5 THE IMPACT OF ACCESSION TO THE EUROPEAN UNION ON PERCEPTIONS RELATED TO BUSINESS RISKS IN CENTRAL AND EASTERN EUROPE. A DISTANCE-TYPE ANALYSIS[1]

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Abstract

The purpose of this paper is to investigate the impact of 2004 accession to the European Union on perceptions related to business risks in Central and Eastern European countries. The investigation makes use of the data provided by the Regular Reports on Global Competitiveness published annually by the World Economic Forum. Methodologically, our analysis requires the estimation of an average for the core of 15 member states of the European Union (EU 15) for each individual pillar considered to describe properly the business environment. In doing so, it is possible to measure the convergence – in terms of a distance-type analysis – of the new member states with the average of EU 15, prior and after the accession, comparatively. In addition, based on a k-means clustering technique, we investigate similarities between the same countries, as well as the convergence of different groups of countries with the group which contains this average.

Keywords: business risk, convergence, clusters, Eastern European Enlargement

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1. Overview

The present study is focused on the qualitative analysis of the impact of 2004 accession to the European Union of Central and Eastern European countries on the perceptions on business risk of the managers from these countries. We used a k-means clustering technique in order to notice the evolution of similarities and dissimilarities in the perceptions of managers about risks. We also used direct Euclidian distances for measuring the convergence and divergence between different countries from this group and the average of 15 core member states of European Union (EU 15). These instruments allow us to make both qualitative (in the first case) and quantitative (in the second case) analyses regarding the evolution of distances between a group of countries (the new member states) against another group of countries (that contains the average of EU 15) and also to assess the way different countries are grouped, according to the chosen survey variables. The periods of pre-accession (two years, 2003 and 2004) and post-accession (two years, 2005 and 2006) were both taken into consideration in the analysis. When computing the EU average, only the original 15 states were taken into consideration. In order to analyze the manner in which the EU accession had an impact at a microeconomic level on the perceptions on risks, we used the World Economic Forum (WEF) reports, "The Global Competitiveness Report", edited by Klauss Schwabb (WEF) and Michael Porter (Harvard University)[1].

2. Research methodology

The main purpose of cluster based models is to reduce the quantity of required data by grouping them by similarities. This method of data grouping, by using clustering algorithms, was initially created as an automatic instrument that could allow organizing the information by taking into consideration different categories and taxonomies [Jardine and Sibson, 1971[2] or Sneath and Sokal, 1973[3]]. The models based on clustering algorithms were divided into two main categories: hierarchical and partitioned clustering methods [Anderberg, 1973[4], Hartigan, 1975[5], Jain and Dubes, 1988[6] or Jardine and Sibson, 1971[7]]. For each category, different other clustering algorithms have been discovered [Tryon and Bailey, 1973[8], Kolliopoulos and Rao, 1999, Kumar and Sen, 2004, Bădoiu, Har-Peled and Indyk, 2002].

[1] *2004 is considered a pre-accession year (accession took place in May 2004) given the fact that data for annual reports are collected until May and reflected the period up to that moment.*
[2] *See: Jardine, N. and Sibson, R. (1971)* Mathematical Taxonomy*. Wiley, London.*
[3] *See: Sneath, P. H. A. and Sokal, R. R. (1973)* Numerical Taxonomy*. Freeman, San Francisco, CA.*
[4] *See: Anderberg, M. R. (1973)* Cluster Analysis for Applications*. Academic Press, New York, NY.*
[5] *See: Hartigan, J. (1975)* Clustering Algorithms*. Wiley, New York, NY.*
[6] *See: Anil K Jain, R.C. Dubes (1988),* Algorithms For Clustering Data*, Prentice Hall, New Jersey.*
[7] *Idem 3*
[8] *See: Tryon, R. C. and Bailey, D. E. (1973)* Cluster Analysis*. McGraw-Hill, New York, NY.*

Clustering based on k-means has its roots in a model proposed by McQueen (1967)[1] and is considered the simplest clustering algorithm. The procedure is relatively simple to put into practice on a set of data applied to a definite number of clusters (equal to k) a priori fixed. The starting point is the establishment, given a previous analysis, of a number of k centroids corresponding to the number of initially established clusters. The most important advantage of this clustering method consists in its simplicity and rapidity and in the fact that could be applied on an important volume of data. The main disadvantage of the method is the fact that the initial clusters' number is randomly established, without a specific method that could indicate the optimal number of clusters[2]. Another problem is related to the difficulty in giving an appropriate interpretation to the results (a higher significance has the using of this method comes from an inter-temporal comparison). This clustering method minimizes the standard deviation inside of each cluster but does not provide a minimum variance at the level of considered sample of data.

The computed centroids will consequently change their position, step by step, until there is no move left to be made and their position is fixed on the graph. The methodology assumes the maximization of an objective function based on a standard deviation function, such as:

$$J = \sum_{j=1}^{k} \sum_{i=1}^{n} \left\| x_i^{(j)} - c_j \right\|^2$$

where: $\left\| x_i^{(j)} - c_j \right\|^2$ is a distance measured between each $x_i^{(j)}$ country and the center of each cluster c_j. This objective function has been developed in the case of more advanced k-means clustering methods that supposed minimizing the squared error vector of distances between individuals and centroids [Gersho, 1979[3], Gray, 1984[4], Makhoul *et al.,* 1985[5], Moore, 2001, Har-Peled and Kushal, 2004[6]].

The algorithm we used in the case of k-means clustering analysis demands the following steps:

1. Selection of a specific multi-annual time series of data about relevant countries for the current analysis;

2. The analysis of a specific number of pillars considered to be relevant for the perceptions of managers towards the business risks they are facing;

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[1] *See: J. B. MacQueen (1967): "Some Methods for classification and Analysis of Multivariate Observations", Proceedings of 5-th Berkeley Symposium on Mathematical Statistics and Probability, Berkeley, University of California Press, 1:281-297*

[2] *Har-Peled, S. and Mazumdar, S. (2004), "Coresets for k-means and k-median clustering and their applications", Proceedings 36th Annual ACM Symposium Theory Computation, pages 291–300.*

[3] *See: Gersho, A. (1979) "Asymptotically optimal block quantization". IEEE Transactions on Information Theory, 25:373-380.*

[4] *See: Gray, R. M. (1984) "Vector quantization".* IEEE ASSP Magazine*, April, pages 4-29.*

[5] *See: Makhoul, J., Roucos, S., and Gish, H. (1985) "Vector quantization in speech coding". Proceedings of the IEEE, 73:1551-1588.*

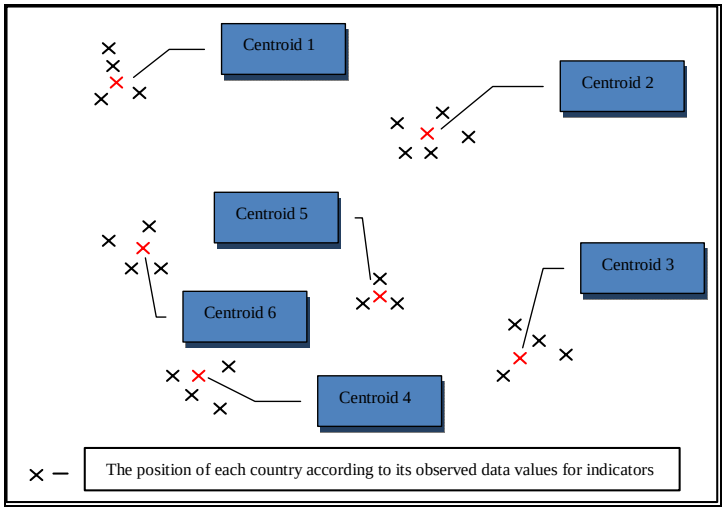
[6] *See: Har-Peled, S. and Kushal, A. (2004), "Smaller coresets for k-median and k-means clustering", http://www.uiuc.edu/~sariel/papers/04/small coreset/.*

3. Finding the number of optimal clusters by testing the data sample with k=5, k=4 and k=6. In our case, we concluded that the best results were obtained with a value of k=6.

4. The determination of centroids for each cluster (See Figure 1);

Figure 1

Plotting of centroids according to the k-means clustering technique

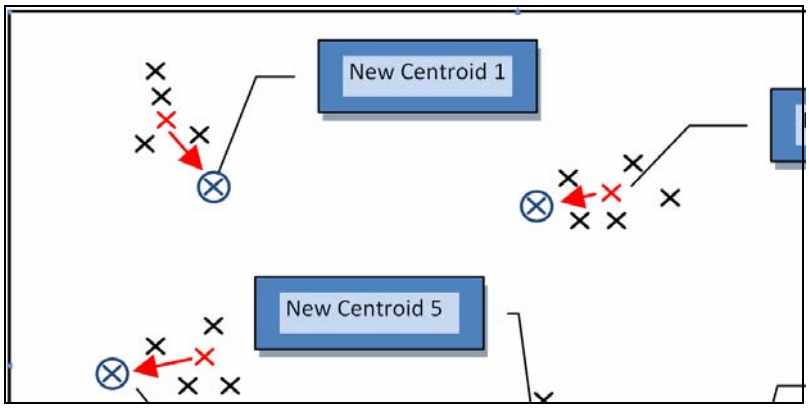


5. The inclusion of each country in the closest centroid;

6. The repositioning of centroids and countries after each iteration (see Figure 2);

Figure 2

Repositioning the countries to the new centroids



7. Following this preliminary grouping, the coordinates of centre is recalculated and, as a consequence, the repositioning of the k established clusters in the first process

occurs, leading to a repositioning of the countries according to the new centers. Therefore, a country dynamics is generated ("a loop");

8. The iteration process is repeated until the positions of assessed countries remain stable inside the clusters. In the end, we determine the coordinates of each centroid, the distances between centroids and the distance between each country and the centre of its centroid.

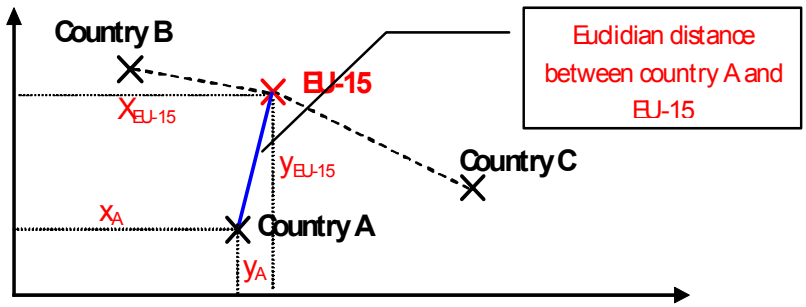
In the analysis, the individuals were represented by the 23 EU member states (15 original countries and 8 new member states from the 2004 enlargement). The number of clusters – k – was established at 6, taking into account the number of individuals and survey variables associated with each pillar. The number of iterations was established at 10. In this way, we were able to determine the similarities and links that exist between different European states, as well as the manner in which the accession to the EU affected this grouping of states through the perceptions of managers on the business environment associated with each pillar from the "Global Competitiveness Report".

On the other hand, there are a lot of methods used to calculate the distance between two points of a multi-dimensional space, in order to assess the convergence between two or more individuals (in our case, countries). The most used distances in convergence analysis are[1]: Euclidian distance, "City Block" (Manhattan) distance, Cebyshev distance, Minkowski of order "m" distance, Quadratic distance, Canberra distance, Pearson correlation coefficient, Squared Pearson correlation coefficient.

Taking into consideration the specific of our analysis (the data used in analysis are scores determined on a scale between 1 and 7 for different survey variables), we decided to use Euclidian distance for measuring the distance between different countries and the EU15 average. The Euclidian distance is the shortest distance between two points in a multidimensional space being equal with the length of the line that connects these two points:

Figure 3

Computation of Euclidian distances



[1] *Andrew R. Webb,* Statistical Pattern Recognition*, 2nd Ed., 2002, John Wiley and Sons Ltd, pp. 170.*

In the plane space (with only two dimensions) the Euclidian distance is equal to the distance between two points A(x1, y1) and B(x2, y2) obtained by applying the Pythagoras theorem[1]:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} .$$

The Euclidian distance in a space with three dimensions between the points A(x_1, y_1, z_1) and B(x_2, y_2, z_2) is obtained by a similar method as in the previous case:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2} .$$

Generalizing, the Euclidian distance between two points in a space with "n" dimensions will be obtained with the following formula:

$$d = |\mathbf{x} - \mathbf{y}| = \sqrt{\sum_{i=1}^{n} |x_i - y_i|^2} .$$

The Euclidian distance for curve shapes and spaces is more difficult to determine. The meaning of distance in economic literature is "the shortest distance between two points". If the points are placed inside of a sphere, for instance, there will be different ways to connect these two points through a line, but the "distance" will be only the shortest line.

The Euclidian distances measures the impact of EU Eastern enlargement on the convergence between Eastern countries acceding in 2004 and EU15 estimated average in terms of perceptions of managers on the risks associated with business environment. This Euclidian distance was calculated for each country for the 4 years period on the six pillars of indicators considered representative for our analysis. In the analysis, the space dimension is calculated according with the associated survey variables (indicators) for each pillar. We considered that any reduction of the Euclidian distance between the new member states and EU15 average reflects a higher convergence in terms of risks associated to the business environment from these countries (as the risks are perceived by local managers).

3. Data used in the analysis

The available data were grouped into six pillars:

- **Pillar I:** "**Macroeconomic Environment**" with 9 survey variables;
- **Pillar II:** "**Human Resources: Education, Health and Labor**" with 7 survey variables;
- **Pillar III:** "**Infrastructure**" with 6 survey variables;
- **Pillar IV:** "**Public Institutions: Contracts and Law**" with 14 survey variables;
- **Pillar V:** "**Domestic Competition**" with 5 survey variables;
- **Pillar VI:** "**Company Operations and Strategy**" with 23 survey variables.

The survey variables describing these categories were analyzed by associating scores from 1 to 7 (1, very bad and 7, very good) obtained by using a survey of a representative group of managers from the sampled countries.

[1] *Weisstein, Eric W. "Distance." From MathWorld - A Wolfram Web Resource. Resource Internet; http://mathworld.wolfram.com/Distance.html*

The average scores of the oldest fifteen European Union members (EU15) were computed as a weighted average. We used the weight of each member state in the EU15 Gross Domestic Product, for each computing year.

Even though other weighing possibilities were also available (e.g. the number of companies from each member country in the total number of companies at European level) there were strong counterarguments (such as the weak relevance of the number of companies in a country for the dimension and the quality of the business environment) that determined the optimum choice to be the GDP weight. We used official EU statistics, EUROSTAT, the National Accounts, Gross Domestic Product at Market Prices (millions of euro) for each EU15 member country, for the period 2003-2006 (including).

4. Results

Following the application of the above mentioned k-means clustering methodology as well as Euclidian distances for each of the six analyzed pillars we obtained a wide range of specific results. The following sections present in detail the dynamics of clusters and distances during the four analyzed years for each of the six pillars.

4.1. Pillar I: "Macroeconomic Environment"

The clusters' evolution over the 2003–2006 period for the first pillar is presented in Annex 2, and our analysis produced the following findings:

- We first notice the existence of relatively stable clusters of homogenous countries. The first cluster is formed by Finland, Denmark, Luxemburg, Sweden and Ireland and is surprisingly completed by Estonia, a new member country. Another relatively stable cluster is formed by Portugal, Spain, Austria, Belgium and Germany, sometimes including also France.
- The majority of the new member states from the 2004 Eastern enlargement seem to group in different clusters than the original European countries. The only exception is Estonia that tends to follow the group of Scandinavian countries.
- None of the countries joining the EU in 2004 belongs to the cluster of the EU15 average, a proof of the fact that the development gap existing in the pre-accession period could not be overcame in the first two years after the accession. Moreover, each of the 8 new member states is included in a cluster that shows a high volatility, and even a divergent tendency as compared to the cluster containing the EU15 average. The only exception is the Czech Republic, which is included in clusters showing a strong convergence tendency towards the average EU15.
- Considering the Euclidian distances computed the countries' accession did not represent a moment of significant change in trends. If 2005 was for only two countries a period of discontinuity (Poland and Lithuania deviating from the EU15 average), 2006 seemed not to have any significant impact on the majority of new member countries (six, out of eight), which continued their previous evolution.
- Our conclusion for the Euclidian distances analysis is that the conditionality required by the EU accession determined a convergence process that started long before the period we analyzed.

4.2. Pillar II: "Human Resources: Education, Health and Labor"

For the second pillar "Human Resources: Education, Health and Labor" the clusters' evolution is presented in Annex 3. Considering the cluster analysis, we found the followings:

- The most stable cluster contains the EU15 average together with United Kingdom, Sweden, Luxembourg, and Germany. Spain and Austria frequently join and, as an exception, Estonia and Slovenia in 2004.
- The group formed by France and Czech Republic to which Austria, Hungary, Ireland and Estonia frequently attach, is relatively stable. In 2004 and 2006 Poland formed a cluster by itself, registering evolutions that are not comparable to any of the countries analyzed; in 2003 and 2005 it formed groups with Lithuania and Latvia. Lithuania, Latvia, Slovenia and Slovakia are connected in three years out of four in the same cluster.
- Estonia and Slovenia show the highest convergence with the EU15 average for three years, grouping in clusters with the smallest distance to the EU15 average, and in 2004 in the cluster containing the EU15 average. After the accession, the two countries have a different evolution, Estonia's cluster is getting closer to the EU15 and Slovenia's deviates form the EU15 average.
- Hungary and Czech Republic clusters are constant in time with respect to the EU15 average.

The Euclidian distances analysis proved the heterogeneity of this category and the fact that the accession moment is not conclusive for determining a convergence tendency with the EU15 average for the great majority of the analyzed countries. We can conclude that, for this pillar, for the eight analyzed countries the EU accession did not represent a significant change in the convergence towards the EU15 trend. Except for Poland and Slovakia, the other countries begin at small distances from the EU15 average, are deviating in the next two years and in 2006 show a slight recovery, with different rhythms for each of them.

4.3. Pillar III: "Infrastructure"

For the third pillar, "Infrastructure", one may observe a dynamic cluster evolution in 2003 – 2006, as shown in Annex 4. The analysis leads to the following conclusions:

- First of all, we noticed the existence of a relatively stable cluster, respectively of some infrastructure homogenous countries. This would be the cluster of France, Germany, Denmark, Finland, and Netherlands, to which Belgium and Sweden frequently adhere. Another relatively stable cluster is formed by Austria, United Kingdom and Luxembourg;
- It is interesting to notice that Sweden is the country that finds itself every year in the EU15 average cluster. In Annex 4, we can observe that the EU15 core member states average experiences, at its turn, a significant volatility.
- In other words, we can assume that the enlargement process had a significant impact even on the fifteen EU member states, repositioning the European Union average. In the cluster that the EU15 average belongs to, the number of countries decreases after the accession moment: from 7 in 2003 and 2004

(remarkably, the same countries) to 4 in 2005 and 5 in 2006. Such an evolution can suggest an increase in this pillar's heterogeneity at the level of the European Union member countries and not a convergence, as the integration theories would suggest. The same thing is confirmed also by the clusters distances' average as compared to the EU 15 average cluster, which experiences a contradictory and volatile evolution.

The countries acceding to the EU in 2004 seem to have a coherent evolution. Thus:

- In the years that preceded the accession moment, the smaller among the Central and Eastern European states (Czech Republic, Latvia, Lithuania, Estonia, Slovenia) showed a higher homogeneity with the least developed countries of the European Union (Portugal, Spain) rather than with the other countries included in the same 2004 Eastern enlargement process (Hungary, Poland or Slovakia). The latter were so different from the rest of the other Central and Eastern European new member countries so that they were in a position to form their own cluster (Hungary and Poland). There is even one case of a Central and Eastern European country that does not resemble any other country of the 2004 enlargement process (Slovakia). After the EU accession, Hungary, Lithuania and Slovakia form their own cluster. Poland seems to converge toward other major countries of the EU, such as Italy. Estonia and Slovenia seem to have consistently caught up with the least developed countries of the European Union, grouping constantly with Portugal and Greece.
- None of the countries that joined the EU in 2004 is grouped in the cluster that includes the EU15 average. Anyway, each of the eight countries from the 2004 enlargement is included in a cluster that shows a visible convergence tendency towards the EU15 average cluster.

Considering the "Distances from the EU15 average" indicator, the 2004 Eastern Enlargement does not represent a moment of radical changes in the trends, by which these countries' convergence to the EU15 average to be shown evidently. If in 2005 only two countries deviate from the EU15 average (Estonia and Slovakia), 2006 seems to show for the majority of new member countries (five out of eight, excepting Slovakia, Estonia and Latvia) a deviation from the European average, thus a divergence in this pillar's evolution. Paradoxically, almost the same countries that in the first year after the accession seem to have an evolution opposed to the EU15 average are the same that in the second year after the accession seem to show the strongest convergence tendency. The same contradiction is valid, in reverse, for the other countries.

4.4. Pillar IV: "Public Institutions: Contracts and Law"

The fourth pillar IV: "Public Institutions: Contracts and Law" recorded a particular evolution for the clusters, presented in Annex 5.

One may notice the existence of some relatively stable clusters, respectively of some homogenous countries, in terms of the legal environment characteristics. In this respect, it is worth mentioning the cluster formed by: Czech Republic, Poland, Lithuania (during the entire analyzed period) and also Slovakia (2003 and 2006), and Latvia (2004 and 2005). This cluster is composed of countries that belong to the 2004 enlargement, a fact which proves the homogeneity of these countries, from this pillar's analysis perspective. Another relatively stable cluster is formed by Portugal, Greece, Hungary and Slovenia. One may notice the fact that Hungary and Slovenia are relatively close, from the legal

environment point of view, to Portugal and Greece. Austria, Germany, and Finland polarize around them countries like the Netherlands, France, Denmark and Sweden. Estonia is an interesting case, because in 2004 we can find it in the EU15 average cluster. The analysis of Euclidian distances evolution between 2004 Eastern enlargement countries and EU-15 average shows the followings:
All the above-mentioned findings indicate that the 2004 Eastern Enlargement did not significantly modify the existing trends. There are some explanations in this respect, namely: firstly, the managers' perceptions on the business environment were not identical: some of them shared too conservative expectations, while others shared too enthusiastic ones; secondly, the transition period in all of these countries proved eventually to be a difficult process, particularly in respect of the proper understanding of the role the property rights and its associated claims and duties is supposed to play in a free-market economy; thirdly, a unitary legal system is still missing in the 2004 Eastern enlargement countries and in the EU15 core member states alike.

4.5. Pillar V: "Domestic Competition"

For this pillar, the different clusters' evolution is presented in Annex 6. In this respect, the 2004 new member states seem to follow a quite coherent development. During the pre-accession years, the most developed of these countries (Hungary, Czech Republic, Poland, Lithuania, Slovenia, Slovakia) showed a higher homogeneity with the least developed EU member states (Greece in particular), rather than with the other countries included in the 2004 enlargement process (namely Latvia and Estonia, countries that were in the same cluster with Portugal). At the same time, it is worth mentioning that prior to the 2004 enlargement all the EU 8 Central and Eastern European new member states were grouped together within two individual clusters only. However, in the post–accession period this state of coherence breaks down, as the new member countries were grouped within much more clusters.

The computed Euclidian distances between the 2004 Eastern enlargement countries and the EU15 core member states average offer the finding that there are some countries (Slovenia, Latvia, and Hungary) that, during the entire period of time covered by this analysis, showed a constant divergent trend, as the distance between each of these countries and the EU15 average increased all along the mentioned period. Some other countries (Poland, Lithuania and Estonia) displayed an extremely high volatile evolution; nevertheless, it cannot be qualified either as a convergent trend, or as a divergent one.

4.6 Pillar VI: "Company Operations and Strategy"

It can be said that this pillar is the most consistent among all the others in terms of the survey variables that describe it. The dynamics of the clusters' developments within this pillar is presented in Annex 7.

Probably one of the key ideas that can be drawn in relation to this pillar is that our cluster-based analysis using k-means method provided a more accurate investigation of the convergence dynamics within the 2004 accession group of countries. Other major conclusions are as follows: the EU15 core member states average moved in a relatively stable manner, being included in the same cluster with France and then Belgium, during the entire analyzed period; the 2004 accession countries have shown a quite visible homogeneity. As a rule, they grouped together into a common cluster for the whole

analyzed period (except for Slovenia); the cluster which contains most of the Central and Eastern European countries does not include, in any of the analyzed years, the EU15 core member states average; Slovenia is the only Central and Eastern European country that showed a different development as it shared a lot of common characteristics with Spain and Italy; a radical change occurred in the case of Poland. This country left the Central and Eastern European countries cluster and joined the cluster including the Southern European countries like Spain, Portugal, and Greece.

On the other hand, the analysis of the distances' average indicates that, although there is a visible homogeneity of the 2004 new member states (their EU accession having as a result the speeding up of the convergence pace), one can notice a quite significant impact on the European countries.

The cluster which contains the Central and Eastern European countries (third cluster in 2003 and 2004; second cluster in 2005; and third cluster in 2006) have got every year nearer to EU15 core member states average (except for the first post–accession year when a slight divergence was registered). On the average, during the period 2003–2006, the distance between the cluster containing Central and Eastern European countries and the one containing the EU15 core member states average has reduced (this fact indicates an obvious convergence of the entire group of countries and, implicitly, a decrease in the risks perceived).

For this pillar, the distance-type analysis undertaken has led to the following findings: there are some specific factors that explain the overall positive developments related to the managers' perceptions on the issues concerning the company operations and strategy. Among these factors we can mention: the spillover effect generated by the foreign direct investments on the improvement of the managerial and marketing corporate practices; a larger access to the external markets; an improved modified perception on the operating of markets; more protection offered and motivation induced for the minority shareholders; an increased export capacity; and successful training of professionalized managers.

5. Concluding remarks

The concluding remarks we can draw from the above analysis are:

I. In the case of the "Macroeconomic Environment" pillar, the majority of Central and Eastern European states seem to be clustering in groups that are strongly differentiated from the rest of the European countries. In terms of the distances analysis, EU accession marks a significant change, these countries' convergence to EU increasing considerably. Our conclusion on this pillar is that the countries from the 2004 Eastern enlargement tend to move towards the average of the EU15 but remain (as a group) strongly differentiated from the rest of the European countries.

II. For the pillar "Human Resources: Education, Health and Labor", in terms of the distances analysis, we found a divergence from the EU15 average before the accession, the next two years showing a distances volatility for the majority of these countries. Cluster based analysis reflects a strong heterogeneity of the pillar and the fact that the moment of accession is not relevant for the pattern of convergence towards the average of EU15 for the majority of the analyzed countries.

III. The analysis on the "Infrastructure" pillar demonstrated the fact that none of the countries that acceded to the European Union in 2004 belongs to the cluster that includes the average of EU15. However, each of the eight countries of the 2004 enlargement is included in a cluster that shows a visible convergence pattern (as distance) to the cluster that contains the EU15 average. For the pillar “Infrastructure”, in terms of distances analysis, the 2004 EU Eastern enlargement does not represent a significant change in the trends, thus the convergence does not become more visible. The conclusion regarding this pillar is that all the countries that joined the EU in 2004 show a convergence pattern with the EU15 average (both individually and collectively) but the accession moment has not a relevant impact on it.

IV. Regarding the "Public Institutions: Contracts and Law" pillar, we can notice the existence of relatively stable clusters, that is, of homogeneous clusters in what regards the legal environment both in the pre- and post-accession periods. We could also observe that the moment of accession reflected a significant volatility of the survey variables (analyzed both individually and collectively), in terms of the distances between clusters. The Euclidian distances analysis showed that for all the eight analyzed countries in the pre-accession period the convergence parameters were stable (for five of the countries the distances increased and for three it decreased), while in the post-accession period a high volatility of these distances was registered. Our conclusion is that the 2004 accession does not seem to have a consistent and clear impact on the evolution of this pillar.

V. The analysis made on the "Domestic Competition" pillar shows the fact that none of the new members of the European Union belongs to the cluster that includes the EU15 average. This can be considered a proof that the existing development gaps could not be recovered. Moreover, this analysis also reflects a visible pattern of divergence from the cluster which includes the EU15 average. The distance type analysis for the pillar “Domestic Competition” showed that, on the whole, the accession moment did not significantly change the trends. Moreover, the distances of the eight analyzed countries average is constantly deviating from the EU15 average for the entire period – thus we have a slight divergence for this pillar.

VI. The "Company Operations and Strategy" pillar shows a clear homogeneity both at the level of the 2004 new member countries and at the EU15 level; as well as the fact that the distance between the group of the eight Central and Eastern European countries and the one containing the EU15 average is significantly shrinking in the analyzed period. In conclusion, we appreciate that in the case of this pillar the accession moment has accelerated an already existing obvious pattern, both individually and collectively. In terms of distances analysis, the pillar "Company Operations and Strategy" shows a noticeable closeness to the EU15 average, both before and after the accession. The accession has accelerated the closeness rhythm for all the analyzed countries, thus we can say that the accession had a positive impact on their convergence.

Overall, the analysis performed on the level of the managers’ perceptions regarding the risks associated with the business environment in the European Union shows that the risks have increased after the 2004 accession moment for the factors related to the public institutions (contracts and law), human resources (education, health and labor) and domestic competition. They have slightly diminished for other factors

(macroeconomic environment and infrastructure). The risks' perception was slowly reduced in the case of the factors related to the companies' operations and strategies. This fact is more relevant as we take into consideration the fact that the companies' strategies represent the most important component of the business environment taken as a whole.

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ANNEX 1

Distances between European Countries and EU-15 average

Pillar I: "Macroeconomic Environment"/ Pillar II: "Human Resources: Education, Health and Labor"

	Pillar I				Pillar II			
	2003	**2004**	**2005**	**2006**	**2003**	**2004**	**2005**	**2006**
Hungary	2.484	2.638	2.095	2.293	0.794	0.933	1.166	0.854
Czech Rep.	4.095	3.466	2.947	2.970	0.529	0.985	1.342	1.245
Poland	2.881	3.390	2.186	3.243	1.852	3.843	2.324	3.217
Lithuania	3.027	2.766	2.575	2.659	0.529	1.849	2.184	1.673
Latvia	2.777	3.048	3.040	2.828	0.529	1.744	2.052	1.386
Estonia	2.938	2.154	2.131	2.095	0.265	0.911	1.187	1.311
Slovenia	2.800	3.111	2.615	2.780	0.265	0.332	0.917	0.843
Slovakia	3.648	3.740	3.615	3.599	1.852	1.453	1.510	1.288

Pillar III: "Infrastructure" / Pillar IV: "Public Institutions: Contracts and Law"

	Pillar III				Pillar IV			
	2003	**2004**	**2005**	**2006**	**2003**	**2004**	**2005**	**2006**
Hungary	5.259	4.831	3.919	4.036	3.129	3.805	3.286	3.644
Czech Rep.	3.262	2.668	2.356	2.985	4.801	4.637	4.190	4.593
Poland	4.861	5.934	4.568	5.319	5.654	7.327	4.956	5.996
Lithuania	3.461	3.296	3.248	3.373	4.905	5.162	5.301	5.185
Latvia	2.929	3.341	3.266	3.066	4.153	5.026	4.409	4.419
Estonia	2.439	2.284	2.577	2.408	2.514	2.198	3.051	2.267
Slovenia	2.980	2.787	2.345	2.982	3.211	3.419	3.309	3.486
Slovakia	5.093	4.191	4.249	3.837	5.693	7.658	4.809	4.169

Pillar V: "Domestic Competition" \ Pillar VI: "Company Operations and Strategy"

	Pillar V				Pillar VI			
	2003	**2004**	**2005**	**2006**	**2003**	**2004**	**2005**	**2006**
Hungary	1.939	1.944	2.371	2.619	6.570	6.550	5.665	5.248
Czech Rep.	1.562	2.005	1.908	1.546	6.175	5.959	4.441	4.371
Poland	2.035	2.983	2.324	2.903	6.655	6.962	6.150	6.551
Lithuania	1.913	1.449	3.122	2.893	6.790	5.795	5.952	5.353
Latvia	1.349	2.020	2.900	3.192	5.704	7.161	6.823	6.298
Estonia	1.170	1.166	2.152	1.841	6.603	6.086	5.725	5.338
Slovenia	1.543	1.584	1.965	2.025	4.746	4.548	4.032	4.490
Slovakia	2.128	2.285	3.081	2.447	7.064	6.679	6.728	6.566

ANNEX 2

Results Pillar I: "Macroeconomic Environment"

2003	2004	2005	2006
Austria Belgium Italy Portugal Spain	Austria Belgium EU15 France Germany Portugal Spain	Austria Belgium EU15 France Germany Netherlands Portugal Spain	Austria Belgium EU15 France Germany Portugal Spain
France Netherlands United Kingdom	United Kingdom	United Kingdom	Netherlands United Kingdom
EU15 Germany	Hungary Italy Poland	Estonia Hungary Lithuania Poland Slovenia	Italy Poland
Estonia Greece Hungary Latvia Lithuania Slovenia	Greece Lithuania	Czech Republic Greece Italy	Czech Republic Greece Hungary Latvia Lithuania Slovenia
Czech Republic Poland Slovakia	Czech Republic Latvia Slovakia Slovenia	Latvia Slovakia	Slovakia
Denmark Finland Ireland Luxembourg Sweden	Denmark Estonia Finland Ireland Luxembourg Netherlands Sweden	Denmark Finland Ireland Luxembourg Sweden	Denmark Estonia Finland Ireland Luxembourg Sweden

ANNEX 3

Results Pillar II: "Human Resources: Education, Health and Labor"

2003	2004	2005	2006
EU15 Luxembourg Netherlands Spain Sweden United Kingdom	Estonia EU15 Germany Luxembourg Slovenia Spain United Kingdom	Austria Denmark EU15 Germany Netherlands Sweden United Kingdom	Austria EU15 Germany Luxembourg Sweden United Kingdom
Germany Greece	Belgium Denmark Finland Netherlands	Greece Italy Luxembourg Portugal Spain	Belgium Denmark Finland Ireland Netherlands
Belgium Finland	Poland	Finland Ireland	Poland
Austria Czech Republic Denmark Estonia France Hungary Ireland Slovenia	Austria France Ireland Sweden	Belgium Czech Republic France	Czech Republic Estonia France Hungary
Italy Latvia Lithuania Poland Slovakia	Czech Republic Greece Hungary Latvia Lithuania Slovakia	Estonia Hungary Slovakia Slovenia	Italy Latvia Lithuania Slovakia Slovenia
Portugal	Italy Portugal	Latvia Lithuania Poland	Greece Portugal Spain

ANNEX 4

Results Pillar III: "Infrastructure"

2003	2004	2005	2006
Belgium Denmark EU15 Finland France Germany Netherlands Sweden	Belgium Denmark EU15 Finland France Germany Netherlands Sweden	Denmark Finland France Germany Netherlands	Belgium Denmark Finland France Germany Netherlands
Austria Luxembourg United Kingdom	Austria Czech Republic Luxembourg	Austria Belgium EU15 Sweden United Kingdom	Austria EU15 Luxembourg Spain Sweden United Kingdom
Czech Republic Estonia Italy Latvia Lithuania Portugal Slovenia Spain	Estonia Greece Portugal Slovenia Spain United Kingdom	Estonia Greece Ireland Portugal Slovenia Spain	Estonia Greece Latvia Portugal Slovenia
Greece Ireland	Ireland	Czech Republic Luxembourg	Ireland
Hungary Poland	Hungary Latvia Lithuania Slovakia	Hungary Italy Latvia Lithuania Poland	Czech Republic Hungary Lithuania Slovakia
Slovakia	Italy Poland	Slovakia	Italy Poland

ANNEX 5

Results Pillar IV: "Public Institutions: Contracts and Law"

2003	2004	2005	2006
Greece Hungary Ireland Portugal Slovenia	Greece Hungary Portugal Slovenia	Greece Hungary Portugal Slovenia	Greece Hungary Portugal Slovenia
Czech Republic Lithuania Poland Slovakia	Czech Republic Italy Latvia Lithuania Poland	Czech Republic Italy Latvia Lithuania Poland	Czech Republic Latvia Lithuania Poland Slovakia
Belgium Italy Latvia Spain	Belgium Estonia EU15 Spain	Estonia Slovakia Spain	Belgium Estonia Spain
Estonia France	Slovakia	Belgium EU15	Estonia Italy
Denmark Finland Luxembourg Sweden	Denmark France Ireland Luxembourg Netherlands Sweden United Kingdom	Ireland Luxembourg Netherlands United Kingdom	EU15 France Ireland Luxembourg Netherlands Sweden United Kingdom
Austria EU15 Germany Netherlands United Kingdom	Austria Finland Germany	Austria Denmark Finland France Germany Sweden	Austria Denmark Finland Germany

ANNEX 6

Results Pillar V: "Domestic Competition"

2003	2004	2005	2006
Austria Belgium EU15 France Ireland Italy Netherlands Spain	Austria Belgium EU15 Ireland	Denmark EU15 France Ireland Luxembourg Sweden	Austria France Germany Netherlands United Kingdom
Germany	Germany Netherlands United Kingdom	Austria Belgium Finland Germany Netherlands United Kingdom	Denmark Finland
Denmark Finland Sweden United Kingdom	Denmark Finland Sweden	Greece Italy Slovenia	Belgium EU15 Ireland Luxembourg Sweden
Czech Republic Greece Hungary Lithuania Poland Slovakia Slovenia	Czech Republic Greece Hungary Italy Latvia Lithuania Slovakia Slovenia Spain	 Spain	 Greece Italy Poland Slovenia Spain
Luxembourg	Poland	Hungary Latvia Lithuania Poland Slovakia	Estonia Latvia Lithuania
Estonia Latvia Portugal	Estonia Luxembourg Portugal	Czech Republic Estonia Portugal	Czech Republic Hungary Portugal Slovakia

ANNEX 7

Results Pillar VI: "Company Operations and Strategy"

2003	2004	2005	2006
EU15 France	Belgium EU15 France	Belgium EU15 France Germany Netherlands Sweden	Belgium EU15 France
Belgium Germany Netherlands Sweden	Finland Germany Netherlands Sweden	Estonia Hungary Latvia Lithuania Poland Slovakia	Greece Poland Portugal Spain
Czech Republic Estonia Greece Hungary Latvia Lithuania Poland Portugal Slovakia	Czech Republic Estonia Greece Hungary Latvia Lithuania Poland Portugal Slovakia	Austria Denmark Finland Ireland. United Kingdom	Czech Republic Estonia Hungary Latvia Lithuania Slovakia
Denmark Finland United Kingdom	Denmark United Kingdom	Luxembourg	Denmark Luxembourg United Kingdom
Austria Ireland. Luxembourg	Austria Ireland. Luxembourg	Czech Republic Greece Portugal Slovenia Spain	Austria Finland Germany Ireland. Netherlands Sweden
Italy Slovenia Spain	Italy Slovenia Spain	Italy	Italy Slovenia