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Objective Competitiveness Ranking amongst EU Regions (Objective Method for Quantifying Regional Competitiveness - a case study applied to EU15 Regions)

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TITLE: Objective Competitiveness Ranking amongst EU Regions
(Objective Method for Quantifying Regional Competitiveness: a case study applied to EU15 Regions)

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Summary:

The current key objective of cohesion policy is to promote the creation of conditions designed to improve growth and strengthen the factors that lead to real convergence (Economic and Social Cohesion).

A relevant grouping of such factors is discovered by considering the Competitiveness of Regions and the strengthening, of such competitiveness, despite the lack of a clear definition, implies a simultaneous study at two different levels: - the first is based on specific factors that upgrade the existing business fabric (Innovation, R+D, networking, labour markets, training, support for the use of advanced technology, services provided to companies, etc.). – The second is how environmental conditions in which such business operates can be improved (Transport Infrastructure, communications (TIC), the environment- sustainable development, use of renewable energy, etc.).

The objective of this paper is simply to propose an objective way of simultaneously considering all factors in order to achieve a Regional Competitiveness ranking and study changes over time. In order to do so, the Regio database and Multi-criteria Decision ranking techniques were used. The analysed period was 1987- 2002 which produced interesting results, especially when compared to other studies.

Key Words: Competitiveness, Economic and Social Cohesion, Real Convergence, EU Regional Policy, multi-criteria decision methods.

1.- Presentation and Work Proposal

*In a European Union context, the aim is to live according to the standards set by the Lisbon European Congress, being that *the EU should become an economy based on the most competitive and dynamic knowledge in the world, with sustainable economic development and growth, more and better jobs and greater social cohesion.* We were*

therefore faced with a dual challenge in order to achieve only part of the abovementioned aims. Firstly, we seek to acquire more comprehensive knowledge of the concept of Competitiveness, and secondly to adapt it to a Regional environment in order to identify the leading factors behind competitiveness as well as to objectively quantify levels.

With regards to the first area, in the broadest possible terms, the issues at the heart of the concept of Competitiveness are basically those that politicians and economic theorists have been trying to implement for a long time: *greater knowledge of the central issues in order to improve financial welfare and re-distribution of wealth.*

Nevertheless, this definition of competitiveness is too broad to reach the second challenge of applying and quantifying it at a regional level. An ascending trajectory of the notion of competitiveness is therefore traced, jumping from a *micro-economic* to a *macro-economic* level.

At a company micro-economic level, there is a clear and direct understanding of the concept of competitiveness, based on the ability of companies to compete, grow and be profitable. At this level, competitiveness relates to a company's ability to consistently and profitably produce when faced with the demands of open markets, in terms of pricing, quality, etc. All companies have to comply with these requirements to stay in the market and the more competitive a company as opposed to its competitors, the greater its ability to gain market share.

At a macro-economic level, the concept of competitiveness has been poorly defined and much more contested. Despite the fact that improving a country's competitiveness is often presented as an overall economic policy objective, there is a great deal of debate on what it actually means and talking of macro-economic competitiveness is even considered a delicate subject.

In 1990 Michael Porter published "The Competitive Advantage of Nations" where he presents competitiveness as a set of factors that permit enterprises of a region become competitive and makes them triumph at a national and international level. As a consequence, the problem is that enterprises of a nation must create and maintain competitive advantages in certain sectors and so compete with success nationally and internationally.

The lack of a generally accepted definition is in itself a source of opposition to the concept of macro-economic competitiveness, essentially the argument being that it is dangerous to base economic policy on such a formless concept that admits a wide range of interpretations.

We now focus our attention on regional competitiveness, a term used even less frequently with an even poorer definition. As a starting point, a definition of regional competitiveness is that provided by the “Sixth Periodical Report of the Regions”:

“Competitiveness is defined as the ability to produce goods and services that pass international market tests, whilst maintaining high and sustainable levels of income or, in broader terms, the ability (of a region) to generate relatively high levels of income and rates of employment, when exposed to external competition”.

“In other words, for a region to be competitive, it is important to ensure both quality as well as quality of work”. The Sixth Periodic Report on the Regions (1999).

Therefore, by not having a concise definition, a series of regional indicators are often used, thus reaching the concept by subjective synthesis of such. In order to measure competitiveness by means of costs, it is necessary to determine unit production costs, taking into account productivity and cost per worker. From an external perspective, competitiveness can also be measured according to exports or market share.

Different partial quantifications have been based on over simplified-models with respect to the broad objective of measuring competitiveness amongst regions, due to the fact that GNP per capita, Productivity or Salaries and Wages, considered separately, do not completely reflect specific regional competitiveness, as they do not take into account the contribution made by other competitiveness factors such as communications infrastructure, R+D, the environment, etc.

We propose a definition of Regional Competitiveness and its subsequent measurement, based on a series of regional socio-economic indicators. We therefore suggest a new way to quantify a region’s level of competitiveness according to a group of equivalent areas, defined as the “joint and simultaneous evaluation of a set of regional competitiveness socio-economic factors, in other words, to quantify different regional features, such as communications infrastructure, employment, R+D, productivity, etc.,

at the same time”. This new measurement does not conflict with traditional methods, but rather complements them.

The key issues that have been linked together to reach our final objective are, firstly, the use of an approach based on the amplitude provided by a regional socio-economic development analysis, which secondly requires a database comprised of a large number of variables or equivalent features, such as the economic as well as social characteristics of each particular region. And thirdly, in addition to the traditional multi-variant analysis techniques for combined processing, multi-criteria decision techniques were applied, as they enable an interpretation that better fits Social Science needs.

2.- Methodology and Data

What we are directly proposing is to assign certain levels of competitiveness to regions using our own decision-making techniques and simultaneously considering a set of indicators, thus indirectly reaching an objective way of quantifying and evaluating Regional Competitiveness.

In this field, multi-criteria decision may be a suitable process, in that it enables evaluation of EU Regional Competitiveness based on several criteria – set of variables – that are considered relevant to the decision-making process.

More specifically, multi-criteria decision does not endeavour to search for “facts” or “absolute optimums”, but rather simply tries to throw light on the decision-making process. Considering that reality, and especially human reality, has multiple points of view, multi-criteria decisions endeavour to provide methods that enable decision-making problems to be solved satisfactorily, problems in which often contradictory points of view must be taken into account. A satisfactory solution does not necessarily have to be the best from all perspectives. Such solution may not even exist. Although not being exactly the same, this approach may be relevant to the issue we are faced with, in the sense that the multi-dimensionality of competitiveness leads to significant advances in certain areas (see GNP per inhabitant, Communications Infrastructure, R+D+i), however may be the result of setbacks in other areas also of interest (workforce, level of training, amongst others).

The 1960's saw the development of a new approach in the area of the discreet multi-criteria decision theory, which became known as the "Multi-criteria assistance to Decision-making". This approach began development in France by Professor B. Roy (1968), today exceeding the borders of its country of origin, although still within Europe¹. It enables us to deal with different issues:

- The choice (α) of a sole "best" alternative.
- The classification (β), of alternatives into categories, such categories being conceived according to the rules to be followed by alternatives they are to house.
- The ranking (γ) of alternatives or a certain part of such.
- The description (δ) of alternatives and their consequences.

The proposals put forth by Professor B. Roy have generated an absolutely new theory, based on binary relations called over-classification and on the concepts of concordance and discordance with a given over-classification hypothesis. Under these principles, multi-criteria aggregation procedures have been created, of which the ELECTRE procedures can be highlighted.

Specifically, each one of the ELECTRE methods arose from the difficulties encountered in studying a specific and concrete issue, and each is designed to provide a solution to one of the four mentioned issues. Nevertheless, they all share the same mathematical tools, as they are based firstly on the use of binary relations called over-classification, and secondly on the concepts of concordance and discordance with a given over-classification hypothesis.

Firstly, we will endeavour to define what is understood by an over-classification ratio and then observe how each ELECTRE method builds indexes that measure the level of concordance or discordance with hypotheses such as "alternative a over-classifies alternative b ". Thus, it is specifically stated that an alternative a over-classifies an alternative b if a is at least as good as b in relation to the majority of criteria (concordance condition), without being clearly worse with respect to the other criteria (discordance condition).

The basic features of each ELECTRE method are summarised below:

¹ An alternative to this approach is that proposed by Saaty and his Analytical Hierarchical Process (AHP).

- In Electre I, the issue refers to the choice of the “best” action to be taken. In order to do so, and with the support of the over-classification ratio, Group A potential alternatives must be divided into two complementary sub-groups N and $A \setminus N$ such as: every alternative belonging to $A \setminus N$ is over-classified by at least one alternative that belongs to N; the alternatives belonging to $A \setminus N$ are eliminated; the alternatives belonging to N are incompatible; these are the chosen alternatives.

In the case of Regional Competitiveness, we would only have to identify the most competitive Regions (alternatives), in other words, the best Regions as far as this complex concept is concerned.

- Electre II endeavours to provide Group A with potential alternatives, using ranking relationships in a total pre-ranking structure for each criteria, thus facilitating choice; in other words, the objective is to rank potential alternatives from best to worst, tolerating the ex aequo.
- The purpose of Electre III is to order potential alternatives from best to least best. Although it is much more comprehensive and complex than ELECTRE II, it follows the latter’s basic guidelines: construction of the over-classification ratio, preparation of two antagonist groups and a synthesis of the final ranking. The final result is a partial pre-ranking, meaning that ex aequo is allowed and the lack of comparativeness tolerated, thus providing an order based on blocks or levels.

Both are appropriate for application to the issue at hand, as we would now obtain a ranking of levels covering the more competitive to the less competitive regions (alternatives). However, in order to apply it, the level of importance (weight or weighting) must be assigned to each indicator (criterion) used as a factor of regional competitiveness, an issue that will be dealt with and solved later.

- Electre IV, as opposed to the previous methods, is relatively simple. Although partly based on ELECTRE II and ELECTRE III, this method highlights the inexistence of weighting of criteria, or the abandoning of the initial over-classification hypothesis, which makes the ideas of concordance and discordance useless.

- Electre IS is an adaptation of ELECTRE I to logic diffusion, enabling the use of thresholds of preference and indifference. In order to choose the "best" alternative, Group A of potential alternatives must be divided into two sub-groups, as in ELECTRE I.
- Electre TRI deals with the issue relating to classifying each alternative into a pre-defined category. Reference alternatives are used to segment criteria into categories: each category is limited below and above by two reference alternatives and each reference alternative thus serves as a border for the two categories, one upper and the other lower. Electre TRI is therefore a method of assigning action (regions) to pre-defined categories (hypothetical reference regions). The assigning of an action (region) "a" results from the comparing of "a" to the profiles (action – regions- reference) that define the limits of categories.

The ELECTRE III method covers the needs highlighted, without reducing the importance of other possibilities provided by other methods applicable to Social Science in general and the Economy in particular.

Who are the individuals of interest in this study?

The individuals – or actions in decision terminology – are the European Regions. The regional database chosen to apply this methodology is the REGIO section of the Eurostat Newcronos database.

In general terms, EU regional disparity is measured by breaking down level 2 administrative regions (NUTS 2), although both groupings (mainly NUTS 1 LEVEL) as well as exclusions were made according to data availability criteria (particularly relevant when determining exclusions) and also to identify uniform regions, in a similar way to that done by other authors such as Rodríguez-Pose (1995, 1997), Cuadrado, Mancha any Garrido (1998), López-Bazo et al (1997), amongst others. A total of 128 regions were chosen, as shown in Table 4 of the Annex *What information is used and how was it processed?*

The information used is limited by that available on the database itself. Specifically, 63 variables were used (grouped into 10 Areas) for the purpose of capturing the different dimensions of Regional Competitiveness: *Demography, Economy, Employment,*

Unemployment, Research and Development, Transport, Power, Standard of Living, Tourism and Education.

As a prior step to the Electre TRI analysis, a Principal Components Analysis (PCA) was performed, firstly to summarise the information in a small group of factors (11) shown in Table C of the Annex and, more importantly, to rank the factors from greater to lesser importance (% explained variance) and therefore extract the most relevant information from observable variables.

The results obtained (details of which are not shown due to lack of space) have enabled the Electre III analysis, using original variables considered the most relevant in explaining European regional differences: income per capita and the differences in employment and unemployment. Moreover, the PCA shows that employment and unemployment are more important than GNP per capita, in the sense that they explain a greater percentage of information (providing a better explanation of the differences between regions).

3.- Results (Ranking and Comparison).

The purpose of the Electre III methodology is to obtain a ranking of EU Regional Competitiveness, based on available regional data. The novelty of this ranking lies in the fact that it jointly takes into account regional socio-economic factors considered as essential in order to measure the level of competitiveness.

It is also important to highlight that the study covers several years (1987, 1993, 1997 and 1999), as observing the evolution of order over time provides information on the stability of the European competitive structure. We believe that the regions showing substantial “jumps” in the ranking perform worse than those that have greater stability. In addition, within this stability, those that occupy the best positions are linked to factors and regional competitive strategies that are globally successful, whereas a high rate of mobility is associated with socio-economic structures dependent on situational competitive factors and/or changing structures.

Why is a ranking of this kind considered a novelty?

Ranking of regional economies is common practice in specialised economic analyses, as it enables a comparison of the importance of each particular region within the group. In general, these rankings are based on one variable (per capita income, productivity, unemployment rate, etc.), although they often depend on different regional features

(population, km², etc.). Nevertheless, this type of ranking encounters the disadvantage that one sole variable determines positions. Working with partial indicators thus provides partial information. As a result, the value of a ranking capable of simultaneously taking into account a large number of variables becomes evident.

Another alternative method to multi-dimensional ranking is the Regional Competitiveness Synthetic Indicators. Based on the common approach of simultaneously combining economic, social and business indicators, etc., their results are questioned due to the need to weigh the importance of each indicator to the final contribution to the index, as well as because the final Regional Competitiveness index results from compensating heavy doses of certain socio-economic factors with others. This last situation, for example, could hide substantial imbalances, producing good Regional Competitiveness results simply as a result of high values for only one socio-economic factor.

Considerations on the application of the Electre III method on a regional basis

As highlighted above, the Electre III multi-criteria decision method is based on rankings, by building an over-classification relationship in order to model decision makers' preferences. The final result is a partial pre-ranking shown as a graph.

In the field of regional analysis, the Electre III procedure has been used to build a ranking of 128 regions selected from the EU-15 by using socio-economic factors as ranking criteria, obtained as original variables subject to an analysis of main components. In this way, decision-maker preference is represented here by the performance of regions under different factors (regional strategies). The final result is a partial pre-ranking of regions. In other words, a best to worst region ranking is obtained, thus enabling "incomparability".

The phases in preparing regional rankings by Electre III are:

- a) building of an over-classification ratio,
- b) preparation of antagonist rankings, and
- c) synthesis of a final ranking.

The way to establish over-classification of one region with respect to another lies in the idea expressed in multi-criteria terms: one region over-classifies another if it is at least

as good as the latter in a majority of socio-economic competitive factors, without being too much worse with respect to the others.

Over-classification is therefore built on a condition of concordance, which demands that a certain majority of socio-economic competitiveness factors favour the region that over-classifies; and on a condition of discordance, which demands that the pressure not be so great on some of the minority factors, thus favouring inverse over-classification. These over-classifications do not concern more than two regions, it therefore being necessary to repeat the process with all possible pairs of ranked regions.

The concept of concordance is focused on the constructing of an index obtained by considering factors that “favour” the proposed hypothesis, meaning those making the first region at least as good as the second. In obtaining this index, fundamental data is seen as the weighting of factors that favour the hypothesis. In this study, weighting is expressed as a percentage of variance per factor. The discordance index is calculated according to the other factors, meaning those making the first region not as good as the second.

An over-classification hypothesis cannot be maintained unless there is good concordance with data, without a level of discordance that is too high. In other words, if it has a sufficiently high level of concordance and a sufficiently low level of discordance. However, two threshold levels are set in order to determine it: one of concordance, expressing the minimum concordance required; the other of discordance, expressing the maximum discordance allowed. All hypotheses, and subsequently all ranked pairs, are then subjected to the contrasts of the two indexes.

Application to European regions does not require a distinction between strong and weak preferences. One region is therefore better than another, according to a given factor, if its value is higher and indifference leads to equal evaluation of regions. It is therefore possible to compare the results obtained with the potential results provided by traditional approaches.

In addition, concordance is given a credibility degree of 1 when there is total concordance and 0 when there is no concordance, taking on values between 0 and 1 in all other cases (values obtained by lineal interpolation). When all factors have been considered, the degrees of credibility (one per criterion) of concordance for “a over-classifies b” enable the concordance index to be calculated.

Non-discordance indexes (index per ranked pair of regions and factor), are also subject to analysis between thresholds, the idea being the following: when there exists discordance with the hypothesis “*a* over-classifies *b*”, it is because the credibility of the concordance of this hypothesis is nil. In other words, non-discordance is an index that eventually enables an over-classification hypothesis to be rejected, following the application of concordance, when there exists strong opposition to at least one factor.

It is here where a new threshold intervenes, that of veto. It is considered that discordance can be tolerated up to a certain level, but there is a point (the veto threshold) at which a hypothesis cannot be maintained. It is therefore said that a factor opposes its veto to the validation of the proposal “region *a* is at least as good as region *b*” if the difference in values is as important for *b* thus impeding, in global terms, that region *a* is at least as good as region *b*. The difference at which this idea of discordance is exemplified is precisely the veto threshold.

In this study, we have opted for not introducing veto thresholds. It is therefore assumed that there are no factors in which an extremely negative value will impede a good position in the final ranking, if the region scores favourably in the remaining factors.

This hypothesis is important, given that the Electre, and in particular the Electre III method, are so-called non-compensating methods, meaning that poor values in one factor cannot be compensated by good values in others. Rankings are therefore obtained in which all factors are taken into account independently.

A region that is well positioned in the final ranking is one that is better than others in the majority of factors.

Once all the preceding information has been obtained, we are in a position to calculate what is known as the “credibility index” of a given over-classification hypothesis, such an index demonstrating the level of concordance with the hypothesis proposed and weakened by the level of discordance detected.

At this stage of the process, we are ready to look for rankings. In order to obtain them, we work with significance levels of the degree of credibility (which indicates as of what value the difference between two credibility degrees is significative) and successive descending and ascending distillation is employed.

To determine the number of preferred (best) regions to a given region, we require a new threshold at which only the over-classifications with higher credibility are taken into

account. This ends up in a repetitive process that consists of a search for a sub-group of increasingly less regions, with maximum qualification for increasingly lower levels. This procedure is known as descending distillation. With regards to ascending distillation, the same procedure is used, except that now the alternatives maintained are those with minimum qualification.

All of this leads to two rankings, two complete pre-rankings. The intersection, in a mathematical sense of the term, of the two complete pre-rankings is a partial pre-ranking. This means that non-comparability of two regions is allowed. The partial pre-ranking obtained reveals the comparisons that can be reasonably considered as well established, according to available data.

Ranking of EU Regions according to their Socio-economic competitiveness factors

Table 1 shows the uniformity of results of rankings established by Electre III for the four chosen years of 1987, 1993, 1997 and 1999. Nevertheless, it is important to highlight that in all four years neither the total of original variables², nor the factors obtained by main principles, is the same. Even so, it was perfectly possible to calculate rankings, thanks to the fact that the Electre III methodology performs a ranking of regions per year, highlighting that each ranking is based on the information available for that particular year, and what is later compared are the positions.

When using 128 regions, whatever form of presentation of overall results would occupy a lot of space. Maximum use of space is a priority and, therefore, tables contain combined information. As an aid to reading Table 1, it should be mentioned that it begins with a multi-dimensional ranking of regions in 1987. Intermediate columns provide the variations with such ranking, meaning the gain or loss of positions with respect to the initial 1987 position. It is therefore easy to deduce the different levels reached and also possible to evaluate the efforts of certain regions to increase their level of competitiveness, bearing in mind the specific strategies adopted and the context in which regions compete. Finally, on the right a 1999 multi-dimensional ranking has been added, which we call the final position.

² Due to the fact that working with the greatest number of variables in each year was not rejected. Not all variables existed in every year.

In both rankings (1987 and 1999), the marked groups of regions relate to levels of non-comparability within such ranking, in other words, the regions appearing in either level are neither better nor worse than any other region at the same level, in relation to its number of socio-economic factors. It is therefore easy to find regions grouped together with very different socio-economic structures, although with a similar net balance of socio-economic competitiveness factors.

In an attempt to determine the reasons behind the rankings provided by Electre III, Table D of the Annex combines all the information processed up to date. Logically, at an initial glance, it is impossible to deduce the same results as those obtained by the indexes built by Electre III. However, it *is* possible, and we consider it to be of great use, to compare the structures of socio-economic competitiveness factors in regions at a particular level or the different ranking positions. For example, it is now possible to highlight the fact that the best ranked regions have greater population densities (urban economies) and substantial participation in labour markets, however not all of them, such as in the Tyrol, Uusimaa or Brandenburg which, on the contrary, have more than satisfactory regional dynamics.

In addition, starting in 1987 with the same ranking, for example, we find the Basque Country and Trentin-Upper Adige. Performances vary from a loss of 17 positions in 1999 by the former and a gain of 38 positions by the latter. In 1997, the most outstanding differences between them, with respect to socio-economic competitiveness factors were going in opposite directions in *Labour Market Participation*, *Level of basic competitiveness factors*, *Education and Demographic pressure per capita*, however coinciding in *State R+D*.

This is only intended to highlight the possibilities that are now opened up by using this method and that, logically, cannot be covered by only one research study. It would therefore be possible to analyse the reasons behind a significant improvement or worsening of a ranking position, as well as substantial variations experienced by other regions.

One of this study's hypotheses is that the differences between aggregate levels of socio-economic competitiveness factors amongst regions must be analysed from a more global perspective, in other words, by using a greater number of features. This means overcoming the use of GNP per capita as a synthetic indicator in regional competitiveness analyses.

In order to be able to compare results of both (one-dimensional and two-dimensional) quantifications, a ranking of European regions has also been built only on a GNP per capita ranking for 1987, 1993, 1997 and 1999.

In broad terms, substantial differences should obviously not be observed between both rankings, as the GNP per capita is used as a basic indicator for comparison of competitiveness between regions, given that it is correlated with part of the most important basic information. At the same time, there should neither be many differences in the evolution of regions, because GNP per capita enables evaluation of the consequences of regional competitiveness strategies.

However, a more detailed study reveals interesting results. For example, the loss of positions by a large number of Spanish regions is significant, especially those of Asturias, the Basque Country, Aragon or Cantabria, although they had GNPs per capita exceeding 75% of the EU average, they had very low positions due to the simultaneous combination of a group of socio-economic regional competitiveness factors. On the contrary, special mention can be made of the increase by the Comunidad Valenciana, having been one of the Target 1 European regions in GNP per capita, now in the multi-dimensional ranking showing a joint contribution of socio-economic competitiveness factors in Spain only lower to Catalonia, the Balearic Islands and the Comunidad de Madrid.

As far as Galicia is concerned, it has dropped its position in the European ranking in solely GNP per capita, which would question the strategy adopted and action taken. On the other hand, a positive response has been achieved by a small but important rise (5 positions) in the multi-dimensional competitiveness ranking, meaning that the region has improved in a combined evaluation of socio-economic competitiveness factors. This is an important improvement if we consider that it operates in a dynamic environment in which all regions endeavour to take maximum advantage of its strengths and minimise its weaknesses in the shortest possible period of time.

Table 1. Multi-dimensional Ranking obtained by Electre III for 1987 and 1999, as well as positions gained (1993-1987), (1997-1987) and (1999-1987)

Multidimensional ranking of Regions for 1987: INITIAL			Gained Positions		
Region's Code	Region's Name	1987	(1993-1987)	(1997-1987)	(1999-1987)
de6	Hamburg	100	-25	-31	-22
fr1	Île de France	100	0	-19	-4
de1	Baden-Württemberg	97	-11	-38	-12
fi16	Uusimaa (suuralue)	97	-1	-31	-8
de2	Bayern	94	-15	-28	-1
de7	Essen	94	-12	-22	-1
fr42	Alsace	91	-16	-25	-13
se01	Stockholm	91	2	-3	-2
ukg	West Midlands	91	-23	-13	-21
at33	Tirol	89	-10	-17	-15
de3	Berlin	89	0	-20	-15
n13	West-Nederland	89	7	5	11
ukf	East Midlands	89	-14	-8	-15
de4	Brandenburg	86	-22	-58	-34
de9	Niedersachsen	86	-11	-27	-16
dea	Nordrhein-Westfalen	86	-25	-20	-16
deb	Rheinland-Pfalz	86	-4	-11	-5
n12	Oost-Nederland	86	3	5	-5
uki	London	86	0	-11	3
ded	Sachsen	83	-40	-39	-31
it2	Lombardia	83	-8	-20	2
dee	Sachsen-Anhalt	80	-48	-55	-50
dk	Denmark	80	2	17	20
ukd	North West (including Merseyside)	80	2	-2	-17
de8	Mecklenburg-Vorpommern	77	-27	-64	-51
ukj	South East	77	9	17	23
at32	Salzburg	74	-3	-2	-7
de5	Bremen	74	-10	-2	0
ukh	Eastern	74	8	10	22
ukm	Scotland	74	12	1	-7
at13	Wien	71	18	1	10
at34	Vorarlberg	71	-3	-8	-1
be1	Région Bruxelles-capitale/Brussels hoofdstad gewest	71	-3	-33	-27
fi17	Etelä-Suomi	71	-3	-21	-19
fr43	Franche-Comté	71	-3	-15	-8
lu	Luxembourg	71	0	-33	-4
n14	Zuid-Nederland	71	15	29	18
at31	Oberösterreich	69	-12	0	-6
fi15	Pohjois-Suomi	69	-1	-19	-39
it32	Veneto	69	-5	-19	9
it6	Lazio	69	-1	-3	12
se08	Övre Norrland	69	-8	6	-39
uke	Yorkshire and The Humber	69	6	-3	-21
at22	Steiermark	66	2	-19	-10
be2	Vlaams Gewest	66	13	-3	15

Multidimensional ranking of Regions for a 1999: FINAL		
Region's Code	Region's Name	1999
n13	West-Nederland	100
dk	Denmark	100
ukj	South East	100
fr1	Île de France	96
ukh	Eastern	96
de2	Bayern	93
de7	Essen	93
fi16	Uusimaa (suuralue)	89
se01	Stockholm	89
uki	London	89
n14	Zuid-Nederland	89
de1	Baden-Württemberg	85
it2	Lombardia	85
def	Schleswig-Holstein	85
fr71	Rhône-Alpes	85
deb	Rheinland-Pfalz	81
n12	Oost-Nederland	81
at13	Wien	81
it6	Lazio	81
be2	Vlaams Gewest	81
it4	Emilia-Romagna	81
it31	Trentino-Alto Adige	81
ie	Ireland	81
de6	Hamburg	78
fr42	Alsace	78
it32	Veneto	78
ukk	South West	78
at33	Tirol	74
de3	Berlin	74
ukf	East Midlands	74
de5	Bremen	74
fr82	Provence-Alpes-Côte d'Azur	74
es3	Comunidad de Madrid	74
fr24	Centre	74
it12	Valle d'Aosta	74
ukg	West Midlands	70
de9	Niedersachsen	70
dea	Nordrhein-Westfalen	70
at34	Vorarlberg	70
fr61	Aquitaine	70
it33	Friuli-Venezia Giulia	70
at32	Salzburg	67
ukm	Scotland	67
lu	Luxembourg	67
dec	Saarland	67

Multidimensional ranking of Regions for 1987: INITIAL			Gained Positions		
Region's Code	Region's Name	1987	(1993-1987)	(1997-1987)	(1999-1987)
Fr82	Provence-Alpes-Côte d'Azur	66	2	0	8
It11	Piemonte	66	5	-7	-3
Se0a	Västsvrige	66	13	12	-25
dec	Saarland	63	-2	-13	4
Fi14	Väli-Suomi	63	-9	-22	-33
Se02	Östra Mellansverige	63	-2	28	-11
Se09	Småland med öarna	63	-6	18	-15
ukc	North East	63	-9	0	-26
ukk	South West	63	-6	21	15
deg	Thüringen	60	-14	-41	-19
Fi13	Itä-Suomi	60	-6	-26	-49
Fr23	Haute-Normandie	60	-3	-7	7
Fr62	Midi-Pyrénées	60	11	-7	-8
Se07	Mellersta Norrland	60	4	18	-16
At21	Kärnten	57	14	-35	2
def	Schleswig-Holstein	57	22	2	28
Fr41	Lorraine	57	0	-4	-13
Fr52	Bretagne	57	-7	-4	6
it4	Emilia-Romagna	57	22	6	24
Pt11	Norte	57	4	-26	6
Se04	Sydsverige	57	11	27	-5
Se06	Norra Mellansverige	57	-3	6	-27
At12	Niederösterreich	54	14	-13	5
Fr22	Picardie	54	-4	-16	-2
Fr81	Languedoc-Roussillon	54	0	-13	2
nl1	Noord-Nederland	54	17	30	-6
es3 (*)	Comunidad de Madrid	51	24	2	23
fr24 (*)	Centre	51	6	5	23
it12 (*)	Valle d'Aosta	51	3	-10	23
it51 (*)	Toscana	51	6	-17	8
Fr72	Auvergne	49	-17	7	18
gr3	Attiki	49	5	-18	-8
It13	Liguria	49	1	4	18
At11	Burgenland	46	4	-18	-9
Fr61	Aquitaine	46	15	10	24
Es21	Pais Vasco	43	0	1	-17
Fr26	Bourgogne	43	-18	13	13
fr3	Nord - Pas-de-Calais	43	3	4	1
Fr51	Pays de la Loire	43	21	7	16
It31	Trentino-Alto Adige	43	21	4	38
ukl	Wales	43	7	-2	-10
ukn	Northern Ireland	43	11	7	-2
Fr25	Basse-Normandie	40	3	4	8
It33	Friuli-Venezia Giulia	40	17	16	30
It53	Marche	40	14	-27	-7
Pt12	Centro (P)	40	24	26	8
Fr71	Rhône-Alpes	37	52	32	48

Multidimensional ranking of Regions for a 1999: FINAL		
Region's Code	Region's Name	1999
fr23	Haute-Normandie	67
fr72	Auvergne	67
it13	Liguria	67
ukd	North West (including Merseyside)	63
fr43	Franche-Comté	63
at31	Oberösterreich	63
it11	Piemonte	63
fr52	Bretagne	63
pt11	Norte	63
es53	Illes Balears	63
pt15	Algarve	63
at21	Kärnten	59
at12	Niederösterreich	59
it51	Toscana	59
fr51	Pays de la Loire	59
pt13	Lisboa e Vale do Tejo	59
at22	Steiermark	56
fr81	Languedoc-Roussillon	56
fr26	Bourgogne	56
fr21	Champagne-Ardenne	56
fr53	Poitou-Charentes	56
de4 (*)	Brandenburg	52
ded (*)	Sachsen	52
fi17 (*)	Etelä-Suomi	52
se02 (*)	Östra Mellansverige	52
fr62 (*)	Midi-Pyrénées	52
se04 (*)	Sydsverige	52
fr22 (*)	Picardie	52
uke	Yorkshire and The Humber	48
se09	Småland med öarna	48
nl1	Noord-Nederland	48
fr25	Basse-Normandie	48
pt12	Centro (P)	48
it52	Umbria	48
be1	Région Bruxelles-capitale/Brussels hoofdstad gewest	44
se07	Mellersta Norrland	44
fr41	Lorraine	44
fr3	Nord - Pas-de-Calais	44
es51	Cataluña	44
fr63	Limousin	44
se0a	Västsvrige	41
deg	Thüringen	41
gr3	Attiki	41
ukn	Northern Ireland	41
es52	Comunidad Valenciana	41
gr2	Kentriki Ellada	41
ukc	North East	37

Multidimensional ranking of Regions for 1987: INITIAL			Gained Positions		
Region's Code	Region's Name	1987	(1993-1987)	(1997-1987)	(1999-1987)
It71	Abruzzo	37	2	-28	-15
Pt13	Lisboa e Vale do Tejo	37	42	13	22
Es51	Cataluña	34	12	7	10
Fr21	Champagne-Ardenne	34	5	13	22
be3	Région Wallonne	31	30	10	2
Fr53	Poitou-Charentes	31	-10	7	25
It52	Umbria	31	1	0	17
it8	Campania	31	12	0	2
It91	Puglia	31	8	-22	-9
Es22	Comunidad Foral de Navarra	29	0	5	8
Es23	La Rioja	29	-25	-16	-14
gr1	Voreia Ellada	29	21	21	-3
gr4	Nisia Aigaiou, Kriti	29	35	9	1
ie	Ireland	29	10	46	52
itb	Sardegna	29	0	-20	-3
Es52	Comunidad Valenciana	26	6	12	15
It92	Basilicata	26	-15	-23	-19
ita	Sicilia	26	17	18	0
Es24	Aragón	23	-5	5	3
Es53	Illes Balears	23	20	11	40
es7	Canarias (ES)	23	31	2	14
Es12	Principado de Asturias	20	-2	-4	-16
Es13	Cantabria	20	-2	-11	-5
Fr63	Limousin	20	-6	18	24
gr2	Kentriki Ellada	20	26	49	21
Pt15	Algarbe	20	48	11	43
Es61	Andalucia	17	4	-1	9
Es62	Murcia	17	1	-11	-13
Es11	Galicia	14	-3	2	5
It72	Molise	14	-7	-8	-3
It93	Calabria	14	0	-1	5
Es41	Castilla y León	9	2	7	6
Es42	Castilla-la Mancha	6	-2	-3	5
Es43	Extremadura	3	4	0	4
Pt14	Alentejo	3	43	13	8

Note:

(*) They comprise the central or average EU (15) group of regions.

Both in red and a black background, highlighting the absolute number of positions lost or gained by a region in the ranking. Only applied when the gain or loss is equal or greater than 10 net positions.

Source: Own information

Multidimensional ranking of Regions for a 1999: FINAL		
Region's Code	Region's Name	1999
at11	Burgenland	37
es22	Comunidad Foral de Navarra	37
es7	Canarias (ES)	37
uk1	Wales	33
it53	Marche	33
be3	Région Wallonne	33
it8	Campania	33
dee	Sachsen-Anhalt	30
fi15	Pohjois-Suomi	30
se08	Övre Norrland	30
fi14	Väli-Suomi	30
se06	Norra Mellansverige	30
gr4	Nisia Aigaiou, Kriti	30
de8	Mecklenburg-Vorpommern	26
es21	Pais Vasco	26
gr1	Voreia Ellada	26
Itb	Sardegna	26
Ita	Sicilia	26
es24	Aragón	26
es61	Andalucia	26
it71	Abruzzo	22
it91	Puglia	22
es11	Galicia	19
it93	Calabria	19
es23	La Rioja	15
es13	Cantabria	15
es41	Castilla y León	15
fi13	Itä-Suomi	11
it72	Molise	11
es42	Castilla-la Mancha	11
pt14	Alentejo	11
it92	Basilicata	7
es43	Extremadura	7
es12	Principado de Asturias	4
es62	Murcia	4

5.- Conclusion

This last point is intended as a summary of the fundamental ideas of the process designed to measure Regional Competitiveness and to highlight the main results of its application.

An extensive database was used (63 indicators) and changed over time, although even so, the process of obtaining factors (Main Components Analysis), appears to reveal the existence of certain instability over time in the key factors required to explain regional socio-economic competitiveness. In particular, such factors were interpreted as: “Population Ageing”, “Participation in the Labour Market (unemployment)”, “Regional Dynamics” and “Basic Regional Competitiveness Conditions”.

In order to determine the level of competitiveness of the 128 EU-15 regions considered, a simple ranking from most to least net available socio-economic factors was performed and they were considered jointly and simultaneously for the purpose of identifying regions with the best and worst positions on the ranking. In fact, the latter represents precisely the regions that may, as a result of their lack of competitiveness, be impeding the achievement of another important EU regional objective, being that of greater Economic and Social Cohesion amongst such regions.

Once the regions have been identified, the methodology proposed enables us to return to original indicators in order to determine both regional strengths and weaknesses, in comparison with the EU regions as a whole.

When studies are finished, and especially so in empirical projects, it is very important to sum up the main features, conditioning the results obtained. In this case, in general terms, these features depend on the uniformity of regions, the chosen variables, interpretation of factors and their weighting.

Nevertheless, and also looking back in time, this methodology is only intended as an initial step towards objectively describing and quantifying the complex but at the same time important concept of Regional Competitiveness, due to its repercussions on inhabitants when successful and the need to adopt different strategies when it fails.

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7.- Annexes

Table A. Selection of regions (level combination NUTS 2 and NUTS 1)

Austria (at)	at11 Burgenland at12 Niederösterreich at13 Wien at21 Kärnten at22 Steiermark at31 Oberösterreich at32 Salzburg at33 Tirol at34 Vorarlberg	Spain (es)	es11 Galicia es12 Principado de Asturias es13 Cantabria es21 País Vasco es22 Comunidad Foral de Navarra es23 La Rioja es24 Aragón es3 Comunidad de Madrid es41 Castilla y León es42 Castilla-la Mancha es43 Extremadura es51 Cataluña es52 Comunidad Valenciana es53 Illes Balears es61 Andalucía es62 Murcia es7 Canarias (ES)
Germany (de)	de1 Baden-Württemberg de2 Bayern de3 Berlin de4 Brandenburg de5 Bremen de6 Hamburg de7 Hessen de8 Mecklenburg-Vorpommern de9 Niedersachsen dea Nordrhein-Westfalen deb Rheinland-Pfalz dec Saarland ded Sachsen dee Sachsen-Anhalt def Schleswig-Holstein deg Thüringen	France (fr)	fr1 Île de France fr21 Champagne-Ardenne fr22 Picardie fr23 Haute-Normandie fr24 Centre fr25 Basse-Normandie fr26 Bourgogne fr3 Nord - Pas-de-Calais fr41 Lorraine fr42 Alsace fr43 Franche-Comté fr51 Pays de la Loire fr52 Bretagne fr53 Poitou-Charentes fr61 Aquitaine fr62 Midi-Pyrénées fr63 Limousin fr71 Rhône-Alpes fr72 Auvergne fr8 Méditerranée fr81 Languedoc-Roussillon fr82 Provence-Alpes-Côte d'Azur fr83 Corse
Italy (it)	it11 Piemonte it12 Valle d'Aosta it13 Liguria it2 Lombardia it31 Trentino-Alto Adige it32 Veneto it33 Friuli-Venezia Giulia it4 Emilia-Romagna it51 Toscana it52 Umbria it53 Marche it6 Lazio it71 Abruzzo it72 Molise it8 Campania it91 Puglia it92 Basilicata it93 Calabria ita Sicilia itb Sardegna	United Kingdom (uk)	ukc North East ukd North West (including Merseyside) uke Yorkshire and The Humber ukf East Midlands ukg West Midlands ukh Eastern uki London ukj South East ukk South West ukl Wales ukm Scotland ukn Northern Ireland
Finland (fi)	fi13 Itä-Suomi fi14 Väli-Suomi fi15 Pohjois-Suomi fi16 Uusimaa (suuralue) fi17 Etelä-Suomi	Portugal (pt)	pt11 Norte pt12 Centro (P) pt13 Lisboa e Vale do Tejo pt14 Alentejo pt15 Algarve
Sweden (se)	se01 Stockholm se02 Östra Mellansverige se04 Sydsverige se06 Norra Mellansverige se07 Mellersta Norrland se08 Övre Norrland se09 Småland med öarna se0a Västsverige	Belgium (be)	be1 Région Bruxelles-capitale/Brussels hoofdstad gewest be2 Vlaams Gewest be3 Région Wallonne
Holland (nl)	nl1 Noord-Nederland nl2 Oost-Nederland nl3 West-Nederland nl4 Zuid-Nederland	Greece (gr)	gr1 Voreia Ellada gr2 Kentriki Ellada gr3 Attiki gr4 Nisia Aigaiou, Kriti
Denmark (dk)	dk Denmark		
Ireland (ie)	ie Ireland		
Luxembourg (lu)	lu Luxembourg		

Source: Own information

Table B. Regional variables selected

Variables	
Area of the regions	Employment of Agriculture on total employments
Total Population	Employment of Industry on total employments
Population density	Employment of Services on total employments
Rate of annual variation of the population	Rate of occupation (Occupied/Assets)
Crude birth rate (per 1000 resident persons)	Unemployment rate: MALES (% of active population)
Crude death rate (per 1000 resident persons)	Unemployment rate: FEMALES (% of active population)
Infant mortality rate	Unemployment rate: LESS THAN 25 YEARS (% of active population)
Inhabitants' proportion between 0 and 24 years	Unemployment rate: 25 YEARS AND MORE (% of active population)
Inhabitants' proportion between 25 and 44 years	Proportion of employment in sectors of high technology with regard to the total employment
Inhabitants' proportion between 45 and 64 years	Total number of patent applications per million people in population
Inhabitants' proportion of 65 and more years	R&D expenditure all institutional sectors (Percentage of GDP)
Men's proportion between 0 and 24 years	R&D expenditure Business enterprise sector (Percentage of GDP)
Men's proportion between 25 and 44 years	R&D expenditure Government sector (Percentage of GDP)
Men's proportion between 45 and 64 years	R&D expenditure Higher education sector (Percentage of GDP)
Men's proportion of 65 and more years	Kilometres of highway and railcar for every 1000 km ² of surface
Women's proportion between 0 and 24 years	Car Private vehicles
Women's proportion between 25 and 44 years	Number of deaths per million private cars
Women's proportion between 45 and 64 years	Electricity consumption by industrial sector (in gigawatt hours)
Women's proportion of 65 and more years	Electricity consumption by services sector (in gigawatt hours)
GDP.- Gross domestic product (Purchasing Power Standard per inhabitant)	Electricity consumption Total (in gigawatt hours)
GDP.- Gross domestic product (Millions of Purchasing Power Parities)	Total number of hospital beds (Thousands of inhabitants/Per 1000 inhabitants)
Rate of annual growth of the GDP (Purchasing Power Standard per inhabitant)	Average number of inhabitants for household
Productivity	Degree of urbanisation for number of households: Densely-populated area (at least 500 inhabitants/Km ²)
Compensation of employees	Degree of urbanisation for number of households: Intermediate and Sparsely populated area (less than 499 inhabitants/Km ²)
Males Activity rate	Nights spent by residents and non-residents per inhabitant
Females Activity rate	Percentage of students high level on total students: Men (Equal for primary and secondary education)
Females Activity rate between 25 and 35 years	Percentage of students high level on total students: Women (Equal for primary and secondary education)
Participation of the employment part-time in the masculine employment	Percentage of students high level on total students (Equal for primary and secondary education)
Participation of the employment part-time in the feminine employment	

Note: Deflator: Index of consumption prices of the European Union, base 1985. (CRENoS - Ricerche Economiche's Center Nord Sur of Cagliari's University)

Table C. Interpretation of the socioeconomic factors in relation to original variables

Interpretation	Variables	
	POSITIVE influence	NEGATIVE influence
CP1: "Aging of the Population"	<ul style="list-style-type: none"> - Women's proportion between 45 and 64 years - Men's proportion between 45 and 64 years - Women's proportion of 65 and more years - Crude death rate (per 1000 resident persons) - Men's proportion of 65 and more years 	<ul style="list-style-type: none"> - Women's proportion between 0 and 24 years - Men's proportion between 0 and 24 years - Crude birth rate (per 1000 resident persons)
CP2: "Market share of Work"	<ul style="list-style-type: none"> - Rate of occupation (Occupied/Assets) - Participation of the employment part-time in the feminine employment - Females Activity rate between 25 and 35 years - Males Activity rate - Females Activity rate 	<ul style="list-style-type: none"> - Unemployment rate: females (% of active population) - Unemployment rate: males (% of active population) - Unemployment rate: less than 25 years (% of active population) - Unemployment rate: 25 years and more (% of active population) - Average number of inhabitants for household
CP3: "Regional dynamics"	<ul style="list-style-type: none"> - Electricity consumption by industrial sector (in gigawatt hours) - Electricity consumption Total (in gigawatt hours) - Electricity consumption by services sector (in gigawatt hours) - Total number of patent applications per million people in population - R&D expenditure Business enterprise sector (Percentage of GDP) - R&D expenditure all institutional sectors (Percentage of GDP) 	
CP4: "Determining factors of Regional competitiveness"	<ul style="list-style-type: none"> - Productivity - Compensation of employees - GDP.- Gross domestic product (Purchasing Power Standard per inhabitant) - Employment of Services on total employments 	
CP5: "Basic factors of Development"	<ul style="list-style-type: none"> - Men's proportion between 25 and 44 years - Women's proportion between 25 and 44 years - Kilometres of highway and railcar for every 1000 km² of surface 	
CP6: "Economic - residential regional attraction"	<ul style="list-style-type: none"> - GDP.- Gross domestic product (Millions of Purchasing Power Parities) - Degree of urbanisation for number of households: Intermediate and Sparsely populated area (less than 499 inhabitants/Km²) - Degree of urbanisation for number of households: Densely-populated area (at least 500 inhabitants/Km²) 	
CP7: "R&D Public"	<ul style="list-style-type: none"> - R&D expenditure Government sector (Percentage of GDP) - R&D expenditure Higher education sector (Percentage of GDP) - Participation of the employment part-time in the masculine employment 	<ul style="list-style-type: none"> - Employment of Industry on total employments
CP8: "Potential of development"	<ul style="list-style-type: none"> - Rate of annual growth of the GDP (Purchasing Power Standard per inhabitant) - Infant mortality rate 	<ul style="list-style-type: none"> - Total number of hospital beds (Thousands of inhabitants/Per 1000 inhabitants)
CP9: "Education: Pupils"	<ul style="list-style-type: none"> - Percentage of students high level on whole estudiantes: Women (Equal for primary and secondary education) - Percentage of students high level on whole estudiantes: Men (Equal for primary and secondary education) 	

Interpretation	Variables	
	POSITIVE influence	NEGATIVE influence
CP10: "Degree of urbanization"	- Car Private vehicles	- Number of deaths per million private cars - Employment of Agriculture on total employments
CP11: "Demographic pressure per capita: demographic concentration"	- Nights spent by residents and non-residents per inhabitat - Rate of annual variation of the population	

Table D. Ranking multidimensional para 1987 junto al número de posiciones ganadas en el ranking de 1999 y valoración de la dotación de factores socioeconómicos regionales en 1997.

Region's Code	Region's Name	1987	Gained Positions (1999-1987)	Population Density	Aging of the Population	Market share of Work	Regional dynamics	Determining factors of Regional competitiveness	Basic factors of Development	Economic - residential regional attraction	R&D Public	Potential of development	Education: Pupils	Degree of urbanization	pressure per capita: demographic	Number of componentes with rdo >>+	Number of componentes with rdo >+	Number of componentes with rdo <-	Number of componentes with rdo <<-
				ZLDLSENSID	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8	CP9	CP10	CP11				
de6	Hamburg	100	-22	>>+	>>+	>+	<-	>>+	>>+	<<-	>>+	>>+	>>+	<-	<<-	7	1	2	2
fr1	Île de France	100	-4	>>+	<<-	<-	>>+	>>+	>>+	>>+	>+	<-	>>+	<-	>+	6	2	3	1
de1	Baden-Württemberg	97	-12	>>+	>+	>+	>>+	<-	>>+	>>+	<<-	<<-	<-	<-	>+	4	3	3	2
fi16	Uusimaa (suuralue)	97	-8	>+	>+	<<-	>>+	<<-	>>+	<-	>>+	>+	>>+	<<-	>>+	5	3	1	3
de2	Bayern	94	-1	>+	>+	>+	>>+	>+	>+	>>+	<-	<<-	<<-	<<-	>+	2	6	1	3
de7	Essen	94	-1	>>+	>>+	>+	>>+	>>+	>>+	>>+	<-	<-	<-	<-	>+	6	2	4	0
Fr42	Alsace	91	-13	>+	<<-	>>+	>>+	<-	>>+	<<-	<<-	<<-	>>+	>>+	<-	5	1	2	4
Se01	Stockholm	91	-2	>>+	<-	<-	>>+	>>+	<-	>>+	>+	>>+	>+	<<-	>>+	6	2	3	1
ukg	West Midlands	91	-21	>>+	<-	>>+	<-	<-	<-	>>+	<-	>>+	<<-	>>+	<<-	5	0	5	2
At33	Tirol	89	-15	<<-	<<-	>>+	>>+	<<-	>>+	<<-	>+	<<-	>>+	<-	>>+	5	1	1	5
de3	Berlin	89	-15	>>+	>>+	<-	>>+	>+	>>+	<-	>>+	<<-	>+	<-	<<-	5	2	3	2
nl3	West-Nederland	89	11	>>+	<<-	>>+	<-	>>+	>>+	>>+	>>+	>>+	>>+	>+	<-	8	1	2	1
ukf	East Midlands	89	-15	>>+	<-	>>+	>+	<<-	<-	>>+	<-	>>+	<-	>+	<-	4	2	5	1
de4	Brandenburg	86	-34	<-	>>+	<<-	>>+	<<-	>>+	>+	>>+	<-	<<-	<<-	>+	4	2	2	4
de9	Niedersachsen	86	-16	>+	>>+	>+	>+	>+	>+	>>+	>+	<-	<<-	<-	>+	2	7	2	1
dea	Nordrhein-Westfalen	86	-16	>>+	>>+	<-	<-	>>+	>+	>>+	<-	>+	<<-	<-	<-	4	2	5	1
deb	Rheinland-Pfalz	86	-5	>+	>+	>+	>+	>+	>+	>>+	<<-	<<-	<-	>+	<-	1	7	2	2
nl2	Oost-Nederland	86	-5	>>+	<<-	>>+	<-	<<-	>>+	>+	>>+	>>+	>>+	>+	<-	6	2	2	2
uki	London	86	3	>>+	<<-	>+	<<-	>>+	>>+	>>+	>>+	>>+	<<-	>+	>>+	7	2	0	3
ded	Sachsen	83	-31	>+	>>+	<-	>>+	<<-	>>+	>>+	>>+	<<-	<<-	<-	<<-	5	1	2	4
it2	Lombardia	83	2	>>+	>>+	>+	>+	>+	>+	>>+	<<-	<-	>+	>>+	>>+	5	5	1	1
dee	Sachsen-Anhalt	80	-50	>+	>>+	<<-	>>+	<<-	>>+	<-	>>+	<-	<<-	<-	<<-	4	1	3	4

				Population Density	Aging of the Population	Market share of Work	Regional dynamics	Determining factors of Regional competitiveness	Basic factors of Development	Economic - residential regional attraction	R&D Public	Potential of development	Education: Pupils	Degree of urbanization	pressure per capita: demographic	Number of componentes with rdo >>+	Number of componentes with rdo >+	Number of componentes with rdo <-	Number of componentes with rdo <<-
Region's Code	Region's Name	1987	Gained Positions (1999-1987)	ZDL DENSID	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8	CP9	CP10	CP11				
dk	Denmark	80	20	<	<	>>+	>>+	>+	<	>>+	>>+	>>+	<	<<<	>+	5	2	4	1
ukd	North West (including Merseyside)	80	-17	>>+	<	>>+	<	>+	<	>>+	>+	>>+	<	>>+	<<<	5	2	4	1
de8	Mecklenburg-Vorpommern	77	-51	<	>>+	<	>+	<<<	>>+	<<<	>>+	<	<<<	<<<	<<<	3	1	3	5
ukj	South East	77	23	>>+	<	>>+	>>+	>+	<	>>+	>>+	>>+	<	>+	>>+	7	2	3	0
At32	Salzburg	74	-7	<	<<<	>>+	>+	>>+	>>+	<<<	>+	<	<	<<<	>>+	4	2	3	3
de5	Bremen	74	0	>>+	>>+	<	<	>>+	>>+	<<<	>+	>>+	>>+	>+	<<<	6	2	2	2
ukh	Eastern	74	22	>>+	<	>>+	>>+	<	<	>>+	>+	>+	>+	>+	>>+	5	4	3	0
ukm	Scotland	74	-7	<	<	>>+	>+	<	>+	>+	>>+	>+	>+	<	<	2	5	5	0
At13	Wien	71	10	>>+	>+	>>+	<	>>+	>>+	<<<	>>+	<<<	>>+	>+	<<<	6	2	1	3
At34	Vorarlberg	71	-1	>+	<<<	>>+	>>+	>+	>>+	<<<	<<<	<	<<<	<	>+	3	3	2	4
be1	Région Bruxelles-capitale/Brussels hoofdstad gewest	71	-27	>>+	<	<	<<<	>>+	<	<<<	>+	<	>>+	<<<	<	3	1	5	3
Fi17	Etelä-Suomi	71	-19	<<<	>>+	<<<	>>+	<<<	>+	<	>+	>+	>>+	<<<	>+	3	4	1	4
Fr43	Franche-Comté	71	-8	<	<<<	>>+	>>+	<<<	<	>+	<<<	<<<	>+	>+	<<<	2	3	2	5
lu	Luxembourg	71	-4	>+	<	>+	>+	>>+	>>+	<<<	<<<	>+	<<<	<<<	>>+	3	4	1	4
nl4	Zuid-Nederland	71	18	>>+	<	>>+	>>+	>+	>>+	>+	<	>>+	>>+	<	<<<	6	2	3	1
At31	Oberösterreich	69	-6	<	<	>>+	>+	>+	>>+	<<<	<<<	<	<<<	<<<	<<<	2	2	3	5
Fi15	Pohjois-Suomi	69	-39	<<<	<<<	<<<	>>+	<<<	>+	<<<	>+	>+	>>+	<<<	<	2	3	1	6
It32	Veneto	69	9	>+	>>+	>>+	>+	<	>>+	>+	<<<	<	>+	>+	>>+	4	5	2	1
it6	Lazio	69	12	>>+	>>+	<<<	<	>>+	>+	>>+	>>+	<	>>+	>>+	>>+	8	1	2	1
Se08	Övre Norrland	69	-39	<<<	>+	<	>>+	>>+	<<<	<<<	<	>>+	<	>>+	<	4	1	4	3
uke	Yorkshire and The Humber	69	-21	>>+	<	>>+	<<<	<	<	>+	>+	>>+	<	>+	<<<	3	3	4	2

Region's Code	Region's Name	1987	Gained Positions (1999-1987)	Population Density ZDLDENSID	Aging of the Population CP1	Market share of Work CP2	Regional dynamics CP3	Determining factors of Regional competitiveness CP4	Basic factors of Development CP5	Economic - residential regional attraction CP6	R&D Public CP7	Potential of development CP8	Education: Pupils CP9	Degree of urbanization CP10	pressure per capita: demographic CP11	Number of componentes with rdo >>+	Number of componentes with rdo >+	Number of componentes with rdo <-	Number of componentes with rdo <<-
At22	Steiermark	66	-10	<	<	>>+	>+	<<<	>>+	<<<	>+	<<<	>>+	<	<	3	2	4	3
be2	Vlaams Gewest	66	15	>>+	>+	>+	<	>>+	>+	>>+	<<<	<	<	<	<	3	3	5	1
Fr82	Provence-Alpes-Côte d'Azur	66	8	>+	<	<<	>+	>>+	<<	>>+	>>+	<<<	<	>+	>>+	4	3	2	3
It11	Piemonte	66	-3	>+	>>+	<	>+	>+	<	>>+	<<<	<	>+	>>+	<	3	4	4	1
se0a	Västsverige	66	-25	<<<	<	<	>>+	>>+	<<<	>>+	<	<<<	>+	<	<	3	1	5	3
dec	Saarland	63	4	>>+	>>+	<	<<<	>>+	>>+	<<<	>+	<	<	>>+	<<<	5	1	3	3
Fi14	Väli-Suomi	63	-33	<<<	<	<	>>+	<<<	<<<	<<<	<	>+	>+	<<<	<	1	2	4	5
Se02	Östra Mellansverige	63	-11	<<<	>+	>+	>>+	>+	<<<	>+	<	>+	>+	>+	<<<	1	7	1	3
Se09	Småland med öarna	63	-15	<<<	>+	>+	>>+	>>+	<<<	<<<	<<<	>>+	<<<	>>+	<<<	4	2	0	6
ukc	North East	63	-26	>>+	<	>>+	<	<	<	<	>+	>>+	<	>>+	<<<	4	1	6	1
ukk	South West	63	15	>+	>+	>>+	>+	<	<<<	>>+	>>+	>>+	<<<	>>+	>+	5	4	1	2
deg	Thüringen	60	-19	>+	>>+	<	>+	<<<	>>+	<	>>+	<	<<<	>+	<<<	3	3	3	3
Fi13	Itä-Suomi	60	-49	<<<	>+	<<<	>>+	<<<	<	<<<	>>+	<	<	<<<	<<<	2	1	3	6
Fr23	Haute-Normandie	60	7	>+	<<<	<	>>+	>+	>+	<	<<<	<<<	<	>+	<<<	1	4	3	4
Fr62	Midi-Pyrénées	60	-8	<<<	>+	<	>>+	<<<	<<<	>>+	>>+	<<<	>>+	<<<	>>+	5	1	1	5
Se07	Mellersta Norrland	60	-16	<<<	>>+	<<<	>>+	>>+	<<<	<<<	<	>>+	<<<	>>+	<	5	0	2	5
At21	Kärnten	57	2	<<<	<	>>+	<<<	>+	>>+	<<<	<	<<<	<<<	<	>>+	3	1	3	5
def	Schleswig-Holstein	57	28	>+	>>+	>+	<	>+	>+	>+	>>+	<	<<<	>+	>+	2	7	2	1
Fr41	Lorraine	57	-13	<	<<<	<	>+	>+	>+	<	<	<<<	>+	>>+	<<<	1	4	4	3
Fr52	Bretagne	57	6	<	<<<	>+	<	<	<<<	>+	>>+	<<<	>+	>+	>+	1	5	3	3
it4	Emilia-Romagna	57	24	>+	>>+	>>+	>+	<	<	>+	<<<	<	>>+	>+	>>+	4	4	3	1
pt11	Norte	57	6	>+	<<<	>>+	<<<	<<<	>>+	>+	<<<	>>+	>+	>>+	<	4	3	1	4
Se04	Sydsverige	57	-5	<	>+	<	>>+	>>+	<<<	>+	>+	>+	<	>+	<	2	5	4	1

				Population Density	Aging of the Population	Market share of Work	Regional dynamics	Determining factors of Regional competitiveness	Basic factors of Development	Economic - residential regional attraction	R&D Public	Potential of development	Education: Pupils	Degree of urbanization	pressure per capita: demographic	Number of componentes with rdo >>+	Number of componentes with rdo >+	Number of componentes with rdo <-	Number of componentes with rdo <<-
Region's Code	Region's Name	1987	Gained Positions (1999-1987)	ZDLDENSID	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8	CP9	CP10	CP11	Number of componentes with rdo >>+	Number of componentes with rdo >+	Number of componentes with rdo <-	Number of componentes with rdo <<-
Se06	Norra Mellansverige	57	-27	<<	>>+	<	>>+	>>+	<<	<<	<	>>+	<<	>>+	<<	5	0	2	5
At12	Niederösterreich	54	5	<	>	>>+	<	<	>	<	<<	<	<<	<<	>>+	2	2	5	3
Fr22	Picardie	54	-2	<	<<	<	>	>	>	<	<<	<<	<<	<	<<	0	3	4	5
Fr81	Languedoc-Roussillon	54	2	<	<	<<	<	>	<<	>	>>+	<<	>	<	>>+	2	3	4	3
nl1	Noord-Nederland	54	-6	>	<<	>>+	<	>	>	<	>>+	>>+	>>+	>	<<	4	4	2	2
es3	Comunidad de Madrid	51	23	>>+	<	<<	>	>	>>+	>	<	>	>>+	>>+	>>+	5	4	2	1
Fr24	Centre	51	23	<<	<	>	>	>	<<	>	<	<<	<	<	<	0	4	5	3
It12	Valle d'Aosta	51	23	<<	>>+	>	>	>>+	>	<<	<<	>	<<	>>+	>>+	4	4	0	4
It51	Toscana	51	8	>	>>+	<	<<	<	<<	>	<	<	>>+	>>+	>>+	4	2	4	2
Fr72	Auvergne	49	18	<<	>	>	>	>	<<	>	>>+	<<	>	<<	<	1	6	1	4
gr3	Attiki	49	-8	>>+	>	<	<<	<	>	>	>	>	>	>	>	1	8	2	1
It13	Liguria	49	18	>>+	>>+	<<	<<	>>+	<<	<	>>+	>	>>+	>>+	>	6	2	1	3
At11	Burgenland	46	-9	<	>	>>+	<<	<<	>	<<	<<	<	<<	<	>	1	3	3	5
Fr61	Aquitaine	46	24	<	<	<	<	>	<<	>	>>+	<<	>	>	>>+	2	4	4	2
Es21	Pais Vasco	43	-17	>>+	>	<<	>	<	>>+	<	<<	>	>>+	>	<<	3	4	2	3
Fr26	Bourgogne	43	13	<<	<	>	>	>>+	<<	<	<	<<	<	<	<	1	2	6	3
fr3	Nord - Pas-de-Calais	43	1	>>+	<<	<	<	>>+	<	<	<	<<	>	>>+	<<	3	1	5	3
Fr51	Pays de la Loire	43	16	<	<<	>	<	<	<<	>	<	<<	<	>	<	0	3	6	3
It31	Trentino-Alto Adige	43	38	<	>	>>+	<	>>+	>	<<	<<	<	<<	<<	>>+	3	2	3	4
uk1	Wales	43	-10	>	<	>>+	<<	<	<<	>	>	>>+	<	>>+	<<	3	3	3	3
ukn	Northern Ireland	43	-2	<	<<	>	<<	<	<	<	>	>>+	<	>	<	1	3	6	2
Fr25	Basse-Normandie	40	8	<	<<	<	>	>	<<	<	<	<<	<	>	<	0	3	6	3
It33	Friuli-Venezia Giulia	40	30	>	>>+	>	>	>	<	<	<<	<<	>>+	>	>	2	6	2	2
It53	Marche	40	-7	>	>>+	>	<<	<<	<	<	<<	<	>>+	>>+	>>+	4	2	3	3

				Population Density	Aging of the Population	Market share of Work	Regional dynamics	Determining factors of Regional competitiveness	Basic factors of Development	Economic - residential regional attraction	R&D Public	Potential of development	Education: Pupils	Degree of urbanization	pressure per capita: demographic	Number of componentes with rdo >>+	Number of componentes with rdo >+	Number of componentes with rdo <-	Number of componentes with rdo <<-
Region's Code	Region's Name	1987	Gained Positions (1999-1987)	ZDLDENSID	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8	CP9	CP10	CP11	Number of componentes with rdo >>+	Number of componentes with rdo >+	Number of componentes with rdo <-	Number of componentes with rdo <<-
pt12	Centro (P)	40	8	<	>	>>+	<<	<<	<<	<	>	>>+	>>+	<<	>	3	3	2	4
Fr71	Rhône-Alpes	37	48	>	<<	>	>>+	<	<	>>+	>	<<	>	>	>	2	6	2	2
It71	Abruzzo	37	-15	<	>	<	<<	<	<	>	<<	<	>>+	>	>	1	4	5	2
pt13	Lisboa e Vale do Tejo	37	22	>>+	>	>	<	<<	>	>	>	>>+	>>+	>>+	>>+	5	5	1	1
Es51	Cataluña	34	10	>	>	<<	>	<<	>	>>+	<<	>	>	>	<	1	7	1	3
Fr21	Champagne-Ardenne	34	22	<<	<<	<	>	>>+	<	<<	<	<<	<<	>>+	<	2	1	4	5
be3	Région Wallonne	31	2	>	<	<	<<	>>+	<	>	>	<	<	<	<<	1	3	6	2
Fr53	Poitou-Charentes	31	25	<	<	>	<	<	<<	<	>	<<	<	<	>	0	3	7	2
It52	Úmbria	31	17	<	>>+	<	<<	<<	<<	<	<	<	>>+	>>+	>>+	4	0	5	3
it8	Campania	31	2	>>+	<<	<<	<<	<	>	>>+	<	>	>	>>+	>	3	4	2	3
It91	Puglia	31	-9	>	<<	<<	<<	<	>	>>+	<	>	<	<	>	1	4	4	3
Es22	Comunidad Foral de Navarra	29	8	<<	<	>	>	<<	>	<<	<<	<	>>+	<<	<	1	3	3	5
Es23	La Rioja	29	-14	<<	>	<	<<	<	>	<<	<<	>	>	<<	<	0	4	3	5
gr1	Voreia Ellada	29	-3	<<	>	>	<	<	<	>	>	>>+	>	<<	>	1	6	3	2
gr4	Nisia Aigaiou, Kriti	29	1	<<	<	>>+	<<	>	<<	<	>>+	>	>	<<	>>+	3	3	2	4
ie	Ireland	29	52	<<	<<	>	<	>	<	>>+	>	>>+	<	<<	>	2	4	3	3
itb	Sardegna	29	-3	<	>	<<	<	<	>>+	<	<	>	>	<	>>+	2	3	6	1
Es52	Comunidad Valenciana	26	15	>	<	<<	>	<<	>	>	<<	>>+	>	>>+	>	2	6	1	3
It92	Basilicata	26	-19	<<	<	<<	<<	>	>	>	<<	>	<<	<	<	0	4	3	5
ita	Sicilia	26	0	>	<<	<<	<<	>	<	>>+	>	>>+	>	>>+	>	3	5	1	3
Es24	Aragón	23	3	<<	>	<	<	<	<	<	<<	>	>>+	<<	<<	1	2	5	4
Es53	Illes Balears	23	40	>	<	<	>	<	>	<<	>	>	<<	>>+	>>+	2	5	3	2
es7	Canarias (ES)	23	14	>	<<	<<	<	<	>>+	<	>	>>+	<	>	>>+	3	3	4	2

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Region's Code	Region's Name	1987	Gained Positions (1999-1987)	ZDLDESID	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8	CP9	CP10	CP11	Number of componentes with rdo >>+	Number of componentes with rdo >+	Number of componentes with rdo <-	Number of componentes with rdo <<-
Es12	Principado de Asturias	20	-16	<	>>+	<<	<	<	<	<	<	>+	>>+	<<	<<	2	1	6	3
Es13	Cantabria	20	-5	<	>+	<<	>+	<<	>+	<<	<<	<	>+	<	<	0	4	4	4
Fr63	Limousin	20	24	<<	>>+	>+	<<	>+	<<	<<	>>+	<<	<	<	<<	2	2	2	6
gr2	Kentriki Ellada	20	21	<<	>+	>+	<	>>+	<<	>+	<	>+	>+	<<	>+	1	6	2	3
Pt15	Algarve	20	43	<	>>+	>+	<<	<<	<<	<	>>+	>>+	<<	>>+	>>+	5	1	2	4
Es61	Andalucía	17	9	<	<<	<<	<	<<	>+	>>+	>+	>+	<	<<	>+	1	4	3	4
Es62	Murcia	17	-13	<	<<	<<	<<	<<	>+	<	<	>+	>+	<	>>+	1	3	4	4
Es11	Galicia	14	5	<	>>+	<<	<	<<	<	>+	<	>+	>+	<<	<	1	3	5	3
It72	Molise	14	-3	<	>+	<<	<<	>+	<<	<	<	>+	<<	<	<	0	3	5	4
It93	Calabria	14	5	>+	<<	<<	<<	>>+	<	>+	>+	>+	<<	<	>+	1	5	2	4
Es41	Castilla y León	9	6	<<	>+	<<	<<	<	<	<	<	<	>>+	<<	<<	1	1	5	5
Es42	Castilla-la Mancha	6	5	<<	<<	<<	<	<	<	>+	<<	<	<	<<	>+	0	2	5	5
Es43	Extremadura	3	4	<<	<<	<<	<<	<<	<	<	>+	>+	<<	<<	>+	0	3	2	7
Pt14	Alentejo	3	8	<<	>>+	>+	<<	<<	<<	<<	>>+	>>+	<	>>+	>+	4	2	1	5

Note: (>>+ value above the third quartile (greater than 75%); >+between the second and third quartiles (from el 50% to 75%); <-between the first and second quartiles (from 25% to 50%); <<-less than to the first quartile (less than 25%))

Source: own information

