

# Sławomir Dorocki, Monika Borowiec

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## The process of transformation of academic centres as a factor upgrading the quality of human capital in the regions of France

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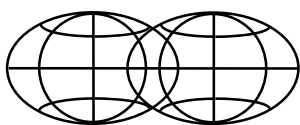
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## The process of transformation of academic centres as a factor upgrading the quality of human capital in the regions of France

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**Abstract.** The article discusses the issue of spatial distribution and diversity of educational potential of Higher Education (HE) urban centres described by the number of students and HE institutions as well as their structure in terms of types in the regions of France in 1998–2008. According to the research results it appears that the actions undertaken in order to level the socio-economic development of the regions of France, i.e. increasing the quality of human capital, resulted in an even distribution of HE centres, their high educational potential and lack of regional specificity in terms of the structure of the educational offer.

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### 1. Introduction

Development of the knowledge-based economy is mainly powered by the increase in resources and the growth of human capital achieved thanks to higher

education (Chojnicki, Czyż, 2003, 2006, 2007; Diebolt, Trabelsi, 2008; Jaoul-Grammare, 2008; Komorowski, 2008; Sowiński, 2008; Borowiec, 2010; Barros et al., 2011). It is widely accepted that in modern times human capital constitutes a key factor which increases

the competitiveness of regions, and the development of higher education is crucial to the acceleration of this process (Grodzicki, 2000; Goldberg, 2004; Kuźnicki, 2004; Dorocki, 2008; Runiewicz-Wardyn, 2008; Stachowiak, 2008; Zioło, 2008; Gayraud et al., 2009; Łukasiewicz, 2009). As a result of stimulating investment in human capital it is possible to diminish the differences in regional development (Świtała, 2007).

The research on the European space diversity in the range of the quality of human capital suggests that it is intense in both the national and regional systems (Borowiec, 2008; Borowiec et al., 2009) (1).

Besides the quality of human capital, according to Chojnicki and Czyż (2008), an important factor of the development of the knowledge-based economy is innovativeness. The indicators which were selected by the authors to define the development level of this type of economy rank France at a quite high position among the European Union states (2).

In the regions of France a high correlation between the quality of human capital and the innovation is marked (Borowiec, Dorocki, 2011).

Considering the above premises this paper discusses the issue of spatial distribution and diversification of educational potential of urban academic centres (UAC) described through the number of students and Higher Education (HE) institutions as well as their typological structure in the regions of France. It aims at answering the question whether the high level of socio-economic development is reflected in a high potential of HE centres and whether their regional layout shows an even distribution. The research refers to the years 1998–2008 when special actions were undertaken to create and introduce the European Higher Education Area (3).

## 2. Materials

The following research uses the statistical analysis method. The figures are based on the statistical data of the number of students in the regions of France according to the type of university and faculty published by Ministry of Higher Education and Scientific Research (Ministère de l'Enseignement Supérieur et de la Recherche). The data is published annually in departmental division in *Atlas régional: effectifs d'étudiants*.

## 3. Results

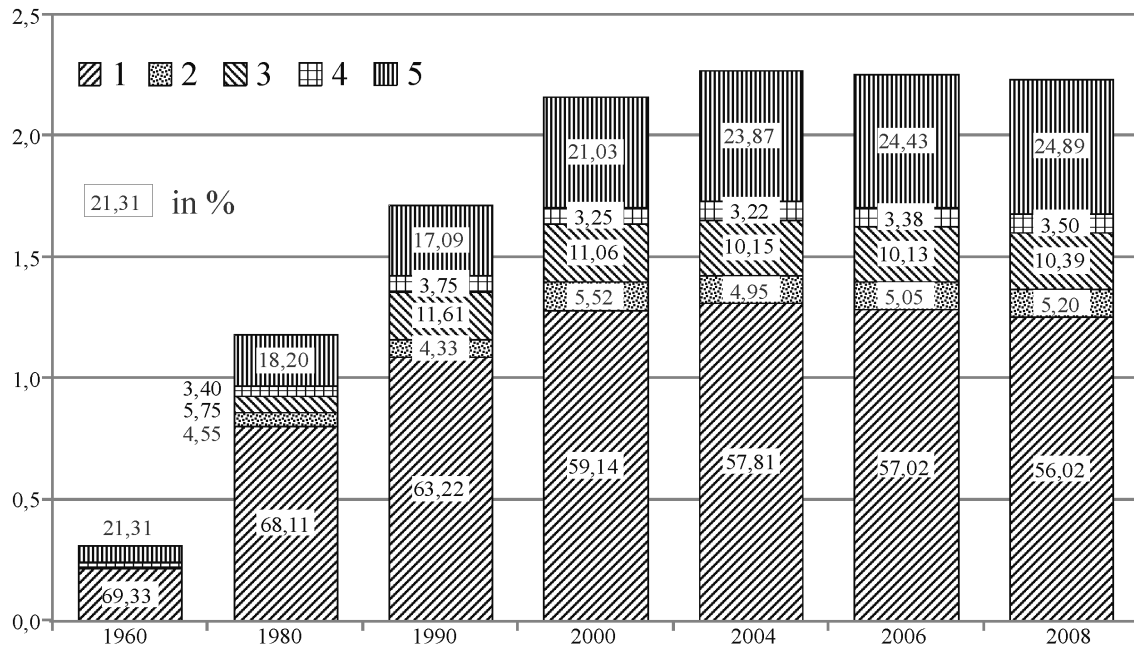
### 3.1. The development of higher education in France

The development of higher education in France dates back to the 12<sup>th</sup> century when the first universities were established (Verger, 1986). In 1793 in order to educate the elite important for the development of the country a special *Grande école* was founded. Until today this institution has remained one of the most prestigious HE institutes in France. The educational reform of the 1960s transformed universities into independent and multidisciplinary institutions as well as founding new educational institutions. Besides universities and the most prestigious *Grandes écoles*, i.e. the ENS (*École normale supérieure*), the research also included University Institutes of Technology (IUT – *Instituts Universitaires de Technologie*), Pedagogical Universities (IUFM – *Instituts Universitaires de Formation des Maîtres*) as well as preparatory courses for the candidates to *Grandes écoles* (CPGE – *Casses Préparatoires aux Grandes écoles*) conducted in high schools (*lycées*), short technical courses (STS – *Sections de Techniciens Supérieurs*) and private HE institutions (Orivel, 1980; Hatzfeld, 1991). The wide offer of the French HE sector enables candidates to tailor the courses to their individual needs and expectations as well as new challenges of civilisational development and the needs of the economy.

The actions to create and introduce the European Higher Education Area, which were first undertaken in 1998 in the Sorbonne by France, Germany, the United Kingdom, and Italy, and later continued in 1999 in Bologna, in 2001 in Prague, in 2003 in Berlin and in 2005 in Bergen, were crucial for the organisation of HE in France.

The Bill on Education passed in 2005 constitutes an integral element of the Lisbon Strategy. It states that by 2010 the following postulates be implemented or achieved: the creation of the Council on Education, an increase in practical science students by 15%, an increase in women who choose to study at practical science and technology departments by 20% and an increase in the number of teachers participating in in-service training by 20% ([www.eurydice.org.pl](http://www.eurydice.org.pl)).

In the years 1960–2008 in France the number of HE students grew from 309.7 thousand to 2.2 mln, i.e. by 721.8% (Fig. 1). The largest dynamics in the increase in the number of students was shown by technical studies; it grew from 8 thousand to 239



**Fig. 1.** Changes in the number of students (in million) and the education structure in urban academic centres in France in the years 1960–2008

Explanation: 1 – universities; 2 – IUT; 3 – STS; 4 – CPGE; 5 – other

Source: Authors’ own work based on Atlas régional: les effectifs d’étudiants

thousand i.e. 29 times. Also universities showed high dynamics in those terms as the number of students grew from 214.7 thousand to 1.3 mln, i.e. by 583.3%. The number of students taking preparatory courses went up from 21 thousand to 78.3 thousand i.e. by 372.6%, while those studying at University Institutes of Technology from 53.7 thousand in 1980 to 116.2 thousand i.e. by 216.4%. The decrease in the share of university students confirms the report of 2010: Les effectifs d’étudiants dans le supérieur en 2009.

The diverse dynamics of the changes in the number of students in the analysed time interval influenced the overall structure of education. In terms of the number of students the universities remained dominant although their share dropped from 69.3% to 56.0%, i.e. by 13.3 pp. (Fig. 1).

Similarly, the importance of the preparatory courses diminished as the share of students taking them decreased from 6.8% to 3.5%, i.e. by 3.3 pp. On the other hand, the share of students at other HE institutions grew. The most significant growth refers to technical faculties, where the change from 2.6% to 10.4%, i.e. by 7.8 pp was recorded. After an initial drop from 21.3% to 17.1% in the years 1960–1990, the share of the students of the remaining HE institutions increased to 24.9%.

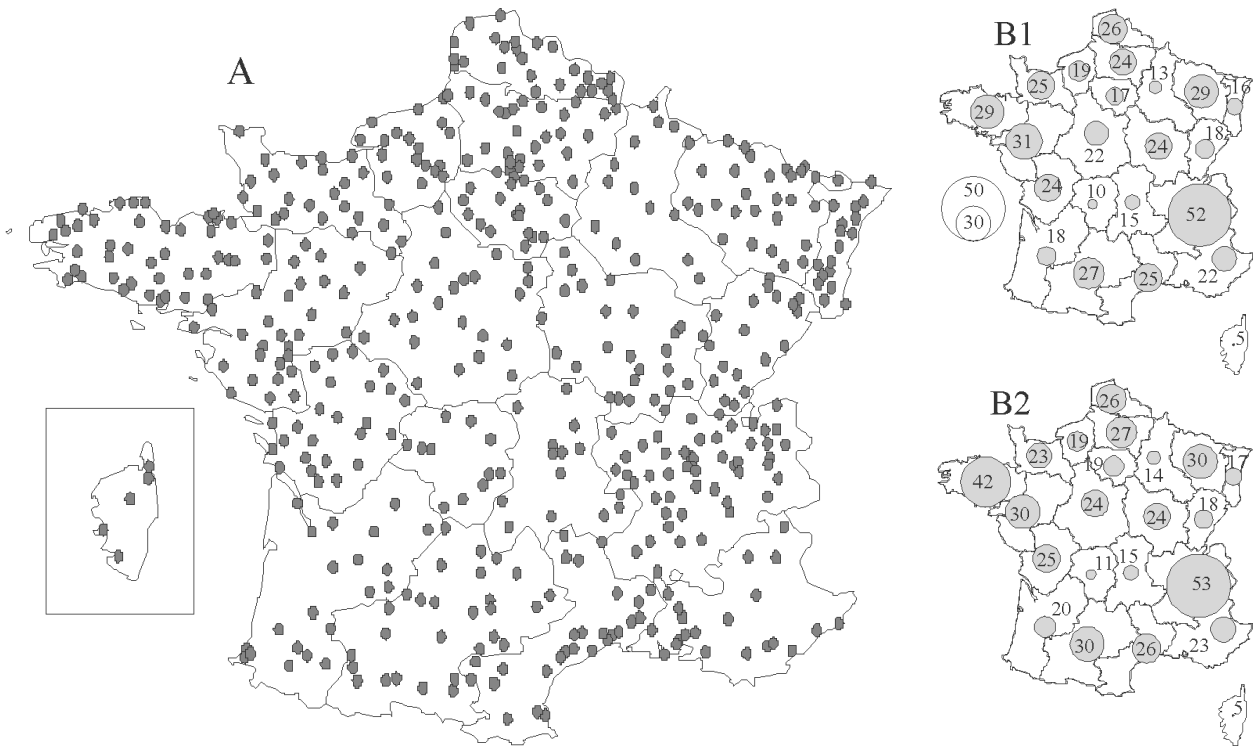
According to the French researchers the increase in the share of students from engineering schools and the professional degrees of universities in the relation to the number of university students is mainly due to the need for employment of educated workers in the contemporary economy and the changes in the global labor market (Felouzis, 2003; Diebolt, Trabelsi, 2008). These changes are created also by the state implementing the Lisbon Treaty objectives (Gayraud et al., 2009).

### 3.2. The spatial distribution and the structure of urban academic centres in France

The network of HE centres in towns and cities in France is relatively evenly spread all over the regions of the country (Fig. 2) (4).

The highest density of HE institutions is recorded in South, West and North France, while it is a little less dense in Central and South-East France.

In the research time span the spatial distribution of academic centres in urban areas did not undergo large changes. Their number, however, grew from 491 to 521, i.e. by 30. The largest number of HE centres is found in the Rhône-Alpe Region (53 centres), followed



**Fig. 2.** Spatial distribution of urban academic centres in France in 1999 and 2008

Explanation: A – urban academic centres; B – numbers of urban academic centres; 1 – 1999; 2 – 2008

Source: Authors’ own work based on Atlas régional: les effectifs d’étudiants

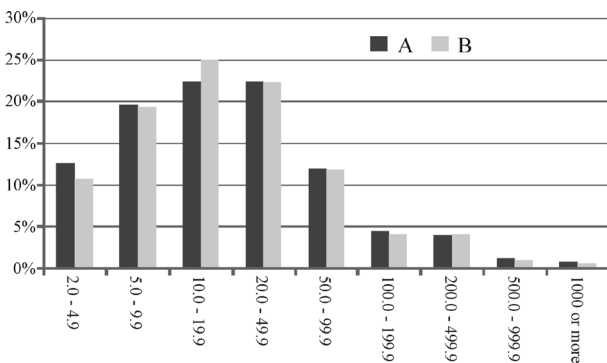
by Brittany (42) as well as the Loire Region (30) and the Central Pyrenees (30). The lowest number of such centres is recorded in Corsica (5) and the regions of Limousin (11) and Champagne-Ardenne (14).

In the study period only two regions recorded a decrease in the number of HE institutions (the Loire

Region and Lower Normandy), while in six regions it did not change. In the remaining 14 regions this number grew. The largest growth in the number of HE centres was recorded in Brittany (by 13 centres), while in the Central Pyrenees, the Central Region, Aquitania, and the Paris Region the growth was insignificant and amounted to 2-3 HE institutions.

Over 60% of the HE institutions are located in towns of 5–50 thousand inhabitants and their spatial distribution does not show any specific regional diversity (Fig. 3).

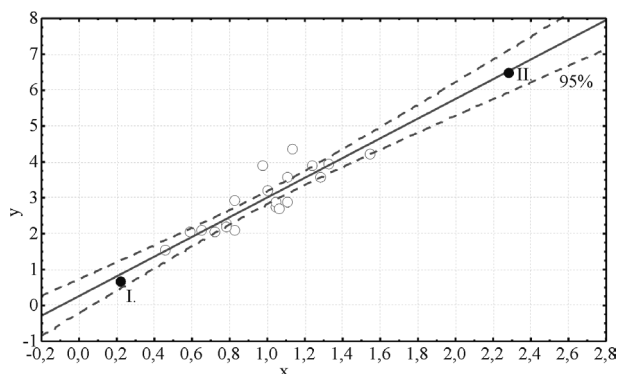
The largest number of HE institutions in urban academic centres in individual regions is located in South-East, South, West and North France, mainly in the Rhône-Alpe Region (160), Brittany and the North Region, while the lowest in Corsica (less than 20) and in the Region of Limousin. The largest growth in the number of HE institutions in the centres was recorded in the regions where their number was the highest, i.e. in Brittany (by 36), in the Rhône-Alpe Region (by 16) and in the Region of Provence and the French Riviera (by 15 each). Only two regions recorded a slight decrease in the number of the HT institutions, namely the Central Region and Languedoc.



**Fig. 3.** Size structure of urban academic centres by population (in thousand) in 1999 and 2008

Explanation: A – 1999; B – 2008

Source: Authors’ own work based on Atlas régional: les effectifs d’étudiants



**Fig. 4.** Correlation between the average number of HE institutions and urban academic centres in the regions of France in 2008 ( $r = 0.94572$ )

Explanation: 95% confidence level x – urban academic centres; y – HE institutions, I. – Corse; II. – Rhône-Alpes

Source: Authors' own work based on Atlas régional: les effectifs d'étudiants

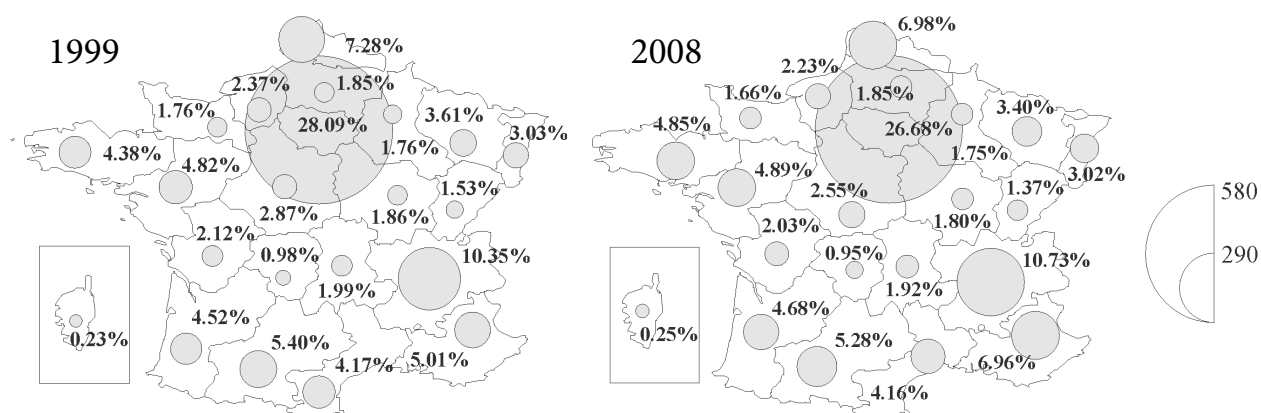
Considering the number of the HT institutions, the potential of the academic centres is little diversified (about 3 institutions per UAC). The average number of HE institutions per urban academic centre is highest in the Region of Provence and the French Riviera and in the North Region (about 4 institutions), while the lowest is recorded in Picardy, Upper Normandy and Poitou-Charentes (about 2.5). An even distribution of the HE institutions among UACs is also reflected by the correlation indicator for the standardised values of the number of UACs and the number of HE institutions. It shows a very high correlation between the number of HE institutions and the number of urban academic centres within the regions (Fig. 4).

### 3.3. The educational potential of urban academic centres in relation to the demographic potential of regions and towns

The further research dealt with the analysis of the potential diversity of urban academic centres in relation to the number of students in HE institutions. The highest number of students is recorded in the Paris Region. It amounts to 584 thousand which makes up 28% of the total number of students in France (Fig. 5a, 5b). Throughout the entire study period its dominant role remains significant and stable. The second place is taken by the Rhône-Alpe Region. However, the number of students taking their education there is much lower and amounts to 10% of the total number. The share of the students in the other regions is similar and relatively low.

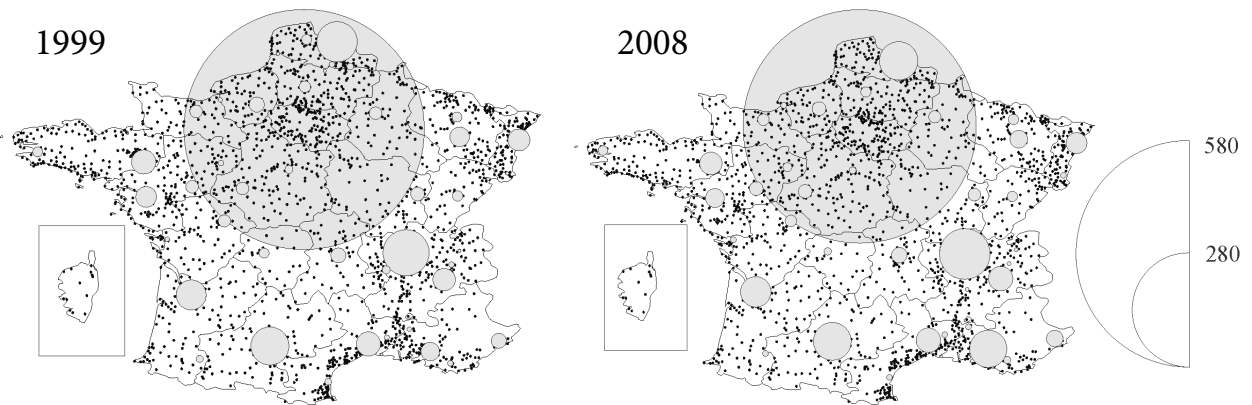
The most important element of HE in the Paris Region is Paris itself. It has 578 thousand i.e. as much as 98% of the total number of students in the region. Similarly, the largest role in the Rhône-Alpe Region is played by the city of Lyon, which has 126 thousand students, i.e. 54% of the total number of the students in the entire region. Other centres do not show such a high educational potential.

Continuous dominance of Paris and the growing importance of the southern regions of France in the spatial structure of higher education are due to historical factors (Cazenave, Gravot, 1986; Canals et al., 2006), the country's decentralisation policy (in particular the Paris region) (Milard, 2004b) and the development of high-technology sectors (Filâtre, 2004) which is evident especially in the south of France in the Alps (Grenoble) and Aquitaine – Toulouse (Grossetti, Machado, 2001).



**Fig. 5a.** Number and percentage of students in urban academic centres by regions in France in 1999 and 2008

Source: Authors' own work based on Atlas régional: les effectifs d'étudiants

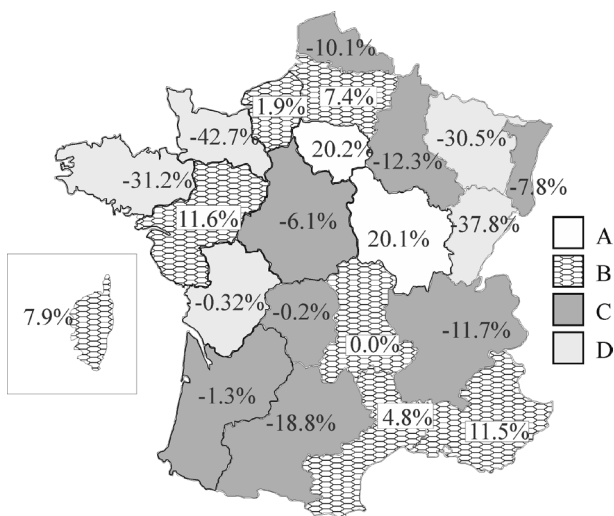


**Fig. 5b.** Number and percentage of students in urban academic centres by cities and towns in France in 1999 and 2008  
 Source: Authors' own work based on Atlas régional: les effectifs d'étudiants

In the study period the highest increase in the average number of students was recorded in the Paris Region and in Burgundy (by over 20%), followed by the Region of Provence and the French Riviera (11.5%) and the Loire Region (11.6%) (Fig. 6). The largest decrease in those terms was recorded in the Region of Lower Normandy (42.7%), Franche-Comté (37.8%), Brittany (31.2), and Lorraine (30.5%).

A much higher average number of students in urban academic centres is recorded in the Paris Region

(12–14 thousand, followed by the Rhône-Alpe Region (about 2 thousand, while it is the lowest in Corsica, Franche-Comté and Lower Normandy (about 500 students). In the other regions this value is not much diversified. In the research period the centres in South and South-East France, as well as in North France, i.e. in the North Region and in Alsace, were of relatively large size. In most regions the average size of educational centres decreased, excluding Paris and Alsace, where it grew.



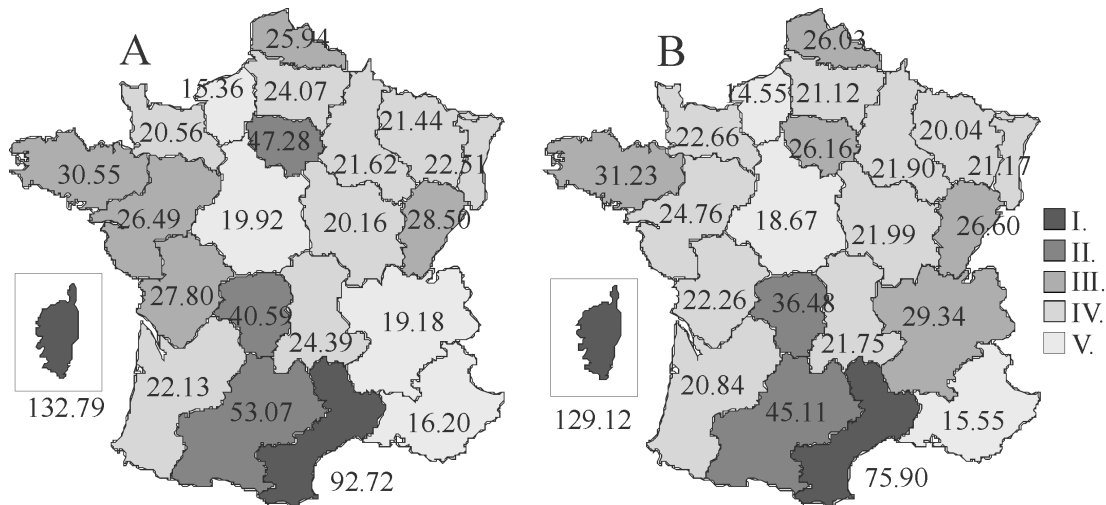
**Fig. 6.** Dynamics of changes in the number of students in urban academic centres in France by regions in the years 1998–2008

Explanation: growth rate: A – >20%; B – 0% to –20%; C – –20% to 0%; D – < –20%

Source: Authors' own work based on Atlas régional: les effectifs d'étudiants

Further studies concentrated on defining the educational potential in relation to the demographic potential of regions and UACs (Frémont et al., 1992; Baron, 2005). In 1999 the indicator of the number of students per 1,000 population of a region ranged from 53.1 in the Paris Region to 18.2 in Corsica. The largest number of students per 1,000 population was recorded in the Region of the Central Pyrenees (43.8), the Rhône-Alpe Region (37.9), the North Region (37.7), and Languedoc (37.6). The lowest values of this indicator were recorded in Picardy (20.5), the Region of Provence and the French Riviera (23.0) and in Burgundy (23.9). By 2008 the values of the indicator had not changed much. The largest changes were recorded in the regions of the highest values of the indicator, where they insignificantly dropped: in the Region of the Central Pyrenees (by 3.4 pp.), Languedoc (by 3.2 pp.) and in the Paris Region (by 2.6 pp.).

In the regions of low values of the indicators the changes were not so clear. The largest growth of the indicator value was recorded in the Region of Provence and the French Riviera (by 8.5 pp.) and Brittany (by 2.4 pp.). Generally, in eight regions the indicator's value increased, while the other regions



**Fig. 7.** Average number of students per 1,000 inhabitants of urban academic centres in 1998 and 2008

Explanation: A – 1999; B – 2008; I – > 55; II – 35-55; III – 25-35; IV – 20-25; V – < 20

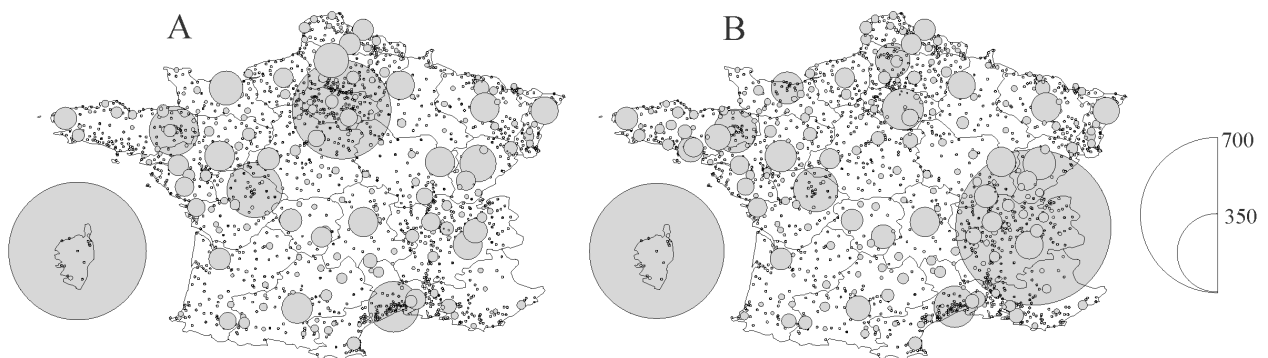
Source: Authors’ own work based on Atlas régional: les effectifs d’étudiants

witnessed an insignificant decrease. The highest indicator of the number of students per 1,000 inhabitants of a given region is recorded in South France as well as highly developed regions in the north. In the study period the number of students per 1,000 of urban population was highest in Corsica (about 130), followed by Languedoc, while the lowest was found in Upper Normandy as well as in Provence and the French Riviera (less than 20). Such a distribution is influenced by the density of settlements and the level of urbanisation (Fig. 7).

The high growth of students in Corsica and the Languedoc region is mainly caused by the increase of university students and engineering schools and

the professional degrees of university students with a low participation of students of technical studies (Baron et al 2003). This situation is typical for regions with low levels of economic development (such as overseas regions of France). This confirms the need for specialised analysis undertaken by the students (Les effectifs d’étudiants dans le supérieur en 2010). Also, high rates of southern France are related to a high proportion of foreign students (Teissier et al., 2004).

In terms of its spatial distribution, the highest level of the above indicator was recorded in the south and west of the country, while the lowest in South-East France (Fig. 8). The researched period of



**Fig. 8.** Number of students per 1,000 inhabitants of urban academic centres in 1998 and 2008

Explanation: A – 1999; B – 2008

Source: Authors’ own work based on Atlas régional: les effectifs d’étudiants



time showed the largest increase in the Rhône-Alpe Region (from 19 up to 29), while the largest decrease was found in the Paris Region (from 47 down to 26). The largest number of students per 1,000 citizens is recorded in the town of Corte in Corsica, in Paris and in the town of Le Bourget-du-Lac in the Rhône-Alpe Region. Most of the regions recorded a drop in the value of the indicator; the largest drop being found in the Paris Region (by about 45%) and in Languedoc (by 18%), where this value had been very high, as well as in Poitou-Charentes (20%) and in the Central Pyrenees (15%).

The increase of students in towns is a result of decentralisation of universities and research institutions in remote areas. The area of Savoie Technolac creating innovation clusters connecting five universities (including University of Savoie with its twenty research laboratories), twelve great scientific and technical institutions (e.g. National Institute for solar energy), and approximately 230 innovative companies can be an example. This confirms the strong relationship of science with technological and economic development of a region (Champ et al., 2001).

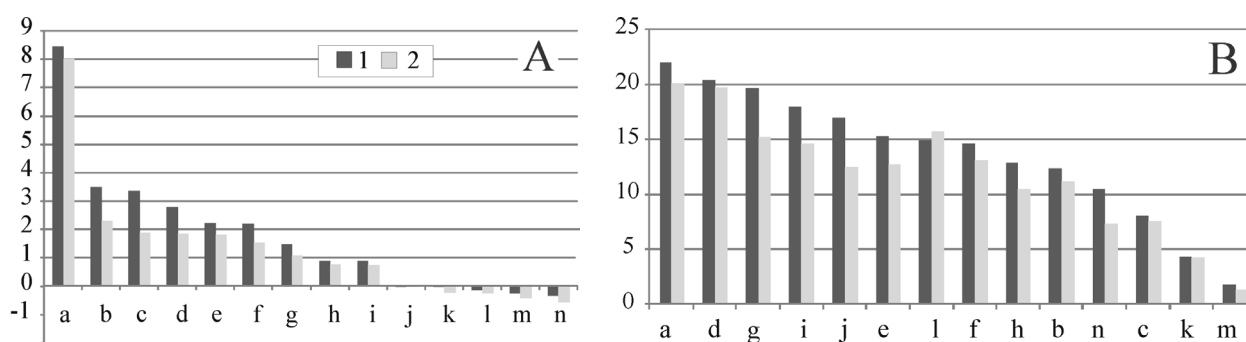
Generally, in all the regions besides the Central one and the Region of Franche-Comté, an increase in the number of both students and urban dwellers was recorded. However, as the dynamics of the growth was slower than earlier, the value of the indicator decreased. Comparing this data with the indicator of the number of students per 1,000 inhabitants in the regions it transpired that the indicator showed less significant decreases than the urban population. This means that the dynamics of the population change in rural areas was lower. The analysis of the share of

students by the size of towns and cities indicates that the largest one is recorded in the cities over 200 thousand inhabitants. If expressed per 1,000 citizens the highest percentage represent those studying in cities of 200–500 thousand.

### 3.4. Regional differentiation of types of higher education institutions

The value of the indicator which shows the concentration of the HE institutions remains low for all the types of them and shows the highest concentration of the *Grandes écoles* in the regions, followed by private and technological institutions (Fig. 9A). In the study period a low concentration of HE institutions was observed as well as a more and more even distribution of all types of HE in urban academic centres.

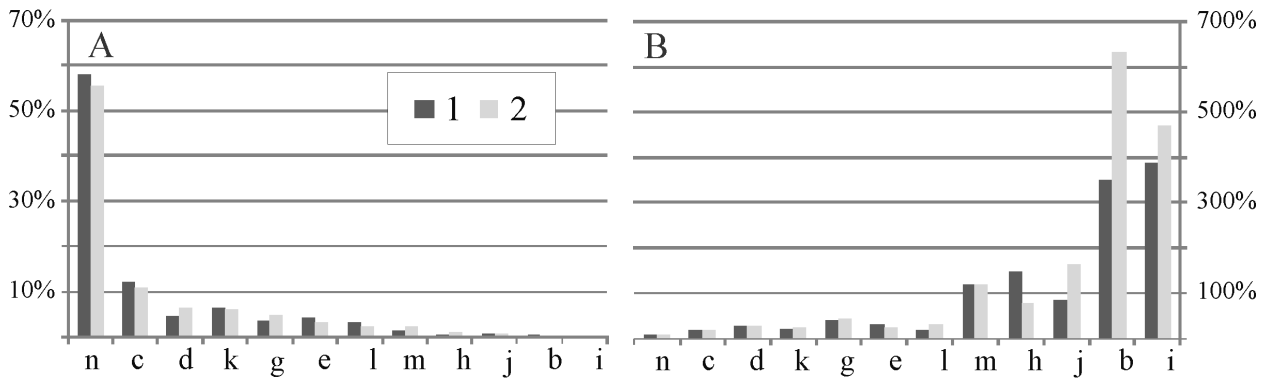
The value of the concentration indicator regarding the number of students is much higher than in the case of HE institutions. As before, the highest concentration in towns and cities of the individual regions refers to the *Grandes écoles* students, followed by the students of medical and engineering institutions, while the lowest refers to the students of economic and trade school, University Institutes of Technology and technological HE institutions (Fig. 9B). These values confirm the concentration of universities that have the greatest impact on the development of high technology sectors. This is confirmed by the dynamics of participation agreements between universities and companies with the primacy of the leading major universities of France in spite of the increase of activities of peripheries (Grossetti, Nguyen, 2001).



**Fig. 9.** Concentration indicator of individual HE institution types (A) and concentration indicator of the number of students of individual HE institution types (B)

Explanation: 1 – 1999; 2 – 2008; a – ENS; b – private; c – STS; d – medical; e – IUFM; f – all types; g – engineering; h – others; i – law and administration; j – art; k – IUT; l – CPGE; m – economic and trade; n – universities

Source: Authors' own work based on Atlas régional: les effectifs d'étudiants



**Fig. 10.** Change the value of the average proportion of students in the type of HE institutions by regions (A) and the coefficient of variation by regions (B) in 1998 and 2008

Explanation: 1 – 1999; 2 – 2008; b – private; c – STS; d – medical; e – IUFM; f – all types; g – engineering; h – others; i – law and administration; j – art; k – IUT; l – CPGE; m – economic and trade; n – universities

Source: Authors' own work based on Atlas régional: les effectifs d'étudiants

The average share of the number of students in the structure of HE institutions was recorded in the Paris Region and in the Rhône-Alpe Region, while the highest increase (over 25%) was recorded in Central France, especially in the Central Region and in Auvergne. The highest mean share in the regions is recorded by universities (about 55%), followed by technical HE institutions (about 10%) (Fig. 10). The share of other HE institution types is much lower. The largest diversity of this share in the regions refers to law and administration as well as private HE institutions. During the study period the diversity in this type grew. The least diverse is the share of universities which are evenly distributed within the regions.

In the next part of the research it was investigated whether there exists a specific regional speciality by types of HE institutions and how the number of these institutions changed. The largest dynamics was shown by *Grandes écoles*, which are rather sporadic in regions, followed by other and private HE institutions. The number of other types of HE institutions did not change a great deal. The number of *Grandes écoles* grew in the Rhône-Alpe Region. Moreover, such HE schools appeared in Brittany, the Region of Provence and the French Riviera, the Central Pyrenees and Lorraine. The most intensive growth in other HE institutions was recorded in the Central Pyrenees (by 500%), Burgundy (by 400%) and Languedoc (by 300%). The largest increase in the number of universities appeared in Lower Normandy, Brittany and Franche-Comté, while of engineering HE institutions and IUFM in Brittany and Franche-Comté as well as in Burgundy and Lorraine. The private HE

institutions showed the largest dynamics of growth in the Rhône-Alpe Region, in the North Regions and in Brittany. The number of law and administration as well as technical HE institutions was relatively stable and showed a very insignificant growth in the regions. The number of University Institutes of Technology, as well as art and medical HE institutions, on the other hand, decreased in some regions in East France. Similarly, the number of preparatory courses and economic and trade schools in the regions fell.

#### 4. Conclusions

Considering the results of the research it can be concluded that the potential of urban academic centres in France in terms of the number of HE institutions is not much diversified, the network of the HE institutions remains spread evenly, and the dominant role in terms of the number of students is held by Paris (Canals et al., 2006). In the studied years the process of levelling the disproportions in the educational potential by regions and UACs was recorded (Milard, 2004a; Grossetti, Milard, 2011). According to the analysis of specialisation in higher education in the years 1986–2001 conducted by Baron (Baron et al., 2003) in regional specialisation of France, except of a clear decline in Paris region, the southern regions and Lower Normandy can be distinguished. In the rest the decrease of specialisation in STS and IUT is not so clear. The decentralisation process is also confirmed by a decrease of concentration of universities in Paris (Baron, Berroir, 2007).

Additionally, there is no clear regional specificity in terms of the types of HE institutions. It can be concluded, thus, that the activities aiming at levelling the level of the socio-economic development and competitiveness of the regions through the increasing quality of human capital have resulted in an even distribution of urban centres of higher education.

## Notes

- (1) The value of the synthetic measure of quality of human capital in the EU ranges from 1.8 in Romania to 5.4 in Denmark, 3.9 for France, and 2.9 for Poland. In NUTS 2 regions in the EU the value of the synthetic measure ranges from 0.20 for East Storebaelt in Denmark to 2.2 Mellersta Norrland in Sweden. The highest values of the meter in France are characterised by the regions of Ile de France 1.0, Alsace 0.9 and the Rhône-Alpe 0.8 and the lowest 0.3 Corse, Champagne-Ardenne Limousin 0.4 and 0.5. For comparison, in Poland, the value of the meter ranges from 0.2 in Warmińsko-Mazurskie to 0.6 in Mazowieckie voivodship.
- (2) In France the employment indicator in the HT sector is 5.9%, while in the services highly saturated with knowledge 36.9%; the EU average in those terms is, respectively, 6.6% and 32.8%. Similarly, considering the HDI index of 0.884, France takes a high fourth position in EU, right after Ireland, Sweden and the Netherlands. For comparison, for Poland these indicators are respectively 5.1%, 24.7% and 0.813.
- (3) In 2006, the European Union universities educated 18.7 million students (since 1998 their number has increased by 25%), i.e. 17% of learners at all levels of education. The participation of students in the total number of learners in the individual EU countries was uneven and at an average of 17.4%, for France was 14.7%, and for comparison, in Poland 22.6% (Borowiec, 2011).
- (4) The changes in distribution, structure and accessibility of higher education in Poland were analysed by Bajerski (2009).

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