ABSTRACT. In the year 2015 the European Union has reached the halfway of implementation of Europe 2020 strategy, which is aimed at forming the conditions for sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion. In this context the aim of the paper is to analyze the level of fulfillment its aims with special concentration on diversity between New Member States that joined European Union in 2004 and 2007 (EU-10) and Old European Union Members (EU-15). The empirical part of the paper is based on the taxonomic research with application of zero-unitarization method. In order to make the dynamic analysis for the years 2004-2013 the constant reference point for the whole period was used. The evaluation was based on the Eurostat Europe 2020 indicators. The analysis showed significant diversity between New and Old Member States. However, in the years 2004-2013 EU-10 had made an important progress in the implementation of Europe 2020 strategy.

JEL Classification: C00, E61, 052

Keywords: Europe 2020 strategy, multivariate analysis, zero-unitarization method.

Introduction

In the year 2015 the European Union has reached the halfway of implementation of Europe 2020 strategy. The plan constitutes the second in this century ten-year strategy, which is aimed at building the conditions for sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion. As the foundation for the Europe 2020 strategy three mutually reinforcing priorities were formed: a) Smart growth: developing an economy based on knowledge and innovation; b) Sustainable growth: promoting a more resource efficient, greener and more competitive economy. c) Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion (European Commission 2010, p. 3).
Europe 2020 document is a continuation of the Lisbon Strategy announced at the beginning of this century, which was aimed at improving conditions for sustainable economic development described with the formula “to become the most competitive and dynamic economy in the world; based on knowledge, capable of sustainable economic growth with more and better jobs and greater social cohesion” (see Royuela-Mora et al., 2005, pp. 54-58; Lenain, 2005, pp. 9-31). The Lisbon Strategy was adopted during the significant economic changes associated with development of the global knowledge-based economy, which was accompanied by very high rate of economic growth achieved by the United States (see Balcerzak, 2009, pp. 3-22). It was an ambition of political and economic elites of the European Union to create the conditions, which would allow Europe to “catch up” of the United States in terms of the development of conditions for using the potential of knowledge-based economy. Unfortunately, already in the halfway of the Lisbon strategy, it was clear that the achievement of its objectives is impossible (Mogensen, 2005, pp. 46-49). In this time many representatives of European political elites were in favor of the view that the failure of Lisbon strategy implementation should be mainly treated as a consequence of European Union enlargement and the structural diversity between “New and Old Europe” (see Wanilin, 2006). In this context the main aim of the paper is to analyze the fulfillment of the goals of Europe 2020 strategy from the perspective of the years 2004-2013 with special consideration to the progress obtained by ten countries that joined EU in the years 2004 and 2007. In the analysis a special attention was given to the results of the Visegrad Group as the biggest economies of the EU-10 in relation to the achievements of the most important Eurozone economies. The first year of the analysis is the year of the biggest European Union enlargement, which can be considered as the most significant institutional change in Central and Eastern Europe. In the same time it is the first year of the availability of the data for all the specific diagnostic variables for reaching targets of Europe 2020. The year 2013 is the last year when the data is available.

This article should be treated as a continuation of the research on the realization of Lisbon strategy made in the year 2008 (Balcerzak et al., 2008, pp. 77-88). It also refers to the research made in 2011, which was aimed at evaluation of “starting position” of Poland in the context of Europe 2020 (Balcerzak, 2011a, pp. 31-41) and its progress during the difficult years of financial crisis in Europe (Balcerzak, 2015a, pp. 343-352, 2015b).

The article is organized as follow. In the first part the previous research on the fulfillment of Lisbon and Europe 2020 strategies is discussed. The second part of the article has strictly empirical nature with taxonomic dynamic analysis for the years 2004-2013 with application of zero-unitarization method. The article is ended with conclusions and potential suggestions for economic and institutional policy.

The article completes and improves existing studies by:
1. Most of the empirical works implementing tools of multivariate analysis for the evaluation of Lisbon or Europe 2020 strategies take static perspective. They are usually based on the changeable reference point which is estimated separately for every year. However, in case of the taxonomic analysis provided in this paper the normalization of variables is based on the constant reference point for the whole period of the analysis, which gives the possibility of dynamic analysis and enables comparing the values of synthetic index for all the years. As a result, this dynamic analysis can be also considered as a potential input data for future econometric research (see also Balcerzak, 2011b, pp. 456-467).
2. Most of the multivariate researches on the subject are done at the general level with one synthetic measure for all five aims of Europe 2020 strategy. In this paper the fulfillment of aims of Europe 2020 is evaluated at two analytic levels. First, the overall evaluation with one synthetic measure for all the five aims of Europe 2020 strategy was estimated. Then,
the countries were evaluated in terms of the separate aims of the strategy (see also Balcerzak & Pietrzak, 2014a, 2014b).

1. Literature review on previous research concerning Lisbon and Europe 2020 strategy

The literature on the results of implementation of both Lisbon and Europe 2020 strategies can be divided in two main categories. The bigger part of the empirical efforts has been given to qualitative and benchmark review of results obtained by selected countries or international comparisons of results in a given sphere of the strategy. The smaller part of the literature concentrate on the complex quantitative multivariate analyses based on the indicators proposed by European Commission for evaluation of progress in case of both plans. Due to the significant amount of publications especially in the first group, only some representative results will be discussed here.

In the first group among one of the mostly cited works one can point the analysis of Denis et al. (2005) that was concentrated on the problem of productivity slowdown in the context of the Lisbon strategy proposals. Their research confirmed the structural nature of the EU’s productivity downturn, which was to a high extent the result of an outdated and inflexible industrial structure in Europe. The European industrial structure had been to slow to adapt to the process of technological changes and intensifying pressures of globalization. As a result in the context of Lisbon strategy goals, the authors concluded that the whole EU’s innovation system must be fundamentally reformed with special attention not only to the commonly assumed increase in the amount of financial resources devoted to knowledge production, but especially by improving the linkages in the innovation system and making fundamental changes in many areas of the European regulatory environment.

De Bruijn and Lagendijk (2005, pp. 1153-1172) made an interesting contribution to the discussion on the role of national and regional innovation systems in the context of the Lisbon strategy. Analogous to the previous research they show that that European innovation policies should not focus solely on technological innovation and R&D. They argue that the gap between European countries and other leaders of the global economy is especially wide in terms of human knowledge capital. Thus, education and training should be the prime target of development policy. In the context of growing political attention and increasing amount of resources allocated to implementation of regional innovation systems, these authors argue that there is no significant relationship between different types of regional innovation systems and the data on competitive strength and welfare. On the other hand, there is a strong influence of innovation systems at the national level. These results prove that at first instance economic development is determined within a national context.

In case of research on Europe 2020 strategy one can start with the simulations and scenario analysis made by Hobza and Mourre (2010) who were using macroeconomic model QUEST III in order to explore the possible extent of potential gains attributed to the strategy implementation. In the simulation process they constructed some stylised scenarios combining fiscal consolidation efforts with differentiated progress in implementing structural reforms necessary to fulfill the targets of Europe 2020. What was the strong side of this simulation was the fact that it demonstrated the effects of fiscal consolidations alone and in combination with structural reforms. It is obvious that due to affiliation of the authors, political context of the Europe 2020 strategy, and the objective methodological characteristics of the research, these results should be treated with great caution. However, the simulation and scenario analysis still show the significant gains in terms of output and improvement of labour market conditions that can be reached as a result of reforms, which could increase annual growth between 2010 and 2020 from 1.7% in the limited reform scenario up to 2.2% in the ambitious reform scenario, to be compared with 1.5% in the baseline. In case of the labour
market the structural changes can lead to gains between around 1% and 4½%, which is equal to additional 1.5 to almost 11 million jobs.

Moving to the quantitative multivariate research one can point Balcerzak et al. (2008, pp. 77-88) who were evaluating the first five years of Lisbon strategy implementation with application of two classical methods of organizing and sharing objects with Ward’s cluster analysis and Hellwig’s synthetic variable method. As a result of application of these taxonomic methods it was possible to obtain the ranking of the countries for the year 2000, 2003 and 2005 and to group the countries into homogenous subsets from the perspective of Lisbon strategy realisation. The main aim of the research was to evaluate the results of the biggest EU economies which determine to the highest extend the results of the whole European Union. During the first five years of Lisbon strategy implementation the best results were obtained by relatively small UE countries such as Netherlands and Scandinavian economies. In case of four most important economies of the UE German, Great Britain, France and Italy only the results obtained by the first one were adequate to the leading role of the country in the common market. The results of France and Great Britain could not be satisfying as they were rated in the end of the first ten countries, whereas the 17 and 19 position of Italy was highly disappointing. As a result in the first stage of Lisbon strategy implementation it could be concluded that the failure of the plan could not be considered only as a “statistical” consequence of EU enlargement on the Central and Eastern Europe. Relatively low results of leading EU economies showed serious structural problem of the whole EU, which was later confirmed during the global financial crisis.

Based on the same methodological approach as the previous research Magdalena Olczyk (2014, pp. 21-43) was analysing the achievements of old and New Member States (NMS) in reaching the goals of Lisbon strategy in the year 2000 as the starting point of Lisbon strategy and the year 2010 as the last year of the plan. The results of the research confirmed significant gap between the EU-15 and the NMS. In the year 2010 only Czech Republic, Slovenia and Cyprus were qualified to the group of countries’ with the average level of Lisbon strategy indicators.

On the other hand, Baležentis et al. (2011, pp. 6-21) were concentrating on the Europe 2020 strategy. In order to conduct the international comparisons, they used the multi-objective method Multimoora for analyzing the structural indicators that cover headline targets of the strategy. The research covered two years: the year 2005 and 2008. As a result it enabled to identify the progress of the European countries before adoption of the strategy and showed significant heterogeneity between European countries.

In the context of Europe 2020 Balcerzak (2011, pp. 31-41) was assessing the position of Poland in relation to other EU member states at the start of the plan. To do so two methods of linear ordering were used (Hellwig’s method and zero unitarisation method) with the data for 2008. The study showed unsatisfactory position of Poland, which occupied positions 22 and 21 of the 27 EU member states in the case of the two prepared rankings and was outwitted by the Baltic States, the Czech Republic and Slovakia. This evaluation was repeated based on the updated Eurostat data with the same methodology for the years 2008 and 2012. The research showed that the four years between 2008 and 2012 were used quite effectively by Poland. In case of both methods of measurements the country was significantly much better rated in the year 2012 than in the year 2008. Whereas in the year 2008 Poland was grouped among the countries with average results in the implementation of Europe 2020 strategy, in the year 2012 it was rated among the countries with high effects (Balcerzak, 2015a, pp. 343-352). This progress was also confirmed with the application of natural breaks method for grouping the EU countries from the perspective of fulfillmment aims of Europe 2020 strategy in the years 2004, 2008 and 2013. It is woth to remember that this good outcome was obtained during difficult years of financial crisis in Europe (Balcerzak, 2015b).
In the context of the discussed research the empirical effort presented in this paper should be placed in the second stream of the literature, which concerns quantitative multivariate analysis.

2. Method of dynamic taxonomic research

With aims of building fundaments for smart, sustainable and inclusive growth European Commission has proposed the following headline targets (Europe 2020..., 2010, p. 3; Balcerzak, 2011a, pp. 31-41):

a) 75% of the population aged 20-64 should be employed.

b) 3% of the EU's GDP should be invested in R&D.

c) The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right).

d) The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree.

e) 20 million less people should be at risk of poverty.

This means that the problem of fulfillment the aims of Europe 2020 strategy should be considered as a complex phenomenon. Thus, some tools of multivariate analysis are needed to assess the performance of individual countries. As a result, in order to evaluate the progress of European Union member states a classic approach for organizing and sharing of objects was applied based on normalization of variables with zero unitarisation method. The method was chosen because it is characterized by relatively high efficiency in organizing and sharing objects. The additional advantage of the method is its simplicity and the lack of methodological controversies for its application (see Kukułła, 2000, pp. 7-16; Kukułła, Bogocz, 2014, pp. 5-13).

In comparison to the previous research of the author (Balcerzak et al., 2008, pp. 77-88, 2011, pp. 31-41; 2015, pp. 343-352) and many other articles in the field (see Olczyk, 2014, pp. 21-43; Baležentis et al., 2011, pp. 6-21) a dynamic approach with two analytical level was used here. The analysis is based on the normalization with a constant reference point for the whole period of the analysis – the years 2004-2013. The constant reference point gives the range of normalized variable described with equation 1 (Kukułła, Bogocz, 2014, p. 5).

\[ R(X_{jt}) = \max_{it} x_{ijt} - \min_{it} x_{ijt} \]  

First, the overall evaluation of the countries with one synthetic measure for all the five aims of Europe 2020 strategy is presented. Then the countries are evaluated in terms of the separate aims of the strategy.

The applied method allows to create rankings of countries with the best and the worst levels of implementation of Europe 2020 targets. In addition, the method gives the possibility of grouping the countries into four classes: a) countries with very high level of synthetic measure of fulfillment aims of the strategy; b) countries with a high position; c) the countries with an average position; d) countries with low position in the sphere of reaching the targets of Europe 2020 strategy.

In the research the data from Eurostat for the period of 2004-2013 was used (Eurostat, Europe 2020 indicators, http://ec.europa.eu/eurostat/data/database, 15.03.2015).

The fulfillment of headline targets is currently monitored with the following specific diagnostic criteria:

**Target 1. 75% of the population aged 20-64 should be employed.**

- \( x_{jt} \) – Employment rate of females – age group 20-64 (% of the population);
- \( x_{2jt} \) – Employment rate of males – age group 20-64 (% of the population).

**Target 2. 3% of the EU’s GDP should be invested in R&D.**
\[ x_{3t} \] – Gross domestic expenditure on R&D (% of GDP).

**Target 3. The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right).**

\[ x_{4t} \] – Greenhouse gas emissions, base year 1990;
\[ x_{5t} \] – Share of renewable energy in gross final energy consumption;
\[ x_{6t} \] – Intensity of energy consumption estimated final energy consumption in millions tons of oil equivalent in relations to GDP.

**Target 4. The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree.**

\[ x_{7t} \] – Early leavers from education and training – females – % of the population aged 18-24 with at most lower secondary education and not in further education or training;
\[ x_{8t} \] – Early leavers from education and training – males – % of the population aged 18-24 with at most lower secondary education and not in further education or training;
\[ x_{9t} \] – Tertiary educational attainment – females – age group 30-34;
\[ x_{10t} \] – Tertiary educational attainment – females – age group 30-34.

**Target 5. 20 million less people should be at risk of poverty.**

\[ x_{11t} \] – People at risk of poverty or social exclusion – percentage of total population;
\[ x_{12t} \] – People living in households with very low work intensity – percentage of total population;
\[ x_{13t} \] – People at risk of poverty after social transfers – percentage of total population;
\[ x_{14t} \] – Severely materially deprived people – percentage of total population.

In case of standard multivariate research the diagnostic variables are assessed with regard to the criteria of information importance. In that case the diagnostic variables should be characterized by high space variation, information importance and relatively low correlation.

High space variation means that diagnostic variables should not bear a strong resemblance to themselves in the sense of information about objects. In order to assess space variation very often a variation coefficient is used. When a variable has a lower value than accepted \( V = \varepsilon \) (usually \( V = 10\% \)), it is eliminated from the set of diagnostic variables.

Formal criteria of information importance also often include criterion of information significance. The variable fulfills this criterion, when for benefit variables\(^1\) it obtains low values of variable. In order to assess the importance skewness coefficient is usually used. In case of benefit variable for an important variable it has positive values. When the distribution of a variable characterizes with left asymmetry it means that the variable weakly differentiates the analyzed objects as most of them obtain high values of a given feature.

The last formal criterion of information importance is based on the need for low correlation between diagnostic variables. High correlation between the variables can lead to duplication of information. In case of high correlation between the variables some representative variables are selected with an accepted frontier value of correlation coefficient \( r = r^* \) (usually \( r^* = 0,8 \)) (see Zeliaś, 2000, pp. 40-45).

However, in this research the diagnostic variables proposed by European Commission as a benchmark for reaching targets of Europe 2020 strategy were used. Thus, the above mentioned typical formal criteria were not implemented.

\(^{1}\) In case of benefit variables (stimulants) \( X^+ \) for every two values \( x_{ij}^+, x_{kj}^+ \) that refer to objects \( O_i, O_k \), the relation \( x_{ij}^+ > x_{kj}^+ \rightarrow O_i > O_k \) is fulfilled, where \( > \) means that object \( O_i \) is preferred to \( O_k \). In that case a maximum value of variable is preferred. In case of negative variable (destimulants) \( X^- \) for every two values \( x_{ij}^-, x_{kj}^- \) that refer to objects \( O_i, O_k \), the relation \( x_{ij}^+ > x_{kj}^- \rightarrow O_i < O_k \) is fulfilled, where \( < \) means that object \( O_i \) is preferred to object \( O_k \). In that case minimum value of variable is preferred.
Among the diagnostic variable one can find both benefit ($x_{1b}$, $x_{2b}$, $x_{3b}$, $x_{5b}$, $x_{9b}$, $x_{10b}$), and negative variables ($x_{4b}$, $x_{6b}$, $x_{7b}$, $x_{8b}$, $x_{11b}$, $x_{12b}$, $x_{13b}$, $x_{14b}$). The stimulants were normalized with the formula 2 and the destimulants with the formula 3.

\[
 z_{ijt} = \frac{x_{ijt} - \min_{ij} \{x_{ijt}\}}{\max_{ij} \{x_{ijt}\} - \min_{ij} \{x_{ijt}\}} \quad (i = 1, 2...n); \quad (j = 1, 2...m); \quad (t = 1, 2...l), \quad z_{ijt} \in [0, 1] \tag{2}
\]

\[
 z_{ijt} = \frac{\max_{ij} \{x_{ijt}\} - x_{ijt}}{\max_{ij} \{x_{ijt}\} - \min_{ij} \{x_{ijt}\}} \quad (i = 1, 2...n); \quad (j = 1, 2...m), \quad (t = 1, 2...l), \quad z_{ijt} \in [0, 1] \tag{3}
\]

Assessment of the variable that characterizes the objects – a synthetic measure $SM_{it}$ – was obtained with the formula 4.

\[
 SM_{it} = \frac{1}{m} \sum_{j=1}^{m} z_{ijt} \tag{4}
\]

\[
 (i = 1, 2...n); \quad (j = 1, 2...m); \quad (t = 1, 2...l); \quad SMR \in [0, 1]; \quad z_{ij} \in [0, 1]
\]

The synthetic measure enables to divide the set of countries into four groups:

1. The countries with very high level of synthetic measure of fulfillment aims of the strategy, where:

\[
 SM_{it} \geq \bar{SM}_{it} + S(SM_{it}) \quad (i = 1, 2...n), \quad (t = 1, 2...l) \tag{5}
\]

2. The countries with a high level of synthetic measure of fulfillment aims of the strategy, where:

\[
 \bar{SM}_{it} \leq SM_{it} < \bar{SM}_{it} + S(SM_{it}) \quad (i = 1, 2...n), \quad (t = 1, 2...l) \tag{6}
\]

3. The countries with an average level of synthetic measure of fulfillment aims of the strategy, where:

\[
 \bar{SM}_{it} - S(SM_{it}) \leq SM_{it} < \bar{SM}_{it} \quad (i = 1, 2...n), \quad (t = 1, 2...l) \tag{7}
\]

4. The countries with low position in the sphere of reaching the targets of Europe 2020 strategy, where:

\[
 SM_{it} < \bar{SM}_{it} - S(SM_{it}) \quad (i = 1, 2...n), \quad (t = 1, 2...l) \tag{8}
\]

Where:

\[
 \bar{SM}_{it} = \frac{1}{n} \sum_{i=1}^{n} SM_{it} \quad S(SM_{it}) = \left[ \frac{1}{n} \sum_{i=1}^{n} (SM_{it} - \bar{SM}_{it}) \right]^{2} \quad (i = 1, 2...n), (t = 1, 2...l)
\]
In the first stage of the research the synthetic measure for fulfillment all the five targets of the Europe 2020 strategy was evaluated. Based on this synthetic measure of development the countries were grouped into the four categories. The result of the empirical effort is presented in Table 1 (in Annex) and in Figures 1 and 2.

In the second stage of the research the synthetic measures for reaching the separate four targets were estimated. In case of second target as it is evaluated with only one variable there was not need to use any tools of multivariate analysis. The results are presented in appendix in Table 2 to 5 (in Annex) and in Figures 3 to 12.

Figure 1. The average level of fulfilment targets of Euro 2020 strategy in case of the Visegrad Group, EU10 and EU15 in the years 2004-2013
Source: own estimation based on Eurostat data: http://ec.europa.eu/eurostat/data/database (15.03.2015).

Figure 2. The average level of fulfilment targets of Euro 2020 strategy in case of the Visegrad Group, Germany, France and Italy in the years 2004-2013
Source: own estimation based on Eurostat data: http://ec.europa.eu/eurostat/data/database (15.03.2015).

*Figure 1* and *Figure 2* show the gap between New and Old Member States in the first year of the analysis. In spite of the fact that after the decade since the biggest European Union enlargement this diversity is still significant, it can be seen that the NMS had reached an
important progress as during that period the gap was reduced by half. In 2004 the average value of synthetic measure for fulfillment for all five targets of Europe 2020 in case of EU-10 and the Visegrad Group was respectively equal to almost 82% and 80% of the average value reached by EU-15. In the year 2013 this relation in both cases reached 92%. It is also worth to stress that in the last year of the analysis all the Baltic countries, Czech Republic and Slovenia were classified in the second group of countries that fulfill the targets of the strategy to high extent. What is also important when we compare the result of the Visegrad countries as the biggest economies in the group of NMS and the achievements of the biggest economies of the Eurozone Germany, France and Italy (Figure 2) this picture is still valid. The Visegrad countries not only reduced their distance to Germany and France but increased their advantage over Italy.

![Figure 3](http://example.com/figure3.png)

**Figure 3.** The average level of fulfilment of targets 1 of Euro 2020 strategy (75% of the population aged 20-64 should be employed) in case of the Visegrad Group, EU10 and EU15 in the years 2004-2013


![Figure 4](http://example.com/figure4.png)

**Figure 4.** The average level of fulfilment of targets 1 of Euro 2020 strategy (75% of the population aged 20-64 should be employed) in case of the Visegrad Group, Germany, France and Italy in the years 2004-2013

Figures 3 and 4 present the results in case of the first target of Europe 2020. First of all, figure 3 confirms the strong negative influence of global financial crisis in the year 2008 on the labour market in Europe. The decrease in employment level in the years 2008-2010 could be seen in both EU10 and EU15. However, after the year 2010 the situation started improving in case of NMS. When one compares the average results of the Visegrad countries with the biggest economies of the Eurozone good results in that sphere can be only seen in case of Germany. What is even more significant, the positive trend in that economy was not even disturbed by the crisis, which on one hand can be treated as a positive results of serious institutional changes in labour market in Germany after Hartz reforms, but on the other hand can be the results of great benefits of that economy after Eurozone creation. From the perspective of NMS it is important that these economies were able to overcome the negative consequence of the crises of the year 2008-2010.

![Graph](Image)

**Figure 5.** The average level of fulfilment of targets 2 of Euro 2020 strategy (3% of the EU's GDP should be invested in R&D) in case of the Visegrad Group, EU10 and EU15 in the years 2004-2013

*Source:* based on Eurostat data: http://ec.europa.eu/eurostat/data/database (15.03.2015).

![Graph](Image)

**Figure 6.** The average level of fulfilment of targets 2 of Euro 2020 strategy (3% of the EU's GDP should be invested in R&D) in case of the Visegrad Group, Germany, France and Italy in the years 2004-2013

*Source:* based on Eurostat data: http://ec.europa.eu/eurostat/data/database (15.03.2015).
In case of the second target of Europe 2020 – 3% of the EU's GDP should be invested in R&D – the progress in case of both EU-15 and NMS can be considered as very moderate (Figures 5 and 6). From the perspective of the structure of expenditures in case of almost all European countries, and general belief in the role of R&D investments, the lack of significant progress in that sphere should be considered as serious failure of the strategy. Even when we take into consideration the research results cited in the previous part of the article, which show that the expenditure on R&D cannot be treated mechanically as a guaranty of building effective knowledge based-economy, the nominal target of 3% GDP invested in R&D was only reached by Scandinavian countries. In case of the biggest European economies only Germany was close to the target with 2.94% of GDP on R&D expenditures in the year 2013. From the perspective of Visegrad Group the moderate improvements in that field can be treated as an important growth obstacle for these economies. It is important as all of them are facing the problem of “middle income trap”, when the countries use up all the typical easy to launch growth factors such as cheap labor force and other resources. That problem is especially urgent in case of Poland that allocates 0.87% of GDP in that sphere, which is less than half of the level reached by Czech Republic.

![Figure 7](image-url)

Figure 7. The average level of fulfilment of targets 3 of Euro 2020 strategy (The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right)) in case of the Visegrad Group, EU10 and EU15 in the years 2004-2013

Figure 8. The average level of fulfillment of targets 3 of Euro 2020 strategy (The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right)) in case of the Visegrad Group, Germany, France and Italy in the years 2004-2013.

Source: own estimation based on Eurostat data: http://ec.europa.eu/eurostat/data/database (15.03.2015).

Figures 7 and 8 present the results of fulfillment of targets 3 – the "20/20/20" climate/energy targets should be met. In that case both EU10 and EU15 obtain significant progress. What is also important, on average the NMS are generally closing the development gap in that sphere. In case of EU-10 especially good results can be seen in case of Baltic countries and Romania (Annex Table 3).

Figure 9. The average level of fulfillment of targets 4 of Euro 2020 strategy (The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree) in case of the Visegrad Group, EU10 and EU15 in the years 2004-2013.

Source: own estimation based on Eurostat data: http://ec.europa.eu/eurostat/data/database (15.03.2015).
Figure 10. The average level of fulfilment of targets 4 of Euro 2020 strategy (The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree) in case of the Visegrad Group, Germany, France and Italy in the years 2004-2013

Source: own estimation based on Eurostat data: http://ec.europa.eu/eurostat/data/database (15.03.2015).

In case of the fourth target concerning the level of education the average level obtained by EU-10 is very close to the average for EU-15 (Figures 9 and 10). What is interesting the comparison of results obtained by the Visegrad Group with the leaders of Eurozone shows significant advantage of the first one. Only in case of France the synthetic measure of development for that target is higher than the average for the Visegrad Group with relation 0.79 to 0.70 (Annex Table 4). Taking into consideration the role of quality of human capital in the reality of knowledge-based economy, this can be considered as the strongest competitive advantage of central European countries. On the other hand, it must be remembered that effective utilising this potential in the reality of common market with the phenomena of brain drain, especially strong during last crisis, is not automatic. It demands effective macroeconomic and social policies.

Figure 11. The average level of fulfilment of targets 5 of Euro 2020 strategy (20 million less people should be at risk of poverty) in case of the Visegrad Group, EU10 and EU15 in the years 2004-2013

Source: own estimation based on Eurostat data: http://ec.europa.eu/eurostat/data/database (15.03.2015).
In case of the last target that concerns the problem of poverty and social exclusion, though lower level of development, the situation in case of NMS is relatively good (Figures 11 and 12). In spite of the diversity between the average level for EU10 and EU15, which is mostly the consequence of situation in Romania and Bulgaria (Annex Table 5) and important progress of standard of living in case of most vulnerable parts of societies can be seen. The NMS has also managed to go quite well through the crisis time of the years 2008-2010. What is interesting, if one compares the results obtained by the Visegrad group with France, Germany and Italy, only that first economy can be rated higher. The biggest economies of Central Europe have the results close to Germany and significantly higher than Italy.

Conclusions

The multivariate research presented in this paper confirms significant diversity between “Old” European countries and NMS in the sphere of reaching all the targets of Europe 2020 strategy. However, the dynamic research also points that since 2004 till 2013 the NMS (both groups the smaller economies and the Visegrad countries) had achieved an impressive progress and managed to reduce the gap to EU15 by half. Thus, it can be concluded that in the context of level of development of EU countries that progress can be considered as more than proportional in comparison to Old Member States.

Taking into consideration all the five specific targets of Europe 2020, in spite of the lower level of development on average NMS reach especially good results in case of climate/energy target, and very strong position in case of education and quality of human capital. The last one can be considered as especially important in case of building the fundamentals for developing the knowledge-based economy in the region. However, in the same context the weakest achievements of EU10 can be seen in the sphere of investments in R&D. In the future it can make it difficult to utilize the potential of high quality of human capital. Thus, it can become the significant obstacle for growth in case of NMS.

When one concentrates on the results of most important economies of Eurozone the research also shows that the progress made by Germany and France is rather moderate, whereas the results of Italy as third biggest economy of Europe are highly disappointing. This
situation is analogous to the results obtained by these economies at the halfway of implementation of Lisbon strategy in the period 2000-2005 (Balcerzak et al., 2008, pp. 77-88). When one analyses that outcome, one should take into consideration the leading political and economic role of these economies, which are responsible for almost 50% of GDP of EU. In that context the lack of significant progress of these countries for almost last ten years shows the scale of structural problems of the EU. These results cannot be only explained by the global financial crisis in the years 2008-2010, but should be rather threatened as an indicator showing the insufficient efforts of most important European economies in building fundamentals for inclusive European growth delivering high levels of employment, productivity and social cohesion.

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Source: own estimation based on Eurostat data: http://ec.europa.eu/eurostat/data/database (15.03.2015).
Table 3. The result of multivariate analysis of fulfillment of targets 3 of Euro 2020 strategy (The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right) in the years 2004-2013

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Source: own estimation based on Eurostat data: http://ec.europa.eu/eurostat/data/database (15.03.2015).
Table 4. The result of multivariate analysis of fulfilment of targets 4 of Euro 2020 strategy (The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree) in the years 2004-2013

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Source: own estimation based on Eurostat data: http://ec.europa.eu/eurostat/data/database (15.03.2015).
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