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**POTENTIAL OF MACHINE-BUILDING OF UKRAINE: PROGRESS TRENDS**

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*Філіппова С.В., Таран Г.В. Потенціал машинобудування України: тенденції розвитку.*

У сучасних умовах інтернаціоналізації та інновацізації економіки машинобудування, як підкомплекс промисловості і база виробництва і впровадження інновацій, перетворюється у вагомий фактор конкурентоспроможності країни. У статті наведено характеристику структури машинобудування, проведено аналіз стану і тенденцій розвитку цієї галузі в Україні в 2010-2015 рр. за основними показниками їх діяльності, визначені позиції машинобудування в промисловому комплексі України. Проведено оцінку рівня інноваційної активності машинобудування України і відповідних тенденцій розвитку інноваційної діяльності за декількома критеріями за напрямками проведених інновацій.

*Ключові слова:* промисловість, машинобудування, потенціал, тенденції розвитку, інноваційна діяльність

*Філіппова С.В., Таран Г.В. Потенциал машиностроения Украины: тенденции развития.*

В этой статье рассмотрены актуарные расчёты для пенсионных схем на трёх уровнях пенсионного обеспечения Украины: солидарного, накопительного и негосударственного. Проанализировано украинское пенсионное законодательство для каждой системы. Представлено методику проведения актуарных расчётов. Выделено основные входные и выходные показатели, которые используются для расчёта актуарных моделей. Предоставлена сравнительная характеристика каждой с пенсионных систем. Представлены формулы для расчёта пенсий в солидарной системе, виды пенсий в накопительной системе пенсионного обеспечения, риски в негосударственных пенсионных фондах, которые актуарии фиксируют в параметрах при разработке актуарных моделей, а также имитационную актуарную модель расчёта пенсионных вкладов и выплат.

*Ключевые слова:* промышленность, машиностроение, потенциал, тенденции развития, инновационная деятельность

*Filippova S.V., Taran G.V. Potential of machinebuilding of Ukraine: progress trends.*

In modern conditions of economy internationalisation and innovatisation, the mechanical engineering as industry subcomplex and base of production and implementation of innovations, is transformed to powerful factor of country competitiveness. The characteristic of mechanical engineering structure is provided in article, the analysis of development condition and tendencies of this industry in Ukraine in 2010-2015 on the main indicators of their activities is carried out, mechanical engineering line items are determined in industrial complex of Ukraine. Level assessment of innovative activity of Ukrainian mechanical engineering and the corresponding tendencies of innovative activities development for several criteria in the directions of the carried-out innovations are carried out.

*Keywords:* industry, machine-building, potential, progress trends, innovative activity

The present stage of Ukrainian industry development is characterised by extremely difficult economic situation, is on verge of collapse, drops out of implementation process of the latest world technologies. Outflow of foreign and local investments is observed, the enterprises stop work, the established production relations are destroyed, the number of workers is reduced, Ukrainian GDP per capita in 2013 constituted only 3.1 thousand dollars of the USA that corresponded to the penultimate place in Europe, and in 2014 GDP was reduced on 10%, the external debt of the state grew to 30.8 billion US dollars, at the same time the real wage decreased by 21.9% [1]. The mechanical engineering as line of industry, at present formation stage of the world economic relations is one of the most important types of economic activity, occupies a considerable share in structure of Ukrainian refining industry, creates demand for own products and products of allied industries and provides by the equipment other types of economic activity, is basis of Ukrainian innovativeness.

**Analysis of recent researches and publications**

The long experience of industrially developed countries demonstrates significant positive influence of business entities innovative energy on stability and progressiveness of national economy development. Considering low innovative activity of the Ukrainian enterprises and considerable destructive shifts which developed in local economy towards raw industries at the expense of real sector which pose threats for an economic safety of the country, an urgent and important task is the research of mechanical engineering potential and search of prospects of innovative processes development at enterprises of this sector.

*The aim of the article is* determination of the main tendencies and problems in capacity of machine-building enterprises development, and underpinning of theoretical provisions and practical tasks of creation, implementation, promotion of innovations in their activities.

**The main part**

The mechanical engineering of Ukraine unites 11267 entities from which 146 are big, 1834 –

averages and 9287 – small, on production of various machines and the equipment, devices and apparatus, and so forth. In mechanical engineering concentrated more than 15% of fixed assets and nearly 6% of current assets of the local industry and more than 22% of workers quantity [2].

The modern machine-building complex of Ukraine develops within the adopted "Concept of the nation-wide target development program of the industry in Ukraine for the period till 2020" [3].

The Program purpose is neo-industrialisation of Ukrainian economy which provides the development of advanced production on activation basis of innovative and investing activities and entry of the Ukrainian industrial enterprises into new global chains of value creation.

Target reference points of the Program – upgrade existing and creation of new workplaces with the competitive level of the equipment and compensation, increase in a share of the fifth and sixth waves technologies, ensuring commodity filling of the local market by self-produced high-quality industrial output, the export potential development and fixing of line items of national producers in the foreign markets.

In the Concept it is noted that the price conjuncture on the main export line items (steel, mill products) and the mechanical engineering product demand has the determining influence on a situation in the industry. While metallurgical production share in quantity of goods sold of processing industry constituted 27.8% following the results of 2012, mechanical engineering share constituted only 18.7%. It is 2-4 times lower than the level which developed countries have. According to this program, it is provided increase of industrial output index on 2-2.2% annually, increase in a share of innovative products in production volume of industrial output to 50% and increase in a share of the industrial enterprises conducting innovative activities to 25% [3].

In the program the mechanical engineering is recognized by perspective industry which provides competitive advantages in the world markets, increases in level of products and processes, accelerations of growth rates in allied industries. To the most perspective subindustries of mechanical engineering are related: knowledge-intensive machine-building productions (aviation and rocket-and-space industry, shipbuilding, agricultural mechanical engineering, power and transport engineering, high-technology equipment for mining industry; instrument engineering (high-technology devices and systems of large functional and industry purpose, defense-industrial sector [4].

The structure of mechanical engineering as diversified complex consists of four components according to Standard Industrial Classification-2010 [5]:

1. Production of computers, electronic and optical products includes production of computers and the peripheral equipment, equipment of communication

and other types of electronics, and also production of components for these products. For production processes is characteristic development and use of the integrated schemes and devices relating to enough highly specialized miniaturized technologies and also includes production of consumer electronics, equipment for measurement, a research and navigation, the radiological, electromedical and electrotherapeutic equipment, optical devices and the equipment, and also magnetic and optical data carriers.

2. Production of the electric equipment includes production which generates, distributes and consumes an electrical energy, also includes production of the lighting, signal equipment and household electric appliance. Includes groups:

- Production of electric motors, generators, transformers and control equipment;
- Production of batteries and accumulators;
- Production of wires, cables and electrical mounting devices;
- Production of the electric lighting equipment;
- Production of household appliances;
- Production of the other electric equipment.

3. Production of the machines and the equipment which don't belong to other groups, includes production of machines and the equipment which are intended for mechanical or heat treating of materials or implementation of other transactions (hoisting-and-transport, transactions of grinding, weighing, packaging and etc.), including production of their mechanical components which make and use force, and any specially made main parts. Also it includes production of stationary, mobile or manual devices irrespective of, they are intended for industrial, building, agricultural or at-home use; equipment manufacturing of a special purpose for passenger or freight transport. Also it includes the production of other machines and the equipment of a special purpose which isn't classified in other sections Standard Industrial Classification which use or don't use in production processes, such as the equipment for fairs and amusements of entertaining appointment, the automatic equipment for a bowling alley and so forth.

4. Production of vehicles, full trailers and semitrailers includes production of vehicles for transportation of passengers or freights, also includes production of various parts and accessories, and also full trailers and semitrailers production. Includes: production of bodies for trucking facilities, full trailers and semitrailers; production of vehicles; production of nodes, details and accessories to vehicles.

The analysis of activities of the industry and mechanical engineering according to Public service of statistics in Ukraine of 2011-2015 on the main indicators: mechanical engineering production volume; investments into basic capital of mechanical engineering; commodity export and import of mechanical engineering industry showed the following, tab. 1-4.

Table 1. Production volumes of Ukrainian mechanical engineering [1]

Indicator	Years				
	2011	2012	2013	2014	2015
	million UAH				
Industry	1331887.60	1400680.20	1354130.10	1217362.96	1339099.26
Mechanical engineering	133469.00	143533.10	117301.90	101348.84	80470.98
	in % as a result				
Industry	100.00	100.00	100.00	100.00	100.00
Mechanical engineering	10.02	10.25	8.66	8.33	6.01

Source: Compiled by the author according to the materials [1]

During 2011-2015 it is noticeable decrease in production mechanical engineering volumes from 10.02% in 2011 to 6.01% in 2015 that it is much less, than in developed countries in which 30-50% of total amount of industrial output release fall to the share of mechanical engineering that provides technical reequipment of the industry each 8-10 years. Such tendency characterizes chaotic development of machine-building complex. The objective reasons of recession of production volume – is decrease of economic and investment activity in the local market and at the same time reducing foreign sales, especially Russian. For comparison the mechanical engineering products share in GDP of the European Union countries constitutes 36-45%, in the USA – 10%, in Russia – 18% [1].

With these conditions decrease of indexes of machine-building products is logical. The first wave of such reduction happened in 2009 that was caused by consequences of world crisis then insignificant increase took place in 2010. Growth was observed in

all subspecies of mechanical engineering industry: mechanical engineering, except repair and installation of machines and the equipment (for 15.9%), production of the electric equipment (for 28.6%), production of machines and the equipment which don't belong to other groups (for 10.2%), production of motor vehicles, full trailers and semitrailers and other vehicles (for 19.1%) [6].

Dynamics analysis of direct foreign investments in Ukrainian mechanical engineering in tab. 2 showed that their amount decreases when reducing general investments into economy of Ukraine every year. The situation with the international investments is directly connected with an internal economic situation. Ukraine exports goods with low cost, internal transformation of Ukrainian economy didn't take place yet. Foreign investments, which will bring new technologies and will allow to make goods, competitive in the world market are for this purpose necessary.

Table 2. Direct foreign investments (capital stock) in Ukrainian economy by types of economic activity

Indicator	Years				
	2011	2012	2013	2014	2015
	million UAH				
Industry	49362.30	54462.40	58156.90	45916.00	43949.40
Mechanical engineering	1226.00	1154.70	1102.40	917.50	835.63
	in % as a result				
Industry	100	100	100	100	100
Mechanical engineering	2.48	2.12	1.90	2.00	1.90

Source: Compiled by the author according to the materials [1]

In 2015 only 1.9% of expenses on capital investments were financed at the expense of means of foreign investors. At the same time reducing direct foreign investments in Ukrainian economy in 2015 constituted \$81.87 million or 8.9% by 2014. In general investment activity in a machine-building industry for years of independence decreased by 15.4 times (from 29.3% in 1990 to 1.9% in 2015).

Local enterprises manage own funds only for 71.5% of the needs for capital investments. Decrease of capital investments into production of machines and the equipment continues, so the largest volumes of investment were in 2012 – 2781.5 million UAH, in 2014 there was a fall to 2020.8 million UAH or on 27,3%.

The situation with fixed assets depreciation of machine-building enterprises looks tragically. So, in 2011 it constituted 81.9%, and in 2015 – already

83.4%. Among subindustries of mechanical engineering the highest degree of depreciation is fixed at the level of 89.2% in 2011 – in production of machines and the equipment, and the smallest – 51.7% for the same period – in production of the electric, electronic and optical equipment. Today depreciation degree of fixed assets at machine-building enterprises constitutes more than 63%, among them there is production of machines and the equipment – 60.8%, production of the electric, electronic and optical equipment – 52.7% and production of vehicles and the equipment – 70.4% [7].

Export-import transactions play an important role in activities of mechanical engineering enterprises. Reducing investment activity in 2012-2015 in the main marketing outlet led to export reduction of industry products, tab. 3.

Table 3. Dynamics of export and import goods of Ukrainian machine-building industry (\$ billions)

Indicator	Years				
	2011	2012	2013	2014	2015
	export				
General	88.10	81.20	76.10	53.90	28.11
Mechanical engineering	11.90	13.30	10.60	7.40	2.20
	import				
General	88.8	90.2	84.6	54.43	27.38
Mechanical engineering	8.20	10.90	7.00	5.40	2.40

Source: Compiled by the author according to the materials [1]

During 2011-2013 Ukraine exported more than a half of the made products to other countries. In 2014-2015 the share of such products considerably decreased to 28.11%, mechanical engineering products in 2.2%, it is more than five times.

The structure of foreign trade in machine-building products of Ukraine doesn't correspond to current trends in the world market and is characterized by the low quality level of many traditional and potential export goods.

Import of mechanical engineering products in 2011-2015 decreased to 2.4%, in comparison with 2011, it is almost four times. Following the results of 2015 the negative balance of the foreign trade balance of mechanical engineering was created that is connected with lack of competitive goods. The greatest import shares of machine-building products consist of automobile and cargo vehicles, components and the equipment for power plants and agricultural machinery (combines, tractors). Such situation is also connected with the fact that big share of accessories of domestic automobile-building enterprises are imported from abroad. Machine-building enterprises which make heavy automotive vehicles, agricultural machinery, rail cars have the considerable export potential, it is slightly less – cars and buses. Its low level is caused by lack of cooperations in the research and production sphere with world leaders of mechanical engineering, delay of local manufacturers with implementation of environmental European standards, low concentration of producers on innovative development of the enterprises, inability to adapt quickly to needs of consumers and to react to world tendencies, the high level of a moral and physical deterioration of the equipment, an insufficient financial support of the state and lack of the complex program of mechanical engineering and allied industries development [8].

So, as the main modern problems of mechanical engineering of Ukraine it is possible to recognize:

- production reduction of products (services);
- growth of depreciation degree of fixed assets and investments reduction into their updating;
- high level of import dependence – reducing export and increase of import transactions;
- insufficient technological level of the enterprises and industry in general;
- low specific weight of mechanical engineering in industrial structure of an economic complex of the country;

— reducing export of machine-building products on traditional markets of outputs to the CIS countries.

These problems significantly influence the indicators determining financial results of machine-building enterprises, tab. 4: pretax profit and a net profit, with determination of a share of the profitable enterprises in industrial enterprises total quantity.

The best results on all indicators were achieved by machine-building enterprises in 2011: a financial result – 15081.2 million UAH or 67.6% to a total quantity of the enterprises, a net profit – 10777.9 million UAH or 64.8% to a total quantity of the enterprises. In 2012-2013 indicators worsened, so in 2013 activities of industrial enterprises were unprofitable (-4535.2 million UAH), a net profit of machine-building enterprises in comparison with 2011 decreased almost by 3 times. Further the situation worsens, during 2013-2015 activities of the enterprises remain unprofitable. In comparison with 2013 in 2015 unprofitability increased by 40 times.

Decrease in level of profitability of operating activities of machine-building enterprises for types of activity is consistent tab. 5.

Profitability of operating activities in mechanical engineering changed in 2010-2013 within 6.6-9.9%. 2014 is described by low value of this indicator in mechanical engineering (-2.4%). In 2015 the tendency changed to positive, the level of profitability reached 3.1%, generally due to production of vehicles, full trailers and semitrailers. The greatest profitability of operating activities by types of mechanical engineering was in 2012 – 12.8%, in production of vehicles, full trailers and semitrailers, the lowest – 3.4%, in production of computers, electronic and optical products in 2010. For this period profitability of operating activities in production of vehicles, full trailers and semitrailers considerably decreased and has negative value in 2014 (-2.8%). Profitability of operating activities in production of computers, electronic and optical products had the greatest value in 2011 – 13.8% and decreased to (-8.0%) in 2014 that is the lowest indicator of machine-building enterprises. Production of the electric equipment in Ukraine was unprofitable in 2014-2015 (-3.1; -1.3%). Thus, it should be noted general decrease in indicators of profitability in 2014 and their negative value by all types of machine-building products.

Table 4. Indicators of financial results of Ukrainian machine-building enterprises in 2010-2015

Year	Industry	Mechanical engineering	production of machines and equipment	production of the electric, electronic and optical equipment	production of vehicles and equipment	Industry	Mechanical engineering	production of machines and equipment	production of the electric, electronic and optical equipment	production of vehicles and equipment
Financial result to the taxation										
million UAH					in % to a total quantity of the enterprises					
2010	31579.6	7172.8	1823.8	1137.7	4211.3	58.7	60.2	60.1	63.60	53.7
2011	58892.4	15081.2	2621.9	2182	10277.3	62.6	67.6	66.2	68.6	66.3
2012	21353.4	13322.8	2132.4	2079.8	9110.6	62.4	67.0	65.7	70.4	62.4
2013	13204.5	5827.8	1446.6	1345.6	3035.6	63.2	65.1	64.4	65.7	63.3
2014	-166414.0	-20501.5	-3890.9	-6028.3	-10582.3	63.3	64.7	65.4	65.2	62.1
2015	-4756478.0	173806.9	26840.4	86198.5	60768.0	73.6	78.4	80.0	73.9	90.5
Net profit (loss)										
million UAH					in % to a total quantity of the enterprises					
2010	11889.6	4235.5	778.1	614.2	2843.2	57.5	60.4	59.9	62.7	52.9
2011	32229.9	10777.9	1813	1394.8	7570.1	60.8	65.6	64.8	66.9	63.7
2012	2592.4	9268.8	1429.3	2555.1	6393.6	60.7	65.2	63.4	69.15	61.5
2013	-4535.2	3046.8	822.1	935.4	1289.3	62.1	64.1	63.5	65.2	62
2014	-87731.6 <sup>1</sup>	-11007.1	-1397.8	-3071.4	-6537.9	62.4	63.7	64.7	64.3	60.6
2015	-185889.5	-15799.8	-3471.6 <sup>1</sup>	-4405.5	-7922.7 <sup>1</sup>	72.4	73.3	75.1	73.8	69.0

<sup>1</sup> – includes - production of computers, electronic and optical products and the electric equipment

Source: Compiled by the author according to the materials [1]

Table 5. Profitability level of operating activities of machine-building enterprises for types of activity in Ukraine in 2010-2014

Indicator	2010	2011	2012	2013	2014	2015
Mechanical engineering	7.0	9.3	9.9	6.6	-2.4	3.1
production of computers, electronic and optical products	3.6	13.8	5.8	4.2	-8.0	2.0
production of the electric equipment	6.4	4.1	9.3	8.2	-2.9	-1.3
Production of the machines and the equipment which don't belong to other groups	5.5	5.6	6.2	5.4	-1.4	3.3
Production of vehicles, full trailers and semitrailers includes production of vehicles	9.1	12.1	12.6	7.2	-1.6	5.5

\* Data are provided without results of small enterprises activities

Without temporarily occupied territory the AR of Crimea and Sevastopol since 2014, also without part of the anti-terrorist operation zone

Source: Own elaboration

Results of carried-out analysis of mechanical engineering in current condition demonstrate that the industry is in a difficult and unstable financial position. Import exceeds export and there is growth rates delay of amounts of the sold industrial output. Thus, the economic condition of mechanical engineering is at the high level, but considerable influence of the crisis phenomena is observed.

Special feature of industrially developed states and enterprises is constant economic development based on implementation of innovative activities, implementation in production of the latest results of these activities and export on the market of new products and technologies.

Mechanical engineering as complex of fund-creating of productions which specialize in production of technical means of production and non-productive appointment plays material resources role of innovative activities of the enterprises.

Innovative activity analysis of industrial enterprises on indicators of number of machine-building enterprises and amount of costs for innovative activities with their distribution by its types showed the following. A negative tendency is reduction in the industry – 397-359 units, (23.1-22.3%), the number of the enterprises which are engaged in innovative activities. The corresponding tendency is traced by all types of innovative activities for mechanical engineering in general.

By mechanical engineering types increase in number of the enterprises which are engaged in innovative activities was only in production of computers, electronic and optical products – on one unit. In areas structure of innovations all enterprises of mechanical engineering were engaged in internal Research works – 53.5-49.7 total quantities of the innovation-active enterprises, and market of innovations implementation – 41.1-41.8% of machine-building enterprises.

Table 6. The number of machine-building enterprises in Ukraine in areas of the carried-out innovations in Ukraine in 2013-2014, unit / %

	In total		Including were engaged in innovative activities	From them spent means on														
				Internal RW		External RW		Acqui- sition of machines, equipment and soft- ware		other external know- ledge		Education and training of personnel		Market Entering of innova- tions		Another		
	2013	2014	2013	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	
Industry	10189	10010	1715	1609	215	189	114	94	1082	993	85	83	333	319	95	79	165	140
Mechanical engineering	1378	1333	397	359	115	94	35	28	227	198	25	15	80	75	39	33	56	51
Mechanical engineering in % to the industry	13.5	13.3	23.1	22.3	53.5	49.7	30.7	29.8	21.0	19.9	29.4	18.1	24.0	23.5	41.1	41.8	33.9	36.4
production of computers, electronic and optical products of unit / in % to mechanical engineering	196	209	70/ 17.6	71/ 19.8	29/ 25.2	23/ 24.5	7/ 20.0	5/ 17.9	42/ 18.5	39/ 19.7	2/ 8.0	3/ 20.0	9/11.3	12/ 16.0	4/ 10.3	3/ 9.1	6/ 10.7	5/ 9.7
production of the electric equipment, unit / in % to mechanical engineering	281	276	80/ 20.2	64/ 17.8	20/ 17.4	14/ 14.9	7/20.0	5/ 17.9	54/ 23.8	37/ 18.7	8/ 32.0	5/ 33.3	23/ 28.8	11/ 14.7	8/ 20.5	4/ 12.1	9/ 16.1	11/ 21.7
the equipment which don't belong to other groups, unit / in % to mechanical engineering Production of vehicles, full trailers and semitrailers, unit / in % to mechanical engineering	654	615	160/ 40.3	155/ 43.2	42/ 36.5	35/ 37.2	11/ 31.4	10/ 35.7	82/ 36.1	81/ 40.9	9/ 36.0	533.3	33/ 41.3	36/ 48.0	14/ 35.9	16/ 48.5	26/ 46.4	20/ 39.2
Industry	247	233	87/ 21.9	69/ 19.2	24/ 20.9	22/ 23.4	10/ 28.6	8/ 28.6	49/ 21.6	34/ 17.2	6/ 24.0	2/ 13.4	15/ 18.8	16/ 21.3	13/ 33.3	10/ 30.3	15/ 26.8	15/ 29.4

Source: Compiled by the author according to the materials [1]

Table 7. Distribution of total costs amount for innovative activities at Ukrainian machine-building enterprises for the areas of the carried-out innovations in Ukraine in 2013-2014, in thousand UAH

	In total		Including on									
	2013	2014	internal RW		external RW		acquisition of machines, equipment and software		other external knowledge		another	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Industry	9562626.0	7695892.3	1312054.4	1221435.6	326385.8	533104.2	5546329.0	5115338.1	86978.8	47235.4	2290878.0	778779.0
Mechanical engineering	3589990.6	2267097.1	1034536.5	755718.0	178056.5	401084.3	1015701.8	899599.5	27298.0	8044.2	1334397.8	202651.1
Mechanical engineering in % to the industry	37.5	29.5	78.8	61.9	54.6	75.2	18.3	17.6	31.4	17.0	58.2	26.0
production of computers, electronic and optical products of unit / in % to mechanical engineering	174430.4/ 4.9	140673.2/ 6.2	121249.2/ 11.7	109706.3/ 14.5	1013.8/ 0.6	1057.0/ 0.3	48250.7/ 4.8	26226.1/ 2.9	12.0/ 0.0	72.0/ 0.9	3904.7/ 0.3	3611.8/ 1.8
production of the electric equipment, unit / in % to mechanical engineering	233019.3/ 6.5	176915.4/ 7.8	65526.8/ 6.3	65388.4/ 8.7	15040.8/ 8.4	4559.7/ 1.1	129825.0/ 12.9	82762.7/ 9.2	4849.4/ 17.8	3690.0/ 45.8	1777.3/ 1.3	20514.6/ 10.1
the equipment which don't belong to other groups, unit / in % to mechanical engineering Production of vehicles, full trailers and semitrailers, unit / in % to mechanical engineering	1414050.9/ 39.4	1107993.3/48.8	709104.3/ 68.5	413471.1/ 54.7	31128.9/ 17.5	25339.6/ 6.3	612849.0/ 60.3	628519.0/ 70.0	16642.4/ 61.0	4253.0/ 52.9	44326.3/ 3.3	36410.6/ 18.0
Industry	1768490.0/ 49.2	841515.2/ 37.2	138656.2/ 13.5	167152.2/ 22.1	130873.0/ 73.5	370128.0/ 92.3	224777.1/ 22.0	162091.7/ 17.9	5794.2/ 21.2	29.2/ 0.4	1268389.5/ 95.1	142114.1/ 70.1

Source: Compiled by the author according to the materials [1]

The greatest attention in this direction of innovations is devoted at the enterprises on equipment manufacturing which don't belong to other groups, respectively – 36.5-37.2% and 35.9-48.5%. Also we will note that at these entities, actively are engaged in education and training of personnel – 41.3-48.0% of the machine-building enterprises which are engaged in innovative activities.

The main directions of innovations in general at the entities of mechanical engineering which are engaged in innovative activities in 2013-2014 on the

importance are: internal RW; market implementation of innovations; external RW. It is in detail considered by authors [10].

Relatively total amount of costs for innovative activities at machine-building enterprises of Ukraine for the areas of the carried-out innovations in 2013-2014 it is possible to allocate such tendencies, tab. 7.

Total amounts of costs for innovative activities at machine-building enterprises equaled in 2013-2014 – 3589990.6-2267097.1 thousand UAH, reduction by 36.8%. The share of costs amounts for innovative

activities of mechanical engineering in the industry decreases and constitutes 37.5-29%.

The greatest amounts of innovative costs were at the enterprises on equipment manufacturing which don't belong to other groups, respectively – 39.4-48.8% and at the enterprises on production of vehicles, full trailers and semitrailers – 49.2-37.2%. In other types of mechanical engineering costs for innovations are insignificant.

In structure of total costs amount for innovative activities for the areas of innovations most of all was spent for internal RW – respectively 53.5-49.7%, market implementation – 41.1-41.8% and external RW – 30.7-29.8%. In foreign practice every third enterprise spends funds for development of own scientific base and uses results of own RW, in our opinion, activities of local engineering industry enterprises begin to change in a positive side by and this criterion.

Development unevenness of mechanical engineering enterprises testifies to lack of complex development policy of economic activity this type. For improvement of situation it is necessary to expand cooperation in the research-production sphere with local and world leaders of mechanical engineering, to reorient local manufacturers on implementation of the European standards and mobility of production concerning consumers' needs, to attract the international companies to construction of capacities in own territory, and also to recover economy that

will provide access to cheap credit resources to producers and will increase purchasing power of consumers [11].

### Conclusions

In the conditions of an unstable situation in Ukrainian economy effective activities of mechanical engineering enterprises consist, first of all, in creation of certain conditions for their further development: preserving scientific-technical and technological potential and creation of conditions for its further development with orientation to production of competitive goods; expansion of cooperation in scientific-technical and production spheres with the international leading companies of mechanical engineering; reorientation of local manufacturers to implementation of the European environmental standards and mobility of production concerning consumers' needs; adjustment of development priorities of mechanical engineering in modern technologies and demand for machine-building products (services); creation of modern innovative infrastructure. The state functions consist in economy revival, provision of support to the enterprises in regions for carrying out considerable transformations and investment of the perspective enterprises, projects, the ideas, ensuring access to cheap credit resources to producers, increase in purchasing power of consumers.

### Abstract

In modern conditions of economy internationalisation and innovatisation, the mechanical engineering as industry subcomplex and base of production and implementation of innovations, is transformed to powerful factor of country competitiveness. Results of carried-out analysis of mechanical engineering in current condition demonstrate that the industry is in a difficult and unstable financial position. Import exceeds export and there is growth rates delay of amounts of the sold industrial output. Thus, the economic condition of mechanical engineering is at the high level, but considerable influence of the crisis phenomena is observed.

Development unevenness of mechanical engineering enterprises testifies to lack of complex development policy of economic activity this type. In the conditions of an unstable situation in Ukrainian economy effective activities of mechanical engineering enterprises consist, first of all, in creation of certain conditions for their further development: preserving scientific-technical and technological potential and creation of conditions for its further development with orientation to production of competitive goods; expansion of cooperation in scientific-technical and production spheres with the international leading companies of mechanical engineering; reorientation of local manufacturers to implementation of the European environmental standards and mobility of production concerning consumers' needs; adjustment of development priorities of mechanical engineering in modern technologies and demand for machine-building products (services); creation of modern innovative infrastructure.

*JEL Classification: L62.*

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