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FACTORS OF THE INDUSTRIAL REGIONS' DEVELOPMENT: OPPORTUNITIES FOR MODERNIZATION ON AN INNOVATIVE BASIS

Modernization of the economy implies the formation of an effective industrial structure that should be modernized on an innovative basis. Using the statistical models, it will be investigated in the paper which modernization factors reveal a statistically significant relationship with the gross regional product (GRP). The purpose of the article is to test three working hypotheses: not all factors of development have a statistically significant relationship with the level of regional income; the strength of this relationship differs depending on the factor; the impact of factors and the strength of relationship depend on the level of the region's industrial development. To do this, the regions of Ukraine were divided into three groups: industrially developed regions, regions of average industrial development and underdeveloped industrial regions.

The results of modeling showed that for industrially developed regions, as well as for regions of average industrial development and underdeveloped industrial regions, the factor of R&D, innovations and of the modern sector of the economy still do not play principal role in the formation of the regional income in Ukraine. In the industrially developed regions, almost the entire amount of GRP was determined by the impact of direct foreign investment and local budgets' revenues (excluding transfers). Moreover, the impact of the former increased significantly in 2015 in comparison with 2010.

A comprehensive analysis has shown that the funds of local budgets cannot be considered as an effective resource for modernizing the economy on an innovative basis. Major part of these funds is distributed on solving current social problems in the regions. Moreover, funds of local budgets are not sufficient enough to cover the expenditures, while the share of inter-budgetary transfers in the structure of local budget revenues remains rather high.

As far as foreign direct investment is concerned, for now they can compensate domestic institutions' weakness, such as access provision to skills and capital for enterprises. On the other hand, foreign investment can be considered as the factor that restrains the development and even such that causes degradation. To provide a successful modernization of the economy, the industrial regions should rely on the internal resources for innovative growth, using the advantages and positive effects of foreign direct investment.

Keywords: industrial regions, industrial policy, modernization, factors of modernizing, innovation, foreign direct investment.
JEL: O140, O250, R110.

Introduction

The importance of industry is still high, despite the fact that in recent years its volumes have been declining. Currently manufacturing accounts 15.3% of the world gross dom estic product (GDP) and 15.8%

of the European Union GDP [1]. The European Commission estimates that for every 100 jobs created in industry, from 60 to 200 new jobs come into existence in the rest of the economy, depending on the industrial sector [2].

In 2015, the United Nations adopted the Sustainable Development Program until 2030. One of its goals concerns an active increase of industrial production share in the overall employment and GDP by 2030 by integrating of small-scale industrial and other enterprises into value chains and markets, upgrading infrastructure and industries with greater resource-use efficiency, using clean and environmentally sound technologies and industrial processes, boosting scientific researches, upgrading technological capabilities and encouraging innovation. The latest documents of the United Nations Industrial Development Organization are devoted to the roles of technology and innovation in inclusive and sustainable development of industry in the regional aspect as well [3, 4].

In recent years, one of the most examined questions concerning industrial development is why some industrial regions are able to adapt and shift to new developmental trajectories, while others «remain locked in decline over time» [5].

The former leaders of regional development faced such previously unfamiliar phenomena as stagnation and setback in production, bankruptcy and restructuring of giant enterprises and, as a result, high unemployment, an outflow of skilled specialists, a general decline of quality of life. Such situation is most common for old industrial regions, which since the Industrial revolution until the period of mass industrialization and after it developed as territories of concentrated industrial production due to mass construction of industrial facilities mainly in the form of territorial production complexes in limited monofunctional territories. Old industrial areas, affected by long-term deindustrialization, lack of sufficient

capital and advanced technologies face greater challenges in adapting to new economic realities than other regions do.

However, results of industrial restructuring vary remarkably from region to region. It was shown in empirical researches, which were focused on the diversity of industrial development inside the country, even inside conurbation [6], as well as on regional differences of different countries [7; 8]. These researches have revealed that some regions are better than others able to trigger changes in the economic structures, institutions and knowledge basis.

In Ukraine, the volume of industrial production varies considerably by regions too. This indicator is 44 times higher in Dnipropetrovsk region than in Chernivtsi region [9]. So, the significance of industry in regions of Ukraine is different, and determines the peculiarities of their development.

The indicator of the Gross Regional Product (GRP) per capita in industrial regions is considerably higher than the average in Ukraine[1]. The difference between the best values (Poltava region) and the worst values (Chernivtsi region) was 3.3 times, which means that there are significant differences in the development of regions depending on their industrial specifics.

To identify the causes of this state of affairs and to continue the ideas of the predecessors, [10-12], this study focuses on the analysis of the impact of factors contributing to modernization of the economy of Ukraine's regions through their interrelation with the level of GRP. Using the statistical models in the paper, it will be investigated, which modernization factors reveal a statistically significant relationship with GRP. The purpose of the paper is to test three working hypotheses: 1) not all factors of development have a statistically significant

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[1] Since 2014, Donetsk and Luhansk regions have been excluded, and their GRPs have dropped considerably as a result of an armed conflict.

relationship with the level of regional income; 2) the strength of this relationship differs depending on the factor; 3) the impact of factors and the strength of relationship depend on the level of the region's industrial development.

Literature review

X. Hu and R. Hassink focus on two main impact factors for old industrial areas: industrial-sectoral impact factors and institutional-political impact factors [5]. The first group of impact factors includes the extent of industrial specialization; the characteristics of the dominant industry; the quality of regional innovation system; international economic influences (integrating local traditional industries into global production networks). The second group impact factors are associated with regional national and supranational institutes. Political status of regions (decentralization of regions); cultural traditions, regional identity of individuals and groups, social capital and trust; functions, aims, and incentives of political leadership in regions; a national political system and state strategies; supra-national institutional influences on national industrial policy have a strong effect on the regional restructuring.

For D. Acemoglu and J. Robinson only institutions have crucial importance for modernization. Inclusive economic institutions stimulate the economic activity and increase in productivity through the guarantee of property rights. Such institutions "encourage" the masses to participate in the economic activity, which enables them to show their talents and skills, to make choices on their own will" [13, p. 68]. Extractive institutions have opposite properties and "are created for taking incomes and benefits from one social group in favor of another" [13, p. 70].

The development of technology and education is impossible without inclusive institutions. Sustainable economic development is accompanied by technological improvements that make factors of production more efficient. Such improvements are achieved through the development of science and activity of entrepreneurs who have an incentive to implement scientific achievements in profitable projects. Technological achievements relate to the education, skills, knowledge and know-how of the manpower that are acquired throughout life [13, p. 72-73].

To transform a new knowledge into innovations and then implement them in the production process, it is necessary that each level of space and as many people as possible could ensure the "effects of progress in productive use of new knowledge, which increases" [14, p. 11]. Motivation of employees and productivity of their labour determine the production efficiency, and creative and innovative abilities of employees – competitiveness of the enterprise. The decrease of the number and share of workers with professional skills in the region indicates the slow processes of technological modernization of industry (or their complete absence in certain types of activities) [15, p. 22].

The knowledge creation studies explain the nature of the innovation system according to the region's category. So, F. Tödtling and M. Trippl claim, that old industrial regions are less innovative due to specialization in traditional industries and predominance in the regional production structure of the large companies. Old industrial regions often focus on technical skills; managerial skills and "modern" qualifications frequently missing [16, p. 10].

The paper [17] presents the results of a comparative analysis of the influence of the institutional environment on innovation activities and relations in the knowledge intensive sectors of the industrial regions in the Czech Republic (Moravia-Silesia) and Austria (Upper Austria). In both regions, the ICT sector has developed to a large extent in recent years and now constitutes a large share of income and jobs. However, the con-

tribution of new sectors to the development of innovation in these types of regions is different because of the different institutional environment in which local actors act, as the researchers explain.

Compared to Moravia-Silesia, Upper Austria has not only a larger proportion of high-tech companies in relation to basic industries, but also a thicker institutional environment[1]. Software development companies in Upper Austria are more focused on products and technology in their innovations, while firms located in Moravia – on changes in marketing and organizational practices, due to the different stages of the formation and development of software sectors in two regions. The Moravian-Silesian economy has undergone significant restructuring, which has also affected the development of software and ICTs. Software development companies have adapted to the business environment with new strategies, organizational structures and marketing innovations. But firms in Upper Austria, on the contrary, worked in the environment of more technological firms, where the competitive advantage is more in product innovations than in organizational and marketing innovations.

Software firms in Upper Austria use knowledge-generating institutions (universities, technical colleges, and research institutions) to a much greater extent to acquire technological know-how, unlike companies in Moravia-Silesia. In addition, international sources of knowledge are much more important in Upper Austria as compared to Moravia-Silesia. Software firms from Mo-

ravia-Silesia mainly depend on national sources of knowledge. The greater tendency of Austrian firms to external and international sources of knowledge is attributed to the high share of Upper Austria in a technologically more sophisticated innovation product, unlike the Czech region.

The particular conditions and the existing knowledge base have an evolutionary effect on the formation of modern industries in industrial regions. It is empirically proven that old mature industries can become the basis for a new science-intensive sector [18]. An example of the Košice region (Slovakia) demonstrates how using previous technological priorities and new opportunities a lock-in for the further development of the region on an innovative basis can be overcome. An important condition for achieving the goal is the availability of sufficient potential to provide a highly skilled workforce by the regional universities, which is a key factor in the development of modern science-intensive sectors, as well as international connections that provide technological development.

So, the factors, contributing to the development of the region, are its characteristics, the implementation of which is a condition for modernizing the regions' economy on an innovative basis and for their dynamic development.

The selection of factors for further research is related to the possibilities of their statistical measurement for quantitative assessment of their influence on formation of GRP. Today, there is no objective statistical information regarding the integration of local traditional industries into global manufacturing networks. For the same reason, it is difficult to determine the influence of institutional factors, indicating the ability of regions to develop on an innovative basis. The practical consequences of decentralization in Ukraine can be fully determined only a few years after full implemen-

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[1] The notion of "institutional thickness" was first used in the works of British geographers E. Amin and N. Trift. They emphasized that institutions have a decisive influence on economic development. Universities, research and development centers and their research facilities, training centers that provide science and technology parks with specific assets, information and knowledge can greatly contribute to the innovative economic development of the region, the formation of regional development trajectories.

tation of all its (decentralization) provisions and directions. Proceeding from this, in order to achieve the goal stated in the work, the focus is made on the following factors: human potential, R&D and innovation, the modern sector of the economy (that represents a science-intensive economy). The development of high-tech industries is based on large-scale investments, and, therefore, financial support for the region's development is a factor for modernizing its economy. The factor of political status of the region, which envisages decentralization (according to X. Hu and R. Hassink) is proposed to measure by using the indicator "number of public associations per 10000 inhabitants". To assess the level of industrial specialization and to characterize a dominant industry the indicators are taken, which describe a part of modern sector in the economy of regions.

Methods

In Ukraine, the industrial potential is concentrated mainly in seven regions – Dnipropetrovsk, Donetsk, Zaporizhya, Poltava, Kharkiv, Kyiv and Luhansk which are defined as industrially developed regions. In 2015, the share of these regions in the total industrial production was about two thirds (59,6%).

Another group of regions can be considered as regions of average industrial development – Lviv, Cherkasy, Odesa, Vinnytsya, Mykolayiv, Sumy, Ivano-Frankivsk with a total share of 18.8%. The third group consists of regions that are poorly industrialized, their share in the industrial development is 13.4%. On average, one region accounts for 8.5% in the first case, 2.7% in the second one and only 1.3% in the third group of the total industrial output of the country (Figure 1).
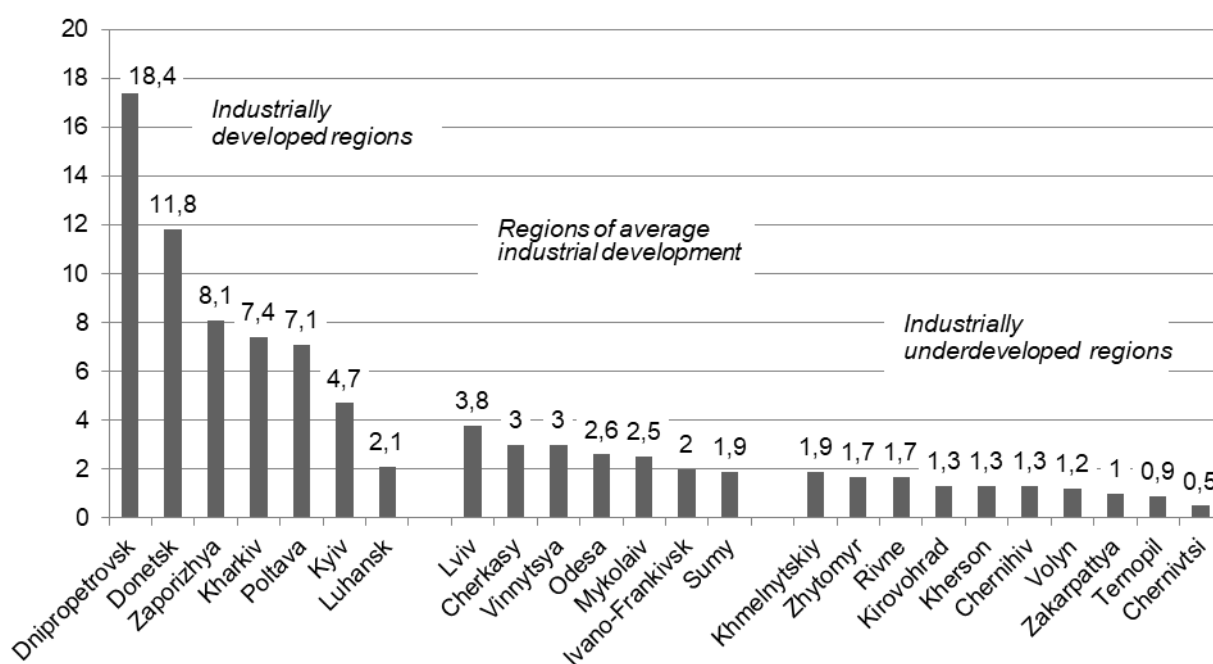
Source: [19]

Figure 1. Rating of regions in the total volume of industrial production, in percents

In 2016, social and economic development of Ukraine was characterized by an increase in the volumes of industrial production as compared with the previous year. However, this happened against the backdrop of a catastrophic decline in the industrial production observed in the previous years. In 2015, compared to 2014, this indicator declined in almost all regions, but the largest decline was experienced by such industrialized regions as Luhansk (66.0%) and Donetsk (34.6%) [20]. First of all, this is due to the situation in Donbass, where there was a large-scale reduction of production and disruption of economic relations.

To study the degree of impact of factors on GDP, the data of the State Statistics Service and the State Treasury of Ukraine have been used. The indicators are selected in such a way that they adequately reflect the characteristics, the implementation of which enables to modernize the region's economy (Table 1).

Table 1

System of indicators, determining the impact of development factors on regional income

Groups	Indicators
Human capital	• number of pupils, students of vocational and technical educational institutions per 10,000 inhabitants • number of students of higher educational institutions having I-IV levels of accreditation per 10,000 inhabitants • employed population, % (percent of inhabitants, age 15-70 years) • number of public associations per 10,000 inhabitants
R&D and innovation	• share of organizations performing scientific and scientific-technical developments, % • share of personnel of scientific organizations in total number of hired employees, % • share of local budgets' funds in financing scientific and scientific-technical developments, % • share of industrial enterprises that implemented innovations, % • share of company's own funds in total amount of financing innovation activity, %
Modern sector of economy	• share of investments in medium- and high-tech industries (to total value of investments in region), % • share of employees engaged in high-tech science-intensive services, % • share of investments in high-tech science-intensive services, % (to total investments in region)
Financial resources	• capital investment per capita, UAH • foreign direct investment (FDI) per capita, US dollars • inter-budgetary transfers (other subsidies and subventions) from the State budget of Ukraine to local budgets per capita, UAH • funds of the State Fund for Regional Development, used in the region per capita, UAH • local budgets' revenues (excluding transfers) per capita, UAH

Source: compiled by the authors.

To justify the factors that ensure the economic development of the region, a database was created, containing the information on 17 variables for 24 regions in 2010 and 2015 (in 2010, there was no State Fund for Regional Development).

Determination of the most influential indicators is based on their relevance to the effective indicator (GRP per capita in the region), which is estimated on the basis of a content analysis and paired correlation coefficients.

In order to determine the impact of factors on the level of GRP, under the absence of multicollinearity between the factors in each group separately, nine indicators were included in the multi-factor regression model in 2010, and in 2015 there were seven indicators representing all four groups.

In 2010:

number of pupils, students of vocational and technical educational institutions per 10,000 inhabitants (x_2);

employed population (percent of inhabitants, age 15-70 years) (x_5);

number of public associations per 10,000 inhabitants (x_6);

share of personnel of scientific organizations in total number of hired employees (x_8);

share of industrial enterprises that implemented innovations (x_{10});

share of employees engaged in high-tech science-intensive services (x_{13});

capital investment per capita (x_{15});

FDI per capita (x_{16});

local budget revenues (excluding transfers) per capita (x_{18}).

In 2015:

number of students of higher educational institutions having I-IV levels of accreditation per 10,000 inhabitants (x_4);

employed population (percent of inhabitants, age 15-70 years) (x_5);

share of personel of scientific organizations in total number of hired employees (x_8);

share of industrial enterprises that implemented innovations (x_{10});

share of employees engaged in high-tech science-intensive services (x_{13});

capital investment per capita (x_{15});

FDI per capita (x_{16});

local budgets' revenues (excluding transfers) per capita (x_{18}).

In 2010 and 2015, according to multiple regression equations, only two parameters were found to be statistically significant in the selected set of factors:

foreign direct investment per capita and local budgets' revenues (excluding transfers) per capita. The final regression equation looks like

In 2010:
$$\hat{y}_{GRP} = -3776.44 + 2.05x_{16} + 15.59x_{18} \quad (1)$$
$$E_{rel} = 6.4\%$$
$$F_\alpha = \begin{cases} \alpha = 0.05 \\ v_1 = 2 \\ v_2 = 21 \end{cases} = 3.5$$
$$D_{\hat{y}_{ri}} = 0.939$$
$$F_p = 161.1$$
$$F_p > F_\alpha$$

Standardized regression equation:
$$t_{\hat{y}_{GRP}} = 0.166\, t_{x_{16}} + 0.846 t_{x_{18}}$$

in 2015:
$$\hat{y}_{GRP} = -8621.04 + 21.38x_{16} + 5.41x_{18} \quad (2)$$
$$E_{rel} = 15.5\%$$
$$F_\alpha = \begin{cases} \alpha = 0.05 \\ v_1 = 2 \\ v_2 = 21 \end{cases}$$
$$D_{\hat{y}_{ri}} = 0.735$$
$$F_p = 29.2$$
$$F_p > F_\alpha$$

Standardized regression equation:
$$t_{\hat{y}_{GRP}} = 0.605\, t_{x_{16}} + 0.484 t_{x_{18}}$$

Standardized parameters of the model (1) indicate that in 2010 the GDP growth in 24 regions of Ukraine on average was almost 5.1 times higher due to the factor of local budgets' revenues, not to direct foreign investment in the region's economy. Ac-

cording to the parameters of the model (2), it is evident that in 2015 the situation changed somewhat: the GRP growth was more influenced by foreign investments – their impact was almost 1.3 times greater as compared to local budget revenues.

To test the hypothesis of the dependence of the strength of link between factors of development and the regional income on the level of region's industrial development, a structural variable (u) was introduced as a conditional code indicating the belonging (1) or non-belonging (0) of the region to the industrially developed region.

As a result, the equation of structural regression, according to the data of 2010 and 2015 respectively, looks like

in 2010:

$$y_{GRP} = -1323.385 + 1.976x_{16} + 13.387x_{18} + 2077.375u \qquad (3)$$

$$E_{rel} = 5.6\%$$

$$F_\alpha = \begin{cases} \alpha = 0.05 \\ v_1 = 3 \\ v_2 = 20 \end{cases} = 3.1$$

$$D_{\hat{y}_{xi}} = 0.946$$

$$F_p = 117.8$$

$$F_p > F_\alpha$$

in 2015:

$$y_{GRP} = -26867.649 + 6.942x_{16} + 8.246x_{18} + 15972.488u \qquad (4)$$

$$E_{rel} = 12.9\%$$

$$F_\alpha = \begin{cases} \alpha = 0.05 \\ v_1 = 3 \\ v_2 = 20 \end{cases} = 3.1$$

$$D_{\hat{y}_{xi}} = 0.855$$

$$F_p = 39.4$$

$$F_p > F_\alpha$$

Parameters at structural variables indicate that the average indicator of GRP, which is determined by factors (x_{16}) and (x_{18}) in industrial regions was higher by 2077,4 UAH than in non-belonging to industrially developed regions, − in 2015 this difference has already been almost 16,000 UAH.

According to Table 2, it can be seen that actual and estimated GRP data are almost the same in the industrial regions, indicating a rather high level of adequacy of models (3) and (4) for these regions. The exception is Poltava region, which demonstrated 16.0% formation of GRP per capita due to the factors other than local budgets' revenues and foreign investments. In 2015, this situation was observed in Mykolayiv and Odesa regions. Only a part of GRP was determined by the effect of development factors that are taken into account in models (3) and (4). The regional distribution of the remnants of regression models indicates the need to introduce additional factors into them, which may be the subject of further research.

In the regions with underdeveloped industry the indicated factors are not fully involved in the GRP growth, as evidenced by significant deviations of the estimated GRP from the fact. They are Volyn, Zakarpattya, Rivne, Ternopil and Chernivtsi regions.

The results of modeling the impact of development factors on regional income allow to make the following conclusions:

firstly, a statistically significant relationship with the level of GRP both in 2010 and in 2015 was demonstrated by the indicators from all four groups of factors;

secondly, in the selected set of factors, the parameters were statistically significant only for the indicators of the group "Financial resources": direct foreign investments per capita and local budget revenues (excluding transfers) per capita. The indicator "Funds of the State Fund for Regional Development" revealed a statistically insignificant feedback with GRP per capita in the region. This may indicate that for the present this tool is not a factor of region's economy development. It is used mainly in the regions with a rather low level of regional income, indicating the ongoing trend towards a centralized balancing of local budgets';

Table 2

Relative estimation of the adequacy of regression models by groups
of regions depending on the degree of industrial development [1]

Regions	2010			2015		
	GRP per capita, ths. UAH, fact	GRP per capita, ths. UAH, calculated	Relative error, %	GRP per capita, ths. UAH, fact	GRP per capita, ths. UAH calculated	Relative error, %
Industrially developed regions						
Dnipropetrovsk	34,71	34,23	1,0	65,90	68,65	-4,0
Donetsk	28,99	28,60	1,0	26,86	25,08	7,0
Zaporozhzhia	23,66	26,07	-10,0	50,61	52,63	-4,0
Kyiv	26,14	27,82	-6,0	60,11	60,87	-1,0
Luhansk	19,79	21,18	-7,0	10,78	11,30	-5,0
Poltava	29,65	24,83	**16,0**	66,39	58,09	**13,0**
Kharkiv	23,64	23,85	-1,0	45,82	49,85	-9,0
Average by group	*26,65*	*26,65*	*6,00*	*46,64*	*46,64*	*6,14*
Regions of average industrial development						
Vinnytsia	14,33	14,70	-3,0	37,27	32,52	13,0
Ivano-Frankivsk	14,81	13,78	7,0	33,17	36,27	-9,0
Lviv	16,35	17,36	-6,0	37,34	36,47	2,0
Odesa	22,54	22,66	-1,0	41,68	34,33	**18,0**
Mykolaiv	20,28	18,11	1,0	41,50	32,45	**22,0**
Sumy	15,71	16,83	-7,0	37,17	33,47	10,0
Cherkasy	17,33	17,35	0,0	40,76	35,58	13,0
Average by group	*17,34*	*17,26*	*3,57*	*38,41*	*34,44*	***12,43***
Industrially underdeveloped regions						
Volyn	13,92	12,94	7,0	30,39	37,89	**-25,0**
Zhytomyr	14,62	15,08	-3,0	30,70	33,92	-10,0
Zakarpattia	12,28	11,47	7,0	22,99	30,22	**-31,0**
Kirovograd	15,53	15,51	0,0	39,36	33,74	14,0
Rivne	13,79	14,46	-5,0	30,35	35,42	**-17,0**
Ternopil	11,71	10,91	7,0	24,96	29,76	**-19,0**
Kherson	14,35	14,44	-1,0	30,25	29,31	3,0
Khmelnitsk	13,60	14,46	-6,0	31,66	33,47	-6,0
Chernivtsi	10,94	12,78	**-17,0**	20,34	29,04	**-43,0**
Chernihiv	15,41	14,65	5,0	35,20	31,20	11,0
Average by group	*13,62*	*13,67*	*5,80*	*29,62*	*32,40*	***17,9***

[1] The relative error values exceeding 10 % are in bold.
Source: compiled by the authors.

thirdly, the content analysis and analysis of paired coefficients determined that the factor of R&D and innovation still do not play principal role in the formation of GRP both in the industrially developed regions and in the regions of other two groups;

fourthly, in industrially developed regions, almost the entire volume of GRP is

determined by the impact of such factors as foreign direct investment and local budgets' revenues. The exception is Poltava region, where a significant part of GRP is formed due to other factors. It can be assumed that this is explained by the region's oil and gas specialization;

fifthly, in the industrially underdeveloped regions, the indicated factors of development (foreign investment and local budgets revenues) are not fully involved in the growth of GRP.

Discussion

According to the research results, the level of regional income is determined, to a greater extent, by the volumes of local budgets (excluding transfers) and foreign direct investment. The analysis presents only a quantitative description of the impact of financial resources on the region's GRP. To determine how the above factors of the group "Finances" contribute to the modernization of the region's economy on an innovative basis, the qualitative characteristics using the indicators "local budget funds" and "foreign direct investment" are needed.

The funds of local budgets. Reforms of Ukraine's regional policy require the introduction of a new model of inter-budgetary relations. Equalization subsidies (withdrawals) have been canceled and a basic (reverse) subsidy has been introduced, as well as subventions for education and medicine. In fact, these changes introduced the mechanism through which the state, by providing special transfers (subventions), assumes a full responsibility for the financial provision of current expenditures for medical and educational institutions that are part of the powers of local budgets and make a significant amount. As a result, in 2016 local budgets' revenues increased by 41.7% as compared to the previous year [21].

However, there are some difficulties in implementing the reforms of the regional policy. The data from Table 3 show that lo-cal budgets' financial resources are not sufficient enough to cover the expenditures, and the share of inter-budgetary transfers in the structure of the local budgets' revenues remains rather high. The share of industrially developed regions in the revenues of local budgets is higher than in other two groups of regions (8.3% vs. 5.5% in the regions of medium industrial development and 4.2% in industrially underdeveloped regions in 2016). At the same time, the share of expenditures is also high (14.4% vs. 11.7% in the regions of medium industrial development and 11.2% in industrially underdeveloped regions in 2016). As a result, the share of inter-budgetary transfers of industrially developed regions in the revenues of local budgets was the largest (in 2015 and 2016) among the three groups of regions.

The analysis of the use of local budgets' funds shows that they are not enough to be directed for investment purposes. According to the Budget Monitoring, the structure of local budgets' expenditures by the economic classification in 2015 and 2016 looked like this - the expenditures for the articles "pay with accruals" and "current transfers to the population for social security" amounted more than 60%. Capital expenditures in the total volume of local budgets' expenditures in Ukraine made up 11.5% and 15.0% respectively, but a significant growth was due to the accounting operations for taking on the balance of lands, belonging to the communal property in Kyiv city [2121]. Under such circumstances, the funds of local budgets cannot be considered as an effective resource for modernizing the economy of regions on an innovative basis.

It is important to note that the funds of the State Fund for Regional Development are not fully developed. According to the monitoring of the use of funds from the State Fund for Regional Development for 2016, no region has fully utilized the funds of this instrument of sustainable develop-

ment. The lowest level of the use was observed in such industrialized regions as Zaporizhya (53.3%), Luhansk (56.6%) and Donetsk (75.5%) regions [22].

Main indicators of Ukraine's local budgets (LB) implementation (percents)

Indicators	2014	2015	2016
LB revenues in the consolidated budget, %	22,2	18,5	21,8
Industrially developed regions	7,6	7,2	8,3
Regions of average industrial development	5,0	4,4	5,5
Industrially underdeveloped regions	4,0	3,5	4,2
LB expenditures in the consolidated budget, %	42,7	40,7	41,4
Industrially developed regions	15,3	13,9	14,4
Regions of average industrial development	11,3	11,5	11,7
Industrially underdeveloped regions	11,5	11,2	11,2
Share of inter-budgetary transfers in LB revenues, %	58,4	59,1	53,4
Industrially developed regions	30,79	32,95	32,38
Regions of average industrial development	28,73	30,05	30,46
Industrially underdeveloped regions	32,77	31,55	32,34

Source: compiled by the authors according to the State Treasury Service of Ukraine.

Unplanned local budgets' revenues from the state budget provoked the practice of the placement of local budgets' funds in bank accounts. According to the State Treasury of Ukraine, all regions had the balance of deposit funds. The leaders are such industrialized regions as Donetsk (UAH 2.7 million), Dnipropetrovsk (UAH 2.6 million) [23].

Foreign direct investments stimulate the economy of the regions. The World Bank research confirms that FDI is an important source of investment for both the public and private sectors. FDI contribute to the development of new technologies, extension of knowledge and development of competition.

By attracting FDI, the regional authorities are expecting the preservation of existing and the creation of new jobs; growth of wages and incomes of the population; expansion of the tax base; increase in exports; upgrading of the workforce; social security of local communities; technology transfer; positive external effects for the regional economy; increasing opportunities for local enterprises in cooperation with foreign companies.

The nature of foreign direct investment in Ukraine is explained by the "institutional transformations and high risks of economic activity" [24, p. 63], and therefore it has some specific features.

1. Most investments in Ukraine are the Ukrainian capital coming from the countries under offshore jurisdictions. As for the structure of FDI coming in the economy of Ukraine from the countries of the world, more than 50.0% are the receipts from Cyprus, the Netherlands and Russia[1]. The 2017 OECD Investment Policy Review (OECD)

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[1] The Netherlands, through favourable tax and other conditions, is also used as an offshore company and is one of the largest sources of investment in the world only formally. For example, $ 1.8 billion investment in the telecommunication sector of Ukraine is due to the fact that Kyivstar Company owns VimpelCom, registered in the Netherlands. The main owner of VimpelCom (through intermediaries) is the Russian "Alpha Group". Real investment from the Netherlands is actually small and presented, for example, by Unilever (one of the world leaders in the food market and household chemicals) [25].

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notes the widespread use of FDI round tripping in Ukraine, which falsifies FDI statistics, because of an overestimation of their real receipts[1].

Significant flows of FDI to Ukraine, which have been formed as a result of the repatriation of domestic capital from offshore jurisdictions, indicate that the state has not yet created the institutional principles and mechanisms that would facilitate the attraction of funds from foreign investors and stimulate domestic investors to invest in the economy of the country. If to take away the volume of FDI in the Kyiv economy, FDI in the economy of industrially developed regions from Cyprus amounted to 60.5% of the total investment from this country in the economy of regions of Ukraine in 2016 and 91.0% from the Netherlands[2]. At the same time, the industrialized Donetsk region is traditionally the main source of direct investments among the regions of Ukraine. Thus, in 2016, the share of this region amounted to 93.6% in the total volume of direct investments from regions of Ukraine in the economies of the world.

2. Financial and insurance activities are the most attractive ones for foreign investors (26.6% of total FDI), as well as the processing industry (20.2%), where investments are distributed in favour of low-tech industries. The largest amount was received by the food and metallurgy industries (6.8% and 4.1% respectively) [26].

It is important to pay attention to the structural changes in the sectoral dynamics by the technological level (Table 4).

The current state of Ukrainian industry shows a decline in FDI volumes, the prevalence of low-tech industries and industries with a low degree of technological processing in the structure of foreign investment, but they are in demand on the domestic and foreign markets. Relatively stable was the investment in the production of those internal-oriented industries that satisfy the vital needs of the population in the main food products (including alcohol and tobacco, which do not indicate a decent level of society's culture), and the pharmaceutical industry. Among the high- and medium-tech industries, only the last one showed an increase in the volumes of FDI in 2011-2016. Other industries (machinery, chemical production, coke production and oil refining products) experienced a significant decline.

3. By regions, the distribution of FDI is extremely uneven. Almost 60.0% of FDI is concentrated in city of Kyiv. Then, with a big break, there are Dnipropetrovsk region (9.3%), Kiev region (4.1%), Donetsk and Odessa regions (3.8% and 3.6% respectively). The smallest amount of foreign investments came in Ternopil region (0.1%) [23]. In 2011-2016, the share of direct investment in GDP increased by 17 pp. The accumulated amount of FDI in 2016 made up $ 38 billion, and was equal to almost 45% of GDP[3]. Among the groups of regions by industrial development, the share of FDI in GRP is the largest in industrialized regions, and in 2015 it was 38.2% (Table 5).

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[1] OECD Investment Policy Reviews: Ukraine 2016 / OECD - Paris. – available at: http: //dx.doi.org/10.1787/9789264257368-en P. 174

[2] Calculated by the authors according to the data of the main statistical departments in Dnipropetrovsk, Donetsk, Luhansk, Kharkiv, Zaporizhyzhia, Kyiv regions and city of Kyiv; Statistical Digest "Investments of foreign economic activity in 2010-2016".

[3] As recognized in the world practice, the level of security of foreign capital in the production of GDP is 30%. [28].

Table 4

Rate of FDI growth in industrial sectors by technological level (percents)

Sectors by technological level	2012	2013	2014	2015	2016	2017	2011-2017
Total	106,23	107,28	103,87	75,83	88,78	104,15	83,00
Industry	92,56	104,20	98,06	70,24	79,66	96,53	51,09
High and medium-high-technology							
Production of main pharmaceutical products and pharmaceutical preparations	186,98	103,98	85,77	69,04	91,92	111,87	118,37
Mechanical engineering except repair and installation of machinery and equipment	107,34	92,17	125,57	72,08	92,86	106,00	88,14
Production of chemicals and chemical products	110,57	106,43	126,53	72,71	78,13	94,81	80,19
Medium-low-technology							
Mining and quarrying	80,48	98,15	110,94	62,47	59,78	81,58	26,70
Production of coke and refined products	85,74	71,16	125,04	23,67	146,05	93,59	24,69
Manufacture of rubber and plastic products, other non-metallic products, mineral products	106,91	114,52	107,43	79,44	91,57	95,87	91,73
Metallurgical production, manufacture of finished metal products, except machinery and equipment	87,64	92,66	64,82	65,02	70,28	97,70	23,50
Low-technology							
Production of food products, beverages and tobacco products	110,99	138,57	106,16	83,84	89,38	105,45	129,04
Textile production, production of clothes, leather, leather goods, and other materials	90,62	100,71	94,58	94,71	91,90	97,35	73,14
Production of wood products, paper production and printing activities	103,61	103,21	109,84	85,92	87,41	101,90	89,89
Manufacture of furniture, other products; repair and installation of machinery and equipment	118,56	135,44	103,55	88,35	112,67	100,31	166,05
Supply of electricity, gas, steam, conditioned air	150,60	248,06	111,63	69,50	106,21	86,44	266,06
Water supply	128,89	89,75	88,35	105,45	66,23	95,83	68,39

Source: calculated by the authors according to the State Statistics Service [27].

*Dynamics of FDI relative to GRP by groups of regions (percents)*

	2011	2012	2013	2014	2015
Ukraine	27,76	26,40	27,14	40,23	44,74
Industrially developed regions					
Dnipropetrovsk	60,43	54,99	51,65	60,01	58,63
Donetsk	21,42	16,66	17,29	37,54	44,10
Zaporizhya	14,52	13,66	15,11	19,38	20,69
Kyiv	21,20	19,67	20,85	29,16	36,75
Luhansk	8,77	9,70	11,39	31,29	52,96
Poltava	8,39	9,90	12,88	18,12	23,68
Kharkiv	28,16	27,35	20,37	26,23	30,25
Average by group	*23,27*	*21,71*	*21,36*	*31,68*	*38,15*
Regions of average industrial development					
Vinnytsya	5,62	5,48	5,48	8,36	8,14
Ivano-Frankivsk	14,68	15,44	15,48	25,70	44,11
Lviv	18,15	16,77	16,61	22,49	27,63
Odesa	14,35	15,06	18,67	26,52	31,32
Sumy	12,51	11,60	11,54	16,53	13,84
Cherkasy	8,54	7,30	21,32	27,44	22,04
Average by group	*12,31*	*11,94*	*14,85*	*21,17*	*24,51*
Industrially underdeveloped regions					
Volyn	9,88	11,64	14,75	16,77	18,70
Zhytomyr	8,23	9,85	10,49	14,47	14,77
Zakarpattya	16,08	13,01	15,18	21,56	25,22
Kirovohrad	2,07	2,16	2,87	6,08	4,01
Mykolayiv	4,77	4,17	6,11	9,49	10,38
Rivne	11,43	9,52	10,09	12,11	15,03
Ternopil	2,92	2,75	2,82	3,78	4,57
Kherson	8,01	7,79	9,68	14,07	14,12
Khmelnytskiy	6,38	5,69	6,20	8,30	10,05
Chernivtsi	4,12	3,76	3,73	6,33	8,10
Chernihiv	3,57	3,37	3,46	5,42	5,90
Average by group	*7,04*	*6,70*	*7,76*	*10,76*	*11,89*

Source: calculated by the authors according to the State Statistics Service [29-31].

Figure 2 shows the structure of investment in high and medium high-tech industries by groups of regions. Significant investments in high and medium high-tech industries were made in industrially developed Zaporizhya and Kharkiv regions. In the first case, there is a traditional investment in the production of motor vehicles, trailers and semi-trailers and other vehicles – 23.0% of all investments in the region's industry. In Kharkiv region, it was the pharmaceutical industry that was invested (6.9%) besides mechanical engineering.

Among the regions of average industrial development, Sumy region is the leader in the share of investments in high and medium high-tech industries (37.6%). In Odessa region, the investments were made in the chemical production (10.0%), production of electrical equipment (4.7%), and machinery (2.0%).
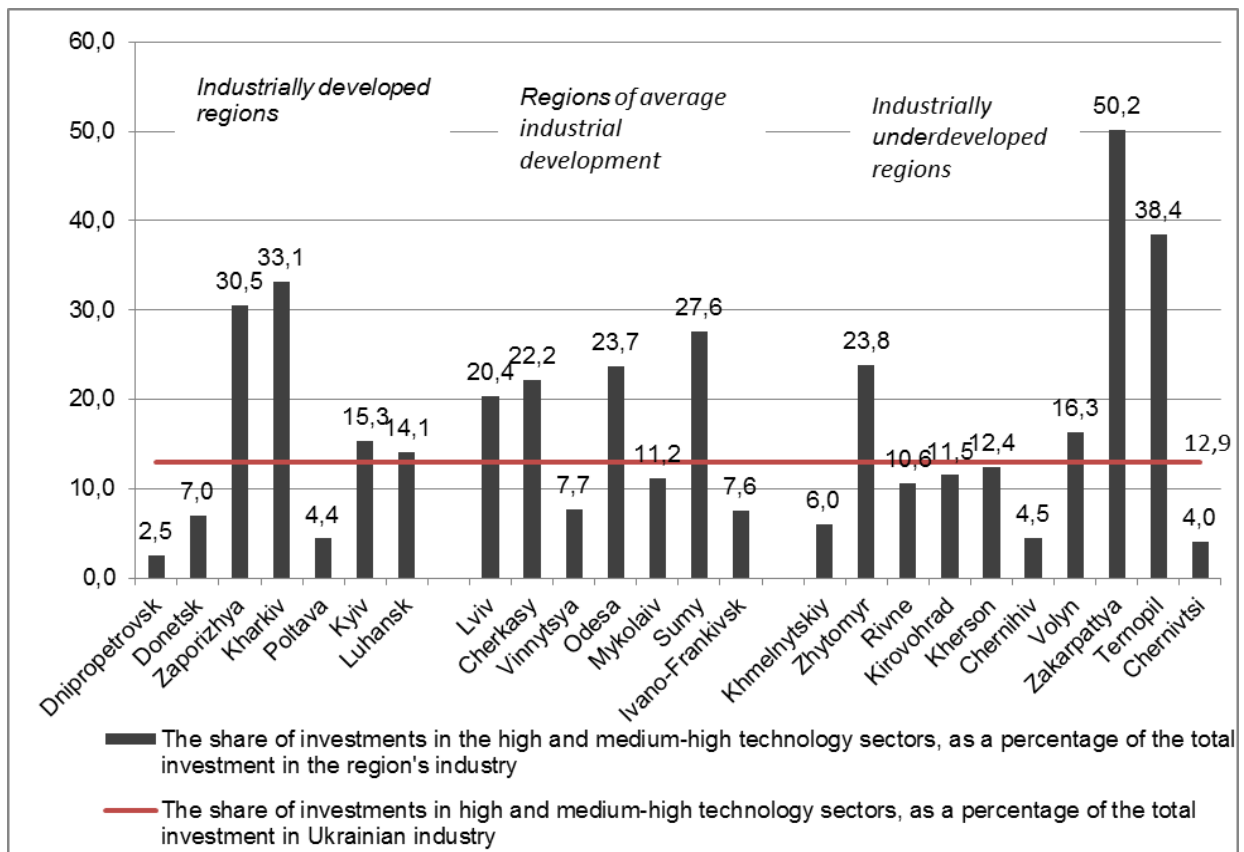
Source: calculated by the authors according to the State Statistics Service of Ukraine [24].

Figure 2. The share of investments in the high and medium high-tech sectors,
as a percentage of total investment in industry

In the group of industrially underdeveloped regions, Transcarpathia region holds a significant advantage in investing in high and medium high-tech production for several years. Its industry is invested by such companies as "Jabil" (production of electric and high-speed equipment, and the equipment for receiving, recording and reproduction of sound and image), "YAZAKI" (manufacturer of automobile harnesses and other automobile products), "Flextronics International Ltd." (production of electronic components), "Eurocar" (production of cars). As a result, it is Transcarpathia region that demonstrates the highest share of investments in high and medium high-tech industries – 50.2%. A large share of investments in the medium high-tech sphere of Lviv region is primarily due to the

opening in 2016 of the "Fujikura Autmotive Ukraine Lviv" plant, which is engaged in the production of auto components.

4. The attractiveness of investments is secured not by the conditions of our country, its investment dynamics, which affects the level of investment risks and stimulates or on the contrary constrains foreign investors, but by the lack of competitive options for investments in other countries (first of all, high wages in comparison to Ukraine). According to the World Bank, in Ukraine, the price of 60 minutes of work is €1 on average. This is 5 times cheaper than in China and 6.5 times less than in Poland or Hungary. Moreover, the benefits of cheap labour can lead to the conservation of problems: increase of wages can weaken the competitive advantages of Ukrainian regions, and

therefore Western companies will be forced to cut down production. On the other hand, the maintenance of low wages of Ukrainian workers constrains the development of the economy, forms excessive requirements to social support of the population, and deforms the pension system. It should also be borne in mind that the reform of decentralization is impossible without the emergence of a critical mass of wealthy and educated people, who are responsible for the development of their community.

5. Foreign direct investment in the medium high-tech industries causes a structural and technological dependence. Companies "come in" with their technology, trained personnel, which binds the regional production to the technological scheme within the framework of a foreign company. The so-called screwdriver assembly of foreign companies' products is a type of activity with an average economic effect and high competition. And even when it comes to high-tech products, it does not develop fundamentally new competencies for engineers and workers. High technology is a tool that allows the country to receive additional income in the form of technological rent, which can be invested in supporting technological leadership. The advanced research and development sector, that links a fundamental and applied science, is a necessary condition for the formation of a high-level technological development. Otherwise, the dependence on import of technologies can become a key factor in reducing the competitiveness of the regional economy.

Actually, a high share of investment in high and medium high-tech production in Transcarpathia and Lviv regions is determined by such competitive advantages as cheap labour and closeness to European borders, due to which the foreign companies open enterprises in these regions, mainly for the screwdriver assembly of products.

Dependence on FDI is a problem, typical for low and middle income countries.

The problem of spillover effect is a debate among the scientists about whether FDI is the key driving force for the economic development, modernization and convergence of the low and middle income countries in Europe, taking into account also the risks and restrictive factors, associated with FDI.

In Galgóczi B., Drahokoupil J. & Bernaciak M. (eds.) [32] is explored the role of foreign direct investment in Central and Eastern Europe in the post-crisis period, comparing models between countries and sectors.

On the one hand, the research suggests that a high level of FDI in the economy is rather a positive factor than an obstacle: in addition to a favourable effect on growth, high-FDI countries got through a financial crisis of 2008-2009 better than low-FDI countries. Moreover, post-crisis regional economic indicators demonstrate a strong positive correlation with FDI level.

However, the situation has changed after the crisis: the most part of FDI's initial impulse was lost. Based on macroeconomic comparisons, the researchers came to the conclusion that, firstly, FDI flows began to shift to tasks-based services, which are based on cognitive tasks, not on knowledge-based business services. Secondly, FDI reinforced regional differences: FDI policies on regional convergence have not yielded results. Instead, the policy of increasing competitiveness becomes more and more oriented to the competitiveness that is based on costs, mainly through reducing labour costs, as well as through creating the institutional environment, that is more favourable to a foreign investor. The above factors weaken the impact of FDI on the modernization of the economy.

In the fundamental paper [28] M.I. Zveryakov reveals the contradictions and the dual nature of transnational corporations (TNCs). "On the one hand, they form a global market space and free movement of capital, goods and labor, and on the other

hand, TNCs can receive super profits under preservation of heterogeneous labour markets and conditions of economic functioning (wage systems, taxation, environmental and social conditions for production, etc.)" [28, p. 6]. In the framework of TNCs, the hierarchy is the central coordination mechanism in dependent capitalism, as opposed to the countries of liberal market and coordinated market capitalism, where the central mechanism of coordination is, respectively, competitive markets and contracts, internal and inter-agency networks of associations [28, with. 11]. In dependent capitalist countries, the economy is often driven by TNCs' decisions on production and banking sector, which means the link between TNC's corporate governance and key sources of investment in the economy of countries of this type. A specific system of relations is being built between labour and capital, a characteristic feature of which is a low wage level. Transfers of innovative technologies to dependent market economies are carried out within the limits of the TNCs. There, a professional training of employees takes place. Therefore, the countries in which production is located do not need to carry out research activities and maintain a training system. Moreover, in the event of any crisis situation or more favorable opportunities in other regions of the world, foreign investors can quickly cut down the production and transfer capital to the regions of other countries.

So, to develop the processes of long-term economic growth through modernization of the economy on an innovative basis, the main emphasis of the state policy must be shifted towards stimulating domestic consumption and boosting domestic investment and innovation.

Conclusions and proposals

Modernization of the economy involves the formation of an efficient industrial structure, and the modernization of the latter should be done on an innovative basis. This research focuses on the factors of mod-

ernizing the economy as applied to the industrial regions. The results of modeling allow to make following conclusions:

for industrially developed regions, as well as for regions of other groups, the factor of R&D and innovation, the modern sector of the economy still do not play principal role in the formation of the regional income in Ukraine;

in industrially developed regions, almost the entire amount of GRP was determined by the impact of direct foreign investment and local budgets' revenues (excluding transfers). Moreover, the impact of the former increased significantly in 2015 comparing to 2010.

A comprehensive analysis has shown, that the funds of local budgets cannot be considered as an effective resource for modernizing the economy on an innovative basis. Most of their part is distributed to solve current social problems in the regions. Although the share of industrially developed regions exceeds a similar figure in the other two groups of regions concerning revenues of local budgets, great expenditures require significant inter-budgetary transfers in industrially developed regions.

As far as FDI is concerned, it can now compensate the weakness of domestic institutions, such as access provision to skills and capital for enterprises. Therefore, it is important for industrial regions to promote positive effects from foreign investment. On the other hand, foreign investment can be the factor that restrains the development and even causes degradation. Moreover, foreign investment should be treated with caution, because it is necessary to provide the economic security of the state, including control over the structure of investments and their sources.

It is important to take into account those global trends, that have been developing lately. According to the "World Investment Prospects Survey 2014-2016", the investors in the secondary and tertiary sectors

expressed some uncertainties about their plans with some low-tech industries such as textiles, wood and wood products, construction products, metals and machinery, forecasting reduction of expenditures in the short-term [33]. Scientists predict that a key factor, restraining the extension and introduction of innovations at the country level, will be the protectionism in the rights of intellectual property, which restricts the penetration of digital solutions not beyond national boundaries, but beyond the value-added chains, built by the corporation. Now, the world trade in many high-tech products is the trade of large corporations, where each of them will protect their intellectual, technological and digital assets. [34, pp. 16-17].

To provide a successful modernization of the economy, the industrial regions should rely on the internal resources of innovative growth, using the advantages and positive effects of FDI. "Cheap" money, but such, that is associated with advanced production, as well as the taxes, favourable to innovation [10; p. 38], will allow to intensify domestic investments, diversify the structure of industry and create high-tech jobs.

The transfer of new technologies from international sources of knowledge, as a positive effect of FDI, is possible only through the interaction of local and foreign enterprises. The success of the interaction is determined by the extent, to which local enterprises and local authorities contribute to raising the qualification level of employees in the industrial sector. To ensure the modernization of industrial regions' economies under limited local budgets, it is necessary to use new tools of development, which become possible in the conditions of decentralization of management (funds of the State Fund for Regional Development, international technical assistance, grants from international donor organizations). The priority directions should be the development of creative industry, the development and im-

plementation of projects on creation of the system of life-long learning. In this connection, further researches will be aimed at presenting a scientific and analytical substantiation of the use of new development tools to ensure the modernization of the economy of industrial regions under decentralization of management.

References

1. Manufacturing, value added (% of GDP) (2017). Databank.worldbank.org. Available at: http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators&preview=on.

2. A Stronger European Industry for Growth and Economic Recovery (Communication From the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (2012). p. 2. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0582:FIN:EN:PDF.

3. Industrial Development Report 2016: The role of Technology and Innovation in Inclusive and Sustainable Industrial Development (2016). Available at: unido.org›fileadmin/user…IDR2016_FULL REPORT.pdf.

4. UNIDO: Annual Report 2016 (2016). Available at: http://www.unido.org/fileadmin/user_media_upgrade/Resources/Publications/Annual_Report/Annual_Report_2016_-_EN.pdf/

5. Hu, X., & Hassink, R. (2015). Explaining differences in the adaptability of old industrial areas. In Routledge Handbook of Politics and Technology (Ed. Hilpert,U.). Routledg.

6. Krzysztofik, R., Tkocz, M., Spórna, T., & Kantor-Pietraga, I. (2016). Some dilemmas of post-industrialism in a region of traditional industry: The case of the Katowice conurbation, Poland. *Moravian Geographical Reports*, 24 (1), pp. 42-54. doi: 10.1515/mgr-2016-0004

7. Tödtling, F., Skokan, K., Höglinger, Ch., Rumpel, P., & Grillitsch, M. (2013). Innovation and knowledge sourcing of modern sectors in old industrial regions: Comparing software firms in Moravia-Silesia and Upper Austria. *European Urban and Regional Studies.* doi: 10.1177/0969776411428498.

8. Popjaková, D., Tkocz, M., & Vančura, M. (2014). New Industrial Spaces in Old Industrial Centres: Selected Examples of Sosnowiec (Poland) and České Budějovice (Czech Republic). *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego*, 25.

9. State Statistics Servise of Ukraine (2016). Industry of Ukraine in 2011-2015 (2016). Available at: http://ukrstat.gov.ua/ druk/publicat/kat_u/2016/zb/12/zb_pu2015 w.zip p. 29 (in Ukrainian).

10. Vyshnevsky, V.P. (2016). Global industrialization and its lessons for Ukraine. *Economic of Ukraine*, 8, pp. 26-43. (in Ukrainain).

11. Zbarazska, L. (2016). Neoindustrialization in Ukraine: concept of national model. *Econ. promisl.*, 3 (75), pp. 5-32 doi: 10.15407/econindustry2016.03.005 (in Ukrainian).

12. Jakubovskiy, M.M., & Liashenko, V.I. (2016). Modernization of the economy of industrial regions: an attempt to conceptualize. *Visny`k ekonomichnoyi nauky` Ukrayiny`*, 1 (30), pp. 188-195 (in Ukrainian).

13. Acemoglu, D., & Robinson, J. (2017). Why nations fail. The origins of power, prosperity, and poverty. Kyiv: Nash format (in Ukrainian).

14. Tatarkin, A.I. (2016). Modernizational upgrade of the Russian space on the basis of innovation initiatives. *Region: economics and sociology,* 1 (89), pp. 6-33 (in Russian).

15. Amosha, O.I., & Antoniuk, V.P. (2016). The labor market of Ukraine's industry and labor potential of the sector: current trends and challenges. *Rynok pratsi ta zaynyatist' naselennya*, 4, pp. 18-24. (in Ukrainian).

16. Tödtling, F., & Trippl, M. (2005). One size fits all? Towards a differentiated regional innovation policy approach. *Research Policy,* 34 (8), pp. 1203-1219.

17. Tödtling, F., Skokan, K., Höglinger, Ch., Rumpel, P., & Grillitsch, M. (2013). Innovation and knowledge sourcing of modern sectors in old industrial regions: Comparing software firms in Moravia-Silesia and Upper Austria. European Urban and Regional Studies. doi: 10.1177/0969776411428498.

18. Hudes, O., & Šebova, M. (2012). The ICT Sector Evolution in an Industrial Region of Slovakia. *Ekonomický časopis*, 60.

19. Jakubovskiy, M.M., & Soldak, M.O. (2017). Regional peculiarities of industrial development in Ukraine. *Economic of Ukrainian*, 3, pp. 35-48. (in Ukrainian).

20. State Statistics Servise of Ukraine (2017). Industrial production in 2016. Available at: http://ukrstat.gov.ua/express/ expr2017/01/11pdf.zip. p.4. (in Ukrainian).

21. The Institute for Budgetary and Socio-Economic Research (2017). Budget monitoring: analysis of budget execution for 2016. Available at: http://www.ibser.org. ua/sites/default/files/kv_iv_2016_monitorin g_ukr_0.pdf (in Ukrainian).

22. Ministry of Regional Development, Construction and Housing and Communal Services. Monitoring of the use of funds of the State Fund for Regional Development 2016. Available at: http://dfrr. minregion.gov.ua/monitoring-vikoristannya-koshtiv-derzhavnogo-fondu-regionalnogo-rozvitku-za-2016-rik. (in Ukrainian).

23. Data on placement of municipal funds in banks deposit accounts (on 01.10.2017). (in Ukrainian).

24. Kindzerskii, Yu.V. (2017) Deindustrialization and its determinants in the

world and in Ukraine. *Economic of Ukraine,* 11, pp. 48-72.

25. Averchuk, Ya. (2017) Foreign direct investment in Ukraine: war and peace. *Weekly 2000,* 9. (in Russian).

26. State Statistics Servise of Ukraine (2017). Investments in foreign economic activity in January-March 2017. Available at: http://www.ukrstat.gov.ua/express/expr 2017/02/35pdf.zip (in Ukrainian).

27. State Statistics Servise of Ukraine (2017). Investment of External Economic Activity of Ukraine 2010-2016 (statistical publication). Available at http://ukrstat.gov.ua/druk/publicat/kat_u/2017/zb/06/zb_invest_zed_2016.zip (in Ukrainian).

28. Zveryakov, M.I. (2017). Globalization and deindustrialization: content, contradiction and ways to solve them. *Economic of Ukraine,* 11, pp. 4-16. (in Ukrainain).

29. State Statistics Servise of Ukraine (2017). Capital investment in Ukraine, 2016 (statistical publication). Available at http://www.ukrstat.gov.ua/druk/publicat/kat_u/2017/bl/05/bl_kiu2016pdf.zip, pp. 38-41. (in Ukrainian).

30. State Statistics Servise of Ukraine (2017). Regions of Ukraine 2017 (statistical publication). Part II. Available at http://ukrstat.gov.ua/druk/publicat/kat_u/2017/zb/12/zb_ru2ch2016pdf.zip. (in Ukrainian).

31. State Statistics Servise of Ukraine (2017). Economic and financial indicators. Official exchange rate of hryvnia against foreign currencies (average for the period). Available at http://www.ukrstat.gov.ua/imf/Pokaz.html (in Ukrainain).

32. Galgóczi B., Drahokoupil J. & Bernaciak M. (eds) (2015). Foreign investment in eastern and southern Europe after 2008. Still a lever of growth? Brussels: ETUI. 379 pp.

33. UNCTAD: World Investment Prospects Survey 2014-2016. Available at: http://unctad.org/en/PublicationsLibrary/webdiaeia2015d4_en.pdf.

34. Idrisov G., Mau V., Bozhechkova A. (2017). Searching for a new growth model. *Voprosy Ekonomiki,* 12, pp. 5-23. (in Russian).

Література

1. Manufacturing, value added (% of GDP). Databank.worldbank.org. Available at: http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators&preview=on.

2. A Stronger European Industry for Growth and Economic Recovery (Communication From the Commission to the European Parliament, the Council, the European Economic and So-cial Committee and the Committee of the Regions. 2012. p. 2. Available at: http://eur-lex.europa.eu/ LexUriServ/LexUriServ.do?uri=COM:2012:0582:FIN:EN:PDF.

3. Industrial Development Report 2016: The role of Technology and Innovation in In-clusive and Sustainable Industrial Development. Available at: unido.org› fileadmin/user…IDR2016_FULLREPORT. pdf.

4. UNIDO: Annual Report 2016. Available at: http://www.unido.org/fileadmin/user_media_upgrade/Resources/Publications/Annual_Report/Annual_Report_2016_-_EN.pdf/

5. Hu X., Hassink R. Explaining differences in the adaptability of old industrial areas. In Routledge Handbook of Politics and Technology (Ed. Hilpert,U.). 2015. Routledg.

6. Krzysztofik R., Tkocz M., Spórna T., & Kantor-Pietraga I. Some dilemmas of post-industrialism in a region of traditional industry: The case of the Katowice conurbation, Poland. Moravian Geographical Reports. 2016. № 24 (1). pp. 42-54. doi: 10.1515/mgr-2016-0004

7. Tödtling F., Skokan K., Höglinger Ch., Rumpel P., & Grillitsch M. Inno-vation and knowledge sourcing of modern sectors in old industrial regions: Comparing

software firms in Moravia-Silesia and Upper Austria. European Urban and Regional Studies. 2013. doi: 10.1177/0969776411428498.

8. Popjaková D., Tkocz M., & Vančura M. New Industrial Spaces in Old In-dustrial Centres: Selected Examples of Sosnowiec (Poland) and České Budějovice (Czech Re-public). Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego. 2014. № 25.

9. Промисловість України у 2011-2015 роках. Офіційний сайт Державної служби статистики. Режим доступу: http://ukrstat.gov.ua/druk/publicat/kat_u/201 6/zb/12/zb_ pu2015w.zip p. 2.

10. Вишневський В.П. Глобальна неоіндустріалізація та її уроки для України. Економіка України. 2016. № 8. С. 26-43.

11. Збаразська Л.О. Неоіндустріалізація в Україні: концепт національної моделі. Економіка промисловості. 2016. № 3 (75). С. 5-32. doi: 10.15407/econindustry2016.03.005

12. Якубовський М.М., Ляшенко В.І. Модернізація економіки промислових регіонів: спроба концептуалізації. Вісник економічної науки України. 2016. № 1 (30). С. 188-195.

13. Аджемоглу Д., Робінсон Дж. Чому нації занепадають; пер. з англ. О. Дем'янчука. Київ: Наш формат, 2017. 440 с.

14. Татаркин А.И. Модернизационное обновление российского пространства на основе инновационных инициатив. Регион: экономика и социология. 2016. № 1 (89). С. 6-33.

15. Амоша О.І., Антонюк В.П. Ринок праці промисловості України та трудовий потенціал галузі: сучасні тенденції і проблеми. Ринок праці і зайнятість населення. 2016. № 4. С. 18-24.

16. Tödtling F., Trippl M. One size fits all? Towards a differentiated regional innovation policy approach. Research Policy. 2005. № 34 (8). pp. 1203-1219.

17. Tödtling F., Skokan K., Höglinger Ch., Rumpel P., Grillitsch M. Innovation and knowledge sourcing of modern sectors in old industrial regions: Comparing software firms in Moravia-Silesia and Upper Austria. European Urban and Regional Studies. 2013. doi: 10.1177/0969776411428498.

18. Hudes O., Šebova M. The ICT Sector Evolution in an Industrial Region of Slovakia. Ekonomický časopis. 2012. №60.

19. Якубовський М.М., Солдак М.О. Регіональні особливості розвитку промисловості України. Економіка України. 2017. № 3. С. 35-48.

20. Експрес-випуск «Промислове виробництво у 2016 році». Офіційний сайт Державної служби статистики. Режим доступу: http://ukrstat.gov.ua/express/ expr2017/01/11pdf.zip. p. 4.

21. Бюджетний моніторинг: аналіз виконання бюджету за 2016 рік. Офіційний сайт Інституту бюджету та соціально-економічних досліджень. Режим доступу: http://www.ibser.org.ua/sites/default/-files/kv_iv_2016_monitoring_ukr_0.pdf.

22. Моніторинг використання коштів Державного фонду регіонального розвитку. Офіційний сайт Міністерства регіонального розвитку, будівництва та житлово-комунального господарства України. Режим доступу: http://dfrr. minregion.gov.ua/monitoring-vikoristannya-koshtiv-derzhavnogo-fondu-regionalnogo-rozvitku-za-2016-rik.

23. Дані щодо розміщення коштів місцевих бюджетів на вкладних (депозитних) рахунках у банках (на 01.10.2017 р.). Офіційний сайт Державної казначейської служби України. Режим доступу: https://www.google.com/url?q= http://www.treasury.gov.ua/main/file/link/3 86614/file/MB_depoz.zip%3Bjsessionid%3 D63A2A30CC930003596724927DAF8869 B&sa=U&ved=0ahUKEwisxL3C8cHZAhX

EFCwKHTZ5Cq0QFggGMAE&client=inte rnal-udscse&cx=000049895089156714868: qgaotkjk48a&usg=AOvVaw3xwi1aM-QPB aAs95r-NCg2

24. Кіндзерський Ю.В. Деіндустрі-алізація та її детермінанти у світі та в Україні. *Економіка України*. 2017. №11. С. 48-72.

25. Аверчук Я. Прямые иностран-ные инвестиции в Украине: война и мир. *Газета «2000»*. 2017. №9.

26. Експрес-випуск «Інвестиції зо-внішньоекономічної діяльності у 2016 році». Офіційний сайт Державної служ-би статистики. Режим доступу: http://www.ukrstat.gov.ua/express/expr2017 /02/35pdf.zip.

27. Статистичний збірник «Інвес-тиції зовнішньоекономічної діяльності України у 2010-2016 роках». Офіційний сайт Державної служби статистики. Ре-жим доступу: http://www.ukrstat.gov.ua/ druk/publicat/kat_u/2017/zb/06/zb_invest_ zed_2016.

28. Звєряков М.І. Глобалізація і де-індустріалізація: зміст, суперечності та способи їх розв'язання. *Економіка Украї-ни*. 2017. №11. С. 4-16.

29. Статистичний збірник «Капі-тальні інвестиції в Україні, 2016». Офі-ційний сайт Державної служби статисти-ки. Режим доступу: http://www.ukrstat. gov.ua/druk/publicat/kat_u/2017/bl/05/bl_ kiu2016pdf.zip. С. 38-41.

30. Статистичний збірник «Регіони України 2017». Частина II. Офіційний сайт Державної служби статистики. Ре-жим доступу: http://ukrstat.gov.ua/druk/ publicat/kat_u/2017/zb/12/zb_ru2ch2016pdf. zip. (in Ukrainian).

31. Економічні та фінансові інди-катори. Офіційний курс гривні до інозем-них валют (середній за період). Офіцій-ний сайт Державної служби статистики. Режим доступу: http://www.ukrstat. gov.ua/imf/Pokaz.html.

32. Galgóczi B., Drahokoupil J, Ber-naciak M. (eds) Foreign investment in east-ern and southern Europe after 2008. Still a lever of growth? Brussels: ETUI. 2015. 379 pp.

33. UNCTAD: World Investment Prospects Survey 2014–2016. Available at: http://unctad.org/en/PublicationsLibrary/we bdiaeia2015d4_en.pdf.

34. Идрисов Г., Мау В., Божечко-ва А. В поисках новой модели роста. *Во-просы экономики*. 2017. №12. С. 5-23, 16-17.

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ФАКТОРИ РОЗВИТКУ ПРОМИСЛОВИХ РЕГІОНІВ: МОЖЛИВОСТІ МОДЕРНІЗАЦІЇ НА ІННОВАЦІЙНІЙ ОСНОВІ

Із використанням статистичних моделей досліджено вплив факторів, які сприя-ють модернізації економіки регіонів України через їх взаємозв'язок із рівнем валового регіонального продукту.

Результати моделювання дозволили встановити, що для промислово розвинутих регіонів, як і для регіонів середнього промислового розвитку та слаборозвинутих про-

мислових регіонів, фактор НДДКР, інновацій та сучасний сектор економіки поки не є визначальними у формуванні ВРП.

Змістовний аналіз засвідчив, що кошти місцевих бюджетів не можна вважати дієвим ресурсом модернізації економіки на інноваційній основі. Для успішної модернізації економіки промисловим регіонам необхідно спиратися на внутрішні ресурси інноваційного зростання, використовуючи переваги та позитивні ефекти від прямих іноземних інвестицій.

Ключові слова: промислові регіони, промислова політика, модернізація, фактори модернізації, інновація, прямі іноземні інвестиції.

JEL: O140, O250, R110.

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ФАКТОРЫ РАЗВИТИЯ ПРОМЫШЛЕННЫХ РЕГИОНОВ: ВОЗМОЖНОСТИ МОДЕРНИЗАЦИИ НА ИННОВАЦИОННОЙ ОСНОВЕ

С использованием статистических моделей исследовано влияние факторов, способствующих модернизации экономики регионов Украины посредством их взаимосвязи с уровнем валового регионального продукта.

Результаты моделирования позволили установить, что для промышленно развитых регионов, как и для регионов среднего промышленного развития и слаборазвитых промышленных регионов, фактор НИОКР, инноваций и современный сектор экономики пока не являются определяющими в формировании ВРП.

Содержательный анализ показал, что средства местных бюджетов нельзя считать действенным ресурсом модернизации экономики на инновационной основе. Для успешной модернизации экономики промышленным регионам необходимо опираться на внутренние ресурсы инновационного роста, используя преимущества и положительные эффекты прямых иностранных инвестиций.

Ключевые слова: промышленные регионы, промышленная политика, модернизация, факторы модернизации, инновация, прямые иностранные инвестиции.

JEL: O140, O250, R110.