the total number of enterprises in Ukraine.

Since 2009, a survey of innovation activities has been conducted in Ukraine according to the international methodology under the Community Innovation Survey (CIS) program.



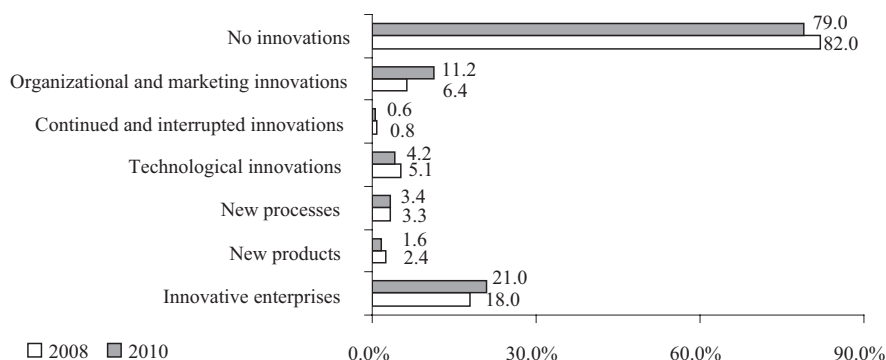
**Fig. 1. Innovative activity of industrial enterprises in Ukraine**

Source: the State Statistics Service of Ukraine.

The first survey was conducted in 2009 for the period 2006–2008 and the second in 2011 for the period 2008–2010.

According to the survey conducted in 2008–2010 and based on the Community Innovation Survey (CIS) methodology, in 2008 only 18% and in 2010 21% of all Ukrainian enterprises were innovative (Fig. 2).

tions for a product in the market in order to increase the sales volume. Introduction of a new organizational method in the enterprise activities, workplace arrangement or external affairs are the organizational innovations. In 2010, every second innovative enterprise was engaged in the non-technological innovations, whereas in 2008 it was every third enterprise.



*Fig. 2. Types of innovation in Ukrainian enterprises in 2008–2010*

Source: the Community Innovation Survey (CIS), the State Statistics Service of Ukraine.

In 2010, as compared with 2008, the number of innovatively active enterprises has increased by 3.0 percentage points mainly at the expense of enterprises engaged in non-technological innovations (organizational and marketing innovations).

A company is considered innovative if it has introduced any type of innovation (marketing, organizational, process or product innovations) for the period of time specified in a survey. Marketing innovations include the introduction of new methods of sale, significant changes in the design or product packaging, its storage, market promotion or sale price fixing aimed at satisfying customers' needs, opening new markets or gaining new posi-

Process and product innovations are included into technological innovations. Process innovation is the introduction of a new or considerably improved production or delivery method of a product. Product innovation is the introduction of a product or service which is new or considerably improved in terms of its properties or methods of use. In 2010, the enterprises engaged in technological innovations comprised 4.2%. Enterprises with the highest technological innovations (the total number of enterprises of a relevant activity type) are those engaged in the field of information system development (38.1%), financial activities (25.6%), processing industry enterprises (24.2%). Notably, in 74.7% of all enterprises tech-



nological innovations were the expenses associated with the purchase of machinery, equipment, and software (more than one third of the total expenses).

The level of innovation activities amongst the majority of Ukrainian enterprises is low. Only 6% of small-sized and 16% of medium-sized companies are innovatively active (for example, in Poland – up to 30%). The most important factors limiting the innovation activity of enterprises in Ukraine are the following (Fig. 2):

1. The price factors:
  - lack of funds within the enterprise or group of enterprises;
  - lack of finance outside the enterprise;
  - overly heavy expenses on innovation activity.
2. Information factors:
  - lack of skilled staff;
  - lack of information on technologies;
  - lack of information on markets;
  - the difficulty in finding partners of innovation activity.
3. Market factors:
  - particular enterprises are dominating in the market;

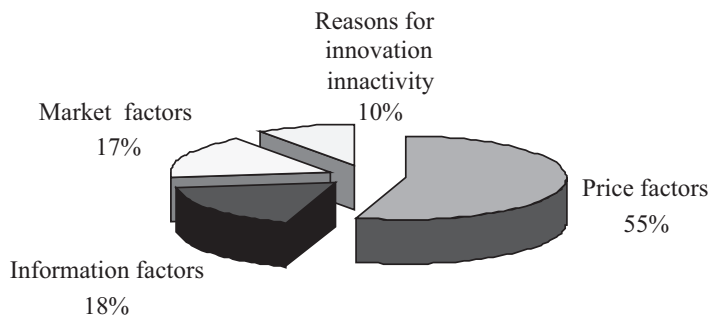
- little demand for innovative products.

4. Reasons for innovation inactivity:

- no need for linkage to the previous innovation activity in the enterprise;
- there is no need due to the uncertain demand for innovations or its absence.

According to a survey of the State Statistics Committee of Ukraine for 2008–2010, the price factors had the greatest impact on the innovation activity of Ukrainian enterprises (55%), since carrying out innovation activities generally requires heavy financial expenses associated with investing funds in the new technical equipment, salaries of skilled staff, the need to protect intellectual property items, etc.

The innovation activity of enterprises, especially industrial, in Ukraine is much lower than in the European Union countries. Ukraine occupies the 74<sup>th</sup> position by “innovation factors” and the 42<sup>nd</sup> position by “capacity for innovation” among 142 countries in the ranking of the World Economic Forum’s Global Competitiveness Report of 2011. Over the last years, Ukraine’s international position in the



**Fig. 2. Factors limiting the innovation activity of enterprises in Ukraine**

Source: the Community Innovation Survey (CIS), the State Statistics Service of Ukraine.



**Table 3. International rating of Ukraine by Global Competitiveness Indices (GCI), innovation and capacity of innovation**

<i>Indicators</i>	<i>Ranks 2007/08 (out of 134)</i>	<i>Ranks 2009/10 (out of 133)</i>	<i>Ranks 2010/11 (out of 139)</i>	<i>Ranks 2011/12 (out of 142)</i>	<i>Difference 2007–2011</i>
Overall GCI	72	82	89	82	-10
Innovation	52	62	63	74	-22
Capacity for innovation	31	32	37	42	-11

Source: the World Economic Forum's Global Competitiveness Reports.

indicators of innovation and capacity for innovation has deteriorated. The ranks of Ukraine according to the World Economic Forum's Global Competitiveness Reports for the last four years are shown in Table 3.

The lack of finance, high risk, poor information on markets and technologies, the lack of qualified labour and a low demand for innovation are the perceived obstacles for innovation faced by industrial enterprises in Ukraine. This evidence calls for the need to improve business environment for enterprises aiming to pursue innovation and a positive change in the government innovation policy.

### **Sources of finance for innovation activities in Ukraine**

The financing of innovation activities plays an important role in all dynamic economies. The legislation of Ukraine contemplates the following types of innovation activities' financial support: a full or partial interest-free loan services (using the funds of the government and local government budgets); full or partial interest compensation (using the funds of the government and local government budgets), paid to the commercial banks and other financial institutions by the entities of innovation activity for providing credit

financing of innovative projects; granting state guarantees to the commercial banks that provide credit financing of top-priority innovation projects; property insurance of innovative project implementation.

The State Finance Institution for Innovations has been established for the financial support of innovation activity in Ukraine. It should be noted that the State Finance Institution for Innovations has not signed any credit agreements for innovative projects' implementation from January 2007 to August 2009. The financing of innovation activities using the budgetary funds is extremely low (1–3%) in Ukraine. In 2010–2011, 1% of total expenses on innovations was financed from the budgetary funds.

The main sources of finance for innovation activities were, and still remain, to be the companies' own funds (during the last decade, 53–88% of the total amount of expenses), mainly due to the earned profit and allocation amortization. For the last ten years, the maximum of self-financing share was noted in 2005 (87.72%) and the minimum in 2011 (52.92%). The total expenditures on innovations of industrial enterprises have amounted to 1791.74 millions US dollars in 2011. The sources of finance for innovation activities in Ukraine in 2002–2011 are shown in Table 4.

**Table 4. The sources of finance for innovation activities**

	USD exchan- ge rate	Total amount of expenses		Including on account of							
		mln UAH	MUSD	own funds		state budget		foreign investors		other sources	
				mln UAH	%	mln UAH	%	mln UAH	%	mln UAH	%
2002	5.33	3013.80	565.44	2141.80	71.07	45.50	1,51	264.10	8.76	562.40	18.66
2003	5.36	3059.80	570.86	2148.40	70.21	93.00	3.04	130.00	4.25	688.40	22.50
2004	5.34	4534.60	849.18	3501.50	77.22	63.40	1.40	112.40	2.48	857.30	18.91
2005	5.04	5751.60	1141.19	5045.40	87.72	28.10	0.49	157.90	2.75	520.20	9.04
2006	5.04	6160.00	1222.22	5211.40	84.60	114.40	1.86	176.20	2.86	658.00	10.68
2007	5.05	10850.90	2148.69	7999.60	73.72	144.80	1.33	321.80	2.97	2384.70	21.98
2008	5.85	11994.20	2050.29	7264.00	60.56	336.90	2.81	115.40	0.96	4277.90	35.67
2009	7.95	7949.90	999.99	5169.40	65.02	127.00	1.60	1512.90	19.03	1140.60	14.35
2010	8.00	8045.50	1005.69	4775.20	59.35	87.00	1.08	2411.40	29.97	771.90	9.59
2011	8.00	14333.90	1791.74	7585.60	52.92	149.20	1.04	56.90	0.40	6542,20	45.64

Source: the State Statistics Service of Ukraine.

During 2002–2007, the share of own financial resources in the overall structure of innovation activity financing was no less than 70%. It is also necessary to emphasize that in 2008–2011 the share of own financial resources in the structure of innovation activity financing of Ukrainian enterprises has decreased (from 60.56% to 52.92%), which is not associated with the investment activation on the part of other entities, but rather with the global economic crisis and, as a result, a decrease of enterprises' profits. In 2011, the share of other resources in the overall structure of innovation activity financing has considerably increased as compared with 2010 (4.8 times), which is explained by the increase in the percentage of credit resources (38.3%) in the structure of other financing resources. In 2011, credits for carrying out innovation activities have been granted to 50 enterprises; 11 enterprises have used the funds of foreign investors, while 14 enterprises have used the funds of domestic investors; 51 enterprises have received state support, whereas 1679 enterprises have carried out innovation activities.

Over the past 10 years, the actual total expenses on innovation activity were only 12.3 trillion US dollars. According to the experts' estimation, their total amount should be 1 trillion US dollars. In the developed countries (with a substantial high-tech sector share as a rule), the GDP per capita is 5–10 times higher, than in Ukraine.

## Conclusions

Thus, intellectual capital is a key factor in the competitiveness of enterprises in an information-rich economy. The management of the Ukrainian enterprises should implement the concept of enterprise management reorientation considering the increasing demand for the formation, management, and development of intellectual capital in order to achieve good results at different levels of economic activity.

Innovations play a key role in ensuring the competitiveness of an enterprise both in the domestic and the world markets. The activity of Ukrainian enterprises is characterized by a low level of innovation

activity, an insufficient volume of realized innovative products, a low financing of innovation activity.

The main factors that retard the innovation activity of Ukrainian enterprises are the lack of necessary funding, high credit rates in banks, considerable expenditures on the development and introduction of innovations, imperfection of the legal framework, and issues related to the purchase of raw stuff and materials.

Favourable conditions should be created at the national level to enhance innovations in Ukrainian enterprises. In Ukraine, the main components of the governmental management of innovations must be:

- development of an innovative culture and innovative infrastructure;
- the state support of fundamental research and search investigations and of

the highest possible development of innovation entrepreneurship;

- granting the state guarantees related to the projects that provide for the introduction of new operational procedures and Eco-innovations;
- various forms and sources of the financing and indirect stimulation of research;
- granting different privileges to research workers (tax reductions, stimulation of the personnel, material provision of research, etc.);
- development of innovation activities of small and middle-sized businesses and in regions.

The realization of the above suggestions will promote the innovation activity in Ukraine and increase its effectiveness.

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## ИНТЕЛЛЕКТУАЛЬНЫЙ КАПИТАЛ ПРЕДПРИЯТИЯ: ИННОВАЦИОННЫЙ АСПЕКТ

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### Резюме

В статье рассмотрена трактовка категории «интеллектуальный капитал», подходы к определению структуры интеллектуального капитала. Важное место в структуре интеллектуального капитала занимает инновационный капитал, использование которого способно повысить конкурентоспособность предприятия на внутреннем и внешнем рынках. Статья содержит результаты анализа инновационной активности

украинских предприятий. Выделены основные факторы, ограничивающие инновационную активность предприятий Украины. Рассмотрены особенности финансирования инновационной деятельности в Украине. Внесены предложения, реализация которых на государственном уровне будет способствовать повышению эффективности инновационной деятельности украинских предприятий.