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## **INNOVATIONS IN TIME OF CRISIS: REALITIES AND PERSPECTIVES**

**Abstract.** Problems of innovative development of Ukrainian economic are actualized in the article. The conclusions and recommendations for further State actions to support innovation activity of national enterprises and their competitiveness on domestic and foreign markets are given.

The article deals with the influence of economic downturn on innovations across Europe. By analysis of economic indicators the extent to which some structural features of national innovation systems affected the stability of enterprises is examined in terms of attracting investment in innovation in crisis conditions and in conditions of phenomenon of social, political and economic tension. It was found that effects of the economic downturn in terms of investment in firm's innovations to various European countries vary. It is determined that in conditions of Ukrainian economic instability a comprehensive target support and protection of domestic producers are required today.

Keywords: innovations, national innovation system, crisis, GDP, subsidies, fiscal system.

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# ІННОВАЦІЇ В ЧАС КРИЗИ: РЕАЛІЇ ТА ПЕРСПЕКТИВИ

Анотація. В статті актуалізовано проблеми інноваційного розвитку економіки України. Наведено висновки і рекомендації щодо подальших дій держави для забезпечення інноваційної діяльності вітчизняних підприємств та їх конкурентоспроможності на внутрішньому та зовнішньому ринках.

У статті розглянуто наслідки економічного спаду на інновації по всій Європі. За допомогою аналізу економічних показників досліджено якою мірою деякі структурні особливості національних інноваційних систем впливали на стабільність підприємств з точки зору залучення інвестицій в інновації в умовах кризи та явищ соціального, політичного та економічного напруження. З'ясовано, що наслідки економічного спаду з точки зору інвестицій в інновації фірм для різних європейських країн не однакові. Визначено, що в умовах нестабільності економіки Україні на сьогоднішній день необхідна комплексна цільова підтримка та захист вітчизняних виробників.

**Ключові слова:** інновації, національна інноваційна система, криза, ВВП, дотації, фіскальна система.

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#### ИННОВАЦИИ ВО ВРЕМЯ КРИЗИСА: РЕАЛИИ И ПЕРСПЕКТИВЫ

Аннотация. В статье актуализированы проблемы инновационного развития экономики Украины. Приведены выводы и рекомендации относительно дальнейших действий государства для обеспечения инновационной деятельности отечественных предприятий и их конкурентоспособности на внутреннем и внешнем рынках.

В статье рассмотрены последствия экономического спада на инновации по всей Европе. С помощью анализа экономических показателей исследовано в какой мере некоторые структурные особенности национальных инновационных систем влияли на стабильность предприятий с точки зрения привлечения инвестиций в инновации в условиях кризиса и явлений социальной, политической и экономической напряженности. Выяснено, что последствия экономического спада с точки зрения инвестиций в инновации фирм для различных европейских стран не одинаковы. Определено, что в условиях нестабильности экономики Украины, на сегодняшний день необходима комплексная целевая поддержка и защита отечественных производителей.

**Ключевые слова:** инновации, национальная инновационная система, кризис, ВВП, дотации, фискальная система.

**Introduction.** State Ukraine since the proclamation of its independence experienced a long period of transition, characterized by the creation of a new political and economic model that would be able to ensure the competitiveness of the national economy. In this regard, there are some significant experience and results. However, in globalization process Ukraine should carefully weigh and evaluate possible effects and acrobatically balance between cooperation with foreign partners and national security because, in our opinion, some of reforms required by the international community may lead to negative consequences in the national economic, social and, after all, public areas.

Gradually increasing actual problems in political, economic and social sphere of Ukraine endanger not only the development but also the survival of state economy. After nearly twenty-five years of development Ukrainian economy faced a serious challenge. Predictions about the future of Ukrainian economy should be based on a clear understanding of what is today the country's economy and what nurtured economic growth before the crisis.

The industrial sector of Ukraine is in a quite difficult situation. Finding new sources of growth takes place at a time when many countries are experiencing stagnation, decline in investment in the manufacturing sector, and consequently diminishing returns, reducing or complete closure of enterprises. Depreciation of fixed assets reaches in some areas from 45 to 74%. More or less the current level of technology is stored mainly in high-tech areas: nuclear power, aerospace industry, aircraft industry. In other areas, especially in machine building, there was a serious collapse. Ukrainian industries (steel, machinery, etc.) underestimated the importance of innovation potential, so that today they face a weakening of their positions on the markets, loss of customers, profit margins reduction, the halt in production due to economic and eventually innovative crisis. Therefore, future growth should increasingly take place by stimulating productivity based on innovation performance.

The issue of tasks and determination of necessary measures needs further study in order to transform the industry and the whole economy into competitive innovation sector that develops dynamically. In the working of this problem remains a number of unsettled questions relating primarily to complex influence of internal and external factors of instability on enterprises activity of Ukraine.

**Literature review.** Works of modern scientists are devoted to the study of problems of the crisis and its impact on the industry development in Ukraine, including J. Goncharov, V. Burlaka, H. Mechnikov, L. Jaremenko, A. Oleshko [1-3] and others. The analysis of their studies found that they were devoted to general aspects of imbalance discussed at the macro and micro levels.

Further research of the problems and determination of tasks and necessary steps is needed with the aim to transform the industry and a whole economy into competitive innovation sector that dynamically develops. In the working of this problem a number of indeterminated questions remains concerning priority of comprehensive influence of internal and external factors of instability on Ukrainian enterprises activity.

The purpose of this study is to write relevant conclusions and proposals concerning incremental topical issues in political, economic and social life of Ukraine that endanger innovative development of the national economy.

**Results.** The economic downturn of 2008-2009 has led to a decline of potential growth in productions output, rising unemployment and a sharp rise of public debt. The crisis of 2014-2015 years is complicated and leads to outflow of investment in innovation activities of many local businesses.

Credit limitation, prices and demand falling for the products of the industry on international market, which took place particularly during 2008-2009 crisis, inefficient reforms, inadequate legislation, the Tax Code in particular (developed and adopted in accordance with the framework of the European Union) shook the economic development of the state and provoked negative trends in economic development and social tensions. The unquestioning is the fact that with the rise of globalization and increasing intensification of international integration processes in different sectors of economy, the risk of instability and state economy increases.

It should be noted that during the adoption of the Tax Code they had tried to cancel simplified system, which led to mass protests of entrepreneurs. As a result, the system had been left dividing simplifiers into four categories to which in mid-2012 two more were added [4].

Of course, it should be noted that a potential source of Ukrainian economic crises is a structure of industrial complex production, its deformation, technological backwardness of most directions, high level of production monopolization. The complex of realised since Ukraine's independence measures at national and regional levels contributed into formation of state single industrial complex, which to a certain extent corresponds the main principles of the market economy and can perform its functions. However, the reforms have not been brought to their logical conclusion.

For general characteristic of the development of Ukrainian industrial production it is necessary to analyze the following indicators: GDP, amount of industrial production, inflation dynamics.

The dynamics of Ukraine's GDP in the period of 2010-2013 tends to increase. GDP dynamics is given in Table 1.

Table 1

GDT dynamics, min.grn. for the period of 2010-2015 [5]									
Year Indicator	2010	2011	2012	2013					
Gross domestic product (nominal)	1082569	1316600	1408889	1454931					

#### GDP dynamics, mln.grn. for the period of 2010-2013 [5]

Analyzing indicators (table 1) it should be emphasized that GDP increases each year. GDP dynamics, mln.grn. for the period of 2014 are given in Table 2.

Period	Nominal GDP (at current prices)	Real GDP (in prices of 2013)	The difference of GDP (real – nominal)	
I quarter	315535	308657	-6878	-2.2%
II quarter	372770	334422	-38348	-10.3%
III quarter	428163	374818	-53345	-12.5%
IV quarter	-	-	-	-
2014 in summary	-	-	-	-

GDP dynamics, mln.grn. for the period of 2014 [5]

As can be seen from the Table 2, the balance between real and nominal GDP in the 1, 2, 3 quarters is negative and accounted respectively for -2.2%, 10.3%, 12.5%. As it is known, nominal GDP is expressed in current (actual) prices of the current year. Real GDP (adjusted for inflation) is expressed in the prices of the previous (or any other base) year. Real GDP thereby takes into account the extent to which real GDP growth is determined by the growth of production, rather than rising prices.

Indicators of the amount of industrial production sales and the share of realized innovative products in industrial ones are represented in table 3.

Indicators of industrial development [5 6]

Table 3

Table 2

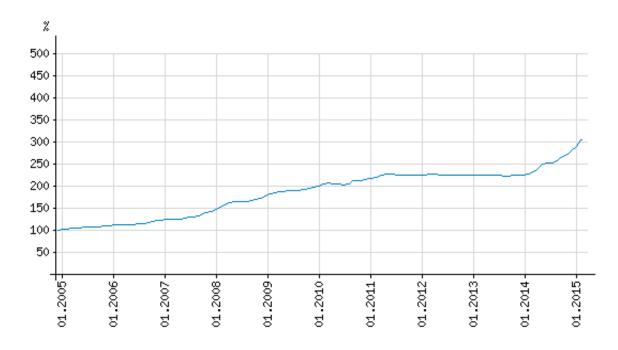
indicators of industrial development [5,0]									
Year Indicator	2010	2011	2012	2013	2014				
Amount of realized industrial production, mln.grn.	792899,1	1008313,2	1014906,6	1006280,5	1066769,4				
The share of realized innovative products in industrial products, %	3,8	3,8	3,3	3,3	-				

The amount of industrial production in the period of 2010-2014 is approximately equal and varies slightly. The share of realized innovative products in industrial products has a strong downward trend.

Thus, we can conclude that in the period of 2011-2013 there has been a decrease in proportion of sales of innovative products in industrial ones. In our opinion inflation and prices of industrial producers have a significant influence on total industrial production.

The chart which displays changes of the dynamics of inflation in Ukraine for the last 10 years cumulatively is shown below (fig.1). Here we see that during this period the final inflation rate was 305.9%.

In recent years, the growth of import rate from EU member states was significantly higher than the rate of Ukrainian export growth resulting in negative trade balance. The negative trade balance of Ukraine in 2007, compared with 2006, increased primarily with a "new" EU countries – at 25.06 percent, with the "old" – at 14.67 percent [7, p.14]. After 2008 (WTO accession) trends of negative trade balance have increased [8]. At the beginning of 2009 negative balance of trade with the EU countries amounted to about 12 billion dollars. The negative balance of foreign trade of Ukraine in 2012 amounted to 9.07 billion dollars. In January-June 2013 trade export set 30 billion 742.7 million dollars, while imports amounted to 34 billion 963.1 million dollars in monetary terms [9].



**Figure 1. Dynamics of inflation in Ukraine in 2005 (cumulative)** 

Information from statistical office Eurostat shows that at the end of the first quarter of 2013 government debt in the euro area (17 member countries) amounted to 92.2% of GDP (which is the historical maximum), compared to 90.6% of GDP at the end of the fourth quarter of 2012. Compared with the first quarter of 2012, public debt to GDP ratio increased in the euro area – from 88.2% to 92.2% and the EU (27 member countries) – from 83.3% to 85.9% and currently stands at 11.6 trillion euro and is constantly growing.

The highest ratio of government debt to GDP at the end of the 1st quarter 2013 was recorded in Greece (160.5%), Italy (130.3%), Portugal (127.2%) and Ireland (125.1%) and the lowest – in Estonia (10.0%), Bulgaria (18.0%) and Luxembourg (22.4%) [10].

Many EU partner countries recently began to use intensively protectionist mechanisms. According to the World Bank in 2012 to protectionist measures resorted 17 of the 20 countries included in the G20.

The Commission notes the sharp increase in the measures taken at the borders, in particular, the increase in import duties. The most significant tariff increase was registered in Argentina, Brazil, Russia and Ukraine.

Thus, the expected consequences of excessive debt burden of developed economies on the global financial system are [11]:

- current debt problems which accompany increase of interest rates on international sovereign bonds, stimulate general increase of interest rates and the related increase in the cost of investment resources leads to lower economic growth in Europe and worldwide. On the other hand, European governments attemption to keep interest rates at low levels may contribute to the flow of capital to the markets of transitional market economy;

- debt crisis extremely intensifies volatile financial markets, the growth of risks complicates financial situation of issuers and investors in Eurobonds. In particular, the international rating agencies review the credit ratings downwards in most EU countries and banks, that are a holders of a large amount of Eurobonds;

- European debt crisis, and in particular possible default of Greece (probability of default is 90%) turns onto further depreciation of the euro. In this regard, competitiveness of countries, exports of which are focused on the European market, reduces. To ensure the stability of the euro the European Central Bank and the central banks of the "Euro zone"

lose some reserves, particularly through the acquisition of the "problem" bonds and creating a stabilization fund;

- concessions for debtor countries in refinancing and restructuring of debt overlay the burden of crisis on taxpayers in other countries.

European Commission sees a threat to global economic growth in expanding activities that contribute to promoting the use of national products, and actions aimed at increasing exports. In particular, the report by European Commission in 2013 states that "the global effort to struggle trade protectionism must be activated to help protect the fragile economic recovery in the world" [12]. Protectionism is the economic policy of a state which aimes to support and protect national economy from the negative global trends and exogenous factors that may trigger instability and economic stagnation. It should be noted that in times of economic instability, the method by which a sovereign state is focused on domestic affairs and resorts to protectionism is an effective defensible measure in the short term.

The advantages of protectionist policy are: filling the state budget through taxes and tariffs; protection of domestic enterprises and new industries which in conditions of increasing competition with foreign companies at early stage of their development couldn't compete with; protection and subsidies of strategic national enterprises; protection of national interests as a priority ones contributes to preservation of sovereignty and independence.

In conditions of unstable economy Ukraine today requires a comprehensive target support and protection of domestic producers. Since regulation of markets of goods, works and services for public funds and their monitoring during the economic crisis is extremely actual.

Of course, international relations are an integral component of international interaction system and is an important element of existence and development of any state, especially in the field of innovation, including IT-technology. However, the investigation held before and statistical analysis aforesaid leads to the conclusion that the decision should be taken carefully.

In contrast to the developed market economies, we have two causes of the crisis, which complement each other – political crisis and the impact of negative events in world economy.

In Ukraine, the crisis has already led to the emigration of skilled labor, budget cuts in public spending on R&D and education systems, as well as weakening of the credit system and infrastructure. If these effects will not be appropriately and adequately responsed by civil structures, there is a risk that the innovation sphere of the economy will be significantly weakened and the potential for growth in the coming years will be blown up.

So, we highlight a number of factors limiting influence on the economic development of Ukraine, which in its turn reduces the financial and economic, innovation activity of enterprises. And they are associated with both internal negative phenomena of economic and political spheres of Ukraine and the consequences of negative processes in the global economy. The main factors are:

- growth of enterprises expenses due to increased prices and tariffs on transportation, and retail electricity tariffs for industry in general, from 1 March 2015 up to 5%;

- increasing of prices for natural gas for industrial consumers from 1 March 2015 up to 56%, and the expiry of preferences for certain chemical and mining and metallurgical industry in tariffs for electricity and rail transportation;

- slowdown of growth rates of economic development, including growth slowing was recorded in Russia, the US, Eurozone and emerging markets of Asia;

- existence of investment disparities, especially innovation activity and market processes uncontrollability balance between supply and demand.

Ukraine has not formed an effective mechanism for massive technological change investing in a recession yet. State scientific and technical programs often do not provide the final results. The speed of uncompetitive producers disintegration is much higher than the rate of creation of new competitive ones. This situation requires further enhancing of the state role to prevent deindustrialization of the country and the recovery of demand for products of domestic manufacturers in domestic and international market. To do this, it is necessary to overcome the distortions in the money supply, to intensify applied scientific research because their weakening in Ukraine inevitably affects its social and economic conditions and, in particular, undermines the ability of businesses of the industrial complex for innovation activity.

In an unstable political and economic situation, the formation of innovative strategies, cooperation and partnership, amplification of effective processes and appropriate methods (levers) of influence are necessary, namely:

1. Optimization of vertical integration in the direction of development: application of precise analysis of core competencies and capabilities to differentiate industry should be used to improve vertical integration. Scoping and optimization of vertical integration requires the use of outsourcing, and identification of potential of research and development as well.

2. The use of effective product development processes. Creation of clear structures is necessary in unstable economic system.

3. Effective management and control system. Monitoring process and critical path should be based largely on effective management and control systems to help monitor data quickly and efficiently, and convert them into key performance indicators. Key indicators include critical parameters of time, budget and results of individual innovative development projects.

4. Benchmarking. The level of research of foreign companies experience during the crisis can support efficient development of industrial sector. The creation of a benchmarking center at enterprise can be a huge advantage in the competition for markets and sales.

Systematic innovation management that provides long-term stability should go beyond short-term considerations during the crisis. Globalization and increasing competitive pressure from developing countries roughly intensified tempo of important decision making. Industrial enterprises of Ukraine should move directly to R&D target markets to accelerate product launch. In addition, access to information and data, new opportunities for innovative activities increased exponentially. Design of innovation is becoming more complex due to reduction of development cycles. Since economies are unstable, businesses must continually review their strategies and innovation activity to respond flexibly. However, the external pressure on the capital markets, the competitive environment or patent law should not be counterproductive. As the world experience shows it is possible to accelerate decision making and produce innovative solutions in difficult conditions.

Studies show that the stock market is not inclined to approve the increase of intangible assets, innovation or technological change in times of crisis. In this situation, large enterprises, including industrial may face adverse conditions to develop radical innovations. That's why these innovations should be financed by venture capital.

Western studies show that the probability to shift the condition of the field is twice more bigger during the recession than during growth. The British study, which embraced 1000 businessmen, clearly showed: for the last 30 years investment in innovation generated 24% return on investment while reducing costs allowed to save only 0.6% [13].

For stable functioning of industry it is important not to destroy the public sector but to commercialize its activity, to strengthen its functions as an equal partner of market relations. On a price policy it should be reflected by the pricing of its ownership share, which should include natural monopoly, infrastructure of industrial production that will prevent breaking of economic ties. It is necessary to introduce a procedure of establishment of innovative associations as a mean of concentration of financing and risk sharing from innovative projects implementation by production enterprises, and develop a national system of innovation risk insurance, including specially created public or public-private insurance company.

**Implications and conclusions.** The main objective of industrial policy at present is a sustainable GDP growth. First of all it concerns to industry, which has considerable potential for substantial increase of competitive products.

The question of determining the impact of innovative development for local industry on the outcomes of their work is particularly relevant in unstable economic and political situation. Currently, the activities of Ukrainian enterprises are mainly focused on the implementation of the adopted technologies. There are many reasons that have led to development of this situation: lack of funding of the basic and applied sciences, lack of funds for scientific and technological

development of enterprises, political and economic crisis lingering. In addition, the situation is complicated by the fact that at present only a few large, effectively functioning enterprises, organizations and institutions have at their disposal a staff of professionals with high professional skills not only in areas of their narrow professional activity, but in modern financial system control theory, the field of innovation.

Of course, financing and conduction of innovation activity becomes more difficult in times of economic instability. Statistical data (table 3) indicates that there was a reduction of implementation of innovative products.

Thus, in unstable economic situation the risk increases that the government will adopt policies and make decisions that are not the best for the medium and long term perspective and may interfere with innovation. However, the increase of the role of the state in active structural policies should be implemented primarily through the use of economic methods of management immanent to market economy, improving regulatory support of the restructuring and reforming the economy as a whole, strengthening property rights and responsibility for its effective use.

It is important to continue to invest in the long-term future sources of growth, such as education, infrastructure, industrial complex, scientific research. This should be a constant priority for government policy during the crisis. Simultaneously with the involvement of public investment to support innovation it is necessary to optimize fiscal policy. Focusing on strong investmentventure base is essential to return to pre-crisis level of development and increase production. In addition, innovative growth orientation makes it easier for government decision-making towards allocation of necessary investments and policy interventions in order to solve many problems facing the economy and society.

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