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THE HUMAN RESOURCE AS A TOOL IN TECHNOLOGICAL SYSTEMS FOR THE DEVELOPMENT OF SPATIAL ECONOMIC STRUCTURE

This publication reviews the relationship between the spatial economic structure of the micro-regions and the human development index, one of the most important indicators for the spatial social structure in the Northern Hungarian region. I have determined the share of foreign working capital as a percentage of the total subscribed capital of the companies operating in the microregions in the North Hungarian region. I compared this data to the HDI index. On the basis of the study it can be stated that the more developing a microregion is, the higher the human development indices in the particular microregion and if in a microregion the human development indices are high, the microregion is more attractive for the inflow of foreign capital.
Key words: spatial economic structure ,spatial social structure, human development index, microregion, development

Introduction

To develop the economy of regions it is important for us to learn which factors and to what extent have an impact on the economic development of a region.

For the sake of comparing regions it is practical to characterise the economic situation of the region by the indicators of the spatial economic structure.

The spatial economic structure of the region or the microregions of the region depends to a great extent on the spatial social structure of the region or the microregions of the region.

This publication reviews the relationship between the spatial economic structure of the microregions of the Northern Hungarian region and the human development index, one of the most important indicators for the spatial social structure thereof.

Indicators for the spatial structure

In the work [2] and [5] the spatial structure means the summary of territorial relations and processes. The discussion of the relations within the spatial structure contains the summary of the decisive processes in the territory.

Spatial structure does not only mean the territorial scope of economic and social processes and a summary thereof but also represents in a spatial structure the variety, internal structure, interaction, mutual determination and controversies of processes going on in the various territorial units.

The spatial structure is a scheme built of spatial elements and the spatial relations among them, a real phenomenon, the interpretation and description whereof being substantially determined by the mode and views of the approach.

We can establish on the basis of Hungarian technical literature that there may be many indicators for the spatial structure.

The contents of the spatial structure are varied but they can be examined in a complex way, too. The basis for examining the spatial structure is provided by numerical information and data relating to the territorial units.

The most important types of processes for the generation of complex indicators are as follows:

•Rank number method: This is the simplest method both from a theoretical and a practical point of view.

•From a given "n" number of ordinary or such indicators (rankings) as have been made ordinary, a complex indicator can be generated by the addition thereof. In such a case we will regard such region as having the most favourable situation as has the lowest total of the rank numbers.

•Complex indicator Bennett: In this process the particular values of each indicator are expressed as a percentage of the maximum of the given indicator. The non-weighted arithmetical average of these values result in a complex indicator the values whereof fall theoretically in the range 0 to 100. It is very rarely for the value of a complex indicator to reach 100 where the value of the same territorial unit is the most favourable, that is, maximal for each indicator studied. In practice, the theoretically possible minimum, that is 0, can also rarely be observed.

•Factor analysis: In deploying this method, we generate such independent factors out of the linear combination of the variables to be analysed as explain the biggest possible portion of the total variances of the original variables. This operation is advantageous for us because – at the expense of some lost information – the many separated variables are united to form fewer groups of indicators comprising factors whereby it is easier to handle and interpret the system. The factor weights in the resulting factor matrix refer to the extent the particular variable takes part in forming the particular factors. In the process, the original variables are standardised during which they lose their unit of measure and dimensions, that is, they hence become comparable without limitation. Beside this,

a common feature of standardised variables is that their arithmetic average will exactly equal zero and their dispersion will be 1. Consequently, the average of the factor values belonging to the factor values will also be zero and their dispersion will be one. The factors have absolutely no correlation with each other.

In examining the spatial structure we can talk about spatial economic structure and spatial social structure.

Spatial economic structure

Salamin [1] considred that the exploration of the spatial economic structure covers the presentation in terms of economics of various regions such as regions, counties, microregions and settlements, the display in space of their features and thereby the analysis of the spatial aspects of the economy.

The range of indicators to be used for exploring the spatial economic structure is rather limited, which means, that practically data broken down by territory only are available, a number of data are available on a county level only and an additional problem is the limitation of the possibility to express numerically the spatial aspects of the economy.

We explore the quantitative and qualitative characteristics of the spatial structure of the economy, whereby complex indicators need to be assigned to the spatial structure; however, the absolute and relative numbers cannot be incorporated in them at the same time.

In the following evaluation of the spatial economic structure from the aspects of area development, the indicators used by VÁTI [6] in the year 1998 are presented.

The area studied is 28 microregions in the Northern Hungarian region and the territory level of the study is that of the microregion.

According to the combined analysis of status and changes of the 10 indicators used for the study, one can distinguish among 5 types of regions having a different path of development, and the particular microregions were classified by the use of the factor analysis method in 5 types according to their status of development and changes in their status:

- Dynamically developing regions,
- Developing regions,
- Emerging regions,
- Revitalising regions,
- Stagnating regions.

Table 1 contains the classification of the Northern Hungarian region according to the above region types and one of the most important indicators of the 10 indicators for foreign capital investment, that is, the share of foreign working capital as a percentage of the total subscribed capital.

Table 1 – The key economic indicator of the microregions of the Northern Hungarian region

Microregion	Region type	Foreign capital as % of the subscribed capital
Borsod-Abaúj-Zemplén megye		
Bodrogközi	Stagnating region	11-30
Sátoraljaújhelyi	Stagnating region	11-30
Sárospataki	Stagnating region	11-30
Abaúj-Hegyközi	Stagnating region	0-10
Tokaji	Stagnating region	11-30
Szerencsi	Stagnating region	11-30
Szikszói	Stagnating region	0-10
Encsi	Stagnating region	0-10
Edelényi	Stagnating region	0-10
Miskolci	Developing region	31-50
Tiszaújvárosi	Dynamically developing region	51-91
Mezőcsáti	Dynamically developing region Emerging region	11-30
Mezőkövesdi	Emerging region	11-30
Kazincbarcikai	Stagnating region	11-30
Ózdi	Revitalising region	31-50
Heves megye		
Egri	Developing region	31-50
Gyöngyösi	Developing region	51-91
Füzesabonyi	Emerging region	0-10
Hatvani	Developing region	31-50
Hevesi	Stagnating region	0-10
Pétervásárai	Developing region Revitalising region	31-50
Bélapátfalvai	Developing region	31-50
Nógrád megye		
Balassagyarmati	Revitalising region	11-30
Salgótarjáni	Stagnating region	11-30
Rétsági	Revitalising region	51-90
Pásztói	Revitalising region	31-50
Bátonyterenyei	Revitalising region	31-50
Szécsényi	Stagnating region	11-30

Spatial social structure

Human resources comprise individual skills and endowments belonging to the individual immanently but remaining partly unutilised or unused in the given structure of economic conditions.

Others hold that human resources are to be understood as the knowledge, abilities and behaviour of subordinates and managers and what they regard as valuable.

The quality and availability of human resources determine to a great extent the competitiveness of a region.

HDI, the human development index, one of the most important indicators of the indices characterising the human resources of the Northern Hungarian region is presented below.

According to the KSH [4] the value of HDI is constituted by the arithmetic average of three indices. Each of them is generated by projecting the numerical values between 0 and 1. Before, the values 0 and 1 were constituted by the two extreme figures, however, for the sake of comparison on a yearly basis, (rather voluntarily) fix values were determined: 25 and 85 years for life expectancy, 100 and 40 000 USD for GDP where logarithmical conversion is used, while 0 and 100% for the literacy rate and the gross enrolment ratio.

The three indices are as follows:

- life expectancy index:

$$\frac{LE - 25}{85 - 25} \tag{1}$$

- education index:

$$\frac{2xALI + GEI}{3} \tag{2}$$

- GDP index:

$$\frac{\log(GDP_{pc}) - \log(100)}{\log(40000) - \log(100)} \tag{3}$$

Where:

LE = Life expectancy,

ALI = Adult literacy rate,

GEI = Combined gross enrolment ratio,

GDPpc = GDP per capita at purchasing power, in dollar.

HDI values published by KSH [3] in the year 2002 regarding the microregions of the Northern Hungarian region are set out in Table 2.

Table 2 – HDI values regarding the microregions of the Northern Hungarian region

Microregion	HDI value
Borsod-Abaúj-Zemplén megye	
Bodrogközi	No data
Sátoraljaújhelyi	0,321
Sárospataki	0,337
Abaúj-Hegyközi	No data
Tokaji	No data
Szerencsi	0,313
Szikszói	0,286
Encsi	0,212
Edelényi	0,182
Miskolci	0,566
Tiszaújvárosi	0,480
Mezőcsáti	No data
Mezőkövesdi	0,402
Kazincbarcikai	0,498
Ózdi	0,304
Heves megye	
Egri	0,668
Gyöngyösi	0,609
Füzesabonyi	0,386
Hatvani	0,532
Hevesi	0,246
Pétervásárai	0,392
Bélapátfalvai	No data
Nógrád megye	
Balassagyarmati	0,520
Salgótarjáni	0,515
Rétsági	0,469
Pásztói	0,399
Bátonyterenyei	0,381
Szécsényi	0,296

Relations between the spatial economic structure and human resources

According to the previous data, which are almost concurrent for the purposes of this study, Figure 1 shows the relation between HDI and the region type in relation to the Northern Hungarian region.
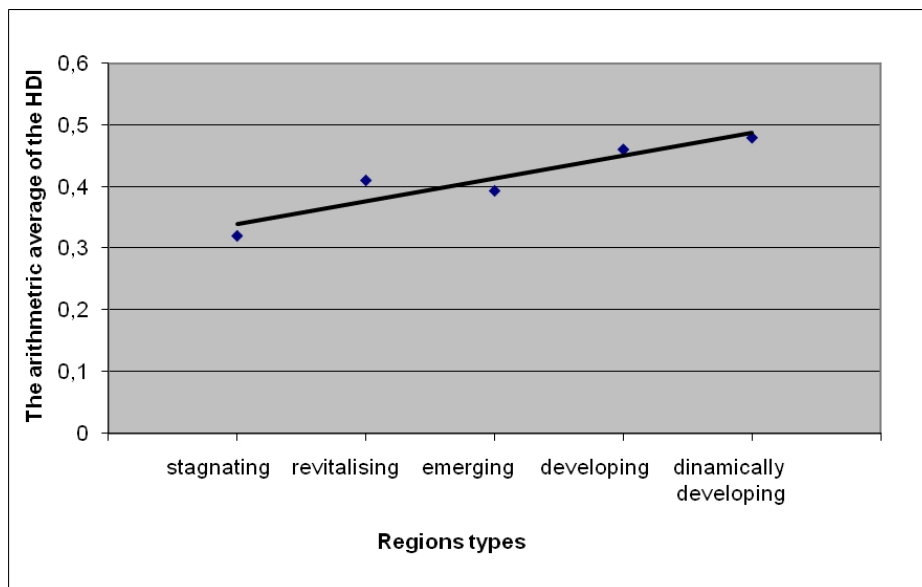

Figure 1 – Relation between HDI and region types

Pursuant to the straight linear trend as per Figure 1, it can be established that the region type and the value of HDI are essentially in direct proportion to each other, that is, the more dynamically the microregion is developing, the higher the value of the HDI.

According to the previous data, which are almost concurrent for the purposes of this study, Figure 2 shows the relation between HDI and the foreign capital.
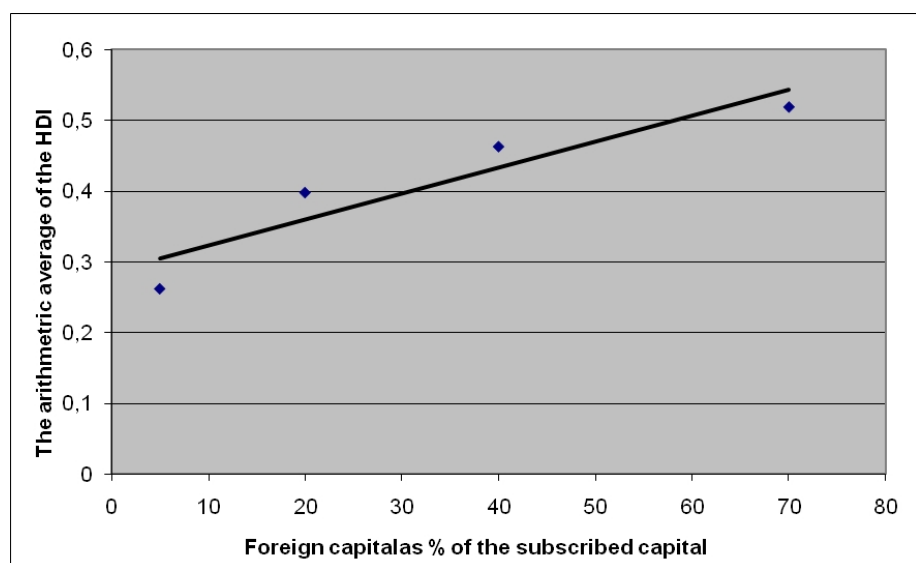

Figure 2 – Relation between HDI and foreign capital

Pursuant to the straight linear regression line as per Figure 2, it can be established that the two indicators are essentially in direct proportion to each other, that is, the higher the extent of foreign capital investments, the higher the value of the HDI.

Summary

Relations between the spatial economic structure and the human development index of the microregions of the Northern Hungarian region have been examined in this publication.

On the basis of the study it can be stated that the more developing a microregion is, the higher the human development indices in the particular microregion and if in a microregion the human development indices are high, the microregion is more attractive for the inflow of foreign capital.

It can be established that where a microregion is developing more and more and the higher the presence of foreign capital in the particular microregion, the more it can develop and the higher its competitiveness.

The economic development of a microregion entails the development of human resources, too, and where human resources are on an advanced level in a region, the region becomes more attractive to the investors and thus the economy and the technological systems of the region can also start developing.

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