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## **DOES INNOVATION IS DRIVING FORCE?**

### **ANALYSIS AND CONTROL FOR EU, POLAND AND UKRAINE**

**Abstract.** The aim of the article is to present condition of innovativeness for Poland as Moderate innovator and Ukraine as modest innovator. The essence and role of innovation was observed for contemporary world economy. The data assessment has been provided in the over last 7 years, it means in period from the year 2010 to 2017. Innovation of the Polish and Ukrainian economies was analyzed on the basis of 27 particular indicators. The method of comparative analysis was used to pursue the adopted aim. Performance for Ukraine and Poland was analyzed and controlled relative to European Union 2017 and 2010. The latest and the most reliable assessment tool, i.e. Innovation Scoreboard 2018, a regular document prepared upon the request of Directorate-General for Enterprise and Industry, European Commission was used to conduct the analysis. The analysis of the dynamics was carried out and the main trends were revealed for innovation in composite indicators. Despite the fact the EU is the obvious leader, Poland which in fact is the part of it, in certain indexes approached EU's performance. In those indexes as innovation-friendly environment, employment impacts and firm investments Poland being a part of the EU became almost equal to it.

Ukraine is the best in Human resource index among all of them but has the worst intellectual assets index. The most significant rise was in the EU in innovation-friendly environment index. Assessment and recommendations for raising innovativeness were formed for the analyzed economies. As a result, reasons of significant difference between Ukraine and Poland were identified. Ukraine is in the 'Modest Innovators' group with the worst indicator. In contrast to Ukraine, Poland is one of the 'Moderate innovators' with almost twice as big as Ukrainian index. The complex approach to use innovation as driving force for economies must include: increase of the level and efficiency of education at schools and universities; research and development of modern technologies; increase of conditions of running economic activity, adequate building of capital for innovation as well as regular increase of expenditures on R&D move to the strategy of creation of own knowledge, creation of competitive advantage based on the latest innovative achievements thus launching original, own solutions and fresh knowledge on the global market.

**Keywords:** innovation, comparative analysis, control, innovation scoreboard, innovation index.

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## ІННОВАЦІЇ ЦЕ РУШІЙНА СИЛА? ОЦІНКА І КОНТРОЛЬ ДЛЯ ЄС, ПОЛЬЩІ ТА УКРАЇНИ<sup>1</sup>

**Анотація.** Мета статті — представити стан інноваційності для Польщі як помірною новатора і України як скромного новатора. Сутність і роль інновацій спостерігалась у сучасній світовій економіці. Оцінка даних була надана протягом останніх семи років, це означає період з 2010-го до 2017 року. Інновації польських та українських економік були проаналізовані на основі 27 конкретних показників із використанням методу порівняльного аналізу. Усі індикатори було проаналізовано для України і Польщі в порівнянні до досягнень щодо Європейського Союзу 2017 і 2010 років. Для проведення оцінки було використано метадані, представлені в Інноваційній індикаційній панелі 2018 (регулярний документ, підготовлений на вимогу Генерального директорату з питань підприємництва та промисловості Європейської комісії). Проведено аналіз динаміки і виявлено основні тенденції інновацій у складових показниках. Попри те, що ЄС є очевидним лідером, Польща в деяких показниках (інноваційно сприятливе середовище, вплив на зайнятість і реальні інвестиції) наближалася до результатів діяльності ЄС. Україна є найкращою за Індексом людських ресурсів, але має найгірший індекс інтелектуальної власності. Найбільше підвищення було в ЄС в інноваційному середовищі. Оцінка та рекомендації щодо підвищення інновацій були сформовані для аналізованих економік. У результаті були виявлені причини суттєвої різниці між Україною і Польщею. Україна перебуває у групі «Скромні новатори» і має найгірший показник. На відміну від України, Польща є однією з «Поміrkованих новаторів», яка майже удвічі перевершує український показник. Як результат, обґрунтовано, що комплексний підхід до використання інновацій як рушійної сили для економіки повинен включати: підвищення рівня та ефективності освіти у школах та університетах; дослідження і розроблення сучасних технологій; збільшення умов ведення господарської діяльності, адекватне будівництво капіталу для інновацій, а також регулярне збільшення витрат на НДДКР, перейти до стратегії створення власних знань, створення конкурентної переваги на основі останніх інноваційних досягнень через запуск оригінальних рішень і «свіжих» знань на світовому ринку.

**Ключові слова:** інновації, порівняльний аналіз, контроль, інноваційне табло, індекс інновацій.

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## **ИННОВАЦИИ — ДВИЖУЩАЯ СИЛА? АНАЛИЗ И КОНТРОЛЬ ДЛЯ ЕС, ПОЛЬШИ И УКРАИНЫ**

**Аннотация.** Цель статьи — представить состояние инноваций для Польши как умеренного новатора и Украины как скромного новатора. Сущность и роль инноваций была исследована для современной мировой экономики. Инновации экономики Польши и Украины были проанализированы на основе 27 конкретных показателей по отношению к Европейскому Союзу 2017 и 2010 гг. Проведен анализ динамики и выявлены основные тенденции инноваций в составных показателях. Оценка и рекомендации по повышению уровня инноваций были сформированы для проанализированных экономик.

**Ключевые слова:** инновации, сравнительный анализ, контроль, инновационное табло, индекс инноваций.

Формул: 0; рис.: 4; табл.: 2; библи.: 11.

**Introduction.** Eternal aspiration to satisfy needs, improve living conditions, facilitate and improve work and due to curiosity — innovativeness has accompanied people since the beginning of mankind. When we look at it in a simplistic way, innovation is synonymous to implementation of something new, innovative, what causes greater improvement of the existing condition [1, p.164]. Under more scientific interpretation innovativeness is tendency for ongoing search and implementation of new solutions, concepts and ideas, which is the effect of creative thinking of the human being. Creativity constitutes divergent process of thinking, which causes generation of ideas which in turn, are changed into innovative solutions in economy through convergent process. In the era of rapid globalization and high competitiveness, innovation is perceived as a cornerstone, a priority tool of functioning and development of not only economic entities, sectors but also the whole worldwide economy.

At the current stage of the civilizational development innovative activity is determined as the driving force of a lofty aim, i.e. human progress, embodiment of values which enable the leaders to unify people in a joint action to create modern, industrial and service policy based on knowledge, innovativeness and entrepreneurship. But modern trends in economic development, digitalization

and virtualization for companies as well as for countries demonstrate controversial tendencies, a specially for small and medium-sized enterprises in countries are characterized as modest and moderate innovators.

**Literature review and the problem statement.** What is the role of innovation in the modern world? When we think on innovation, our imagination leads out towards some substantive artefacts. Nevertheless, innovation in the modern world does not only have material dimension, but it is the essence of progress, development and competitive advantage of particular economies and constitutes the most important creative and productive factor governing economic result and opportunities for development for the enterprises which create these economies. Innovation is driving force of the lofty aim, human progress, embodiment of values which enable the leaders to unify people in a joint action to create modern, industrial and service policy based on knowledge, innovativeness and entrepreneurship [2, p.63-64].

The importance of innovation for economic entities is connected with its initiating role in creation and development of enterprises, industries and new outlets. It is directly transferred to the development of the whole economy and prosperity of the society. These actions and concepts should be directed towards the future, especially because pace of social changes which cause creation of new fields, needs and profound changes in sectors and traditional economies is growing continuously. Therefore, the economies which will not support innovation and implementation of new solutions or will react too slowly to the events which take place in their surroundings will be left behind becoming “assembly plants” for the highly developed states and in case of a little more optimistic scenario will fall into a trap of the average development, because it is not possible to develop limiting only to maintain only existing status quo [3]. Nowadays, development which is not based on innovation, but only on price competition does not guarantee any success. This is technological progress, which is a priority, sine qua non for the condition of assurance development of industry and perpetuation of economic growth.

In the view of the above innovativeness of the analyzed economies of Poland and Ukraine is not at the high level. The reason could be a relatively low level of development of these states in relation to the most innovative economies as well as the lack of acceptance and understanding of importance of innovativeness for the long-term competitive position of a given state and general disbelief in the opportunity of creation of strong innovative potential among entrepreneurs [4].

The current condition of innovativeness shows that the states with a high level of innovativeness leave a small place for the economies which would like to be closer to the leaders of innovativeness. Therefore, the aspiring economies should construct their own model of innovativeness in the fields which are not so common, e.g. through research and development of nanotechnologies including multifunctional materials and composites with advanced properties such as nano processes and products; technologies of medical engineering, including medical biotechnologies, etc. [5]. Improvement of conduction of economic activities through adjustment of regulatory and financial environment for the needs of innovative and effective economy. It is particularly important to improve the quality of provisions of law. It is hard to say that there is beneficial climate for business and innovativeness without transparency and trust [6, p. 29-34].

To sum up, according to new economic theories, i.e. new theory of growth, new economic geography or the concept of economy based on knowledge, innovativeness is and will remain the main factor of contemporary and future economic growth.

On the other hand management have to either be confident that conditions which have existed in the past will continue into the future or amend the estimates of time–regression analysis to allow for expected changes in the future. It is essential to analyze the effectiveness of the company not only to find out why it is high or low, or better or worse than last year [7, p.193].

To extend the body of literature on connection between innovation policy and efficiency of companies, we specifically address this gap by taking up a research question which focuses on how effective level of innovation policy could be maintained through implementation special indicators to measure performance in innovation for companies.

Group membership is an extremely important indicator because it shows the overall trend of country innovative development among European countries. Ukrainian position is by far the worst which actually explain its innovating situation. Ukraine is a modest inovator. At the same time Poland is a Moderate innovator.

The aim of this article is to present the condition of innovativeness in EU, Poland and Ukraine and their control and assessment. The article identifies the trends in innovation the Polish and Ukrainian economy. The recommendations on raising innovativeness of the economies constitute the result of the conducted analyses and assessments. The method of comparative analysis was used to pursue the adopted aim.

**Research results.** In the analysis of innovativeness of the economies of Poland and Ukraine distinguishes between four main types of indicators — Framework conditions, Investments, Innovation activities, and Impacts — and ten innovation dimensions, capturing in total 27 indicators. The European Innovation Scoreboard provides a comparative analysis of innovation performance in EU countries, other European countries, and regional neighbours [8] .

The first dimension refers to human resources, i.e. factors which allow innovation to exist. The dimension is characterized by new doctorate graduates; population aged 25-34 with tertiary education and lifelong learning.

The second dimension is attractive research systems. There are the following indicators which characterize it: 1) international scientific co-publications; 2) top 10% most cited publications; 3) foreign doctorate students.

Innovation-friendly environment includes such indicators as broadband penetration and opportunity-driven entrepreneurship.

Finance and support constitute the fourth dimension. The dimension is characterized by R&D expenditure in the public sector and venture capital expenditures.

The fifth dimension, firm investments includes the following indicators are R&D expenditure in the business sector, non-R&D innovation expenditures and enterprises providing training to develop or upgrade ICT skills of their personnel.

The sixth dimension refers to innovators and is determined by such indicators as: 1) SMEs with product or process innovations; 2) SMEs with marketing or organizational innovations; 3) SMEs innovating in-house.

Linkages constitute the seventh dimension which is specified by three indicators: 1) innovative SMEs collaborating with others; 2) public-private co-publications; 3) private co-funding of public R&D expenditures.

The eighth dimension is intellectual assets. It is characterized by PCT patent applications, trademark applications, and design applications.

An employment impact constitutes the ninth dimension. It is characterized by employment in knowledge-intensive activities and employment fast-growing enterprises of innovative sectors.

The latest dimension is sales impacts. There are the following indicators which characterized it medium and high-tech product exports; knowledge-intensive services exports; sales of new-to-market and new-to-firm product innovations.

The Figure 1 shows summary innovation index trend for Ukraine, Poland and the EU from 2010 to 2017.

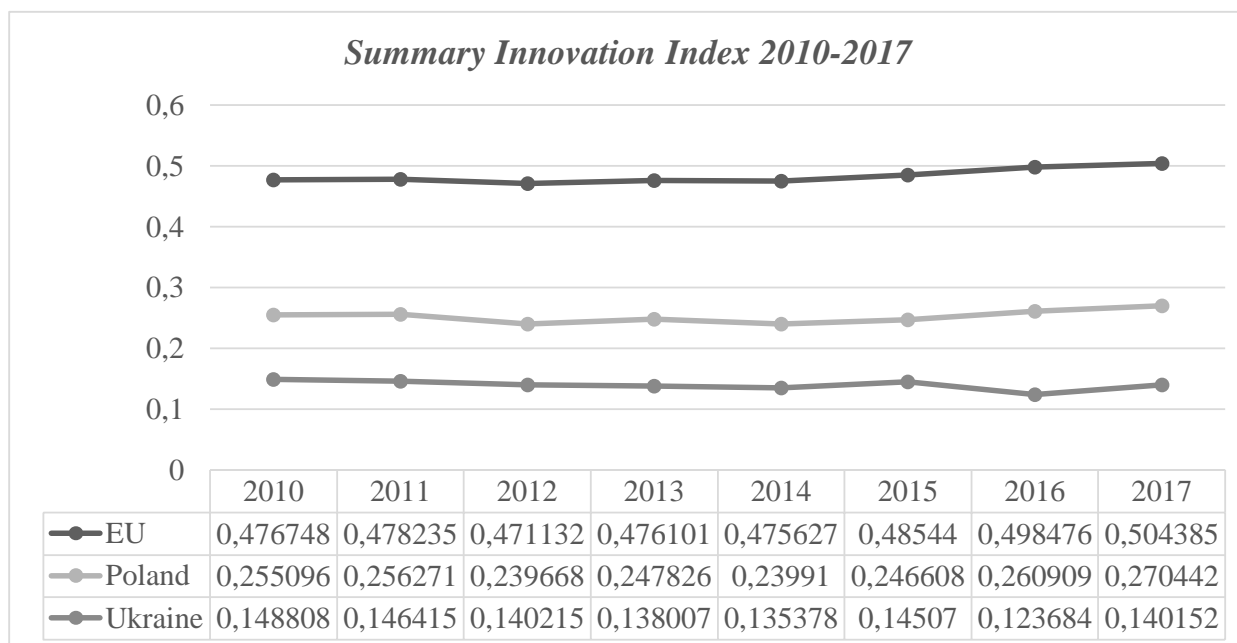


Fig. 1. Summary innovation index: Ukraine, Poland and EU

Source: compiled by the authors based on [8,9]

As it can be seen from the graph, all the participants do not rise or fall significantly except Ukraine's fall in 2016 which has been compensated in 2017. All the trends show slow but sure rise for all of them.

It is also interesting to admit that the EU and Poland had a slight fall in 2011-2012 while Ukraine had not. However, both of them started to grow in 2015-2016 while Ukraine had actually fall.

The Table 1 demonstrates the fluctuation of composite innovation indexes for the EU, Poland and Ukraine in 2010 and 2017.

Table 1

Composite innovation indexes for the EU, Poland and Ukraine

	2017			2010		
	EU	Poland	Ukraine	EU	Poland	Ukraine
Summary Innovation Index	0,504385	0,270442	0,140152	0,476748	0,255096	0,148808
Human resources	0,473001	0,286224	0,521826	0,396404	0,297716	0,260913
Research systems	0,447687	0,131519	0,087951	0,393968	0,085309	0,072317
Innovation-friendly environment	0,505605	0,4807	0,020938	0,377913	0,147882	0,021563
Finance and support	0,59805	0,184138	0,092661	0,555455	0,247782	0,136096
Firm investments	0,458363	0,371449	0,183876	0,410065	0,29578	0,289949
Innovators	0,493019	0,016801	0,091641	0,573058	0,146843	0,104261
Linkages	0,47473	0,178384	0,045225	0,470184	0,225102	0,058893
Intellectual assets	0,431275	0,321508	0,057197	0,427433	0,2221	0,033654
Employment impacts	0,540438	0,496899	0,418605	0,537468	0,492396	0,372093
Sales impacts	0,665326	0,353605	0,209309	0,639063	0,430971	0,289945

Source: compiled by the authors based on [9]

The Figure 2 and Figure 3 show the difference between composite innovation indexes of the EU, Poland and Ukraine in 2017 and 2010. The charts graphically represent the biggest and the lowest figures for each index.

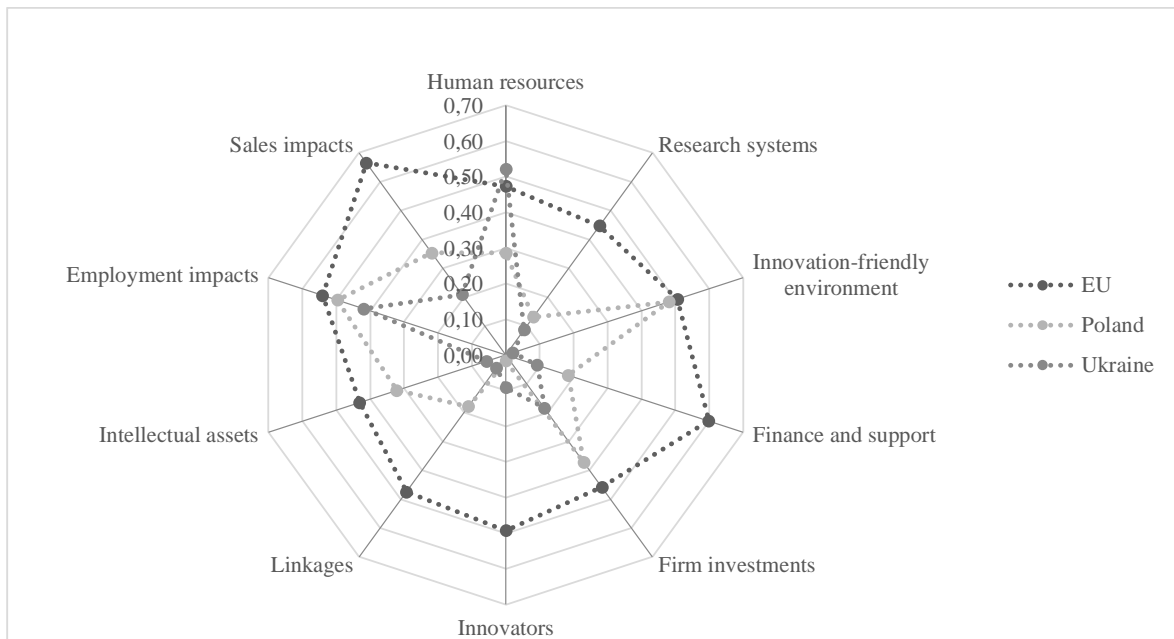


Fig. 2. Composite indicators in innovation for EU, Poland and Ukraine in 2017  
 Source: compiled by the authors based on [8,9]

According to the Figure 2, the EU is an obvious leader in all parts of summary innovation index except human resources due to the fact Ukraine is on 0.05 bigger. However, the European Union is the undisputed leader in innovators leader with 0.49 comparing to 0.16 and 0.09 in Poland and Ukraine respectively.

Despite the fact the EU is the obvious leader, Poland which in fact is the part of it, in certain indexes approached EU's performance. In those indexes as innovation-friendly environment, employment impacts and firm investments Poland being a part of the EU became almost equal to it.

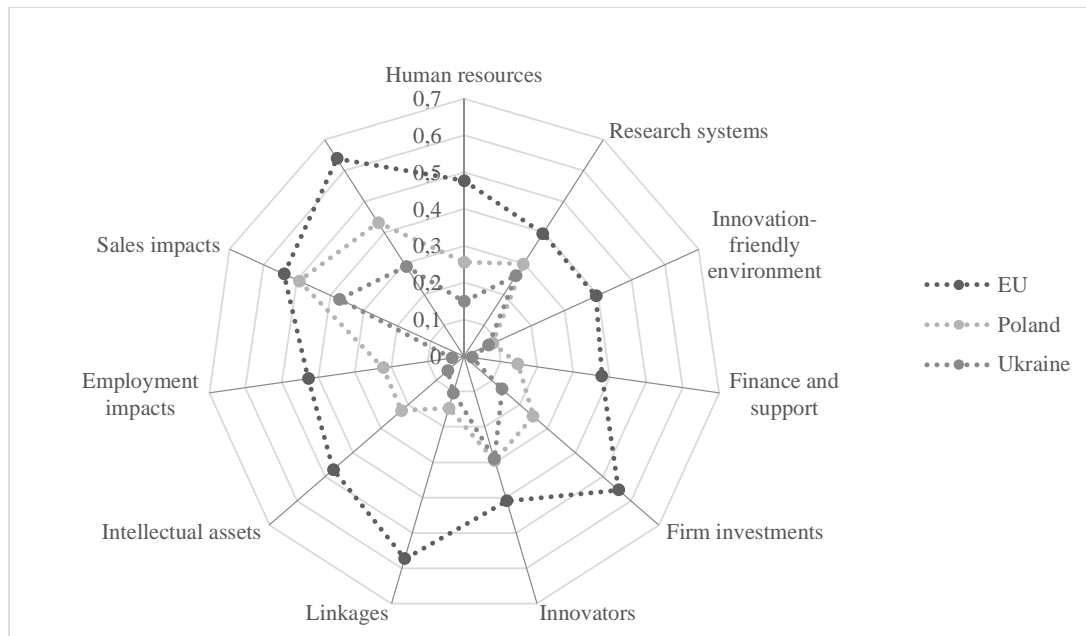


Fig. 3. Composite indicators in innovation for EU, Poland and Ukraine in 2010  
 Source: compiled by the authors based on [8,9]

Regarding the figures of Ukraine, it can be concluded that it is far lower than the Union or Poland. Notwithstanding this Ukraine is the best in Human resource index among all of them but has the worst intellectual assets index.

In contrast to the identical radar chart of 2017 year, the EU is a lot lower what cannot be said about other countries. As it can be seen, 9 from 11 indexes are lower except linkages index which remains stable and innovators index which actually has fallen from 0.57 to 0.49.

On the other hand, there is a completely different situation with Poland. In fact, only 5 indexes have grown up in 2017 comparing to 2010. The radar chart shows that other 5 have fallen and employment impact leveled off. As a result, it is impossible to say about overall upward trend in innovation in Poland.

Regarding Ukraine development, after analyzing all the indexes it can be concluded that situation is even worse than in Poland. As it can be seen from the chart 6 from indicators have fallen while only Innovation-friendly environment index remained stable. Talking about figures which have grew up there are only 5 of them which is even less than half. So that under no circumstances it is possible to conclude good innovation situation in Ukraine.

The Figure 4 shows changes in summary innovation index as well as in indexes it consists of for European Union, Poland and Ukraine in 2017 comparing to the EU indexes in 2010. Therefore, it can be seen the growth of these indexes within 7 years.

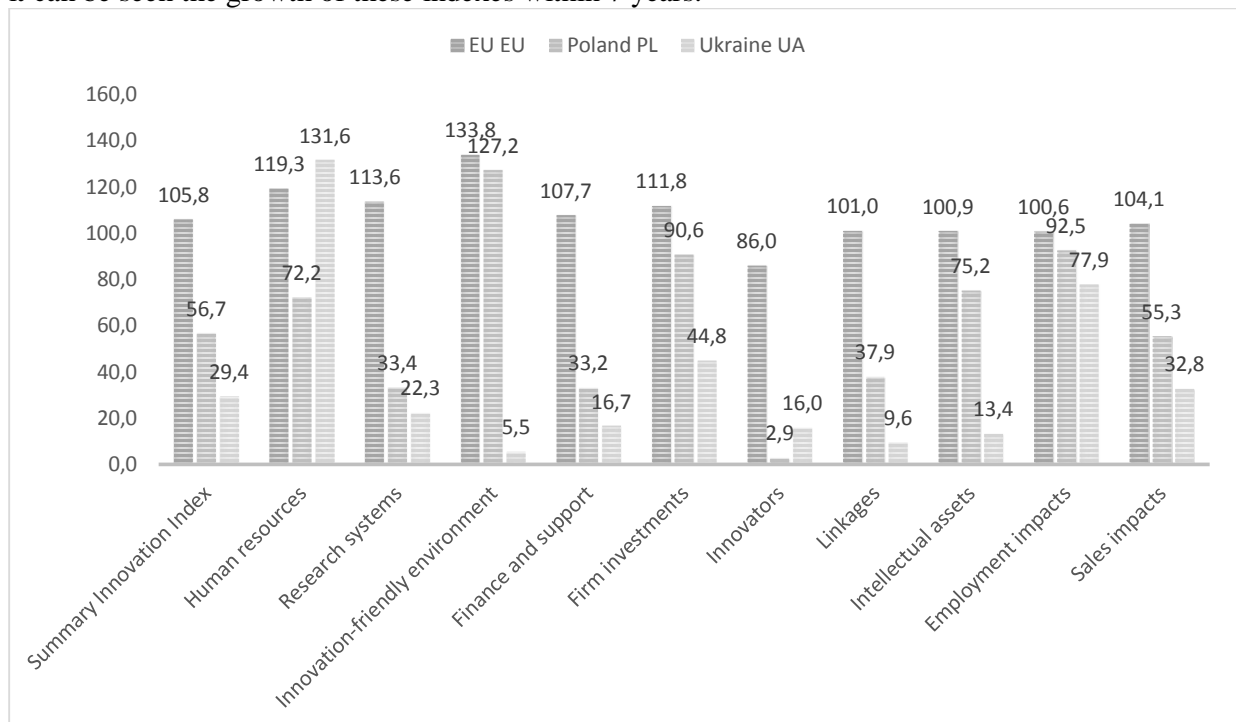


Fig. 4. Composite indicators in innovation for EU, Poland and Ukraine in 2017: performance relative to EU 2010  
Source: compiled by the authors based on [8,9]

As it can be seen from the graph, the most significant rise was in the EU in innovation-friendly environment index. European Union became 138% as large as it was in 2010. Analyzing other changes in indexes it can be seen that in the 2017 the EU has doubled comparing to the 2010 year. On the other hand, Poland has risen more than twice only in the same innovation-friendly environment index on 127.2 in 2017 comparing to the EU in 2010. In contrast to this, in the innovators index it has grown up only on 2.9% which actually is the worst one. Regarding Ukraine, it can be concluded that despite the relatively low growth in almost all the indexes, Ukraine has second largest growth on 131.6 in the human resources index in 2017 which virtually is the biggest among the countries.

The Table 2 summaries information about performance in innovation policy for EU, Poland and Ukraine by selecting and reporting the main innovation indexes to make comparisons where relevant.



Table 2

## Innovation Indicators: for EU, Poland and Ukraine

	Poland			Ukraine			Relative to EU 2017 in		
	Performance relative to EU 2010 in		Growth %	Performance relative to EU 2010 in		Growth %	PL	UA	Comparative %
	2010	2017	2017/2010	2010	2017	2017/2010	2017	2017	UA/PL
<b>Summary Innovation Index</b>	53,5	56,7	106,0	31,2	29,4	94,2	53,6	27,8	51,9
<b>Human resources</b>	75,1	72,2	96,1	65,8	131,6	200,0	60,5	110,3	182,3
1.1.1 New doctorate graduates	46,2	33,3	72,2	61,5	123,1	200,0	23,9	88,3	369,5
1.1.2 Population completed tertiary education	140,3	147,8	105,3	N/A	N/A	N/A	130,3	N/A	N/A
1.1.3 Lifelong learning	33,3	30,2	90,6	N/A	N/A	N/A	29,6	N/A	N/A
<b>Research systems</b>	21,7	33,4	153,9	18,4	22,3	121,2	29,4	19,6	66,7
1.2.1 International scientific co-publications	44,0	86,4	196,3	0,0	5,3	N/A	53,1	3,2	6,0
1.2.2 Scientific publications among top 10% most cited	24,9	38,7	155,7	18,5	21,6	116,9	37,3	20,8	55,8
1.2.3 Foreign doctorate students	9,4	7,5	80,2	24,5	29,2	119,3	6,8	26,4	388,2
<b>Innovation-friendly environment</b>	39,1	127,2	325,3	5,7	5,5	96,5	95,1	4,1	4,3
1.3.1 Broadband penetration	77,8	144,4	185,7	7,7	7,4	97,1	81,3	4,2	5,2
1.3.2 Opportunity-driven entrepreneurship	16,2	117,0	720,8	N/A	N/A	N/A	108,6	N/A	N/A
<b>Finance and support</b>	44,6	33,2	74,4	24,5	16,7	68,2	30,8	15,5	50,3
2.1.1 R&D expenditure in the public sector	57,5	29,2	50,8	41,1	14,1	34,3	30,3	14,6	48,2
2.1.2 Venture capital investments	28,0	38,2	136,3	3,2	20,0	632,4	31,3	16,4	52,4
<b>Firm investments</b>	72,1	90,6	125,7	70,7	44,8	63,4	81,0	40,1	49,5
2.2.1 R&D expenditure in the business sector	12,6	51,1	404,5	37,0	29,5	79,5	45,9	26,4	57,5
2.2.2 Non-R&D innovation expenditure	190,7	188,8	99,0	116,1	66,1	56,9	172,7	60,4	35,0
2.2.3 Enterprises providing ICT training	35,7	50,0	140,0	N/A	N/A	N/A	43,8	N/A	N/A
<b>Innovators</b>	25,6	2,9	11,3	18,2	16,0	87,9	3,4	18,6	547,1
3.1.1 SMEs with product or process innovations	24,3	5,9	24,4	0,0	0,0	N/A	7,3	0,0	0,0
3.1.2 SMEs with marketing or organizational innovations	27,7	3,0	10,9	2,4	0,0	0,0	3,6	0,0	0,0
3.1.3 SMEs innovating in-house	24,8	0,0	0,0	51,4	47,3	92,0	0,0	50,7	N/A
<b>Linkages</b>	47,9	37,9	79,1	12,5	9,6	76,8	37,6	9,5	25,3
3.2.1 Innovative SMEs collaborating with others	52,1	23,0	44,2	5,0	3,0	60,0	22,9	3,0	13,1
3.2.2 Public-private co-publications	34,2	36,6	106,8	19,1	15,4	80,9	36,2	15,3	42,3
3.2.3 Private co-funding of public R&D expenditures	58,5	54,5	93,3	N/A	N/A	N/A	53,8	N/A	N/A
<b>Intellectual assets</b>	52,0	75,2	144,6	7,9	13,4	169,6	74,5	13,3	17,9
3.3.1 PCT patent applications	9,6	18,8	195,7	7,6	14,8	194,2	19,6	15,5	79,1
3.3.2 Trademark applications	50,7	80,5	158,6	18,5	18,1	98,1	71,2	16,0	22,5
3.3.3 Design applications	92,6	124,2	134,1	0,1	8,5	6591,1	128,7	8,8	6,8
<b>Employment impacts</b>	91,6	92,5	101,0	69,2	77,9	112,6	91,9	77,5	84,3
4.1.1 Employment in knowledge-intensive activities	42,9	59,7	139,4	83,1	93,5	112,5	54,1	84,7	156,6
4.1.2 Employment fast-growing firms innovative sectors	126,4	115,8	91,6	N/A	N/A	N/A	123,8	N/A	N/A
<b>Sales impacts</b>	67,4	55,3	82,0	45,4	32,8	72,2	53,1	31,5	59,3
4.2.1 Medium & high tech product exports	90,4	83,9	92,8	59,6	28,3	47,5	79,2	26,7	33,7
4.2.2 Knowledge-intensive services exports	45,2	45,8	101,2	55,8	64,0	114,7	43,7	61,1	139,8
4.2.3 Sales of new-to-market and new-to-firm innovations	66,2	32,7	49,4	16,4	1,6	9,5	32,3	1,5	4,6

Source: compiled by the authors based on [8,9,10,11]

Analyzing Polish indicators of innovativeness, it is possible to say that mostly they are lower than the EU's. It is the normalized performance which dominates at the table which means that there are mostly normalized performances below 50% of EU. As it can be seen from the table 1, summary innovation index in Poland has increased slightly comparing to the EU of 2010 and 2017 indexes. Analyzing the table, it becomes clear that almost all indexes have decreased while SMEs innovating in-house has plumed to zero in 2017 comparing to the EU. In fact, all the innovators indexes has plumed on 80-90% within 7 years. What is more, sales impacts index and human resources index have decreased an average of 23% as well.

On the other hand, innovation-friendly environment index has increased significantly from 39.1 on 2010 to 95.1 in 2017 comparing to the EU. Design applications index, trademark applications and R&D expenditure in the public sector indexes have also increased which shows a positive trend.

Regarding the dynamic of the best indexes of 2010 such as Population with territory education, non-R&D innovation expenditures and employment fast-growing enterprises it can be concluded that all of them have decreased in 2017 comparing to the EU. Despite of this downward trend they all rest on the leading positions and keep their advantage over European Union.

In contrast to the Polish indicators, Ukrainian ones seem to be almost fully lower than the EU's with only one index higher. There is only 1 index above 120% of EU and 6 indexes between 90% and 120% of EU while others are below 50% of EU or not available.

While evaluating the table of Ukrainian indexes it is not difficult to admit that overwhelmingly, indicators are located in 20% below zone. Sales of new-to-market or firm innovators have lost 91% from 2010 to 2017 comparing to the EU plunged from 16.4% to 1.5% respectively. It is necessary to highlight that those key indexes as population with territory education, enterprises providing ICT training and other are simply unavailable.

Notwithstanding on the obvious downward trend there still rest some indexes which have grown up from 2010 to 2017 comparing to the EU. One of them is an employment impact indicator which has increased from 69.2% to 77.5% in 2017. Another one is a knowledge-intensive services export which has also risen from 55.8% in 2010 to 61.1% in 2017 comparing to the EU.

While conducting general assessment of innovativeness of the Polish and Ukrainian economies one should refer to the position of these states in the annual ranking determining innovativeness of the EU.

As a result, it becomes obvious why there is such a significant difference between Ukraine and Poland. Ukraine is in the 'Modest Innovators' group with the worst indicator. In contrast to Ukraine, Poland is one of the 'Moderate innovators' with almost twice as big as Ukrainian index.

Therefore, to increase the level of innovativeness Poland and Ukraine should put emphasis on:

1) Raising the level and effectiveness of education at schools and universities increasing the emphasis on the quality of education in the fields crucial for the innovative potential of the economy, including great emphasis on promotion of creativity, critical thinking and development of leadership talents.

2) Capital for innovation. It is mostly provision of finance to start innovative activity, e.g. in the form of start-ups or financing new innovative undertakings through a coherent system of mature financial institutions which want to invest into innovative undertakings. Acquirement of capital for innovation, expansion and new technologies with the use of Venture Capital. Development of human capital through increasing qualifications of staff of R&D system and development of awareness of the role of education in economic growth, support for staff adaptability system and for innovative actions and creation of competitive system of creation of knowledge constitute the second aspect.

3) Systematic rise of expenses on R&D. The biggest part of these expenses should be spent only on R&D and creation of own innovative products or technologies not on the so called business environment institutions or capital investments through purchase of new technologies, machinery and devices from others. Increased finances on research should aim at better adjustment of supply of R&D for the needs of the market as well as stimulation of demand of enterprises for innovation and research and development works.

4) Creation of strong innovative potential basing on the above-mentioned actions.

**Conclusions.** These economies fulfil mostly the developmental assumptions through the model based on the capacity of imitations of solutions created in the states which are the leaders in rankings of innovativeness as well as the model based on price competition (due to low labor costs),

domestic market and EU funds. Nevertheless, these simple growth reserves will be exhausted in a few years and the states will face the lack of opportunities to develop or fall into a middle income trap or “me-too diffusion” and stop catching up the most developed states.

Therefore, these states should, through increase of the level and efficiency of education at schools and universities; research and development of modern technologies; increase of conditions of running economic activity, adequate building of capital for innovation as well as regular increase of expenditures on R&D move to the strategy of creation of own knowledge, creation of competitive advantage based on the latest innovative achievements thus launching original, own solutions and fresh knowledge on the global market.

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