
THE RELATIONSHIP BETWEEN THE IMPROVEMENT OF HUMAN RESOURCE AND HUMAN INFRASTRUCTURE IN SARKAD REGION

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1. INTRODUCTION

Regional roles of communities organized to reach different aims have huge importance in the European Union. According to the EUROSTAT NUTS, regional level corresponds to Level IV. (its newer name is LU (Local Unit) II.) Today, this means the statistical regions in Hungary. Until 1997 the number of regions was 138. According to the decision of the Hungarian Regional Development Council the number of the regions has changed 168 since 1 January 2004 after verification of regions.

Regional level does not fit into the organization and institutional system of regional development. The notion of region and its place in public administration is clearer (LÁSZLÓ M. – MAGAY M. 2005). According to 1996: XXI. Law 5 § h ‘a region is a regional self-organizing unit which can be defined according to the functional relationship-systems among the settlements, the settlements of the region are in intensive relationship and they are next to each other’(CZUPPON V.2005). Then 2198/2003 (IX.1.) government regulation was published which is about the tasks of the improvement of public administration. Its II/2 part refers to regions as: ‘A region is a settlement-group whose settlements border one another; which have got functional relationship with one or possibly more centre(s). A region makes regional allocation of provision possible with the relationship of the member-settlements’ (SZABÓ-KOVÁCS B. 2005).

To react to this process regional development authority associations, provincial development regional associations, multi-functional regional unions have been established. Their role has been strengthening in 2007-2012 budget period because in the applications the type of union which leads to the aim must be presented. The more a project can be embedded to the social-economical processes, the bigger chance of realization the project has. During application, human resource map has a huge importance since a region, which knows what association it wishes to achieve its aims, has bigger chance to get support. The fundamental condition of regional function and effectiveness is that citizens take part in the project actively and committedly. The most important element of regional associations is the initiative coming from below which is able to activate and harmonize the social-economical-cultural relationships (BOKOR B. 1999). The unique characteristic

of the successful regions is the regional identity which means that initiatives have a unique, strong provincialism. In order to gain it strong moral behaviour is essential which leads us from individual interest to common interest (LUKOVICS M. 2004).

However, regions do not have serious natural resource, and they do not have significant economical power, they have deficit from demographical point of view. It is useful to examine what high added activities can provide the basis for the improvement (ARADSZKI J. 1986). It is necessary to explore the quality of current human resource, the causes of its development before planning any knowledge-based activity.

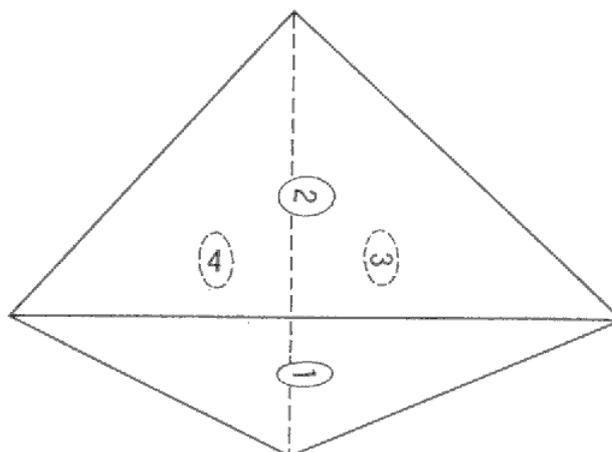
This research introduces Sarkad region as a statistical region. The survey includes the following settlements: Biharugra, Geszt, Körösnagyharsány, Kötegyán, Mezőgyán, Méhkerék, Okány, Sarkad, Sarkadkeresztúr, Újszalonta and Zsadány.

The purpose of the research is to measure the human resource development in the settlements of Sarkad region and the relationship of human resource by the condition and improvement of infrastructure. The importance of human resource has been increased for decades. Because of the decrease of natural resources modern societies have changed from quantity production to quality production. This quality change has brought technological development that connected to the revaluation of human capital. In modern economical and social-geographical theories human resource is not only a quantity element but its key principles are also emphasized.

Distribution of sex and age, biological features are important but knowledge and experience have an outstanding role which also belongs to the notion of human capital. Since the beginning of the industrial revolution the quality of the products are more emphasized than their quantity that has changed the planning, developing and marketing processes. The added value has become higher which needs human potential with a new quality. Most companies do not think that the most important factor of location of industry is the labour-force in great quantity but qualified and innovative human resource being willing to mobility (BECSEI J. 2004).

The thickening point of social, economical, infrastructural and natural space is a settlement. These elements take part in a process, which is sometimes facilitating but in other cases it can be impeding, in various intensity. If each space has the same importance this can be demonstrated as a tetrahedron in space.

Figure 1. A tetrahedron model of a settlement



1 – economical sector, 2 – social sector, 3 – infrastructural sector, 4 – natural sector

Source: (TÓTH J. 1999)

This research examines the possible connecting points between social sector and infrastructural sector on regional level. In social sector we analyzed the cardinal point of human resource, in infrastructural sector mainly human infrastructure was in the focus and their relationship.

Social sector is in strong connection with human resource that can be referred to as: 'human resource is the sum of skills producing values accumulated in the whole population' (GÁSPÁR L. 2000). The value-producing skill of the social sector is necessary for creating tangibles by economical factors and it makes man being able to reach his achievement and improving himself on higher and higher level. The quantity level of human resource is represented by demographical features but its quality level is described with health, educational and economical characteristics.

Infrastructure is divided into two groups. One of them is the technical/line infrastructure and the other is called social/human infrastructure (KÓSZEGFALVY Gy. 2002). Transportation and telecommunication have supposed effect from technical infrastructure. To develop human resource it is necessary to get the suitable information fast. Thus, either we can travel to the necessary source by different types of transportation or we can get the necessary information by using the suitable tele-communicational channel(s). In our opinion, in the area of human infrastructure, the degree of supply in local libraries and the number of computers in public educational institutions have great effect on human resource. Besides the factors mentioned above, the rate of commercial net and population is supposed to influence human resource.

2. HYPOTHESIS AND METHODS

Researchers interpret human resource in a lot of ways. According to the Maastricht Agreement one of the European Union's aims is to improve the quality of life in its member countries. In order to achieve this aim it was necessary to develop social indexes that were able to compare the quality of life in each country and/or region and the tendencies of development. At the beginning the target of the Human Development Index (HDI) was to change the earlier GDP which is not able to measure social manifestations. This index has got great advantages: its structure (rate of literates, GDP/person, rate of estimated life expectancy at birth) and its comparability. HDI has got a lot of critiques, it has been modified several times and its acceptance has been controversial among professionals (HUSZ I. 2001, OBÁDOVICS Cs. 2001). Besides Human Development Index several indexes have been appeared – for instance Index of Sustainable Economical Welfare (ISEW), Growth Process Index (GPI) – in researches but in Hungary the significant part of the concerns focuses on the improvement of GDP. However, GDP does not contain the social and human point of views (GÖRBE A. – NEMCSICSNÉ ZSÓKA Á. 2006).

The common disadvantage of the indexes mentioned above is that they cannot be used on regional level; or if they can be used they must be modified. In order to use them on regional level data are not available – GDP, estimated life expectancy at birth – that can provide the base for making comparison between regions, counties and countries. To overcome this difficulty a huge amount of research have been appeared – factor analysis, clastermaking – that are to measure the status of economy (NEMES NAGY J. 1998, BUZÁS N. 2000). Using them in human-resource examinations has been waiting for solution. The Hungarian adaptation of Quality of Life Index (QLI) is a pioneer initiation (MALCOLM S. 2000). The difference between QLI and HDI is that the former one includes the circumstantial and social factors to measure the quality of life. Hungarian professionals have made a unique life-quality index (ÉMI) using Shooker's social, health, economical and circumstantial indicator, which is able to measure the tendentious changes on regional level (VAMOS A. – FARKAS T. 2004). The first human-resource examination supported by regional indexes was taken in 1998 but this research cannot be used in examinations on settlement level (OBÁDOVICS Cs. - KULCSÁR L. – MOKOS B. 2001). Human resource examination on settlement level is less widespread. One of its causes could be the lack of suitable indexes and data. The other reason can be that the importance of this kind of research is not taken seriously by the professionals of regional development.

In most cases data of statistical year 2004 were analyzed, except the numbers of population of demographical data and the data of the composition of population based on native language and religion where the data of the population census in 2001 were used.

Weighted arithmetical mean was used in case of composition of population of demographical data on settlement level, then average-ages were ranked in each settlement. In case of composition of population based on native language and religion bigger communities were examined and native-language and religious communities having only (a) few members were neglected.

We suppose that the state of health of the population is represented by the proportion of the number of people taking part in health service and the whole population. It is likely that some inhabitants had taken part in health provision even several times, however, the fact of health provision shows state of health. There is a GP in every settlement but the level of specialists' health provision is different. This survey neglected the different 'attractions' of the specialists' consultations and the settlements. On the other hand, it is likely that inhabitants of a settlement take the specialist's consultation of another, near settlement into consideration instead of GP's provision in their own settlement.

The other data in health we wanted to analyze was the proportion of people having free-health-service card and the whole population which supposes that a person having such a card lives with disadvantages in his/her health. These two groups of data were ranked in the following way. The higher the number of health provision and the number of people owing free-health-service card were the later rank the settlement got.

In case of education the usual statistical data were used:

- have not finished his/her primary school 10-x
- At least have finished primary school 15-x
- At least have had secondary school leaving exam 18-x
- Have had university/college diploma 25-x

We had the data expressed in percentage. According to these four parameters we ranked the settlements and by using the average of ranks we stated the final rank which puts the settlements into developmental order according to the level of education.

Among indexes measuring the improvement of human-resources we can find data referring to income and economical development many times. In this research, the basis is the level of the personal income tax base per person. We considered that the population of the settlements shows great difference in the rate of population in the age of capacity and employees, too. The other

significant economical factor is the rate of businesses and the number of population. Later, the basis of a further research could be if the financial standing of businesses or net income was defined in relation to educational levels and it would be compared to other factors. But that kind of examination is out of this current research.

On settlement level, the rate of personal income tax base and businesses of population number was ranked. By averages of the previous results we got the final rank of the settlements' economical power. Consequently, we got four rankings about demography, health, education and economical development in Sarkad region. By averaging these rankings we got the final ranking of human-resource development in the settlements.

3. RESULTS

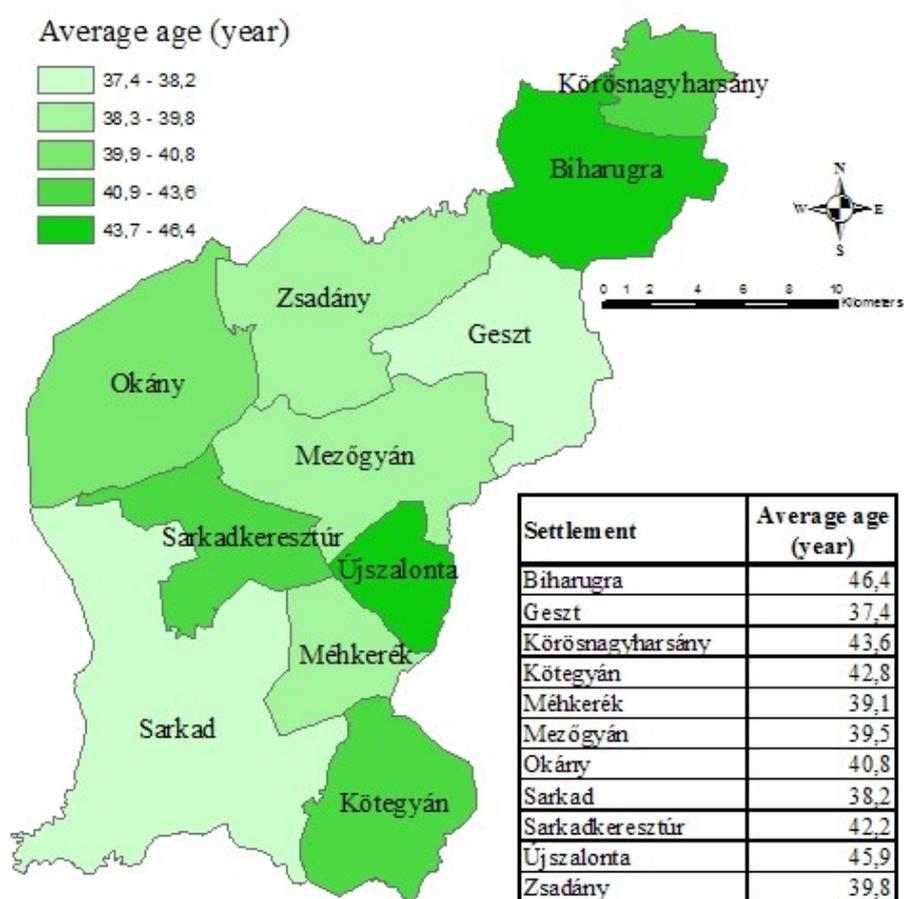
3.1. Number of population and migration

Since World War II negative demographical tendency has been observed – except some years - in the Great Plain. Neither Sarkad region has been an exception (BELUSZKY P. 1981, TÓTH J. 1982). The number of population in each settlement is between one thousand and two thousands, except Sarkad. Méhkerék and Okány also have more than two thousands inhabitants. The centre of the region, Sarkad, has the most inhabitants (10 901 inhabitants) whereas there are only 157 inhabitants in Újszalonta. This later settlement starts losing its functions as inhabitants can get GP care in the near Méhkerék and migration is significant as well (5.73%). Migration spread is negative in Békés County and in Sarkad region, consequently in most settlements. Only in Geszt the number of immigrants is higher than the number of emigrants, however, these inhabitants are supposed to be Romanies. Besides Újszalonta, decrease in population is higher than one percentage in Biharugra, Körösnagyharsány, Kötgyán and Zsadány.

3.2. Composition of population

The average age of inhabitants in Sarkad region represents a great deviation. The highest average age is in Biharugra (46.4 years) while the lowest average age is in Geszt (37.4 years). This 9-year-difference can be explained with the different circumstances and the 20% higher rate of Romany minority. In Romany generations the number of younger is much higher. The average age in Sarkad, Méhkerék and Mezőgyán is lower than 40 years. The difference between the average age and the decrease of population is marked. The more inhabitants leave the settlement the higher the average age is. Consequently, it is likely that more younger leave their settlement, so the average age of older increases.

Figure 2. The average age of inhabitants in Sarkad region (2001)



Source: Zoltán Katona edition based on T-STAR database

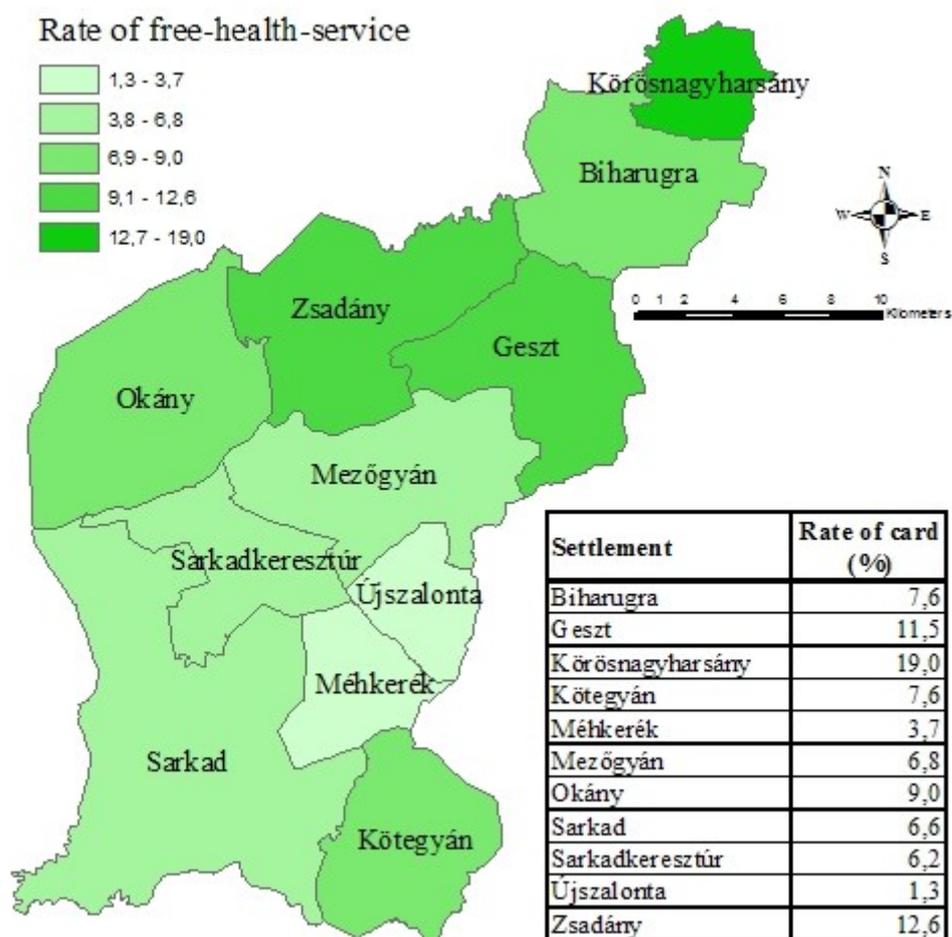
3.3. Composition of population based on native language and religion

In two settlements the rate of having other native language than Hungarian is significant. Whereas in Geszt more than 20% of the inhabitants is Romany, in Méhkerék almost 80% speaks Romanian as their first language. In Kötegyán, Körösnagyharsány, Mezőgyán and Sarkad the percentage of inhabitants speaking Romany reaches almost 5. Composition of religion is different from the mean in Hungary. There are only three settlements (Geszt 10.4%, Méhkerék 24.1%, Sarkad 44.2%) where the number of religious inhabitants is below 50 %. The rate of religious inhabitants is 93.2% in Biharugra and it is 89.9 % in Körösnagyharsány. The dominant religion is the Calvinist with the exception of two settlements. Most people in Geszt are Catholic or Calvinist while in Méhkerék the majority is Baptist because of the high number of inhabitants having Romanian as their mother tongue.

3.4. Health

We classified the state of public health by the number of people taking part in health service and the number of people having free health-service-card. In this region the only settlement where there is no GP surgery is Újszalonta and – without getting any information – altogether two inhabitants have free health-service card. Thus, we ranked this settlement into the last place in the area of public health. From public health's point of view Körösnagyharsány is in the best position as the rate of health provision is 3.2 per person. Most people in all settlements get health provision 7-9 times a year as usual. The highest rate of health provision is in Geszt (10.8) and Mezőgyán (11.3). The data of health provision in the county is not included in these results. The number of people owning free health-service-card is really high in Körösnagyharsány (19.0%) but it is prosperous in Méhkerék (3.7%).

Figure 3. Rate of free-health-service card in Sarkad region (2001)



Source: Zoltán Katona edition based on KSH database

A really high correlation can be seen in the rankings of the two points of view in the area of public health; except Körszén which is at the opposite end of the two rankings.

Factors examined above cannot cover and tinge the whole public health. Unfortunately, clearer picture cannot be read based on these data of the settlements. In a future research by interviews it would be useful to explore the motivation of inhabitants about the background of the negative state of public health and establishing prevention with doctors.

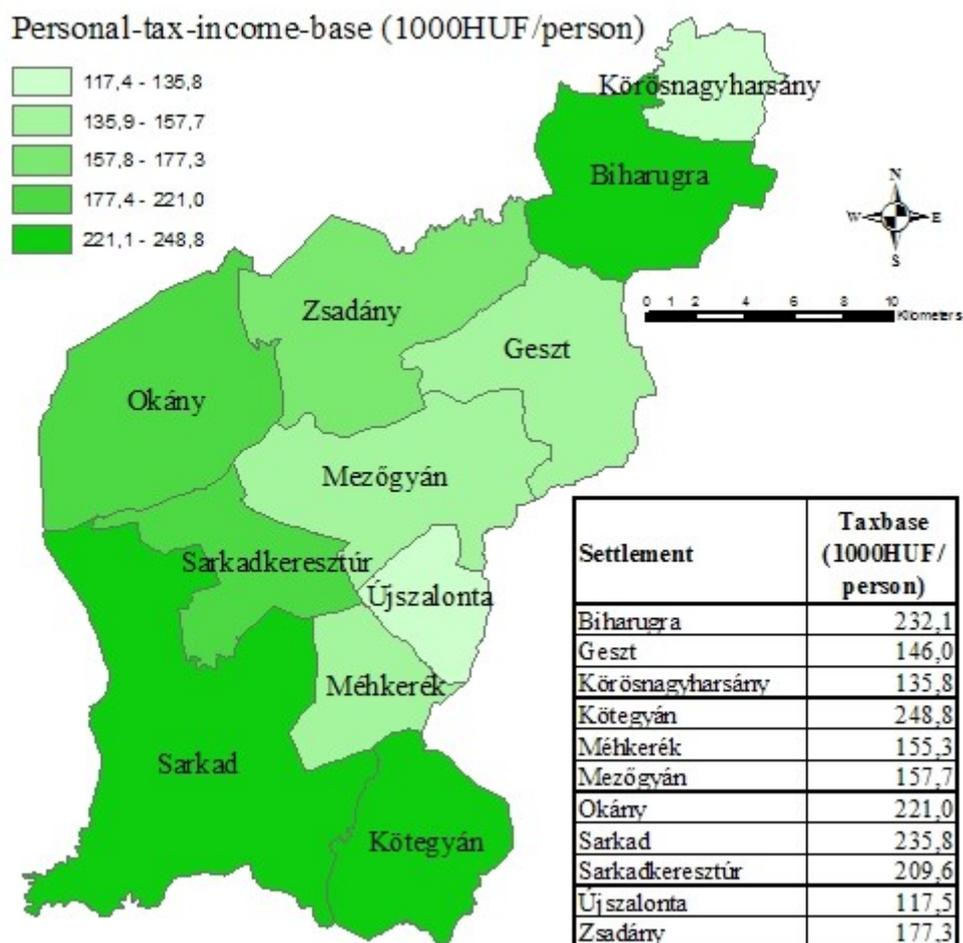
3.5. Education

Great deviation can be seen in the distribution of illiterates in each settlement – people did not finish the first year of primary education in the percentage of the suitable age groups. While 0.2% did not have a primary school certificate in Zsadány, in Okány this number is 4.1%. The results in Sarkadkeresztúr (0.4%), Kötegyán (0.4%) and Biharugra (0.5%) are prosperous. There is no significant difference in the number of people finished eight grades of primary education. Biharugra and Sarkad have a positive outstanding result in the number of people having school-leaving-exam, the former one's rate is 21.1% and the later one's is 19.9%. Sarkad has an outstanding educational function as this is the centre of the region and the only secondary school in Sarkad region is in this little town. The rate of inhabitants having school-leaving-exam is very low in Újszalonta (7%), Mezőgyán (13.7%) and Geszt (14%). The proportion of inhabitants having a diploma is really low, in regional rate it is 3.8%. Moreover, we have to mention that the number of people having diploma is not the highest in Sarkad (4.1%), in the centre of the region but in Biharugra (4.9%). The lowest rate is measured in Körösnagyharsány and Okány with 3-3 percentages. In Újszalonta the number of inhabitants having diploma cannot be measured.

3.6. Number of businesses and profitability

The regional differences in the country can be seen in the life of economy. According to economical indexes Békés County has been among the last ones for decades (NEMES NAGY J. – RUTTKAY É. 1992). The number of live businesses in Sarkad region is really low even if we compare it with the unfavourable level of Békés County. It takes only 3.7 %. Furthermore, this sad data shows other serious differences. The rate of live businesses in Újszalonta is 1.9 %, in Mezőgyán it is 2.2 % and in Geszt it is 2.4 %. The 'highest' data can be found in Sarkad (4.6 %), in Biharugra (4.4 %) and in Geszt (4.2 %). The number of live businesses is lower because this data includes the number of private enterprises and of small family businesses.

Figure 4. Personal-tax-income-base in Sarkad region (1000HUF/person, 2001)



Source: Zoltán Katona edition based on APEH database

The number of employees is low, on regional level the rate is 29.7 %. The highest employment is in Biharugra where the proportion of employees is 42.2 %. The lowest employment is in Méhkerék where every fifth person works on an average. By using these results we examine the amount of personal income tax per employee. In the region the personal income tax base is very small, it does not reach one million HUF in the settlements. In the order of the highest personal income tax base per employee Sarkad and Kőtegyán can be found. The personal income tax base per employee is the lowest in Körsnagyharsány, Geszt and Újszalonta. In Újszalonta only 24 % of the inhabitants pays tax while the amount of monthly tax base per person in 2004 did not reach 47 000 HUF.

4. CONCLUSION

The order of human resource is led by the only town of the region, Sarkad, which won the race by its economical 'force' because in order to promote a settlement to a town rank the settlement has to own secondary educational institutions and their existence supposes the higher level of human resource. The second settlement is Biharugra which is the last one from demographical point of view as the average is 46.4 years. By using this data extensive consequences could not be drawn but in Biharugra education is emphasized and the economical life can be considered lively on local level. We plan the wide research of this settlement in the future.

The educational data are in strong correlation with the final order. The relationship between the demographical order and the human resource order is not significant. Thus, in the future it would be useful to examine the connection of the importance of demography and the order of human resource. Four of the last five settlements in the order (Körösnagyharsány, Újszalonta, Geszt, Mezőgyán) are dead settlements. These are the victims of the Treaty of Trianon. In Geszt you can still find the road which has led to Szalonta and was used by Tisza-family. The results show significant differences between Újszalonta and the other settlements of the region. The average age is really high, Újszalonta is the last one from educational point of view, thus its economical indexes are low. Public health indexes are not published in case of Újszalonta as the inhabitants can get GP's health care in the near Méhkerék. This settlement has got a lot of difficulties.

| Settlement | Demography | Public health | Education | Economy | Human resource order |
|------------------|------------|---------------|-----------|---------|----------------------|
| Sarkad | 2 | 3 | 3 | 1 | 1 |
| Biharugra | 11 | 5 | 1 | 2 | 2 |
| Méhkerék | 3 | 1 | 2 | 5 | 3 |
| Kötegyán | 8 | 2 | 4 | 3 | 4 |
| Sarkadkeresztúr | 7 | 2 | 5 | 5 | 5 |
| Okány | 6 | 5 | 7 | 4 | 6 |
| Geszt | 1 | 7 | 8 | 8 | 7 |
| Zsadány | 5 | 7 | 6 | 6 | 7 |
| Körösnagyharsány | 9 | 4 | 9 | 7 | 8 |
| Mezőgyán | 4 | 6 | 10 | 9 | 8 |
| Újszalonta | 10 | 0 | 11 | 10 | 9 |

The settlements in Sarkad region need human resource improvement. The research had two purposes; firstly trying out a method and secondly exploring human resources in Sarkad region. The exploration was successful, although, besides analysing statistical data empirical research will be needed to include into the process.

The region is situated in Békés County, near the Romanian border. The survey presented that the integration of the region into the county and the commuter belt has not completed. However, the road-system is not suitable and the improvement programmes do not provide solution for these settlements, in order to develop this region the mayors' and the inhabitants' help is necessary. Furthermore, Romanian settlements near the border must have been involved, connecting points must be found in order not to build the same functions separately expensively. To improve regions it is vital that the communities and settlements should use the Slovak and Romanian traditions, and the multi-cultural benefits. There are a lot of possibilities to win a competition to realize these ideas. The extension of the model on regional level and supporting the survey by personal interviews and empirical research are coming soon.

5. REFERENCES

- ABONYINÉ PALOTÁS J. 1981: *Az infrastruktúra területi rendszerei*. Földrajzi Közlemények. 29. 146. p.
- ARADSZKI J. 1986: *Békés megye elmaradott területei*. Településfejlesztés, 1986/4. VÁTI, pp. 36-42.
- BECSEI J. 2004: *Népességföldrajz*. Ipszilon Kiadó Kft, Békéscsaba, pp. 259-282.
- BELUSZKY P. 1981: *Két hátrányos helyzetű terület az Alföldön: A Közép-Tiszavidék és a Berettyó-Körösvidék*. Alföldi Tanulmányok V. kötet, MTA Földrajztudományi Kutatóintézet Alföldi Csoportja, Békéscsaba, pp. 131-161.
- BOKOR B. 1999: *Területfejlesztés – kistérség – régió*. In: Bánlaky P. – Bokor B. – Tóth J. (szerk.): *A terület- és településfejlesztés társadalmi összefüggés-rendszere*, JPTE – Felnőttképzési és Emberi Erőforrás Fejlesztési Intézete, Pécs, pp. 161-167.
- BUZÁS N. 2000: *Klaszterek: kialakulásuk, szerveződésük és lehetséges megjelenésük a Dél-Alföldön*. Tér és Társadalom, 4. pp. 109-123.

- CSATÁRI B. 2004: *A magyarországi vidékiségről, annak kritériumairól és krízisjelenségeiről*. In: Területi Statisztika, 7. (44.) évfolyam 6. szám, pp. 532-543.
- CZUPPON V. 2005: *Adalékok a Tamási kistérség társadalomföldrajzához*. In: Pirisi G. – Trócsányi A. (szerk.) 2005: Tanulmányok Tóth Józsefnek a PTE Földtudományok Doktori Iskola hallgatóitól, PTE TTK FI – PTE Földtudományok Doktori Iskola, Pécs, pp. 159-160.
- FALUVÉGI A. 2000a: *A magyar kistérségek fejlettségi különbségei*. In: Területi Statisztika, 3. (40.) évfolyam 4. szám, pp. 319-348.
- FALUVÉGI A. 2000b: *Elmaradott, munkanélküliséggel sújtott települések*. In: Területi Statisztika, 3. (40.) évfolyam 1. szám, pp. 3-16.
- GÁSPÁR L. 2000: *Bevezetés az emberi erőforrások elméletébe*. Pécsi Tudományegyetem, Felnőttképzési és Emberi Erőforrás Fejlesztési Intézete, Pécs, 11. p.
- GÖRBE A. - NEMCSICSNÉ ZSÓKA Á. 2006: *A jólét mérése, avagy merre halad Magyarország*. http://korny10.bke.hu/kovasz/kov2/gpi_hun.html, letöltve: 2006. január 14.
- HUSZ I. 2001: *Az emberi fejlődés indexe*. Szociológiai Szemle, 2001. 2. pp. 72-83.
- LÁSZLÓ M. – MAGAY M. 2005: *A terület- és településfejlesztés szervezeti és intézményi rendszere*. In: Pap N. – Tóth J. (szerk.) 2005: Terület- és településfejlesztés I. A terület és településfejlesztés alapjai, Alexandra Kiadó, Pécs, 43. p.
- LUKOVICS M. 2004: *A regionális identitás szerepe a regionális gazdaságfejlesztésben*. In: Czagány L. – Garai L. (szerk.) 2004: A szociális identitás, az információ és a piac. SZTE Gazdaságtudományi Kar Közleményei, JATEPress, Szeged, pp. 214-228.
- MALCOLM S. 2000: *Quality of Life Index Project: Progress and Setbacks in Wuinte 1990-1999*. <http://www.qli-ont.org/spring2000/qlispring2000.html>. Letöltve: 2006. március 5.
- NEMES NAGY J. 1998: *Tér a társadalomkutatásban*, Bevezetés a regionális tudományba, Dialóg Campus, Budapest, 253. p.
- NEMES NAGY J. – RUTTKAY É. 1992: *Gazdasági társaságok az Alföldön*. Alföldi társadalom, MTA RKK ATI, Békéscsabai Osztály, Békéscsaba, pp. 56-72.
- OBÁDOVICS Cs. – KLUCSÁR L. – MOKOS B. 2001: *A vidéki térségek emberierőforrás-fejlettségének alakulása Magyarországon*. A Falu, 2001. tél

- RECHNITZER J. 2003: *Az infrastrukturális rendszerek új irányai és hatásuk a nemzetgazdaság fejlődésére.* In: Rechnitzer J. – Hardi T.: A Széchenyi István Egyetem hatása a régió fejlődésére. Tudományos füzetek, V. kötet, SZIE Gazdaság- és Társadalomtudományi Intézet, Győr, pp. 7-15.
- SZABÓ-KOVÁCS B. 2005: *A kistérségi szint főbb jellemzői Magyarországon.* In: Bugya T. – Wilhelm Z. (szerk.) 2005: Tanulmányok Tóth Józsefnek. PTE TTK FI – PTE Földtudományok Doktori Iskola, Pécs, pp. 83-95.
- TÁNCZOS-SZABÓ L. 1981: *Mezőberény és Sarkad kereskedelmi tevékenységének általános jellemzése.* In: Tóth J. (szerk.): A közép-békési centrumok koordinált fejlesztését megalapozó kutatások (1978-1980) részletes eredményei, V. kötet A közép-békési településegységek nem városi jogállású települései, MTA Földrajztudományi Kutatóintézet Alföldi Osztály, Békéscsaba, pp. 240-252.
- TÓTH J. 1982: *Az Alföld II. világháború utáni népesedésének néhány sajátossága.* Alföldi tanulmányok VI. kötet, MTA Földrajztudományi Kutatóintézet Alföldi Csoportja, Békéscsaba, pp. 153-175.
- TÓTH J. 1984: *Az Alföld népessége.* In: Tóth J.: Az Alföld gazdaságföldrajzi kutatásának eredményei és további feladatai, I. plenáris ülés előadásai, Tudományos konferencia, MTA Földrajztudományi Kutatóintézet Alföldi Csoportja, Békéscsaba, p. 93.
- TÓTH J. 1999: *A magyar településrendszer fejlődésének néhány kérdése.* In: Bánlaky P. – Bokor B. – Tóth J. (szerk.): A terület- és településfejlesztés társadalmi összefüggés-rendszere, JPTE – Felnőttképzési és Emberi Erőforrás Fejlesztési Intézete, Pécs, 7. p.
- VÁMOS A. – FARKAS T. 2004: *Az életminőség mérése a Bátonyterenyi kistérségben.* In: Területi Statisztika 7. (44.) évfolyam 1. szám, pp. 21-31.