

# **PHD THESIS**

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## **DETERMINING FACTORS OF REGIONAL DEVELOPMENT IN THE EUROPEAN UNION AND IN HUNGARY**

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KAPOSVÁR  
2005.

# 1. PRELIMINARIES AND OBJECTIVES OF THE STUDY

The dissertation deals with the *determining factors influencing the regional development* in Hungary and in the European Union (EU).

In the recent days, primary attention has been paid to the development in Hungary, the EU and in non-EU countries as well. The success of the European Integration is unquestionable; and the recent challenges, such as globalization, economic competition, and the fight against terrorism have encouraged the member states to strengthen their cooperation even more.

The role of distance and space has undergone a transformation. In the changing economies due to the globalisation, one of the strongest processes is the strengthening of localization. Space has always had outstanding role in the development of Europe. Depending on the setting conditions of economic activities connecting and joining different parts of the continent, the geographic situation of dynamic regions changed in the developing periods. Due to the different degree and quality of development, however, Europe became unequal.

What factors determine the development of inequity and the development of certain areas? What reasons and causes can be seen among these? Which tools contribute or distort the development. And in the end, which areas are considered as developed and less developed? The dissertation searches the answers on these questions.

The objective of the dissertation is to define, analyse and group the factors determining the development in 254 regions of the EU-25 with statistical tools (cluster analysis, factor analysis). Based on the results obtained it gives the static development situation of the EU-25 countries in year 2002, which identifies the well-developed, less-developed and under developed areas. Further aim of the thesis is to give recommendations on the solution of the existing regional challenges.

*It is also targeted* to find out how the join of two another candidates (Romania and Bulgaria) will influence the regional development status of the

EU and what additional measures will have to be implemented after the next enlargement process.

*In order to achieve the above mentioned objectives, the following tasks were done:*

- Analysis of the *economic development* of the regions of the EU, based on that the level of Gross Domestic Value (GDP) expresses the “value producing power” of the economy of an area.
- Analysis of the *infrastructural facilities* and the quality of *human resources*, as the development state of the infrastructure and the skill and cumulative knowledge of labour force are determining from the aspect of the adaptability and competitiveness of the regional economies.
- The quality of human capital highly relates to the level of *Research and Development* (R+D), therefore, the relation between the R and D expenses and the competitiveness of the regions are also analysed. This helps to reveal the regional differences in the level of R and D activities.
- The *ability to attract private capital* in the regions can be the basis of the structural renewal. Attraction of foreign capital is essential to a structural change and successful development of a region that will get high technology, modern products and marketing knowledge only in this way. The author intends to reflect on that the investors primarily make their decisions by considering the infrastructural background and the quality of the human capital and the combination of favourable factors; that is, not only one factor.
- Crucial factors of regional inequalities are also the *peripheral geographic situation* and the *quality of the environment*, therefore these features are also aimed to be analysed.
- Also the *national economy* highly influences the development of the regions, because it can affect the directions and opportunities of the development, thus the thesis analyses this factor as well.

## 2. MATERIAL AND METHOD

The structure of the dissertation follows the requirements of the PhD Doctoral Regulation. The analysis covers 213 regions of the EU-15, 41 regions of the ten new member countries and 14 regions of Romania and Bulgaria, the candidate countries. In total, 268 regions were involved in the analysis of the factors influencing the regional development.

The analysis is based on secondary data. The basic data analysed statistically were selected out of the database of the EUROSTAT, the Hungarian Statistical Office and from other internet sources.

The aim of the dissertation is to introduce the reader a position and based on it new regional models by applying a method of assorting the population according to one of its criteria, using factor and cluster analyses. These methods are mathematical-statistical tools making enable to measure complex definitions. The aim of the factor analysis is to replace the whole of the variables involved in the analysis with an artificially made group of so called main component variables. The mentioned method was necessary, because as a result such new and complex indicators are calculated, which are in relation with the basic data, correlation between them is calculable, and thus the content of the factors can be identified (e.g. chapter showing the human resource analysis). Another statistical method used is cluster analysis. This method is suitable to in-group different observational units, which was used in case of the analyses of transportation and telecommunication infrastructure, human resources, GD and innovation.

The factors determining the regional development analysed in chapter Results, are the following:

- Based on the data of Eurostat, on *regional level*, the following can be analysed:
  - GDP
  - Human resource and human capital
  - Infrastructure

- Transportation infrastructure
  - Social infrastructure and tourism
    - Research and development activities and innovation
- Based on the data of Eurostat, on *national level*, the following can be analysed:
- Infrastructure
    - Energy
    - Telecommunication
  - Foreign capital
  - Role of national payments
- Based on the data of Eurostat, can *not* be analysed:
- Quality of environment

Consequently of all above mentioned, the main factors of the model regional development are GDP, human resource, transportation infrastructure, social infrastructure and tourism, R and D; and the side factors are the marine and air transport. These later factors were considered, because in the author's opinion regional development is influenced by the geographic situation and the consequent advantages and disadvantages.

Scores were used to define the regional development. The regions were given points on the main five factors (GDP, transportation infrastructure, human resource, tourism and innovation, social infrastructure) and the two side factors (marine and air transportation). In case of the main factors, the most developed three regions were given three points, while in case of side factors it was 1 point only. Differentiation of the two groups of variables was necessary, because, in case of main factors, a group was formed by several criteria, therefore these have a higher informational value; while in case of side factors, the variable is a "group" on its own.

As word editor, software of Microsoft Word, processing of data, and creating diagrams Microsoft Excel and Power Point was used for. Statistical analyses were done with the software Statistical Package for Social Sciences (SPSS 9.0).

### 3. RESULTS

The model based on deep analysis of the factors influencing the regional development in the beginning of the 21<sup>st</sup> century, shows the development situation of the EU-25 and two candidates (Table 1).

**Table 1: Figures of the regional development model for EU-27 (2002)**

Scores	Number of regions	Level of development	Sign in map	Share (%)
15 points	4	Well-developed	1.	1.50
14 points	6	Well-developed	1.	2.23
13 points	19	Well-developed	1.	7.08
12 points	22	Well-developed	1.	8.20
11 points	42	Developed	2.	15.67
10 points	44	Mid- Developed	3.	16.41
9 points	31	Mid- Developed	3.	11.56
8 points	30	Mid- Developed	3.	11.19
7 points	27	Less developed	4.	10.07
6 points	17	Less developed	4.	6.34
5 points	15	Under-developed	5.	5.59
4 points	10	Under-developed	5.	3.73
<i>Malta:</i>	1	n. a.		0.37
Totally:	268			99.94

*Source:* own calculations (original data source: [www.europa.eu.int/comm/eurostat](http://www.europa.eu.int/comm/eurostat))

In case of four regions (Wien, Brussels, Noord-Brabant and Limburg), outstanding figures can be seen. These top developed regions are followed by 6 well-developed regions less behind them. Out of these, two are situated in the Netherlands as well (Friesland, Zuid-Holland), another two are in the United Kingdom (Greater Manchester, Merseyside), one is in Belgium (Vlaams Brabant) and the whole of Luxemburg. *Out of the 51 most developed regions*, 4 can be found in Austria, 6 in Belgium, 4 in Germany, 3 in Spain, 1 in Finland,

4 in France, 3 in Italy, 10 in the Netherlands, 1 in Sweden, 1 in the Czech Republic, 12 in the United Kingdom and the whole of Denmark and Luxemburg (*Map 1*).

The following belong to the ten *least developed regions*: Severozapadjen, Seversn Tsentralen, Yugozapaden in Bulgaria, North-East and South-West Romania, South Great Plain in Hungary, Vychodné in Slovakia, Swietokrzyskie in Poland, Magdeburg in Germany and Dytiki Macedonia in Greece. Totally, out of 69 less developed regions, 5 can be found in Bulgaria, 6-6 in Germany and Hungary, 15 in Poland, 8 in Romania, 3 in Slovakia, 5 in Greece, 4 in Spain, Portugal, Italy and the Czech Republic, 1 in Austria and 2 in the United Kingdom, and also Latvia and Lithuania belong here. Out of these regions, 26 can be found in the former EU-15 and 43 in the new member countries.

Almost 9 percent of the regions are considered as under-developed, another 17 percent is less developed. This means that 26 percent of the regions are under the critical level from the aspect of regional development. Well-developed regions represent 19 percent, and developed regions 15 percent.

Out of the whole area of the EU-27, 26 percent is developed, 40 percent is mid-developed, and 34 percent is less developed. Out of the total population, 38 percent lives in developed regions, 30 percent in mid-developed and 32 percent in less developed regions. The smallest share is represented by the developed areas, however, the highest share of the population lives here; therefore, the density of the population is the highest here, 107.16 hd/square km. In case of the mid-developed areas it is 56.24 hd/km<sup>2</sup>, and at the worst level the density is 66.92 hd/km<sup>2</sup> (*Table 2*).

**Table 2: The share of different development levels by area and population (2002)**

Groups	Area (000 km <sup>2</sup> )	Share (%)	Population (million hd)	Share (%)
1. Well-developed regions	405,16	9,30	72,19	22,77
2. Developed regions	720,69	16,65	48,46	15,25
3. Mid-developed regions	1719,18	39,71	96,69	30,49
4. Less developed regions	1009,44	23,36	67,70	21,38
5. Under-developed regions	474,95	10,97	31,65	9,99
Malta	0,33	0,01	0,39	0,12
<i>Totally:</i>	4329,75	100,00	317,08	100,00

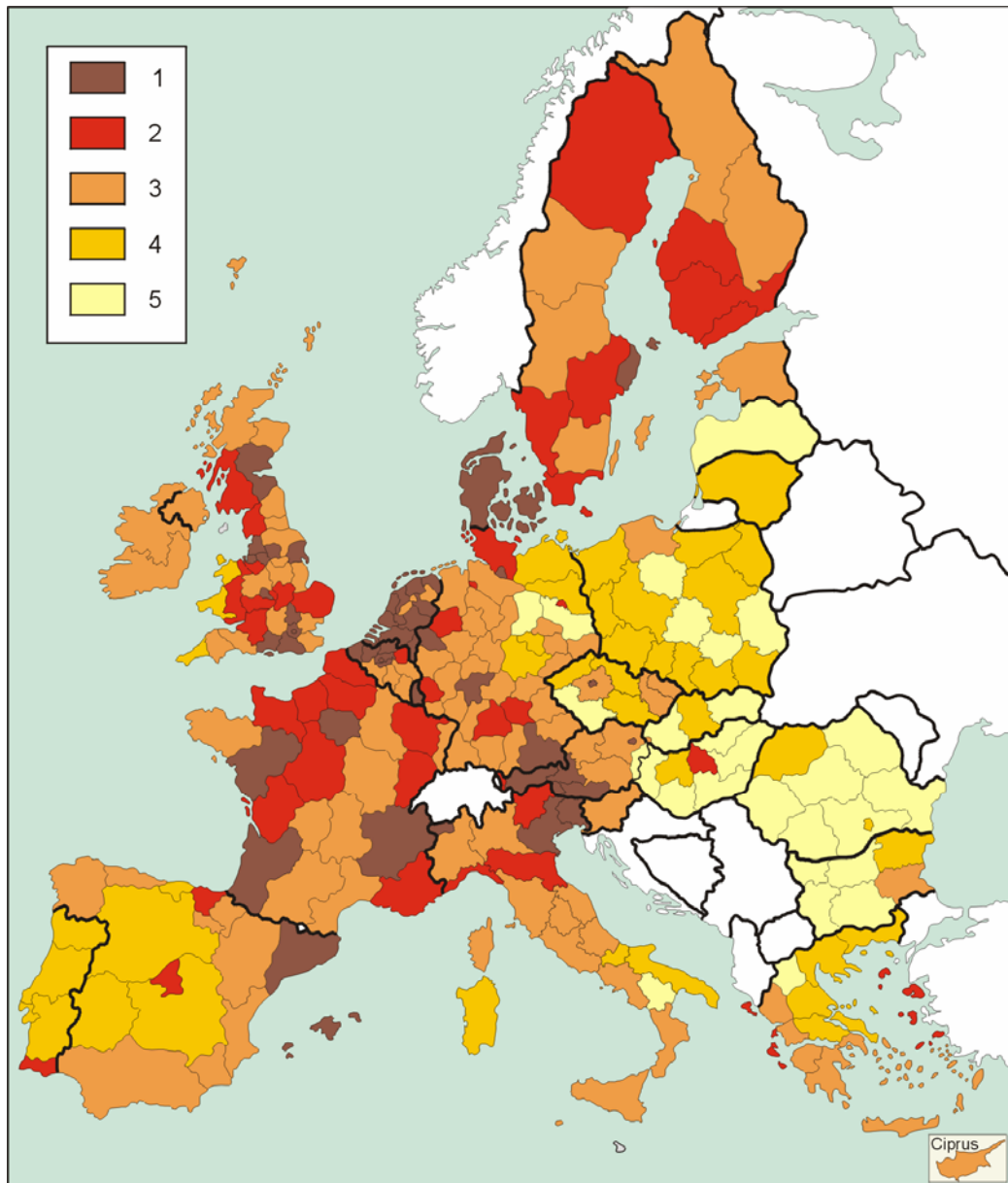
*Source:* own calculations (original data source: [www.europa.eu.int/comm/eurostat](http://www.europa.eu.int/comm/eurostat))

Conclusions on the development state of Hungary:

- *Region of Middle Hungary* is the most developed from the aspect of the whole country. However, in the EU-25, it belongs “only” to the developed category.
- The following development level belongs to the *Region of Middle Transdanubia*, but it is less developed in EU-25 context.
- *The regions of West and South Transdanubia, North Hungary, North Great Plain* belong to the least developed areas
- And the least developed region is *South Great Plain*, from all aspects considered.



*Map 1. Model showing the regional development status of the EU-27 (2002)*



*Legend: 1. Well-developed regions, 2. Developed regions, 3. Mid-Developed regions, 4. Less developed regions, 5. Under-developed regions*

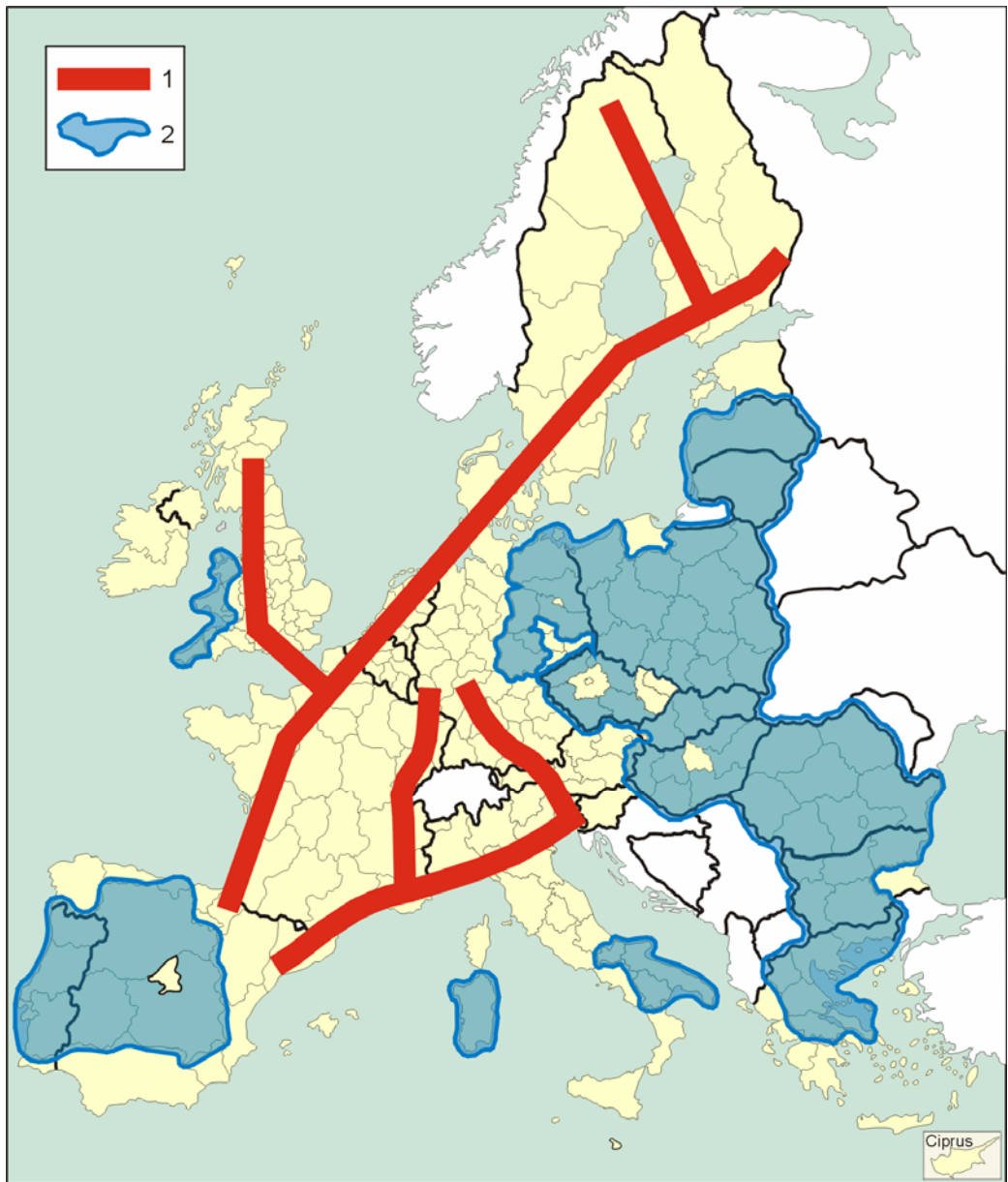
*Source: own graph based on own calculations (original data source: [www.europa.eu.int/comm/eurostat](http://www.europa.eu.int/comm/eurostat))*

## 4. CONCLUSIONS

Conclusions made based on the regional development model of EU-27:

- According to the analysed five main and two side factors, well defined axes of well-developed (1) and developed (2) regions can be seen. These two development lines are shown by Map 2.
- The first axis starts from South Finland, goes through the southern parts of Sweden, Denmark and North-Germany, the Netherlands, Belgium, the western and the northern parts of France and ends in the region Pais Vasco in Spain. Two offsets of the axis can be seen from Finland, one lays towards Norrland on the Sweden Belt, another to the United Kingdom
- Another axis crosses the southern part of the continent. It starts from the region of Cataluña (Spain) to the east along the coast, lays across the North-Italian coast down to the Slovenian border. Also two offsets are seen: the axis starting in the region Provence-Alpes-Côte d'Azur of South France goes through East-French and Luxemburg and ends in the West-German territories. The other line starts at the beginning of the axis also to the North, through the western parts of Austria up to the region Damstadt in Germany.
- Another 8 well-developed areas can be seen far off the axles, which are mainly capitals and their regions: Madrid, Wien, Prague, Berlin, the regions Algarve in Portugal, Ionia Nisia in Greece and Voreio Aigaiio.
- Also the underdeveloped and less developed territories of the EU are shown by the model. An “amoeba” of the CEE countries can be seen in Map 2. It covers the new member countries (excepting Estonia, Cypress and Slovenia) and the whole of the two candidate countries, also a large part of Greece with the exception of the islands and the western parts.
- Another three smaller “amoeba” can be circumscribed: one of them is situated in South-Italy, another in the middle Spanish territories and the whole of Portugal, and the third one can be seen in case of the marginal areas of the English western coast

**Map 2: The “axels” of the developed and the “amoebas” of the less developed regions of the EU**



*Legend: 1.Axle of developed regions 2. Amoeba of less developed regions*

*Source: own graph based on own calculations (original data source: [www.europa.eu.int/comm/eurostat](http://www.europa.eu.int/comm/eurostat))*

## 7. NEW SCIENTIFIC RESULTS AND FINDINGS

1. Based on the selected indicators, the main factors of the regional development were defined, analysed and modelled in the regions of the current and candidate states of the EU. The models are based on factor and cluster analyses, the results are shown on the author's own maps.

The models defined:

- Gross Domestic Product regional model
- Human resource regional model
- Land infrastructure regional model
- Telecommunication infrastructure national model
- Tourism and social infrastructure regional model Innovation regional model
- EU-15 national public expenditure model

2. Based on statistics, it was the first time when 254 regions of the EU-25 and those of the two candidates were analysed, compared on regional development level.

3. After having summarised the results of the indicators, the regional development model of the EU-25 was created. The results of the survey has shown that based on the factors involved, the developed regions of the EU are situated by two main axles, while the less developed areas form amoebas.

4. It was stated that according to the indicators involved, the new member states and certain regions of the three southern cohesion countries and the western costal areas of the United Kingdom are the less developed regions.

5. I have recommended certain measures to be introduced by the structural policy of the EU, which contribute the development of the less developed areas.

6. The analysis of the factors influencing the regional development covered the Hungarian regions as well. These were also analysed based on the complex indicators of the survey. Based on the results obtained, the regions of Hungary was put in order by their development stage, and were compared with the rest 261 regions of the EU; meanwhile the attention was called on the severe structural deficiencies of the Hungarian regions.

## 6. RECOMMENDATIONS

Challenges defined on the basis of the development stage 2002:

### *1. Transportation infrastructure*

- It is necessary to integrate and modernize the network of the roads and railways, in order to create a more efficient connection between the former and the new member states.
- The connections to trans-European networks have to be improved in order to make it fully available for each region.
- The transit roads need improvement primarily to develop the trade between the new member states, because their long term economic development can only be achieved in this way.
- The short distance marine transport needs improvement, which especially important for the peripheral regions and islands; at the same time, the connections between different types of transport have to be improved.
- A certain part of the EU budget for motorway investments should be expended on railway and marine transport.
- Strategy is needed on the development of the availability of outer regions and their connections to the European continent, because the priorities of trans-European networks do not cover this issue.
- The telecommunication and energy-supply should be improved along Europe.

### *2. Human resource*

- Employment rate should increase all over the EU, when great emphasis should be laid on creating new work places; the labour productivity and its quality need improvement.
- Such receipting labour market is needed, where the unemployment rate and the social and regional differences in work availability are low.

- In the EU policy, it is also important to lay greater emphasis to increase the investments in human capital and improve the educational level.
- Especially in the new member states, it is necessary to widen the range of higher level professional education and to make life long learning possible for more people.
- The economic potential of women should be better exploit especially in the EU-15. Therefore, appropriate social infrastructure is necessary to establish.
- Entering employment should be more attractive for more people and actions should be done about avoiding early left of employment, with rewarding works and suitable working hours.
- The employment challenges of those people have to be solved who not easily get jobs, such as handicapped, ethnical minorities and migrants.

### *3. Innovation*

- Relations between research institutes and industrial companies have to be deepened. Availability of financing and know-how's should be improved.
- Greater expenditure is needed in the R and D sector, because innovation is the key of the knowledge based society.
- Huge regional differences in R and D expenses of different companies should be lowered; especially in case of the new member countries a higher innovative potential is necessary.

## 7. PUBLICATIONS IN THE FIELD OF THE DISSERTATION

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