

Section 3

Features of innovative development of Ukrainian enterprises in the globalized economy

3.1. Current state and prospects for the development of innovative activity of industrial enterprises in Ukraine and the world²

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At the present stage of the development of society, there is a transition from a reproductive to an innovative type of development, which simultaneously opens up great prospects for individual countries in particular and society as a whole, but, unfortunately, at the same time generates risks.

Given the current trends, it becomes clear that the national innovative development can be achieved only through the development of various industries on an innovative basis. This applies primarily to industry.

According to [1], it is possible to single out the main barriers to the modern industrial policy of an innovative nature, in particular:

- economic and political instability;
- tendency towards migration of highly educated youth and scientists;
- low level of development in innovative infrastructure and weakness of institutes for development;
- lack of developed financial system with the participation of the state, which can support lending to the economy, aside from innovations that have heightened risks;
- weak venture funds and an undeveloped system for regulating their activities, as well as taxation.

These barriers are global in nature and their solutions, first of all, depend on the government, although each individual innovative industrial enterprise can contribute to the formation of an industrial policy of an innovative nature.

To better understand the essence of innovation, we will focus on the approaches to classification of innovations in terms of the level of novelty (the depth of changes that are made in the sphere of their creation and

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use) and the types of strategic behavior of innovatively active enterprises in more details.

So, according to innovative potential and degree of novelty, Prygozhyn A.I. [2] determines radical, combinatory and improving innovations. Ilienikova S.D. [3] separates radical (basic), improving and modifying innovations in compliance to the depth of introduced changes. In turn, according to the level of novelty N. Chukhrai and R. Patora [4, p. 15-16] define radical (the introduction of discoveries, inventions, patents) and ordinary innovations (know-how, rationalization proposals). For the degree of novelty, Glushchenko L.D. identifies basic, perfecting and elementary innovations [5, p. 97], Based on the level of novelty, I. Lutsykyv presents radical, relative and improving innovations [6, p. 91-92]. Illiashenko S.M. [7, p. 14] distinguishes the following types of innovations in terms of the level of novelty:

- radical (pioneer) innovations, based on discoveries, they usually cause the creation of new branches of production and consumption, new markets, the formation of new relations in various spheres of human activity, and the like;
- ordinary innovations, based on inventions or new solutions; they make significant changes to traditional industries;
- improving innovations, based on rationalization proposals; they develop traditional products, technologies, management methods and the like.

In addition, Shkola V.Yu. [8, p. 76-78] proposes to consider modifying and replacing innovations as variants of improving, where modifying innovations mean new modifications of existing goods within the reached level of development of the corresponding technical system. And replacing innovations are new improved models of existing goods, reflecting the growth of main technical parameters, that is, the evolutionary development of technical system in accordance with the state of socio-ecological and economic systems.

In prospect we will adhere to the opinion of Illiashenko S.M. [7, p. 14], taking into account the view of Shkola V.Yu. [8, p. 76-78], and consider radical, simple and improving (modifying and replacing) innovations.

The enterprises are engaged in the production of the corresponding innovations with different levels of novelty, they also differ in the level of their innovative activity and act in accordance with innovative development strategy they have chosen.

According to the type of strategic behavior, all innovatively active enterprises are divided into four groups: explorers, patients, violents and commutants. Each type of strategic behavior provides for the use of enterprises by various innovative strategies and, accordingly, the production

and distribution of products with different levels of novelty. Table 3.1 shows the relationship between the type of strategic behavior of enterprises, the innovative strategies that they use, and the type of innovation in terms of the level of novelty that they produce.

Table 3.1. Financing of scientific and technical projects according to fields of activity

Type of strategic behavior of innovation enterprises	General characteristics	Relevant innovation strategies	Innovations on the level of novelty
Explorant	Innovative activity is aimed at the development and production of radical innovations. They operate from the beginning of production release at pre-investment stages	Active and offensive	Radical innovations
Patient	Narrow specialization. They focus on specific areas of activity. Concentration of efforts on the products limited in demand. Production of products with unique properties which has an exclusive character and is of high quality and focuses on demanding consumers. It functions simultaneously at the stages of production release and fall of inventive activity	The strategy of finding your own niche and traditional strategy	Ordinary innovations, radical innovations are possible
Violent	Mass standard production. High quality of products, its high level of standardization, unification and manufacturability. Satisfying the needs of a wide range of consumers. Orientation to innovations which make products cheaper. More focused on partial improvements. They operate at the stage of reducing demand for products, that is, at the end of the life cycle	Passive and offensive, defensive, traditional and imitation (licensing) strategies	Ordinary and modifying innovations
Communitant	Satisfy local or even individual demands. Better fitness to meet small sized needs of specific consumers. Individualization of the use value of the goods. Use innovations created by others, enriching them with individual characteristics and adapting to the needs of specific consumers. There is a tendency to imitate. Focus on innovations, aimed at improving product quality and serving local needs. Organization of new services based on new technologies	Opportunistic (quality strategy)	Replacing innovations based on product differentiation

Based on the analysis of Table 3.1, it can be argued that innovation enterprises with different types of strategic behavior have different levels of innovative capacity. This relationship is clearly shown in Figure 3.1.

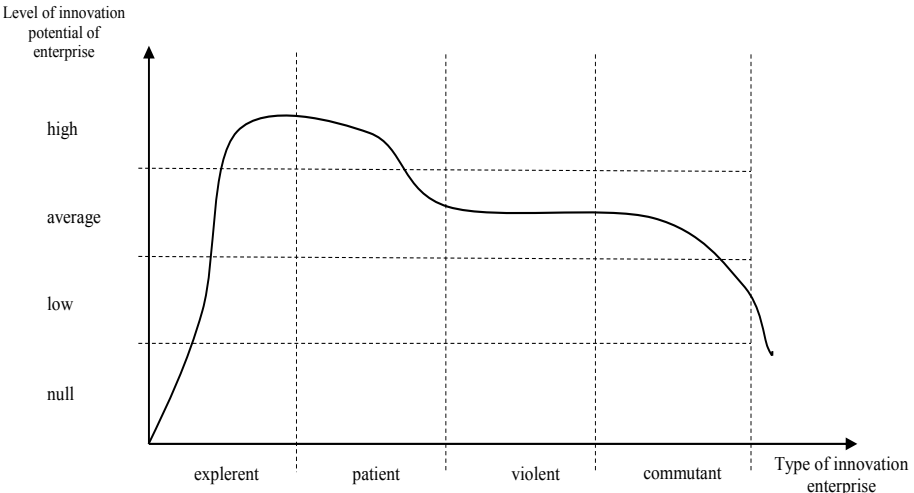


Figure 3.1. Dependence between the type of strategic behavior of innovation enterprise and the level of its innovation potential (compiled by the authors)

According to Figure 3.1, explerent companies which are leaders in the production and promotion of innovative products have the most innovative potential. They create radical innovations. The level of innovative potential of patient enterprises varies between high and average. As a rule, they create simple innovations, although they have the potential to develop the radical ones. Violent enterprises have an average innovative potential and direct their activities mainly to modifying and simple innovations. The level of innovative potential of commutant enterprises fluctuates between average and low, they focus their activities on replacing innovations oriented to a limited number of consumers (in the local market). So, we can conclude that, depending on the type of strategic behavior chosen by the enterprise, its products will differentiate.

Next, we will analyze the indicators of innovative activity of domestic industrial enterprises for the period from 2000 to 2015 (Table 3.2).

Table 3.2. The main indicators of innovative activity of industrial enterprises for 2000-2015 (compiled by the authors on the basis of [17-22])

Year	Number of industrial enterprises that sold industrial products	Proportion of enterprises involved in innovations, %, number of enterprises engaged in innovations (in brackets,)	Proportion of enterprises implemented innovations, %, number of enterprises implemented innovations (in brackets)	Proportion of enterprises, implemented innovations, %, number of enterprises implemented innovations (in brackets)	Realization of innovative types of production *, titles	New technological processes, processes	Proportion of realized innovative products in the volume of industrial, %
2000	9475	18.0 (1705)	14.8 (1491)	14.3 (1352)	15323	1403	-
2001	10293	16.5 (1697)	14.3 (1503)	12.6 (1298)	19484	1421	6.8
2002	10037	18.0 (1808)	14.6 (1506)	- (-)	22847	1142	7.0
2003*	9931	15.1 (1496)	11.5 (1120)	- (-)	7416	1482	5.6
2004	9920	13.7 (1359)	10.0 (958)	11.0 (1095)	3978	1727	5.8
2005	10047	11.9 (1193)	8.2 (810)	10.2 (1022)	3152	1808	6.5
2006	9995	11.2 (1118)	10.0 (999)	9.2 (918)	2408	1145	6.7
2007	10346	14.2 (1472)	11.5 (1186)	10.0 (1035)	2526	1419	6.7
2008	10728	13.0 (1397)	10.8 (1160)	9.3 (993)	2446	1647	5.9
2009	10995	12.8 (1411)	10.7 (1180)	9.0 (994)	2685	1893	4.8
2010	10606	13.8 (1462)	11.5 (1217)	9.1 (964)	2408	2043	3.8
2011	10350	16.2 (1679)	12.8 (1327)	10.1 (1043)	3238	2510	3.8
2012	10089	17.4 (1758)	13.6 (1371)	10.3 (1037)	3403	2188	3.3
2013	10103	16.8 (1715)	12.9 (1312)	10.2 (1031)	3138	1576	3.3
2014**	10010	16.1 (1609)	12.1 (1208)	9.0 (905)	3661	1743	2.5
2015***	4767	17.3 (824)	15.2 (723)	11.9 (570)	3136	1217	1.4

Notes: * – until 2003 – new types of products; ** – starting from 2014 – excluding the temporarily occupied territory of the Autonomous Republic of Crimea, Sevastopol and part of ATO zone; *** – starting with the report for 2015 – legal entities of types of economic activity in industry with a working force of 50 people or more.

As can be seen from Table 3.2, the proportion of enterprises engaged in innovative activity in the total number of them during the period under review was insignificant but did not have a steady upward trend. If in 2007 the proportion of innovatively active enterprises increased to

14.2% against 11.9% in 2005, whereas in 2008 and 2009 there was a decrease. In 2010-2012 they were characterized by an increase in the proportion of enterprises engaged in innovative activity to 13.8%, 16.2% and 17.4%, respectively. In 2013-2014 there was a gradual decrease in the proportion of innovatively active enterprises to 16.8% and 16.1%, respectively. However, despite the gradual activation of innovative activity at Ukrainian enterprises and the growth in the number of new technological processes and production of innovative products that have been introduced, the proportion of realized innovative products in the industrial volume tends to decrease from 6.7% in 2006, to 3.3% in 2012 and 2013 and to 2.5% in 2014. However, the deterioration in the indicators in 2014 can be explained by the complication of the situation in the East of Ukraine as part of the antiterrorist operation.

Figure 3.2 shows the volume of sales of innovative products by industrial enterprises of Ukraine.

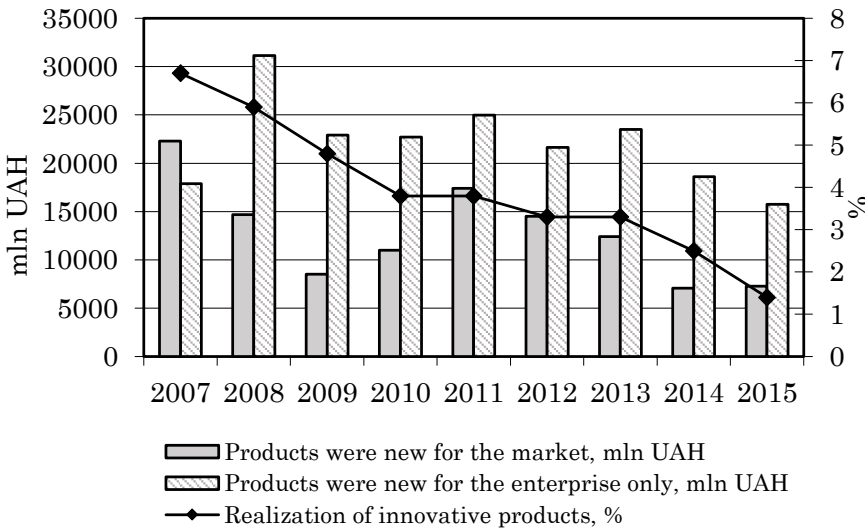


Figure 3.2. Volumes of realization of innovative products by industrial enterprises [17-21]

According to Figure 3.2, there is a tendency to decrease in the volumes of realization of innovative products on the market (by 3.4% in 2013 compared to 2007, by 4.2% in 2014 as compared to 2007) that can be explained by the lack of financial resources of enterprises and difficulties with bringing innovations to the market. Quite often enterprises are able to create innovative products, but they do not know how to bring

them to the market and interest consumers, which can be explained by the lack of marketing policy of distribution.

In addition, it should be noted that although in 2007 the proportion of enterprises with innovative products which were new to the market, predominated, since 2008 most enterprises focused on the development and implementation of innovative products that are new within the enterprise, but not for the market (in 2013 65% and 35% respectively, in 2014 – 72% and 28%, in 2015 – 68% and 32%, respectively). This is determined by the lack of funds, insufficient level of development of R&D at enterprises, incomplete market data, undeveloped system of bringing innovative products to the consumer.

If we consider the distribution of the volume of expenditures in the areas of innovation activity, then we can trace the disproportion between the directions and the amount of deposits (Figure 3.3).

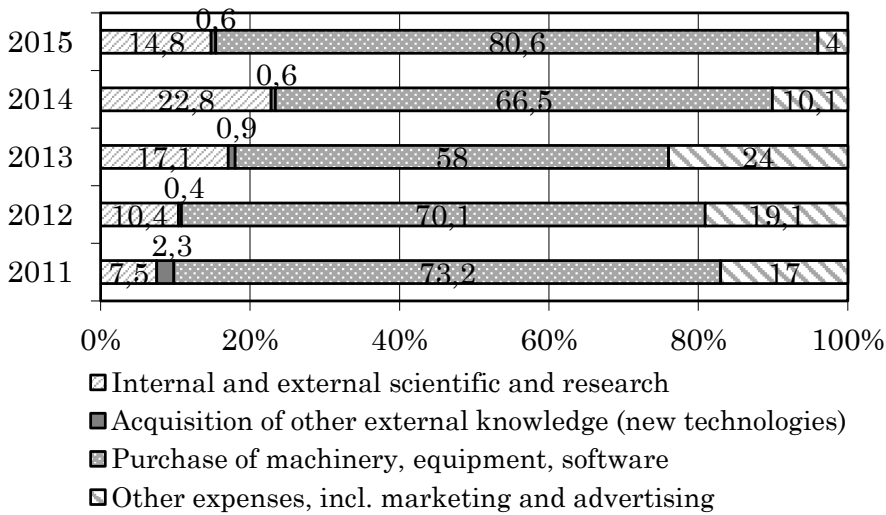


Figure 3.3. Distribution of the volume of expenditures in the areas of innovative activity [17, 21]

During all 5 years (from 2011 to 2015), a bulk of the funds is spent on the acquisition of machinery, equipment and software. To implement innovations, in 2014, 1,206 enterprises spent 7.7 bln UAH, more than two thirds of which to purchase machinery, equipment and software, 15.9% – to make research and development (R&D) by own forces, 6.9% – to purchase R&D results in other enterprises (organizations), 0.6% – to make an acquisition of other external knowledge (new technologies) and

10.1% – to educate and train personnel for the development and implementation of new or significantly improved products and processes, activity on market introduction of innovations and other works related to the creation and implementation of innovations (other costs) [23-24].

In 2015, enterprises spent 13.8 bln UAH on innovations, including 11.1 bln UAH for the purchase of machinery, equipment and software, 2 bln USD for internal and external research and development, 0.1 bln UAH for acquisition of other external knowledge (acquisition of new technologies) and 0.6 bln UAH for education and training of personnel to develop and implement new or significantly improved products and processes, market innovations and other activities related to the creation and implementation of innovations (other costs).

In addition, it should be noted that Ukrainian proportion in the world trade volume of high-tech science-intensive products is very small – it takes only 0.1%. This can be explained by the apparent type of development in Ukraine.

It is equally important to determine the proportion of innovative products exported abroad. So, the number of enterprises, implemented innovative products outside Ukraine, and their proportion in the total volume of innovative products sold are presented in Table 3.3 [25].

Table 3.3. The number of enterprises, implemented innovative products outside Ukraine, and its proportion in the total volume of innovative products sold

Year	Number of enterprises, implemented innovative products outside Ukraine, units	Proportion of innovative products sold outside Ukraine in the total volume of innovative products sold, %
2010	343	40.7
2011	378	29.8
2012	332	36.9
2013	334	44.8
2014	295	29.2
2015	213	47.0

Thus, during the analyzed period, there is a significant change in the dynamics of the proportion of innovative products sold outside Ukraine. The smallest proportion of sales was observed in 2011 and 2014.

Since 2006, the State Statistical Service of Ukraine has started to conduct surveys of innovation activities of enterprises on the methodology of the Community Innovation Survey, CIS, implemented by the EU.

In the course of four studies conducted between 2006 and 2015, Ukrainian enterprises with innovative activity were identified according to the types of innovations they were engaged in (Figure 3.4).

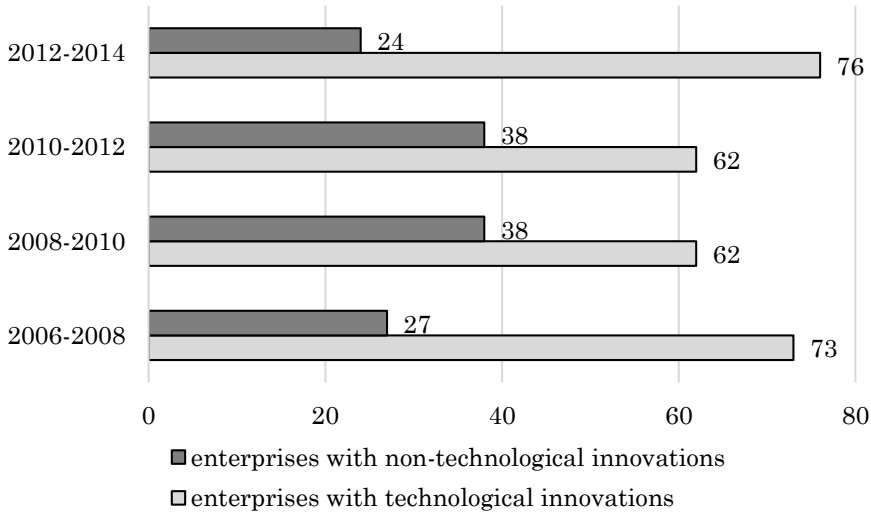


Figure 3.4. The proportion of innovative enterprises with technological and non-technological innovations in industry by survey periods, % (calculated according the State Statistical Service of Ukraine)

During four study periods the ratio of enterprises with technological and non-technological innovations remained almost unchanged. The proportion of enterprises with non-technological innovations ranged from 24 to 38%, while the proportion of enterprises with technological innovations varied from 62 to 76%.

Thus, the primary focus of Ukrainian innovative enterprises is on the introduction of technological innovations, that is, new products and new processes. Simultaneously, the proportion of marketing and organizational innovations remains insignificant.

If compared with the indicators of innovative activity of enterprises in the European Union (EU-28), during 2012-2014 49.1% of enterprises showed innovative activity. During 2010-2012 the innovative activity index was 48.9%. The greatest innovative activity was shown in Germany (67.0%), Luxembourg (65%) and Belgium (64%); the lowest in Poland (21.0%) and Romania (12.8%) [26].

If consider in the context of types of innovations, the situation in 2012-2014 will be the following: 27.3% of innovatively active enterprises were engaged in organizational innovations, 23.9% introduced product

innovations, 22.8% introduced marketing innovations and 21.6% – process innovations. Thus, we can observe that the innovatively active enterprises of EU-28 introduce different kinds of innovations almost equally [26]. Thus, it can be argued that the European Union countries focus their attention on both technological (product and process) and non-technological (marketing and organizational) innovations.

Let us consider the activity of the innovation leader of the European Union, Germany, in the implementation of non-technological innovations in more detail. In 2012-2014 the proportion of enterprises in Germany that implemented marketing and organizational innovations was about 45% of all enterprises. In 2012, 14% of enterprises introduced only marketing innovations, 13% – only organizational innovations without significant changes in marketing and 18% introduced both marketing and organizational innovations.

Table 3.4 presents the dynamics of the introduction of marketing innovations at German enterprises in 2010-2014.

Table 3.4. Distribution of enterprises and organizations in Germany for subtypes of marketing innovations (compiled based on [27])

Marketing innovations	2010-2012	2012-2014
	share in all marketing-innovators	share in all marketing-innovators
Distribution channels	58	52
Design	41	45
Pricing	32	30
Advertisement	53	53

As can be seen from Table 3.1, in 2012 and 2014 more than 30% of all German companies have presented at least one marketing innovation. In 2012 and 2014, new advertising techniques and new distribution channels were the most common types of marketing innovations, followed by a new design and new pricing. In addition, during the period under study, the positive dynamics of the introduction of new design of products at innovation enterprises was traced, the percentage of enterprises decreased somewhat, new distribution channels and pricing were introduced, the proportion of enterprises, introduced new advertising techniques, remained unchanged.

The dynamics of introduction of organizational innovations at German enterprises in 2010-2014 is presented in Table 3.5.

Table 3.5. Distribution of enterprises and organizations in Germany for subtypes of organizational innovations (compiled based on [27])

Organizational innovations	2010-2012	2012-2014
	share in all organizational-innovators	share in all organizational-innovators
External relations	37	38
Work organization	67	66
Business processes	66	59

In accordance with Table 3.2, 31% of all enterprises presented at least one organizational innovation in 2012 and 2014. Such organizational innovations as a new work organization made up the largest proportion (66% in 2014 and 67% in 2012 for all enterprises-organizational innovators, 21% in 2014 and 20% in 2012 for all enterprises), new business processes and new external relations comprised a slightly smaller proportion.

So, innovative and active German companies actively introduce non-technological innovations.

According to a study done in Great Britain 2012-2014, 53% of enterprises showed innovative activity, including 61% of large enterprises and 53% of small and medium-sized enterprises.

At the same time, 25% of innovatively active enterprises have introduced technological (product and process) innovations. 19% (with almost a third of product innovations (32%) were new for the market), while the process innovations – 13% (more than a quarter (27%) of technological innovations were new for industry processes).

At the same time 42% of innovative and active UK companies introduced non-technological innovations. In particular, 27% of enterprises engaged in the introduction of «new business practices», 20% – in «new method of organizing work responsibilities», 16% – in «changes in marketing concept and strategies» [28].

In accordance with the above-mentioned Ukrainian innovation enterprises, it is necessary to pay attention to non-technological innovations as a basis for providing advanced innovative development [29; 30].

At present, given the current trends in the development of Ukrainian innovation activity, it is advisable to develop its traditional sectors as [1]:

- complex modernization of production with the introduction of modern achievements of domestic and world science and technology;
- the development of priority industries that will determine the main vectors of the growth of science-intensive types of engineering activities, in particular, the production of aviation and rocket and space techniques, instrument engineering, shipbuilding, manufacture of the

newest rolling stock and other equipment for railway transport, machine tool, power and agricultural machinery, production of electronic equipment and communication tools;

- the development of technological equipment for the modernization of basic industries in the direction of resource and energy conservation, greening production and increasing its overall level of efficiency.

Summarizing the above, it can be noted that in its scientific and technological and innovative development, Ukraine lags far behind the developed countries of the world. This is caused both by the lack of proper state support for the innovative activity of industrial enterprises, and by the fact that enterprises themselves are not ready for its implementation.

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