The spatiality of the creative micro-regions in Hungary

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Today the economic environment is influenced and transformed by other background processes besides globalisation, which worth being and have to be paid attention to as area organiser powers. Nowadays the development of globalisation processes unambiguously shows that human factors and the knowledge based on it may become the future key factors to development. We live in a world where knowledge, human creativity and the ability to process infinite information are also one of the prime movers of development.
This study aims to analyse how Hungarian micro-regions can be classified according to the position of the creative class. The starting question is whether the micro-regions as regional units are suitable to examine the spatial position of the creative class.
In the analysis of the Hungarian micro-regions I take Richard Florida's study dealing with the creative class as a starting point. I examine the database and its indicators developed for Hungarian micro-regions with multivariable statistical methods, like Multidimensional Scaling (MDS) and Hierarchical cluster analysis.

Keywords: creative class, knowledge-based economy, micro-regions, regional analysis

1. Introduction

In the global contest *not the material possessions* but instead the knowledge and the relationship capital have become factors of vital importance, the most important movers of economic development (Enyedi 2000). In regional science, knowledge is identified as a *decisive factor of regional development* (Lengyel 2003; Rechnitzer – Smahó 2005; Varga 2005). Considering the changes of factors determining regional growth and development we can find also in Hungary that in the years after the change of regime those areas stood out where the human factors were concentratedly at present. Nowadays the quality of *human capital* – according to several recognised academic trends, its innovativity and creativity – *and economic development are in very close connection with each other*, furthermore, the success of a region is among others determined by the available labour force's ability to innovative economic performance. (Lengyel–Rechnitzer 2004; Varga 2009). Naturally, besides skilled

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workforce several factors play a role in the economic performance of a region, but today knowledge, human creativity and the ability to process information have become one of the most important factors of development. Consequently, knowledge-based economic development strategy can be applied successfully in regions where the human resource of a required quality is available (Lengyel 2007).

The theory worked out by American economist-geographer Richard Florida stands out from the trends tracing regional development back to the quality of labour force. Not only did Florida introduce the concept of creative class but he also worked out the method suitable to examine the creative class of the city regions in the USA. (Florida 2000a).

2. Knowledge-based economy and the creative class

It turns out from the most widely accepted definitions of knowledge-based economy that it is quite a complex concept and it has wide-ranging properties, which can be approached from several aspects. (OECD 1996; OECD 2005, ESRC 2005; Kok 2003; DTI Competitiveness White Paper 1998; Leadbeater 1999; Huggins–Izushi 2008; Leydesdorff 2006; WBI 2007; Lengyel B.–Leydesdorff, L. 2008). There is only one common segment of the definitions, which emphasises the outstanding role of the creation of knowledge. It can also lead to the conclusion that mapping knowledge-based economy with indicators cannot happen with some selected ones but a complex, multivariable analysis has to be applied.

The explanations of global economy linked to knowledge can be classified according to basically two kinds of logic:

1. The "knowledge-based economy" as a programme has rather an *economic political character*. The economic political public opinion considers the R&D ability as the pledge of succeeding in knowledge-based economy (Bajmócy 2008; Lengyel B. 2008).
2. The other explanation of knowledge-based economy is connected to the *human capital side*; it plays an important role in creating and spreading knowledge (Varga 2009).

The latter forms the subject of the study, that is *the special segment of the human capital side of knowledge-based economy, the analysis of the position of the creative class*, and it does not deal with the economic political side of knowledge-based economy. János Rechnitzer and Melinda Smahó (2005, p14) highlight that *"national regional research has so far neglected the analysis of knowledge as a new component of regional development"*, so – although in this field there have been significant steps forward recently – I intend to move in this direction with my research. Naturally, the classification of the explanations of global economy linked to knowledge according to two kinds of logic cannot be separated, since the quality of human capital essentially influences whether it is possible to use knowledge-

based economic development strategy in the given area. I go back to this briefly in the analytic part of the study.

In the analysis of the character of knowledge-based economy a basic question is *what moves knowledge-based economy*? According to one of the accepted answers, which can be approached from the human capital segment of knowledge-based economy, the development possibilities of certain regions are greatly determined by the quantity and quality of the human resources in the area. (Rechnitzer et al. 2004). According to Florida (2002a) in the 21st century *not simply knowledge-based economy,* but rather *a creative economy was created*, which *is moved by a special segment of human recourses, the creative class.*

3. Richard Florida's basic model

Florida explains economic development with the so-called *3T model*, that is *Technology*, *Talent* and *Tolerance*. The point of this is that besides technology, as one of the – generally accepted – keys to economic growth, talent and tolerance are also considered as forwarders of the creative economic growth. According to Florida these three factors are necessary but in themselves not sufficient conditions of economic development. Florida claims that if a region has these three factors and they can also work together well then the region is able to show development, otherwise it falls behind (Florida 2002a):

1. *Technology, the first T*: About the first component of the 3T, technology, neoclassical Robert Solow says in his work awarded Nobel Prize that boosting economic development rather depends on the increase of the extent of technological progress than on income accumulation or market extension studied until then (Lengyel–Rechnitzer 2004). By technology, Florida means *the economic-technological development of the given area, which means the existence of high-tech industries*. He finds their presence a necessary but not sufficient condition for a region to be able to become a creative centre and to attract further creative people and businesses, which can generate dynamic economic growth and higher employment.
2. *Talent, the second T*: Talent as the second variable can be traced back to Nobel Prize winner Robert Lucas's theses emphasising the role of human capital. This key factor means *the quality of the human resources available*. Highly skilled people can create new knowledge. They can efficiently and creatively use their already existing and new knowledge, and make values by this. Higher education is not necessarily needed for creative work; however, most creative workers have degree. The members of the creative class usually work in knowledge-intensive industries and have extensive creative capital, which they use in their work as well as in

other fields of their lives. Universities as catalysts have an important part in producing the creative class.

3. *Tolerance, the third T*: The third, new factor of Florida's 3T model *may be its most important, decisive variable.* Tolerance itself can be approached in several ways, and this factor is one of the cornerstones of the creative class's way of life.

Florida regards tolerance as a factor that essentially influences the model, because technology and talent are variables which have already been known and mentioned as key factors, which were earlier used to describe the economic development of some regions as well. Compared to them, the appearance of tolerance in the model is a new feature. Since the aim for individualism is a common characteristic of the creative class members. They like being their own masters and defining their identity themselves in a way that it expresses their creativity. They are open-minded to diversity as a thing that is needed to display and enrich their creative potential (Florida 2004). *In creative economy the competitive regions recognise the creative workforce*, they accept that it has to be judged by expertise and not by appearance. "*Cities and also regions lose competitiveness if they do not reflect the new culture"* (Florida 2002a). According to the theory, *economic development depends on creative people's decisions on settlement*. And these people look for places which are colourful, tolerant and open to new ideas. This realisation makes it necessary to have tolerance appeared as a variable in the 3T model of the growth of the new and creative economy. Since tolerance helps unfold talent, which forwards economic development. Florida claims with this that there is a close connection between receptive and open cultural environment and economic development (Florida 2005).

Florida gives a detailed description about his method in none of his works, the reader has to make it out and interpret. Besides the method, I found deficiencies in presenting the indicators and the indicators mapping them. However, it has advantages and disadvantages as well. The advantage of the not completely defined method that studying and taking it as a starting point we can make our own 3T model of an examined country and region. Its disadvantage definitely is that mapping the method and its indicators step by step is impossible. Florida uses *one or two indicators to define each index* in most cases in his 3T model. The own model later contains the indicators that are relevant, but it is necessary to involve further indicators according to the characteristic features of the examined regions.

4. The international adaptations of the model

Florida's method and indicators can hardly be adapted in Hungary because of the American specialities, on the other hand, the aggregation level analysed by Florida

is too high compared to the microregional level I intend to analyse. I expect going through the benchmark examples to make answering these hypotheses easier.

The 10 international adaptations surveyed during the research involved extremely important experience relating the adaptability of the method in Hungarian micro-regions. Several authors found that while analysing European regional levels it is impossible to adapt the method totally, because *most of the indicators* belonging to the indicators which form Florida's 3T model *are unattainable from the database of different countries* (Andersen–Lorenzen 2005; Lengyel–Ságvári 2008; Hackler–Mayer 2008; Houston 2008; Zimmerman 2008). Several studies used much more indicators and complete indicator systems than Florida to achieve genuine results (Andersen–Lorenzen 2005; Clifton 2008; Hara 2008; Mellander–Florida 2007; Lengyel–Ságvári 2008) and used multivariable statistical analyses (Lengyel–Ságvári 2008; Sharp–Joslyn 2008). The other important experience is that in the analysis it is practical to make the overall examination of the selected regional level first, then after drawing the lessons and conclusions, *narrowing the involved regions down and making a further study (*Lengyel–Ságvári 2008; Andersen–Lorenzen 2005). This method can be entirely used for the regional level I have chosen, on the basis of the quite different development and characteristics of the certain domestic micro-regions.

All the studied international works are founded on Richard Florida's basic methodology and basic model, but we can state that each study without exception has something new which, after considering Florida's methodology carefully, is due to the characteristic features of the given country and the chosen regional level. After all this we can state that the international works approached the study of the creative class's regional position with *identical set of concepts, identical analytic methods and similar set of indicators*.

I can only use the experience of international adaptations based on Florida's methodology indirectly in my analysis, since the authors studied *cities, regions, city regions or workforce catchment areas* in international relation – except of Lengyel and Ságvári – which are not suitable for the regional level I intend to examine. From the international studies, only the city regions, the regional units used by Andersen and Lorenzen (2005), are similar to the microregional level which I have chosen as a basic unit for my analysis.

Naturally, the method I developed and intend to present is only a possible version of the way to interpret and analyse the spatial position of the creative class and the regional development in Hungarian micro-regions.

5. Analysis of Hungarian micro-regions

The majority of the reviewed analyses studied city region, workforce catchment area and microregion levels. The first two can correspond to the *intersectional region*

from the region concepts (Lengyel–Rechnitzer 2004), which is quite important and well interpretable from economic aspect, but which is very difficult to be mapped with statistical data, because its boundaries cannot be given accurately.

According to international practice, I would also apply workforce catchment areas or city regions as the basic unit of the analysis. In domestic data collection, micro-regions can be corresponded to workforce catchment areas most of all (Lukovics 2007; Lukovics 2008).

6. Used data

For developing the data, I collected basically the data belonging to the indicators that form Richard Florida's 3T model, and I founded on international and national studies. It is important to mention that the final data the analysis is based on *reached its final form after repeated refining.*

My work was made more difficult by *the limited amount of data available on microregional level* and the lack of *data* used in the basic model but *not collected in Hungary*. The overwhelming majority of the data regarding the 174 micro-regions is from the National Region Development and Region Organisation Information System. In addition, the number of patents are collected from the Hungarian Patent Office "PIPACS" industrial property rights database, the number of the public body members are from the Hungarian Academy of Sciences Public Body database, and I received the R&D data from the Central Statistics Office after personal data request.

While making the database I took several aspects into consideration, but I mostly aimed to use the latest data available in 2008 in the analysing part of the study. The database is built up from the *microregional data of 2006* and the *national census data of 2001*. It is true that the census data of 2001 shows the state 7 years before, but I could use only that because this is the latest complete data source which is available.

The database formed in this way contained *93 basic data*[2], from which the database that the analysis is based on was developed by making specific and rate indicators. In the next step I arranged the data *according to the 3T model*, thus Florida's Technology dimension was mapped by 11, Talent dimension by 26 and Tolerance dimension by 16 indicators. *I started the analysis with altogether 53 indicators*. It is to be noted that the disproportionate distribution of the indicator numbers belonging to the different dimensions does not mean the overrepresentation of the dimension mapped with more indicators. This is because rankings are made separately within each dimension and the final T index is made from the unweighted arithmetic average, so the number of indicators the dimensions consist of becomes indifferent during the calculation the final T index.

[2] Including the data used for the calculation of final T index correlation.

The analysis is not completely the adaptation of Florida's methodology and model, but based on the experience of the application of the basic model and its foreign use, an analysis which is supported by appropriate database and also provides methodological novelties compared to the basic model. In fact, I take the *main idea, the mental framework and the methodological milestones* and I adjust them to the characteristics of the regional unit I study. I mean by methodological novelties that *I use much more variables* to develop the model than Florida and the other authors, and I form the analysis to suit Hungarian characteristics.

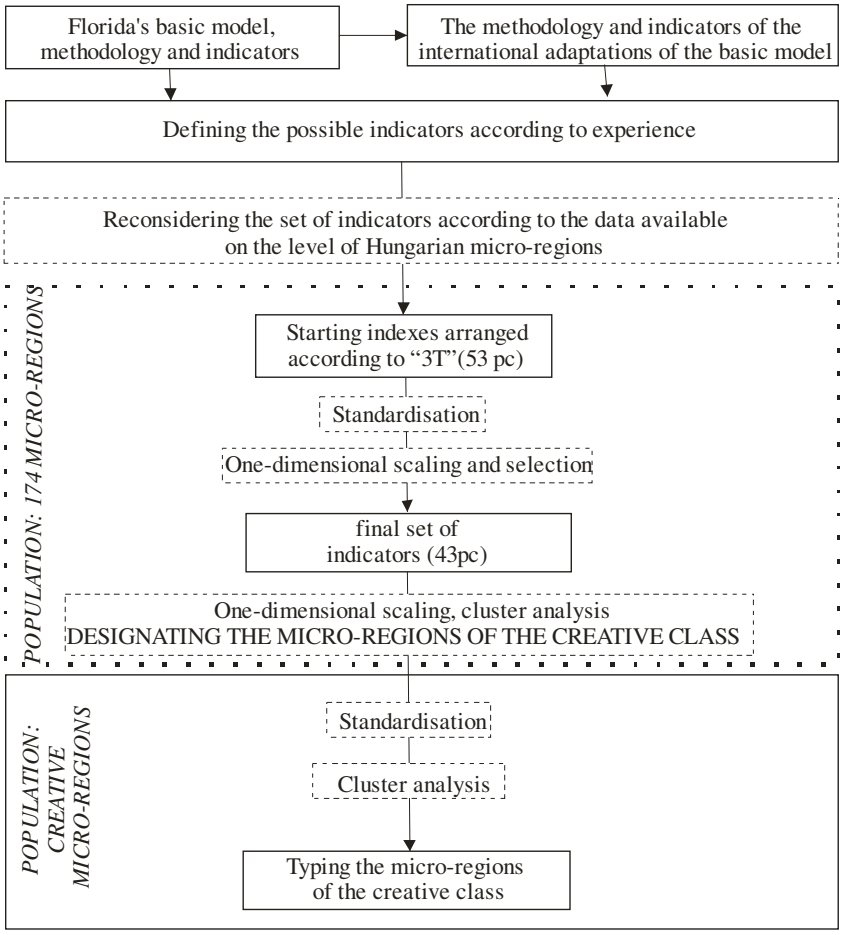
7. The methodology of the analysis

After standardising the 53 starting indicators of the database we intend to make the rankings of the micro-regions based on each T, then the final rankings based on it. On the basis of the reviewed analyses it became obvious that *each region of the whole area structure cannot be regarded as a place of where the creative class appears*, so several people attempted to sophisticate the analysis in a way that *they continued to make it with regions* which were *detached* according to certain aspects *as sampling population.*

The former idea, according to which the 174 micro-regions considered as sampling population should be narrowed down after examination to micro-regions where the creative class can more probably be found, follows also from Florida's works. According to him, it does not make sense even theoretically to examine regions with extremely different development level, thus *it is practical to detach and continue to examine the regions where the creative class is more concentratedly at present* than in the other ones. (Florida 2002b). The method which is suitable to narrow down is making a ranking with the help of a one-dimensional scale, and as a result the best performing micro-regions stand in the first places and the worst performing ones in the last positions. However, the main habitat of the creative class according to the one-dimensional scale can be chosen in quite a subjective way. In the interest of detaching as objectively as possible I use cluster analysis.

After this I expect that *the circle of micro-regions in which the creative class very probably appears can be selected from the 174 micro-regions*, thus in the following part of the analysis I consider the *n* pieces of micro-regions as sampling population. I continue differentiating the *n* pieces of micro-regions defined as the habitat of the creative class according to the 53 indicators with the help of cluster analysis (Figure 1). Finally, I refine the results with correlation calculation.

Figure 1. The logical system of the methodology of the analysis



Source: own creation

8. Final set of indicators

As I wrote in the methodological part, first I ran[3] a one-dimensional scaling on each T dimensions, as a result of which each microregion got a coordinate separately in Technology, Talent and Tolerance dimensions, on the basis of which they could be ranked. In the course of this examination all variables remained with appropriate S-stress value in the case of the es mapping Technology (S-Stress value: 0,03) and Talent (S-Stress value: 0,11) , but I had to select from the indicators in the case of Tolerance (S-Stress value: 0,2). After the selection with mathematical-statistical methods the *final database consisted of 11 indicators mapping technology, 25 indicators mapping talent and 6 indicators mapping tolerance, that is 43 indicators in total* (Chart 1).

The *final ranking number* based on the 3 dimensions together was formed by averaging the ranking numbers of the three one-dimensional scaling.

Chart 1. The final set of indicators

	The name of the indicators
TECHNOOGY	1. Number of patents per 10000 inhabitants in the microregion from 2000 to 2006 (pc)
	2. Number of R&D places per 10000 inhabitants, 2006 (pc)
	3. Investments of R&D places per 1000 inhabitants, 2006 (thousand HUF)
	4. Expenses of R&D places per 1000 inhabitants, 2006 (thousand HUF)
	5. Expenditure of R&D places per 1000 inhabitants, 2006 (thousand HUF)
	6. Actual total number of R&D places per 1000 inhabitants, 2006 (person)
	7. Actual number of scientific researchers in R&D places per 1000 inhabitants , 2006 (person)
	8. Number of public body members of the Hungarian Academy of Sciences per 10000 inhabitants, 2006 (person)
	9. Number of computers in public educational institutions per 1000 inhabitants, 2006 (pc)
	10. Number of work places with Internet supply in public educational institutions per 10000 inhabitants, 2006 (pc)
	11. Number of ISDN lines per 1000 inhabitants, 2006 (pc)
TALENT	12. Number of regular cultural activities per 1000 inhabitants, 2006 (person)
	13. Number of participants in regular cultural activities per 1000 inhabitants, 2006 (person)
	14. Number of students in higher education in all departments according to the seat of the institution per 1000 inhabitants, 2006 (person)
	15. Number of teachers working in higher education according to the seat of the institution per 10000 inhabitants, 2006 (person)
	16. Number of visitors to permanent theatres per 1000 inhabitants, 2006 (person)
	17. Number of registered businesses in health and social supply national economy sector per 10000 inhabitants, 2006 (pc)
	18. Number of registered businesses in education national economy sector per 10000 inhabitants, 2006 (pc)
	19. Number of registered businesses in financial transmission national economy sector per 10000 inhabitants, 2006 (pc)
	20. Number of registered readers in libraries of workplaces, higher education and other institutions per 1000 inhabitants, 2006 (person)

[3] I used the SPSS version 13.0 in my analyses.

	21. Number of cultural events per 1000 inhabitants, 2006 (pc)
	22. Number of participants on cultural events per 1 inhabitant, 2006 (person)
	23. Number of visitors to museums per 1000 inhabitants, 2006 (person)
	24. Number of other intellectual workers per 1000 inhabitants, 2001 (person)
	25. Number of workers in service sector per 1000 inhabitants, 2001 (person)
	26. Number of workers in service character industries per 1000 inhabitants, 2001 (person)
	27. Number of managerial and intellectual workers per 1000 inhabitants, 2001 (person)
	28. Number of people having qualifications in higher education per 1000 inhabitants, 2001 (person)
	29. Number of employees in financial activities per 1000 inhabitants, 2001 (person)
	30. Number of employees in health and social supply per 1000 inhabitants, 2001 (person)
	31. Number of employees in estate business and economic service per 1000 inhabitants, 2001 (person)
	32. Number of employees in education per 1000 inhabitants, 2001 (person)
	33. Number of employees with service occupations per 1000 inhabitants, 2001 (person)
	34. Number of employees with managerial and intellectual occupations per 1000 inhabitants, 2001 (person)
	35. Number of employees with other intellectual occupations per 1000 inhabitants, 2001 (person)
	36. Income of intellectual works per 1 inhabitant, 2006 (thousand HUF)
	37. Number of medical specialists per 1000 inhabitants, 2006 (person)
TOLERANCE	38. Number of immigrations per 1000 inhabitants, 2006 (person)
	39. Number of dependent men per 1000 inhabitants, 2001 (person)
	40. Number of single men and women over 15 per 1000 inhabitants, 2001 (person)
	41. Number of divorced people over 15 per 1000 inhabitants, 2001 (person)
	42. Number of ethnic minority members per 1000 inhabitants, 2001 (person)
	43. Number of families based on common-law relationship per 1000 inhabitants, 2001 (pc)

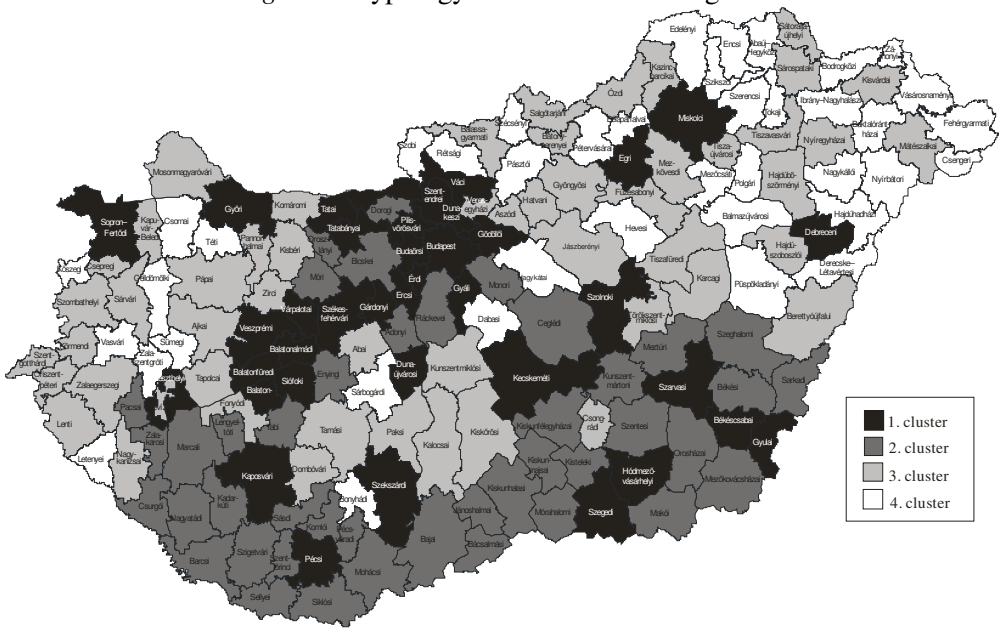
Source: own creation

9. Designating the creative micro-regions

As I have already mentioned, we cannot unambiguously determine the micro-regions considered to be the most probable habitat of the creative class with the help of one-dimensional scaling, since we cannot draw arbitrarily the limit after one microregion of the rankings. To be able to separate the creative and less prospering micro-regions, it is practical to use cluster analysis.

I chose *hierarchical clustering* for my analysis, because there had not been any former guiding regarding the number of clusters to create. Based on the structural chart of the hierarchical clustering procedure four clusters could be identified (Figure 2).

Figure 2. Typology of the 174 Micro-regions



Source: own creation

Those micro-regions got into the first cluster which are the most outstanding from the aspect of technology, talent and tolerance as well. The second, third and fourth clusters are built up from micro-regions that have lower value than the average according to at least one of the T dimensions, thus these micro-regions – as non-creative ones – are left out of the further part of the analysis. So in the following I continue analysing exclusively the micro-regions that form the first cluster.

10. Typing the creative micro-regions

The new sampling population to be studied is the 38 micro-regions belonging to the first cluster. The indexes used to analyse the new sampling population are identical with the ones used in analysing the 174 micro-regions, so I study the 38 micro-regions with the help of 43 indicators.

After standardising the indicators belonging to the 38 micro-regions once more, I create additional groups by means of cluster analysis, through the analysis of which I expect to be able to differentiate further and make the position of the creative class more accurate.

Since the number of clusters to be created – similarly to the analysis on the 174 micro-regions – was not definable beforehand, I ran *hierarchical clustering program*

again. It can be gathered from the merging chart of the clusters that designating 4 clusters is justified this time as well. The 1st cluster includes 5 micro-regions, the 2nd cluster includes 5 micro-regions, the 3rd cluster includes 23 micro-regions and the 4th cluster includes 5 micro-regions (Chart 2).

Chart 2. The Typology of the Creative Micro-regions

Super creative micro-regions	**„Spill-over" driven micro-regions**	**Potentially creative micro-regions**	**Moderately creative micro-regions**
– Budapest	– Budaörsi	– Békéscsabai	– Balatonalmádi
– Debreceni	– Dunakeszi	– Dunaújvárosi	– Balatonföldvári
– Pécsi	– Érdi	– Egri	– Balatonfüredi
– Szegedi	– Pilisvörösvári	– Ercsi	– Keszthelyi
– Veszprémi	– Szentendrei	– Esztergomi	– Siófoki
		– Gárdonyi	
		– Gödöllői	
		– Gyáli	
		– Győri	
		– Gyulai	
		– Hódmezővásárhelyi	
		– Kaposvári	
		– Kecskeméti	
		– Miskolci	
		– Sopron-Fertődi	
		– Szarvasi	
		– Székesfehérvári	
		– Szekszárdi	
		– Szolnoki	
		– Tatabányai	
		– Tatai	
		– Váci	
		– Várpalotai	

Source: own creation

I put a great emphasis on finding the main characteristics of each cluster, so after examining the values belonging to each cluster of the charts in the output of the cluster analysis thoroughly and one by one, I attempt to name the four clusters in a way that the name can reflect the relation of the micro-regions in certain clusters to the 3T dimension (Chart 3).

Chart 3. The Typology of the 38 Creative Micro-regions

Cluster	Technology (T1)	Talent (T2)	Tolerance (T3)
Super creative micro-regions	high	high	high
„Spill-over" driven micro-regions	relatively low	relatively high	relatively high
Potentially creative micro-regions	relatively high	medium	medium
Moderately creative micro-regions	medium	relatively low	relatively low

Source: own creation

After running the cluster analysis, it is remarkably important for interpreting the results to *define the most important characteristics of the certain clusters* according to criteria based on which the certain micro-regions were arranged into clusters. Technically, this can be realised by listing the average value of each variable in the given cluster into one of the outputs of the SSPS. After analysing these values we can unambiguously define what characteristics the micro-regions have to get in the certain clusters, in this way the four basic types of creative Hungarian micro-regions could be created (Figure 3):

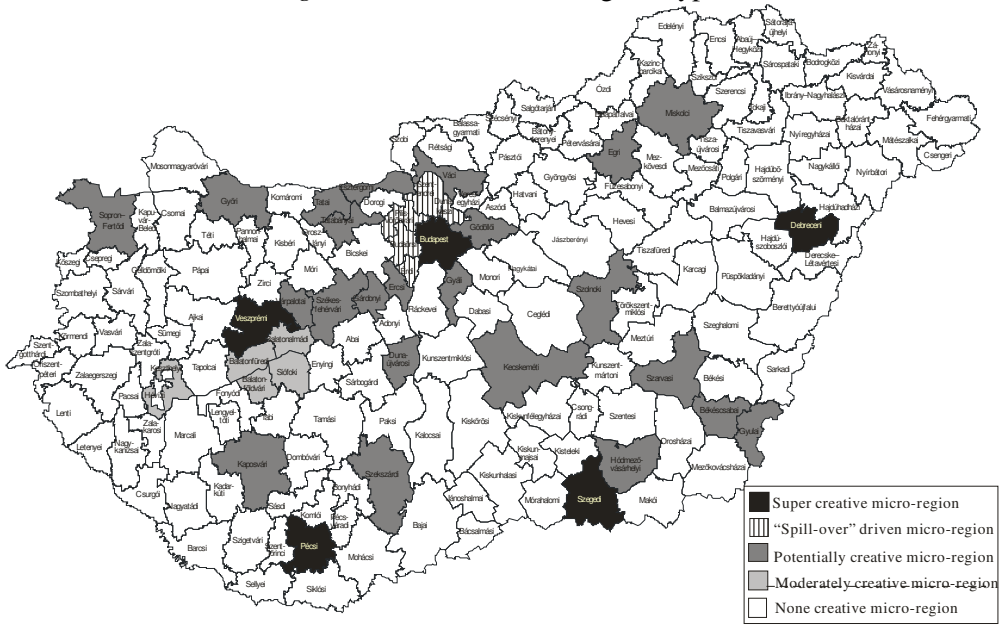
1. *Super creative micro-region*[4]: the 5 micro-regions where the variables of all the three T dimensions have the highest value. The micro-regions of Budapest, Debrecen, Pécs, Szeged and Veszprém stand out from the aspects of Technology, Talent and Tolerance. These micro-regions also stand in the first 5 places of the final rankings the one-dimensional scaling resulted in. The variables of all the three Ts show higher values than the average in this cluster than in the other three.
2. *„Spill-over" driven micro-region:* from the variables grouped according to the 3T those ones show a relatively high value which belong to the circle of Tolerance and Talent, while the variables of Technology have a relatively low value. This cluster includes the micro-regions belonging to the agglomeration ring of Budapest, bordering from north, north-west, west and south-west. Studying the social-economic processes nowadays we find that as a response to the urbanisation drawbacks being present in Budapest, on the one hand, the economic and political elite concentrated in Budapest moves to the agglomeration more frequently and commutes to Budapest to work, on the other hand, more and more businesses chose premises in settlements in the much more liveable and very close

[4] The super creative compound is from Florida's works. In addition, as to be noted, the micro-regions in this cluster compared to developed countries cannot be termed super creative.

agglomeration instead of Budapest. The creativity of the micro-regions of this cluster can be mainly attributed to the spill-over of the knowledge developed in Budapest.

3. *Potentially creative micro-region:* the variables in the Technology dimension of these micro-regions have a relatively high value; in addition, the variables of Talent are averagely high as well as in the case of the Tolerance dimension. The high value of the Technology variables is due to that in 90 per cent of the micro-regions in this cluster there is a seat or an affiliated department of some kind of higher educational institution. If we take a look at the final rankings of the one-dimensional scaling, the micro-regions belonging to the Potentially creative cluster are in the first third of the rankings on the basis of their ranking number.
4. *Moderately creative micro-region:* it represents micro-regions which have an average value in Technology dimension, while the variables of Tolerance and Talent dimensions are relatively low in value from the variables grouped according to the 3T dimensions. There are only 5 micro-regions in the cluster of the Moderately creative micro-region; however, they are close to each other geographically near Lake Balaton.

Figure 3. Creative Micro-region Types



Source: own creation

11. Conclusions

The study looked for the answer to the basic question that how it is possible to classify the Hungarian micro-regions according to the position of the creative class. The first statement based on the examination is that the *creative class cannot be mapped with one or two selected indicators; a complex indicator system is needed to be used*. The concept of knowledge-based economy is so complicated and complex that the analyses based on and started from it have to have a complex set of indicators so that the results drawn from the analysis can be correct.

Based on international studies and my own examination it can be stated that not all the 174 micro-regions have the "critical mass" of the creative class, because of this it is necessary to examine and type the so-called creative micro-regions separately. Based on the four groups which were formed after making the examination of the technology, talent and tolerance variables with one-dimensional scaling and the cluster analysis, the micro-regions that can be defined as creative micro-regions become unambiguously detachable. These detached, 38 creative micro-regions are the most outstanding in all the three dimensions.

As a result of the analysis, the 38 creative micro-regions form four groups according to the average extent of values of technology, talent and tolerance taken in each cluster and after evaluating these properties, named Super creative micro-regions, "Spill-over" driven micro-regions, Potentially creative micro-regions and Moderately creative micro-regions. The micro-regions involving cities with county rights are creative micro-regions with five exceptions (Nagykanizsa, Nyíregyháza, Salgótarján, Szombathely and Zalaegerszeg). These five micro-regions can be ranked among the non-creative micro-regions on the basis of technology, talent and tolerance dimensions together.

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