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Smart growth as a challenge for Poland in the light of the Europe 2020 strategy

Abstract

Aim/purpose – The aim of the paper is to present smart growth, which is one of the pillars of the Europe 2020 strategy, as a challenge for Poland.
Design/methodology/approach – The paper includes a critical analysis of the literature, analysis of domestic and EU documents, and Eurostat statistical data. Comparative analyses in time and space were conducted using basic statistical methods (descriptive characteristics of distributions, measures of dynamics).
Findings – The analysis carried out in the paper showed that Poland's position against the EU-28 countries in terms of smart growth is relatively good. It is mainly noticeable in the implementation of education-related targets, whereas Poland's situation in the R&D area is much poorer.
Research implications/limitations – The main implications include the fact that the identified degree of Poland's implementation of the elements of smart growth, may be a basis for drawing up necessary actions to be taken in the analysed areas.
Originality/value/contribution – The paper evaluates the implementation of the smart growth targets included in the Europe 2020 strategy in Poland against the EU-28 countries and shows the status and perspectives of the implementation of smart growth in Poland in the light of domestic documents.

Keywords: sustainable growth, smart growth, Europe 2020 strategy, European Union, Poland.
JEL Classification: Q01, Q56.

1. Introduction

The European Union (EU) has faced a number of challenges in the 21st century resulting from increasingly stronger competition in the international arena (keeping pace with the United States, Japan, or dynamically developing BRICS countries), pollution and climate change as well as social and economic differentiation of countries that form it (cf. Signore & Fazio, 2014; Xodo, 2011).

In order to meet them, the Lisbon Strategy for the EU was adopted, the aim of which was substantial innovation growth and the resulting growth of competitiveness of EU economies. Despite not having met the Lisbon targets, the EU was still one of the significant economic areas of the world yet with a lower economic growth compared to e.g. the United States. One of the main reasons for failing to implement the Lisbon strategy assumptions was a low level of R&D investment and an unsatisfactory degree of the use of tele-information technologies.

The consequences of this state of affairs included, among others, the European Commission adopting the Europe 2020 strategy for smart, sustainable and inclusive growth (cf. Amanatidou, Saritas, & Loveridge, 2016; Ergazakis & Metaxiotis, 2011; McCann & Ortega-Argilés, 2014; Singh, 2012), where the leading role was ascribed to R&D issues, innovation seen as a prime source of competitiveness as well as economic and employment growth (Frankowski & Skubiak 2012).

Such an opportunity is offered by the implementation of targets and tasks adopted in the EU strategic document, i.e. Europe 2020 strategy. Due to the broad range of the issues addressed in the Europe 2020 strategy, the paper focuses on one of its pillars – smart growth.

The literature abundantly addresses the issue of implementation of the Europe 2020 strategy by individual countries in the Community (cf. Fura, Wojnar, & Kasprzyk, 2017; Radulescu, Fedajev, Sinisi, Popescu, & Iacob, 2018; Stec & Grzebyk, 2018; Szymańska & Zalewska, 2018). A critical look at the Europe 2020 strategy assumptions is also presented.

However, few scientific works include analyses or discussion of the implementation of targets adopted in the Europe 2020 strategy under the pillars identified in it, i.e. smart growth, sustainable growth, and inclusive growth. A critical literature analysis also showed that what is missing is analyses concerning the degree of implementation of targets set in the individual pillars of the Europe 2020 strategy, carried out from the perspectives of individual EU countries. This

fact was an inspiration to and a starting point for undertaking an analysis of the degree of implementation of assumptions set for Poland included in the smart growth pillar.

The main purpose adopted in the paper is to present smart growth as a challenge that Poland faces in the light of implementation of the Europe 2020 strategy. Specific goals were assigned to the main purpose, namely:

1. Separating smart growth as an element of the Europe 2020 strategy.
2. Evaluating the implementation of the Europe 2020 strategy smart growth targets in Poland against the EU-28 countries.
3. Showing the status and perspectives of implementation of smart growth in Poland against domestic documents.

The layout of the paper is driven by the implementation of its purpose. First, a characteristics of smart growth in the context of the Europe 2020 strategy is carried out. Then, a description of research methodology is presented. The following part presents the implementation of targets under smart growth in Poland against the EU-28 countries. The paper closes with conclusions.

The literature, government documents and Eurostat secondary data were used in the paper.

2. Literature review – smart growth in EU documents

The innovation policy in the European Union has been evolving for many years, which consisted in redefining goals and creating various impact instruments as part of which a lot of ventures or innovative projects were implemented (e.g. Europe Innova, Pro Inno Europe).

At the moment, the current EU strategic document in force, which is a continuation of the Lisbon strategy (to a great extent using its experience), is the Europe 2020 strategy for smart, sustainable and inclusive growth (European Commission, 2010a). It assumes smart and sustainable development, an increased number of jobs, improving quality of life which should be conducive to social inclusion and should define the direction of development of societies. This strategy is based on three pillars: smart growth, sustainable growth and inclusive growth.

Smart growth emerged in the context of the political concept of building smart specialisation of regions, which was then introduced despite a modest theoretical framework (Foray, David, & Hall, 2011). The desired path to build smart specialisation strategies was included in the European Commission docu-

ment as: seeking market niches and intensifying efforts for absorbing knowledge directed at economic actions which may potentially bring quick results on global markets but also meet social challenges such as globalization (European Commission, 2010e).

Smart growth is understood in EU strategic documents as the development of economy based on knowledge and innovation (European Commission, 2010a), as growth creating high value added, requiring significant R&D outlays and the use of mechanisms conducive to the effective application of theoretical knowledge in economic practice (Dziawgo & Dziawgo 2016; Stern, 2007; Yi, 2013). As a consequence it is supposed to bring about improved results in three areas.

The first one is the area of education and knowledge, were the aim is to achieve a high level of education and increase international attractiveness of European higher education institutions through encouraging learning, studying and improving qualifications. According to the guidelines, member states should invest in all education systems in order to increase their effectiveness and efficiency in raising the level of competences of the labour force. It is impossible to create an economy based on knowledge without adequately educated society.

The second area concerns research (innovation). Improving outcomes in this scope is to be done by creating new products and services that will in turn contribute to an increased pace of economic growth and employment and will aid solving social problems such as climate change, energy efficiency, security as well as active and healthy aging of societies. Therefore, not only do innovative products and services contribute to the implementation of the smart growth strategy target, but also to integration and sustainable development targets.

The third area refers to the digital society (use of information and communication technologies). The computerisation of society is to consist mainly in accelerating the dissemination of the Internet and in gaining benefits from the single digital media market by households and companies. According to the European Commission estimation, global demand for information and communication technologies is about EUR 2,000 trillion, where only a quarter of this demand comes from EU enterprises (Jantoń-Drozdowska & Stępiński, 2014).

Each of the three pillars of the Europe 2020 strategy was assigned flagship initiatives (Boyd & Owens 2012; Ionescu, 2015; Kedaitiene & Kedaitis, 2012; Mazur-Wierzbicka, 2012; Radulescu et al., 2018). Three flagship initiatives were identified under smart growth. They are included in Table 1.

Table 1. Flagship initiatives of the smart growth pillar included in the Europe 2020 strategy

Flagship initiative	Aim
Innovation union	Improving framework conditions and access to finance for research and innovation. This is to result in strengthening the role of the innovation chain and increasing the level of investment throughout European Union
Youth on the move	Improving the performance of education systems and enhancing attractiveness of European higher education on the international arena
A digital agenda for Europe	Speeding up the roll-out of high-speed internet and making it possible for households and firms to enjoy the benefits of a digital single market

Source: European Commission (2010a, more: 2010b, 2010c, 2010d).

Five main targets were formulated in the strategy, among which those addressing innovation (R&D area) and education (Table 2) need to be directly referred to in terms of smart growth – target values were specified for the entire European Union.

It needs to be noted that all targets formulated in the strategy are closely interrelated and point to the condition of the European Union that is expected in 2020. Increased layouts on research and development and introducing innovation in economy, together with a more effective use of resources will improve EU's competitiveness and allow the creation of new jobs. In turn, improvement in the education field will contribute to reducing unemployment and poverty.

Table 2. Headline targets and indicators of the Europe 2020 strategy under the smart growth pillar

Headline targets	Headline indicators
Devoting 3% of EU GDP to R&D investment	R&D expenditure (in % of GDP)
Increasing the level of education by reducing the share of early school leavers to under 10% and increasing, by at least 40%, of the share of the population aged 30-34 having completed tertiary or equivalent education	Early school leavers
	People aged 30-34 with tertiary education

Source: European Commission (2010a).

Bearing in mind the fact that EU member states are significantly diversified in economic and social terms, a different starting point was adopted for each of them as well as different target values that can be achieved in the time horizon established in the Europe 2020 strategy. Each of the states was obliged to implement different means of achieving the targets so that they would be adapted to their specificity and problem areas. In view of the above, EU member states were obliged by the European Commission to translate EU headline targets of the Europe 2020 strategy into national targets and to determine the methods of their implementation. As a result of undertaken actions and effects achieved at

the level of all member states the implementation of common EU targets, including strengthening the EU position in the world, is to be brought about. Consistent with the European Commission guidelines, national targets and means by which they are to be achieved were formulated by member states in relevant documents, i.e. National Reform Programmes (NRP). The National Reform Programme for the implementation of the Europe 2020 strategy was adopted in Poland by the Council of Ministers on 26 April 2011.

Poland presented the following as national targets of the Europe 2020 strategy under the smart growth pillar: achieving the level of R&D outlays equal to 1.7% GDP; reducing the percentage of early school leavers to 4.5% and increasing the percentage of people aged 30-34 with tertiary education to 45% (National Reform Programme, 2011). With regard to the latter, it needs to be noted that the target for Poland was set for 45%, that is 5% higher than the EU target. It was a consequence of recognising Poland's achievements to date in terms of the development of tertiary education.

3. Research methodology

The Europe 2020 strategy indicators in the smart growth pillar are the basis for the analysis. The years 2004-2017 were adopted as the basic time horizon for the analyses. Due to the fact that Poland joined the European Union in 2004 the analyses start in 2004. Also from 2004 onwards the data necessary to conduct the assumed analyses is comprehensive. Despite the fact that the Europe 2020 strategy has been in force since 2010 relevant data from before 2010 were referred to in order to show the outlining trends and to be able to carry out a conclusion-making process.

The analysis performed in the study was implemented in a cross-section of two groups of countries, i.e. the EU-13 (countries that have joined the European Union since 2004[*]) and the EU-15 (the countries of the 'old' EU).

Descriptive characteristics of distributions were applied for the analyses using the following measures: second quartile (median), maximum and minimum. Analyses of the dynamics were also carried out.

In order to specify the direction, pace and intensity of changes of the level of the investigated phenomena for individual groups of countries a dynamics

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[*]   Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia.

analysis was carried out in the study using percentage fixed-base relative increase.

The research part was based on secondary data coming from the Eurostat database (Europe 2020 indicators – Headline indicators (t2020_h): Gross domestic expenditure on R&D (GERD) (t2020_20), Early leavers from education and training by sex (t2020_40), Tertiary educational attainment by sex, age group 30-34 (t2020_41)).

4. Research findings and discussion

4.1. Smart growth in Poland against the EU-28 states – comparative analysis

4.1.1. R&D and innovation field as the smart growth pillar

The R&D and innovation field is a fundamental pillar of smart growth. It requires – due to its specific nature – incurring significant expenses in order for the European Union to be able to compete with the USA or Japan in the research and innovation area. Other equally important issues include the structure of expenditure on research as well as EU bodies creating conditions encouraging private entities operating in the territory of the European Union to conduct research and development activity (compared to the USA or Japan the EU features a significantly lower level of private sector investment) (cf. Pelle & Végh, 2015).

An analysis of data included in Table 3 shows that R&D expenditure (in % of GDP) was at a higher level in the EU-15 countries compared to the EU-13 in the analysed period (2004-2016). Nevertheless, the dynamics of the increase of the analysed indicator was significantly higher in the EU-13 group compared to the EU-15 group. It is worth highlighting that in most of the analysed years (except for 2006, 2012, 2013, 2014) the value of R&D (in % of GDP) expenditure for Poland was at the same level as the value of the median of this indicator for the EU-13. Among all EU-28 countries the greatest expenditure on R&D was seen in Sweden and Finland (in the EU-13 group during the whole investigated period – Slovenia), whereas the lowest in Cyprus (except for 2013 and 2014 – Romania). Among the EU-15 countries, the most modest expenditure on R&D (in % GDP) in the entire investigated period was observed in Greece, while Portugal devoted not much more expenditure on R&D (in % of GDP) than Greece.

Table 3. Development of the 'R&D investment' indicator for Poland and medians, maximum and minimum values for the EU-28 countries, including the division into groups of the EU-13 and the EU-15 in 2004-2016 (% of GDP)

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	d_1 (2004-2016)
Poland	0.55	0.56	0.55	0.56	0.6	0.66	0.72	0.75	0.88	0.87	0.94	1.0	0.97	76.4
Median														
UE-13	0.55	0.56	0.65	0.56	0.6	0.66	0.72	0.75	0.83	0.82	0.88	1.0	0.85	54.5
UE-15	1.81	1.78	1.76	1.69	1.64	1.71	1.72	1.9	1.94	1.95	2.0	2.0	2.03	12.6
UE-28	1.05	1.075	1.145	1.18	1.29	1.375	1.43	1.465	1.335	1.36	1.37	1.33	1.26	20.0
Maximum														
UE-13	1.37	1.41	1.53	1.42	1.63	1.82	2.06	2.42	2.57	2.58	2.37	2.2	2	–
UE-15	3.39	3.39	3.5	3.35	3.55	3.75	3.73	3.64	3.42	3.31	3.17	3.27	3.25	–
Minimum														
UE-13	0.34	0.37	0.38	0.4	0.39	0.44	0.45	0.45	0.44	0.39	0.38	0.48	0.44	–
UE-15	0.53	0.58	0.56	0.58	0.66	0.63	0.6	0.67	0.7	0.81	0.83	0.97	1.01	–

d1 – relative fixed-base increase (%).

Source: Author's own compilation based on Eurostat (2019) data.

The data included in Table 4 reveal not a very optimistic image of possibilities of timely achieving the 3% R&D expenditure level in the scale of the entire EU. Despite taking a number of actions of an institutionalised nature towards building an innovative economy a significant differentiation of outcomes is still noticeable among the member states in this regard. This results mainly from different structures of economies of the EU countries. In 2016, the level of R&D expenditure was higher than the assumed reference level in Austria and Sweden only (in Sweden – despite a noticeable descending trend in the level of R&D outlays in the analysed period). In Bulgaria, Croatia, Romania, Cyprus, Lithuania, Malta, Latvia, Slovakia as well as in Poland the scale of expenditure in the research and development area did not exceed the level of 1% GDP.

Table 4. Expenditure on research and development activity (% GDP) in the EU states in 2004-2016

Countries	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1	2	3	4	5	6	7	8	9	10	11	12	13	14
EU-13													
Bulgaria	0.47	0.45	0.45	0.43	0.45	0.49	0.56	0.53	0.6	0.63	0.79	0.96	0.78
Cyprus	0.34	0.37	0.38	0.4	0.39	0.44	0.45	0.45	0.44	0.48	0.51	0.48	0.5
Czech Republic	1.15	1.17	1.23	1.31	1.24	1.3	1.34	1.56	1.78	1.9	1.97	1.93	1.68
Estonia	0.85	0.92	1.12	1.07	1.26	1.4	1.58	2.31	2.12	1.72	1.45	1.49	1.28
Croatia	1.03	0.86	0.74	0.79	0.88	0.84	0.74	0.75	0.75	0.81	0.78	0.84	0.85
Hungary	0.86	0.92	0.99	0.96	0.98	1.14	1.15	1.19	1.26	1.39	1.35	1.36	1.21
Lithuania	0.75	0.75	0.79	0.8	0.79	0.83	0.78	0.9	0.89	0.95	1.03	1.04	0.85
Latvia	0.4	0.53	0.65	0.55	0.58	0.45	0.61	0.7	0.66	0.61	0.69	0.63	0.44

Table 4 cont.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Malta	0.49	0.53	0.58	0.55	0.53	0.52	0.62	0.67	0.83	0.77	0.72	0.77	0.61
Poland	0.55	0.56	0.55	0.56	0.6	0.66	0.72	0.75	0.88	0.87	0.94	1	0.97
Romania	0.38	0.41	0.45	0.52	0.57	0.46	0.45	0.49	0.48	0.39	0.38	0.49	0.48
Slovenia	1.37	1.41	1.53	1.42	1.63	1.82	2.06	2.42	2.57	2.58	2.37	2.2	2
Slovakia	0.5	0.49	0.48	0.45	0.46	0.47	0.62	0.66	0.8	0.82	0.88	1.18	0.79
EU-15													
Austria	2.17	2.38	2.37	2.43	2.59	2.61	2.74	2.68	2.91	2.95	3.07	3.05	3.09
Belgium	1.81	1.78	1.81	1.84	1.92	1.99	2.05	2.16	2.27	2.33	2.39	2.47	2.49
Germany	2.42	2.42	2.46	2.45	2.6	2.72	2.71	2.8	2.87	2.82	2.87	2.92	2.94
Denmark	2.42	2.39	2.4	2.51	2.78	3.07	2.94	2.97	2.98	2.97	2.91	2.96	2.87
Greece	0.53	0.58	0.56	0.58	0.66	0.63	0.6	0.67	0.7	0.81	0.83	0.97	1.01
Spain	1.04	1.1	1.17	1.23	1.32	1.35	1.35	1.33	1.29	1.27	1.24	1.22	1.19
Finland	3.31	3.33	3.34	3.35	3.55	3.75	3.73	3.64	3.42	3.29	3.17	2.9	2.75
France	2.09	2.04	2.05	2.02	2.06	2.21	2.18	2.19	2.23	2.24	2.23	2.27	2.25
Ireland	1.18	1.19	1.2	1.23	1.39	1.61	1.6	1.54	1.56	1.56	1.5	1.2	1.18
Italy	1.05	1.05	1.09	1.13	1.16	1.22	1.22	1.21	1.27	1.31	1.34	1.34	1.29
Luxembourg	1.62	1.59	1.69	1.61	1.64	1.71	1.51	1.47	1.27	1.3	1.26	1.27	1.24
Netherlands	1.81	1.79	1.76	1.69	1.64	1.69	1.72	1.9	1.94	1.95	2.0	2.0	2.03
Portugal	0.73	0.76	0.95	1.12	1.45	1.58	1.53	1.46	1.38	1.33	1.29	1.24	1.27
Sweden	3.39	3.39	3.5	3.26	3.5	3.45	3.22	3.25	3.28	3.31	3.15	3.27	3.25
United Kingdom	1.55	1.57	1.59	1.63	1.64	1.7	1.68	1.68	1.6	1.65	1.67	1.67	1.69

Source: Author's own compilation based on Eurostat (2019) data.

In countries with a relatively low level of expenditure in the research and development area, the undertaken actions should be focused on creating effective partnerships for innovation between companies and academic institutions in order to accelerate the pace of commercialisation of results of research and development work. It is also essential to shape pro-innovation attitudes both among entrepreneurs, so that they can see the benefits of investing in the R&D sphere, and in the education system (Gmurczyk, 2014). An important role in this respect is given to the state as the entity which defines the direction of desired changes and mechanisms for creating rules of cooperation and financing the pro-innovation policy.

According to Eurostat (2019) data, the enterprise sector has the largest share in R&D expenditure in the EU (in 2016, 64.9% of total expenditure on research and development). In 2016, a smaller share was recorded for the 'higher education' and 'public administration' sectors: 23.0% and 11.2%, respectively. It should be noted that although the share of these two sectors in research and development is growing at a slower pace, they are more resistant to fluctuations in the economic situation. The smallest share was in the private non-profit sector: 0.9% (Eurostat, s.a.).

Improving the competitiveness of the EU economy on the international stage requires intensification of activities in the innovation sphere among all member states, both at the institutional and financial level. The fact that there is a clear correlation between economic growth in the EU and investment in research and innovation makes the need to increase investment in this area particularly important (European Commission, 2016).

Intensity of research and development in the EU still remains behind other developed economies, such as the United States or Japan. A relatively high position of the EU in the global sector of research and development has been weakened by the increase of expenditure on research and development in China. In 2015, China overtook the EU, devoting 2.07% GDP to research and development (Eurostat, 2019).

4.1.2. Education field as the smart growth pillar

The two further indicators analysed when evaluating smart growth address education-related issues. The development of the first of them allows for an observation of the change in the level of percentage of people who leave school early in the EU-28 countries. The second, in turn, shows the percentage of people aged 30-34 with tertiary or equivalent education.

The data about early school leavers included in Table 5 show that, in the EU-15 group, the situation in the investigated period is much more alarming than in the EU-13 group.

Table 5. Development of the 'Early leavers from education and training' indicator for Poland and medians, maximum and minimum values for the EU-28 countries, including the division into groups of the EU-13 and the EU-15 in 2004-2017 (%)

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	d1 (2004-2017)
Poland	5.6	5.3	5.4	5.0	5.0	5.3	5.4	5.6	5.7	5.6	5.4	5.3	5.2	5.0	−10.7
Median															
UE-13	12.6	12.5	12.5	11.4	11.7	11.5	10.8	10.6	10.3	9.1	6.8	6.9	7.7	8.7	−30.9
UE-15	12.7	12.9	12.6	12.5	12.0	11.3	11.8	11.6	10.5	9.7	9.0	9.2	8.0	8.8	−30.7
UE-28	12.65	12.7	12.6	12.5	11.9	11.4	11.25	11.05	10.4	9.5	8.85	9.2	7.95	8.7	−31.2
Maximum															
UE-13	42.1	33.0	32.2	30.2	27.2	25.7	23.8	22.7	21.1	20.5	20.3	19.8	19.6	18.6	−
UE-15	39.3	38.3	38.5	36.5	34.9	30.9	28.3	26.3	24.7	23.6	21.9	20.0	19.0	18.3	−
Minimum															
UE-13	4.3	4.9	4.7	4.1	4.4	4.9	4.7	4.2	4.4	3.9	2.7	2.7	2.8	3.1	−
UE-15	8.8	8.7	8.6	8.0	7.9	7.0	6.5	6.2	7.5	6.1	6.1	6.9	5.5	5.1	−

d1 – relative fixed-base increase (%).

Source: Author's own compilation based on Eurostat (2019) data.

Out of all the countries analysed in terms of early school leavers in 2005-2010 the worst situation was seen in Portugal, while in 2011-2017 in Spain. In the countries of the EU-13 group, the greatest percentage of early school leavers was seen in Malta, while the second country in terms of the percentage of early school leavers in the EU-13 was Romania. Slovenia (years 2004-2005, 2007, 2011-2014), Croatia (years 2006, 2008, 2014-2017) and Slovakia (years 2009-2010) were on the opposite pole. Poland achieved a very high position in the entire analysed period against the EU-28 countries (Table 6). The percentage of early school leavers in Poland was significantly lower that the value of the median for both the EU-13 and the EU-28. It is worth highlighting that in the investigated period a significant declining trend of early school leaving in the European Union was observed, which allows for an optimistic outlook on meeting the target set by the Europe 2020 strategy for 2020, i.e. reducing the percentage of early school leavers to under 10%. Poland has already met this target.

Finding employment is a fundamental problem for early school leavers. In 2016, 55.7% of early school leavers aged 18-24 were unemployed or not active on the labour market.

Table 6. Early leavers from education and training (% of population aged 18-24) in the EU states in 2004-2017

Countries	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
EU-13														
Bulgaria	21.4	20.4	17.3	14.9	14.8	14.7	12.6	11.8	12.5	12.5	12.9	13.4	13.8	12.7
Cyprus	20.6	18.2	14.9	12.5	13.7	11.7	12.7	11.3	11.4	9.1	6.8	5.2	7.7	8.6
Czech Republic	6.3	6.2	5.1	5.2	5.6	5.4	4.9	4.9	5.5	5.4	5.5	6.2	6.6	6.7
Estonia	13.9	14.0	13.4	14.4	14.0	13.5	11.0	10.6	10.3	9.7	12.0	12.2	10.9	10.8
Croatia	5.4	5.1	4.7	4.5	4.4	5.2	5.2	5.0	5.1	4.5	2.7	2.7	2.8	3.1
Hungary	12.6	12.5	12.5	11.4	11.7	11.5	10.8	11.4	11.8	11.9	11.4	11.6	12.4	12.5
Lithuania	10.3	8.4	8.8	7.8	7.5	8.7	7.9	7.4	6.5	6.3	5.9	5.5	4.8	5.4
Latvia	15.9	15.4	15.6	15.6	15.5	14.3	12.9	11.6	10.6	9.8	8.5	9.9	10.0	8.6
Malta	42.1	33.0	32.2	30.2	27.2	25.7	23.8	22.7	21.1	20.5	20.3	19.8	19.6	18.6
Poland	5.6	5.3	5.4	5.0	5.0	5.3	5.4	5.6	5.7	5.6	5.4	5.3	5.2	5.0
Romania	22.4	19.6	17.9	17.3	15.9	16.6	19.3	18.1	17.8	17.3	18.1	19.1	18.5	18.1
Slovenia	4.3	4.9	5.6	4.1	5.1	5.3	5.0	4.2	4.4	3.9	4.4	5.0	4.9	4.3
Slovakia	6.8	6.3	6.6	6.5	6.0	4.9	4.7	5.1	5.3	6.4	6.7	6.9	7.4	9.3
EU-15														
Austria	9.8	9.3	10.0	10.8	10.2	8.8	8.3	8.5	7.8	7.5	7.0	7.3	6.9	7.4
Belgium	13.1	12.9	12.6	12.1	12.0	11.1	11.9	12.3	12.0	11.0	9.8	10.1	8.8	8.9
Germany	12.1	13.5	13.7	12.5	11.8	11.1	11.8	11.6	10.5	9.8	9.5	10.1	10.2	10.1
Denmark	8.8	8.7	9.1	12.9	12.5	11.3	11.0	9.6	9.1	8.0	7.8	7.8	7.2	8.8
Greece	14.5	13.3	15.1	14.3	14.4	14.2	13.5	12.9	11.3	10.1	9.0	7.9	6.2	6.0
Spain	32.2	31.0	30.3	30.8	31.7	30.9	28.2	26.3	24.7	23.6	21.9	20.0	19.0	18.3
Finland	10.0	10.3	9.7	9.1	9.8	9.9	10.3	9.8	8.9	9.3	9.5	9.2	7.9	8.2

Table 6 cont.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
France	12.3	12.5	12.7	12.8	11.8	12.4	12.7	12.3	11.8	9.7	9.0	9.2	8.8	8.9
Ireland	13.1	12.5	12.2	11.8	11.4	11.7	11.5	10.8	9.7	8.4	6.9	6.9	6.3	5.1
Italy	23.1	22.1	20.4	19.5	19.6	19.1	18.6	17.8	17.3	16.8	15.0	14.7	13.8	14.0
Luxembourg	12.7	13.3	14.0	12.5	13.4	7.7	7.1	6.2	8.1	6.1	6.1	9.3	5.5	7.3
Netherlands	14.1	13.5	12.6	11.7	11.4	10.9	10.0	9.2	8.9	9.3	8.7	8.2	8.0	7.1
Portugal	39.3	38.3	38.5	36.5	34.9	30.9	28.3	23.0	20.5	18.9	17.4	13.7	14.0	12.6
Sweden	9.2	10.8	8.6	8.0	7.9	7.0	6.5	6.6	7.5	7.1	6.7	7.0	7.4	7.7
United Kingdom	12.1	11.5	11.2	16.6	16.9	15.7	14.8	14.9	13.4	12.4	11.8	10.8	11.2	10.6

Source: Author's own compilation based on Eurostat (2019) data.

Increasing the percentage of people aged 30-34 with tertiary or equivalent education is the second indicator significant for raising the level of education. In analysing data included in Table 7 what stood out was the dynamics of increase of the percentage of people aged 30-34 with tertiary or equivalent education in Poland in the analysed period. It is significantly higher for the entire EU-13 group. The values of the 'People aged 30-34 with tertiary or equivalent education' indicator for Poland in the analysed period were higher than the value of the median of this indicator for the EU-13 group, while they were lower than the value of the median for the EU-15 group.

Table 7. Development of the 'Population aged 30-34 with tertiary or equivalent
education' indicator for Poland and medians, maximum and minimum values
for the EU-28 countries, including the division into groups of the EU-13
and the EU-15 in 2004-2017 (%)

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	d_1 (2004-2017)
Poland	20.4	22.7	24.7	27.0	29.7	32.8	34.8	36.5	39.1	40.5	42.1	43.4	44.6	45.7	124
Median															
UE-13	18.5	18.5	20.7	25.7	26.3	27.9	28.0	28.2	29.8	32.3	34.1	34.3	33.8	34.3	85.4
UE-15	33.6	37.6	36.4	38.1	39.8	40.7	42.0	41.9	43.0	43.2	43.8	45.0	45.6	44.6	32.7
UE-28	26.0	25.8	27.5	29.0	30.3	32.2	34.8	37.2	39.15	40.6	41.55	42.0	43.2	44.5	71.2
Maximum															
UE-13	41.0	40.8	46.1	46.2	47.1	45.0	45.3	46.2	49.9	51.3	53.3	57.6	58.7	58.0	–
UE-15	43.4	43.7	46.2	47.3	46.3	48.9	50.1	49.7	51.1	52.6	52.7	52.3	54.6	53.5	–
Minimum															
UE-13	10.3	11.4	12.4	13.3	15.4	16.8	18.3	20.3	21.7	22.9	25.0	25.6	25.6	26.3	–
UE-15	15.6	17.1	17.6	18.6	19.2	19.0	19.9	20.4	21.9	22.5	23.9	25.3	26.2	26.9	–

d1 – relative fixed-base increase (%).

Source: Author's own compilation based on Eurostat (2019) data.

The greatest percentage of people aged 30-34 with tertiary or equivalent education was noted in Finland (2004-2007), Cyprus (2008), Ireland (2009-2013) and Latvia (2014-2017). In turn, the lowest values of the discussed indicator were seen in Romania (2004-2012, 2016-2017) and Italy (2013-2015) (Table 8).

Table 8. Tertiary educational attainment (% of population aged 30–34)
in the EU states in 2004-2017

Countries	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
EU-13														
Bulgaria	25.2	24.9	25.3	26.0	27.1	27.9	28.0	27.3	26.9	29.4	30.9	32.1	33.8	32.8
Czech Republic	12.7	13.0	13.1	13.3	15.4	17.5	20.4	23.7	25.6	26.7	28.2	30.1	32.8	34.2
Estonia	28.3	31.7	32.5	33.5	34.4	36.3	40.2	40.2	39.5	42.5	43.2	45.3	45.4	48.4
Croatia	16.8	17.4	16.7	16.8	18.5	21.3	24.5	23.9	23.1	25.6	32.1	30.8	29.3	28.7
Cyprus	41.0	40.8	46.1	46.2	47.1	45.0	45.3	46.2	49.9	47.8	52.5	54.5	53.4	55.8
Latvia	18.2	18.5	19.3	25.7	26.3	30.5	32.6	35.9	37.2	40.7	39.9	41.3	42.8	43.8
Lithuania	30.9	37.7	39.4	36.4	39.9	40.4	43.8	45.7	48.6	51.3	53.3	57.6	58.7	58.0
Hungary	18.5	17.9	19.4	20.6	22.8	24.0	26.1	28.2	29.8	32.3	34.1	34.3	33.0	32.1
Malta	17.6	17.6	20.7	20.8	21.0	21.9	22.1	23.4	24.9	26.0	26.5	27.8	29.9	30.0
Poland	20.4	22.7	24.7	27.0	29.7	32.8	34.8	36.5	39.1	40.5	42.1	43.4	44.6	45.7
Romania	10.3	11.4	12.4	13.9	16.0	16.8	18.3	20.3	21.7	22.9	25.0	25.6	25.6	26.3
Slovenia	25.1	24.6	28.1	31.0	30.9	31.6	34.8	37.9	39.2	40.1	41.0	43.4	44.2	46.4
Slovakia	12.9	14.3	14.4	14.8	15.8	17.6	22.1	23.2	23.7	26.9	26.9	28.4	31.5	34.3
EU-15														
Belgium	39.9	39.1	41.4	41.5	42.9	42.0	44.4	42.6	43.9	42.7	43.8	42.7	45.6	45.9
Denmark	41.4	43.1	43.0	38.1	39.2	40.7	41.2	41.2	43.0	43.4	44.9	47.6	47.7	48.8
Germany	26.8	26.1	25.8	26.5	27.7	29.4	29.7	30.6	31.8	32.9	31.4	32.3	33.2	34.0
Ireland	38.6	39.2	41.3	43.3	46.3	48.9	50.1	49.7	51.1	52.6	52.2	52.3	52.9	53.5
Greece	25.1	25.5	26.9	26.3	25.7	26.6	28.6	29.1	31.2	34.9	37.2	40.4	42.7	43.7
Spain	36.9	39.9	39.4	40.9	41.3	40.7	42.0	41.9	41.5	42.3	42.3	40.9	40.1	41.2
France	35.6	37.7	39.7	41.4	41.0	43.0	43.2	43.1	43.3	44.0	43.7	45.0	43.6	44.3
Italy	15.6	17.1	17.6	18.6	19.2	19.0	19.9	20.4	21.9	22.5	23.9	25.3	26.2	26.9
Luxembourg	31.4	37.6	35.5	35.3	39.8	46.6	46.1	48.2	49.6	52.5	52.7	52.3	54.6	52.7
Netherlands	33.6	34.9	35.8	36.4	40.2	40.5	41.4	41.2	42.2	43.2	44.8	46.3	45.7	47.9
Austria	20.9	20.7	21.1	20.9	21.9	23.4	23.4	23.6	26.1	27.1	40.0	38.7	40.1	40.8
Portugal	16.3	17.5	18.3	19.5	21.6	21.3	24.0	26.7	27.8	30.0	31.3	31.9	34.6	33.5
Finland	43.4	43.7	46.2	47.3	45.7	45.9	45.7	46.0	45.8	45.1	45.3	45.5	46.1	44.6
Sweden	33.9	37.6	39.5	41.0	42.0	43.9	45.3	46.8	47.9	48.3	49.9	50.2	51.0	51.3
United Kingdom	33.6	34.5	36.4	38.3	39.5	41.4	43.1	45.5	46.9	47.4	47.7	47.9	48.2	48.3

Source: Author's own compilation based on Eurostat (2019) data.

The percentage of people aged 30-34 with tertiary education was at 39.9% in 2017 in the EU. This means that the target included in the Europe 2020 strategy at the level of 40% was almost met three years before the time limit set in the strategy. However, the level of higher education in the EU still remains behind indicators of other main world economies, such as Korea, Japan, Canada or the United States (Eurostat, 2019).

The level of the 'Population aged 30-34 with tertiary of equivalent education' indicator is positive for Poland in the analysed period. However, it needs to be noted that the increase in the percentage of persons with tertiary education does not always translate into these people getting a satisfying job. A lot of graduates feel frustrated with the fact that despite completing tertiary education they are not offered jobs appropriate to their education, which often forces them to take jobs below their qualifications. In order to avoid the effect of wasting social capital the educational offer should be tailored to market expectations as soon as possible, including offering the possibility to receive some work experience while still studying, which plays an essential role in the circumstances of rapid technological progress and progressive production mechanisation.

4.2. Implementation of smart growth targets included in the Europe 2020 strategy in Poland – state and perspectives

According to the recommendations of the European Commission, the basic targets of the Europe 2020 strategy were translated into national targets collected in National Reform Programmes. They outlined paths to achieving national targets under those set in the Europe 2020 strategy. As far as smart growth is concerned, NRP addresses two targets, i.e. expenditure on research and development and education.

In the framework of the research and development expenditure, a defined level was assumed for it (Table 9).

Table 9. Expenditure on research and development target: Level of expenditure on research and development in years 2011-2020 (% of GDP)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Share	0.75	0.88	0.87	0.94	1.00	1.12	1.25	1.38	1.53	1.70

Source: National Reform Programme (2017).

Research and innovation are perceived as a driving force of long-term economic growth in Poland. However, it is an area which in the Polish reality requires enhanced action. This is confirmed by the results obtained by Poland in all dimensions of the European innovation scoreboard, which stay below the EU average (Innovators European Innovation Scoreboard, 2017). Boosting investment in the business sector is certainly a fundamental challenge. Additional serious problems include: a low level of commercialisation of research results as

well as barely noticeable links between the science sector and the business sector. They are the barriers to the development of innovative economy (Innovators European Innovation Scoreboard, 2017).

So far, support from public funds, where particular significance was assigned to EU structural and investment funds, has played an essential role in the observed gradual increase in research and development investment. Enterprises' expenditure on research and development, despite their observed increase, remain at one of the lowest levels in the EU. Enterprises barely incur any expenditure on the R&D activity which is carried out by universities or research institutes (Innovators European Innovation Scoreboard, 2017).

The National Reform Programme assumes implementation of specific initiatives for the R&D activity by the end of 2018. The main ones include (National Reform Programme, 2017):
− entry into force of the Second Innovativeness Act,
− creation of the National Institute of Technology,
− increased protection of industrial property rights (adoption of draft amendments to the Industrial Property Law Act by the Council of Ministers; development of proposals for use/modification of respective Intellectual Property Rights (IPR) instruments based on the identified needs of enterprises),
− entry into force of the Act on the Polish Industrial Platform 4.0 foundation,
− implementation of sectoral programmes and R&D programmes serving the implementation of large R&D projects.

Nevertheless, in the framework of education-related targets, the following were assumed as main actions to be implemented by the end of 2018 (National Reform Programme, 2017):
− enhancement of the teaching excellence system,
− development and implementation, in the form of a competition, of model teacher education curricula,
− implementation of development programmes at medical universities, including the creation of Centres for Medical Simulation,
− higher education reform – entry into force of the Act 2.0,
− introduction of changes in the vocational education system in order to develop a dual education system which would respond to the needs of the economy and be implemented in cooperation with the companies forming schools' economic environment.

Strengthening the activity in the field of research and development certainly requires the development and implementation of adequate policies. It is un-

doubtedly a substantial challenge for the governing circles. It is to be supported by, among others, the developed 'Strategy for Responsible Development by 2020 with the perspective by 2030' which points to measures leading to the reduction or elimination of existing barriers to investment in our country.

5. Conclusions

According to the adopted Europe 2020 strategy, by 2020 the European Union is to become a smart, sustainable and inclusive economy. One of the fundamental challenges that the countries of the European Union face, including Poland, is striving to achieve smart growth, i.a. by the implementation of adequate targets included in the Europe 2020 strategy based on the presented flagship initiatives.

The European Union, wanting to outline development directions, taking into account the development of other economies such as the USA, Japan or China, should make greater efforts to improve the intensity of functioning of the R&D sphere and develop innovativeness of European economies. This will contribute to the increase of competitiveness of the entire EU and creation of new jobs, whereas the undertaken activities in the education sphere focused on increasing the percentage of persons with tertiary education will make it possible to reduce the scale of citizens' unemployment and poverty.

The degree to which the member states meet individual targets adopted under the smart growth pillar of the Europe strategy features significant diversification. This is mainly determined by the industry structure, intensity of using knowledge in particular sectors of the economy and research possibilities of individual countries.

It can be assumed that the EU is on its way to meet or approach the assumed values of education indicators, however, in the case of the R&D expenditure indicator (% GDP) it is very unlikely that the adopted target will be achieved.

The analysis carried out in the paper showed that Poland's position against the EU-28 countries in terms of smart growth is relatively good. It is mainly noticeable in the implementation of education-related targets. Poland takes high positions against the countries of the European Union in terms of the percentage of people aged 30-34 with tertiary or equivalent education. The country is also one of the EU states achieving better results in reducing the number of early school leavers.

It needs to be highlighted that in Poland, year by year, an increase in the outlays on R&D (% GDP) can be observed. Unfortunately, the observed growth dynamics is unsatisfactory.

One can conclude that as regards the issues of investment in research and development very limited progress has been made, which is one of the fundamental challenges for Poland in the analysed area.

Author's further work in this field will include the implementation of assumptions included in the individual flagship initiatives under the smart growth pillar as one of the three basic pillars of the Europe 2020 strategy. It may also be interesting to take up analyses of the use of EU funds by individual countries for innovative activity, as well as to assess R&D expenditure made by individual sectors in the EU-28 countries. Conducting such analyses would make it possible, i.a., to formulate recommendations, as well as to collect and disseminate a set of good practices.

A significant limitation of the performed analyses includes incompleteness of some databases regarding innovation policies implemented by individual EU states. This concerns in particular the countries of the EU-13 group identified in the paper.

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