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Enterprise-focused spatial structure research with special regard to Szabolcs-Szatmár-Bereg County

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Contents

1 Summary of objectives

1.1 Introduction

The spatial structural research of enterprises summarised in the Ph.D. thesis presents a statistical analysis of the connection between enterprise structure and territorial development with a focus on Szabolcs-Szatmár-Bereg county. The research includes an analysis of certain features of the business sector in regard to economic and social processes and an evaluation of the role and impact of this sector on the economy. Using statistical methods, we assessed the economic situation of Szabolcs-Szatmár-Bereg county in the ranking of counties by economic development, and the scale of differences in territorial processes at county level.
The principal aim of the fundamentally exploratory research is to examine territorial disparities in terms of enterprises and their causes and influencing factors (spacial processes), i.e. to assess the spacial dimension from the perspective of the business sector at a micro, macro and meso-level. Research into the above fields allows developing a comprehensive view of Szabolcs-Szatmár-Bereg county, which presents the economic and social characteristics of the region's recent past, the reasons why it is lagging behind in terms of development and the possible routes of improvement.
The other fundamental aim, which could be considered to be ancillary to the principal objective, is to theoretically develop and empirically test a territorially integrated enterprise spatial structure model which is designed to measure the impact of enterprise structure on territorial development in a specific region.
The model makes it possible to determine the level of economic development of Hungarian counties and their territorial disparities in the light of the underlying economic and social processes, the interconnection among factors that influence the spacial structure of enterprises as well as the mechanism of action of quantitative and qualitative features of enterprises. The ultimate aim of the model is to identify key areas of intervention in order to improve performance, efficiency and competitiveness as well as economic and social participation.
The research involved an extensive review of the relevant literature, which served as a basis for the subsequent modelling. First, we reviewed the conceptual framework and the main schools of relevant spatial economic theories, the methodological properties and spatial structural features of spatial modelling as well as the statistical analytical methods used to study the relationships between the characteristics of enterprises and socio-economic processes, taking Szabolcs-Szatmár-Bereg county as the target region. Afterwards, we conducted in-depth interviews with experts to form the basis of subsequent modelling. After theoretically developing the Regional Enterprise Spatial Structure Model, we reviewed the main theoretical and practical aspects of testing, in particular the examination of the characteristics of the sample. Then, we tested the model first at a macro level by means of secondary research, then at a micro level by applying quantitative research methodology. Finally, we looked at the regional spatial structural features of the *meso-level* at the intersection of the former two as it creates a uniform structure for the relationships of socio-economic processes. The findings of the research have been published in several publications, facilitating further research in this subject.

1.2 Relevance of the subject

Mapping out (structural) spacial features of enterprises, analysing stochastic links between the characteristics of enterprises and economic development and examining enterprise-focused territorial disparities in the light of constantly changing economic conditions are always topical issues, in particular for individual actors of the economy, actors setting economic policy guidelines and also for those interested in other subjects due to indirect links. Therefore, the importance of the areas studied is substantiated by several factors:

- Today, it is frequently claimed that the key to the development of Hungarian economy lies in improving the efficiency, economic performance and competitiveness of Hungarian businesses, especially small and medium-sized enterprises (SMEs).
- A natural consequence is that the business sector plays a crucial role in the economic development of a region as the sector is firmly embedded in the particular economic and social environment. As a result, the business sector can have an impact on the performance of the economy through economic and social factors, taking into account the interconnections between the structural characteristics of businesses and economic processes. Furthermore, impacts and connections vary across time and space, so a specific factor does not necessarily produce the same effects and connections in different geographical areas and in different periods.
- Inequality exists both in society and in the geographic location of economic activities. Macro- and micro-level socio-economic processes as well as regional-level processes at the intersection of the former two demonstrate that polarisation is prevalent in the East-West and the centre-periphery dimension. Moreover, the concept of territorial disparities is often associated with poverty, disadvantaged status and underdevelopment.
- Businesses play an important role in shaping economic trends and influencing disparities in the economic space. The results of research into territorial inequality in regard to businesses may affect both the factors that determine economic development and the resolution of problems arising in the structure of enterprises.

In order to influence negative processes, we must be aware of their main causes and mechanisms because only this way can we make relevant decisions on the direction and extent of interventions.

Today, Szabolcs-Szatmár-Bereg county is disadvantaged both economically and socially. The business sector plays a crucial role in the catching-up process by reducing territorial disparities.

1.3 Objectives and research method

The fundamental objective of our research is to develop a territorially integrated enterprise spatial structure model with a dual purpose: first, to identify the factors and processes that shape the structure of businesses and the relations between them in a particular region; and second, it will be possible to measure the network of relations among business characteristics through a sophisticated methodology providing a basis for identifying a typology for businesses in Szabolcs-Szatmár-Bereg county substantiated by empirical research. The model helps to identify the impact of enterprise structure on territorial development, specifying the areas of intervention for the economic development of the county in order to reduce development disparities between medium (mainly county) level territorial units.

We have set the following interim objectives to achieve our primary objective:

- Definition of key concepts related to the purpose of the research, with a detail description of the conceptual framework for territorial disparities. We intend to provide a comprehensive view of **territorial models for business structures**, their areas of application and limitations (*Chapter 2*).
- We intend to develop theoretically the **Regional Enterprise Spatial Structure Model** contained in our main objective (*Chapter 3*).
- In order to **analyse the macro and partly meso-level sub-model of the theoretical model**, we consider it important to review the economic situation of Szabolcs-Szatmár-Bereg county, in particular to analyse the *external factors* defining its business structure, i.e. to examine the relationships between the characteristics of businesses and the socio-economic processes that affect their operation. As part of this, we identify the economic position of Szabolcs-Szatmár-Bereg county in the development ranking of Hungarian counties. In addition, emphasis will be placed on the accurate examination of territorial disparities at county level and within Szabolcs-Szatmár-Bereg county by using inequalities indicators (*Chapter 4*).
- Before empirically testing the theoretical model, we intend to consider the theoretical and practical information on the definition of the sample to be used for making the appropriate generalisations. The **micro-level sub-model will then be tested**, whereby the *internal factors* of the model and the links between these factors will be parametrised. However, this interim goal goes beyond testing the model, as the analysis will try to give a comprehensive overview of the situation, role and development potential of businesses in Szabolcs-Szatmár-Bereg county in the economy. We will also attempt to identify the tools for orientating the *structure of businesses at county level*, to address the problems and points of tension in the structure of businesses and to develop sectoral guidelines and structures which are crucial for the county's development, thereby creating a link to the meso-level. This is important because the **relationships and connections established at micro level (as well as at macro-level) are only integrated at meso-level** (*Chapter 5*).
- Finally, at the end of the thesis we will formulate some **new and novel results** *(Chapter 6)*.

In terms of the objectives, it is important to note that the content of our research constitutes a coherent logical unit through an in-depth analysis of the *external factors – internal factors – internal structure*. The title of the thesis '*Enterprise-focused Spatial Structure Research*' acquires its true meaning when applied to the whole of the above objectives.

2 Methodology

The scientific nature of the dissertation requires the adaptation of the methodology used to achieve the objectives to the standards of economics. As a result, we chose very carefully the research methods as well as the qualitative and quantitative techniques best suited to the task. The reason for this is that the research is focused historical/comparative research into spatial economics theory and its changes, followed by exploratory research.

Our basic assumption is that the development, competitiveness and 'success' of a particular region largely depends on the success of businesses operating in the area and on how the regional enterprise structure fits into territorial flows.

In our research, businesses are considered economic actors involved in influencing socio-economic processes and shaping economic development and territorial differentiation.

For the purpose of identifying the relationships and mechanisms of action between socio-economic factors and the business characteristics, (in addition to descriptive statistical methods) we applied correlation calculation, variance analysis, strength coefficients of association correlations, principal-component analysis, cluster analysis and inequality indices, based on data from the Hungarian counties, in particular Szabolcs-Szatmár-Bereg county and from empirical research. Calculations were based on data from Statistical Yearbooks of 1995-2011 published by the Hungarian Central Statistical Office (KSH), regional statistical yearbooks as well as from the database of individual periodical publications and the data of our empirical research. **The main reason for choosing the time frame (1995-2011)**, in particular its end date, **was to ensure consistency with primary data collection**. (Primary data collection was carried out in summer 2010). **Nevertheless, in the chapter 'Examination of Changes in Socio-economic Factors in Szabolcs-Szatmár-Bereg county since 2011' at the end of the thesis, we evaluate the conclusions, new components and changes in trends based on more recent data**.

At the macro-level, we focused our study on the general level of economic development, research and development activity, the regulatory system, general sectoral characteristics of enterprises, investment, the income of the population, the structure of the labour market, the level of income of people living in the region, developments in major demographic trends, the level of educational of the population and infrastructure, among the factors that affect the structure of enterprises and territorial disparity and determine the socio-economic situation of an area. Since individual factors themselves have a rather complex composition, we applied several indicators to quantify them.

While we work with secondary data in the macro-level analyses, we rely exclusively on primary data from interviews conducted with businesses in our micro-level research. In the case of the latter, we attempted to use a random (probability) sampling procedure when choosing the sampling method so that the conclusions drawn from the sample can be generalised for Szabolcs-Szatmár-Bereg county, which constitutes the whole statistical population in the dissertation. However, this procedure is subject to a sampling error because due to randomness, the sample does not fully reflect the statistical population to be represented. In addition, non-sampling error appears here as well. During the questionnaire-based survey, 250 companies were consulted in Szabolcs-Szatmár-Bereg county using a so-called systematic selection, where every 50^{th} company were selected from the alphabetically ordered company information database of the Central Statistical Office. A larger scale questionnaire-based survey would have incurred excessive costs. Information was collected in the form of telephone interviews supported by questionnaires and it took four interviewers two months (June-July 2010) to complete the process. This survey technique was chosen because more direct business-related information could be obtained, it was not possible to obtain all information related to the research objectives from secondary data sources and this method also allowed clarification of the corrections.

The accuracy level of the whole sample is ±6,2 percentage points at a reliability level of 95 per cent (*Molnár, 2008*).

A Windows-based SPSS 19.0 statistical programme package and Microsoft Excel spreadsheet software were used to carry out statistical calculations and to produce graphical diagrams.

3 Scientific results

3.1 Theoretical overview

The dissertation seeks to synthesise spatial economic and spatial structural theories adjusted to the objective of the research, to review the internal causes of territorial disparities within the nation state and identify the links of causes and effects and to give an overview of the literature on the study of the links between business structure and economic and social processes. We also focus on interrelationships that can help to understand the disparities between Hungarian counties and the underlying factors and phenomena. Due to their complexity, economic and social processes can be appropriately approached and analysed with multi-variable models, which are designed to underpin the methodological bases of our study or are linked to the examination of whether our assumptions are substantiated in the literature. The theoretical background is based on influential and recognised international and Hungarian textbooks, articles published in journals and other scientific work.

The theoretical background of the concept of territoriality and territorial disparities is very complex and diverse due to the multidisciplinary nature of the topic. We do not intend to give a comprehensive overview of these theories. In the thesis, *we focus on theories (location theories, growth theories) that highlight the causal links of territorial disparities related to business structure, bearing in mind the possibilities of a specific Hungarian study*. In this context, *we only summarise theory components which are relevant to the research and on the basis of which we formulated the hypotheses and modelling*.

One of the factors of territorial inequality which is relatively rarely placed in the focus of analysis (*Lengyel, 2003; Egyed, 2009*) is **relational social capital**, a resource that is gradually becoming independent. Its role in the development of disparity processes does not have a direct impact but it can be considered significant, therefore, we treated it as a separate unit in the dissertation and analysed it in theoretical detail as one of the causes.

As the basis for territorial modelling, we reviewed spatial structure models that focus on the relationship between the business sector and territorial processes. In the context of these theories, we concluded that virtually all theories address directly or indirectly the impact of businesses on territorial development and their prominent role in territorial development.

However, none of the theories are specifically focused on enterprise-focused territorial structure analysis. In the Dissertation, in addition to general socio-economic factors, the role of the business sector in affecting territorial disparities is considered a separate field of analysis in the analysis of territorial disparities. Our work can be considered a novelty in territorial research.

3.2 Hypotheses

The following table shows the hypotheses formulated during the work of synthesising spatial economics theories and set up in the context of the present research, according to each research sub-field.

Hypotheses of the dissertation

Theoretical foundations	***Hypothesis on possibility to formulate and apply the Regional Enterprise Spatial Structure Model***
Based on the model of Krugman, Porter, Storper and Lengyel	1. In our research, we analysed key models for assessing spatial processes from the perspective of enterprises and we found that none of them focuses on the representation of the theoretical background of the meso level but all the theories and practical applications of territorial development are based on the role of enterprises in territorial development. Therefore, it is appropriate to set up a model that simulates the link between the meso-level spatial characteristics of enterprises and the development of regions and is integrated in the process of business and meso-level spatial planning. **According to our hypothesis, this model can be developed and used.**
Theoretical foundations	***(County-level) hypotheses on macro-level sub-model, i.e. the impact of macroeconomic processes on territorial disparities***
Based on neoclassical school	2. **Meso-level disparities of territorial development** in the national economy can party be **attributed (also in Hungary) to the regionally different capacity of positive local externalities** and the underlying economic and social processes **to exert their influence.**
Theoretical foundations (Relational capital is part of social capital but not identical with it.)	***Hypotheses on the micro-level sub-model, i.e. on the empirical research (regarding businesses in Szabolcs-Szatmár-Bereg county)***
Based on endogenous growth theory	3. The **involvement of agricultural enterprises** in employment, generating revenues and practical training **is decisive due to the endogenous characteristics of Szabolcs-Szatmár-Bereg county** (natural characteristics, composition of human resource, culture, traditions). Agricultural enterprises are mainly owned by Hungarians.
Based on Krugman's theory of new economic geography	4. The relatively even distribution of economic activity across the region or its concentration in certain areas, giving rise to different combinations of positive and negative externalities, plays an important role in the level of economic development in the county. **Businesses in Szabolcs-Szatmár-Bereg county are characterised by high turnovers and a high concentration of employees.**
Based on market location theories	5. In the late 1980s and early 90s, the radical changes in the economic, social and political circumstances also transformed the structure of the business sector **in Szabolcs-Szatmár-Bereg county**, consequently, **capitalisation and innovation potential have created extreme situations among businesses.**

Source: edited by the author

3.3 Theoretical description of the Regional Enterprise Spatial Structure Model

Before we set out to develop the model, we extensively reviewed the relevant literature, including *Paul Krugman*'s theory of '*New economic geography*' (2003), *Michael Porter*'s *Rhomboid-model* (1990), *Michael Storper*'s (1997) '*Trinity model*' and the ideas of *Imre Lengyel*'s *Pyramid model of regional competitiveness* (Lengyel, 2000) related to our theoretical model. The Regional Enterprise Spatial Structure Model developed in the dissertation was compared with the models providing the methodological foundations on the basis of similarities and differences.

The *Regional Enterprise Spatial Structure Model* examines quantitative and qualitative characteristics of enterprises and their correlations, taking into account that structural characteristics of enterprises are deeply embedded in economic and social processes at macro, micro- and meso-level. The process of modelling has also been supported by so-called explorative in-depth expert interviews.

The business sector is one of the most important elements in the processes of creating economic growth and development, while reducing territorial disparities. Territorial differences may stem from various causes, but perhaps the most powerful factors today are economic and social characteristics. All these connections can be presented by means of a model representing the interaction of three main subsystems (macro, micro, meso), in which the business sector is embedded in the economic and social environment.

When designing the model, the starting point was to identify the factors and processes that affect the composition of enterprises in an area and how the network of relationships between enterprises and regional actors works. For this purpose, it was considered important to frame the factors in a target-oriented structure, starting with a comparison of the factors of supply and demand of regions and businesses.

Individual components of business demand and supply and regional demand and supply are part of the macro- and micro-environment, while the relations between them define the structure of the meso-level economic space. We have drawn up our model starting from this threefold classification.

In the model, the ***micro level*** represents individual enterprises, their qualitative and quantitative characteristics and the connections between them.

The ***macro level*** encompasses the business space, including the complex socio-economic environment which also determines the functioning of individual enterprises.

The ***meso level*** does not only involve the traditional regional level (county), but it also entails a kind of qualitative surplus, as this level is the direct economic space and scope of operation of businesses, which is defined by the totality of businesses and the connections between them. The link between the macro and micro level and between micro-level units is established by the meso level.

The conclusions drawn from inequality processes and the identification of impact mechanisms are based on statistical methods. Economic and social factors that affect the development, performance and fragmentation of regions and the characteristics determining the structure of enterprises are closely intertwined and related in the model.

The objective of the *Regional Enterprise Spatial Structure Model* is to reveal inequalities in the spatial distribution of social and economic activities and to identify their causes from the perspective of the business sector. The model shows the factors and processes that influence the structure of businesses in the local/regional space, the relations established by the structure of enterprises of a particular region and what kind of impact this structure has on the development of the region in order to underpin regional economic policy decisions.

The interpretation framework, i.e. the regional level of the model in regional space is the NUTS3 level, which comprises 19 Hungarian counties in the research.
The Regional Enterprise Spatial Structure Model is based on the assumption that if we want to know and understand the situation of a region or a geographic unit in the economic space, a structural analysis of the economic and social environment (*macro-level sub-model*) and the business sector (*micro-level sub-model*) can be very helpful. Since it is impossible to understand and explain the situation, operation and changes of the regional enterprise structure without the macro-processes and relationships, this component should be included in the model. *This is the macro-level sub-model*. It is also necessary to identify the characteristics of enterprises in the region, in particular to examine the characteristics of their relationship with their natural, economic and social environment. *This is the role of the micro-level sub-model*.

Macro-level theoretical sub-model:
The *macro-level sub-model* aims at analysing the geographic position of an area or geographical unit in the light of socio-economic trends. Based on this, the regions examined can be ranked by their level of socio-economic development, taking into account macroeconomic factors that influence the regional enterprise spacial structure model and its specificities associated with enterprises. In our research, ratio-based indicators were applied to rank Hungarian counties by economic development.
Finally, the model can be used to study the impact of the business sector on territorial development, the system of factors causing territorial inequalities and the scale of territorial disparity at macro level.
The focus of macro-level analyses was Szabolcs-Szatmár-Bereg county, the target area of our research for all variables. The indicator variable for the study of counties was GDP and GDP *per capita*. Explanatory variables consisted of indicators linked to the level of economic development and territorial disparities in terms of macroeconomic and statistical aspects.
The **ultimate objective** of the macro-level sub-model is to **produce a composite indicator based on a principal-component analysis** that determines the position of each region in the economic-development ranking, in particular the position of the target area (Szabolcs-Szatmár-Bereg county in the case of this research) by taking into account several factors.
The method of correlation calculation was used to lay the basis for the principal-component analysis.
The principal-component analysis carried out on the basis of intensity indicators involves the following variables:

- GDP *per capita* (thousand HUF/person),
- entrepreneurial activity (number/thousand inhabitants),
- monthly net average wage of employed persons (HUF).

Micro-level theoretical sub-model:
The micro-level sub-model presents the quantitative and qualitative structural features of enterprises, in particular the connections between the features, their direction and scale. In this case, information is collected form primary sources, because the sub-model uses only variables gathered from interviews with businesses.
Based on the type of variables used, in addition to quantitative data, the *micro-level theoretical sub-model* also contains qualitative data, which include structural characteristics determining the operation, activities and level of development of enterprises and their capacity to engage in economic activity.
The factors affecting the sub-model can be divided into two groups based on the type of variables: quantitative and qualitative indicators.

Quantitative factors of influence: year of establishment, annual net turnover, number of employees, balance sheet total.
Qualitative factors of influence: business activities, legal form, ownership, export activity, R&D activities, employee skills, future employment plans of the enterprise, internship places, relational capital (examined theoretically in the dissertation).
Relationship capital is included among the variables of the micro-level sub-model only on a theoretical basis. In the micro-level theoretical sub-model, we will strongly focus on the study of the interconnections between variables, which enabled us to identify business types in Szabolcs-Szatmár-Bereg county.
The *main difference between the two measurement sub-models* discussed so far is the *level of examinations* (macro- and micro-level), *the type of variables used* (the macro-level sub-model only uses quantitative variables, while the micro level uses both qualitative and quantitative variables) and *the source of information* (secondary information at macro level and only primary information at micro level). All listed variables have a fundamental impact on the future prospects, economic situation and role of businesses. For this reason, the Model is focused on the assessment of variables with regard to the transformation of territorial structure and the quantification of their effects.

Meso-level theoretical sub-model:
The meso-level sub-model examines economic and social processes at regional level, their interconnections, impacts and consequences. We highlight spatial economic phenomena that have an impact at local level in the economic space. In addition, we want to identify the points of connection that the business sector has with the socio-economic characteristics of the region and what role it plays in the evolution of territorial disparities and indirectly in the level of economic development of an area. This sub-model will serve as a basis and provide a coherent framework for the system of causal interconnection of the other two sub-models.
The starting point for the analysis of the enterprise structure of a particular area is the description of the local (meso-level) environment, which is a kind of transition between the macro- and micro-environment and represents a special integrating intersection of the two major environmental categories. A large part of factors prevalent at regional level appears as positive externalities in business operations.
Looking at the meso-level analysis, it is appropriate first to consider the factors and processes that influence the composition of enterprises in the region and how the network of connections between businesses and regional actors is working. A baseline for this is a comparison of supply and demand factors of regions and enterprises within the national economy.
Elements of **corporate/business demand** are essentially factors which are used by the enterprise while performing its activities taking into accounts aspects of performance. This includes the market, the area, capital, the entrepreneurial environment, partners, suppliers, labour and infrastructure.
Regional demand is primarily dictated by the needs of economic operators and social groups in the region, the resulting market and partnership conditions and capital demand.
The elements of **corporate/business supply** include goods, services, jobs and income provided by enterprises.
Finally, r**egional supply** includes the market, the area, the capital, the business environment, infrastructure and social and cultural services.
The enterprise structure of an area can be analysed under the following four axes:

1. **Elements of business demand — elements of regional demand**: A comparison of the elements of business and regional demand allows identifying the coordination of markets and the utilisation of synergy effects. The purpose of the structural analysis is

to assess characteristics (identifying surpluses and shortages in terms of quantity or quality).

2. **Elements of business supply — elements of regional demand:** Consistency or difference between the elements of business and regional demand serves as a basis for preparation of territorial development decisions and the competition of regions. The purpose of the structural analysis is to draw up development alternatives.
3. **Elements of business demand — elements of regional supply:** Links between elements of business demand and regional supply define the choice of the place of business and the competition of businesses. The purpose of the structural analysis is to define development (competition) strategies/specific tasks.
4. **Elements of business supply — elements of regional supply:** The analysis of links between the elements of business supply and regional supply can have a positive effect on the coordination of developments and on addressing shortages and shortcomings. Objective: impact assessment of development decisions.

These connections are determined by the business structure of a region, therefore regional structures differ from each other depending on these connections. However, in order to provide a complex assessment of enterprise-focused regional structures, it is essential to combine and assess meso-level demand and supply elements with macro- and micro-environmental factors. Methodologically, the synthesis of analyses is the meso-level sub-model, uniting and providing a coherent framework for the other two sub-models as a common part (intersection) of the Regional Enterprise Spacial Structure Model.
After an overview of the sub-models and the underlying factors that influence them, we will go on to present the *Regional Enterprise Spacial Structure Model* as the result of the modelling in the form of a thesis.

T1: On the basis of secondary research and in-depth expert interviews, we developed the Regional Enterprise Spacial Structure Model, which aims to measure the impact of enterprise structure on territorial development in a selected area. The model will help to analyse the level of development of a particular region on the basis of a sophisticated methodology and to identify the direction and scale of the effects produced by macro-, micro- and meso-level factors affecting territorial development. The model encompasses the interaction of three key sub-models (macro, micro, meso), where the business sector is embedded in the economic and social environment. The business sector influences the performance of the economy by means of economic and social factors. This regionally integrated model is called Regional Enterprise Spacial Structure Model.

The core element of the model is business activity and performance, which creates a link between macro-level mechanisms, micro-level business characteristics and the meso-level processes at the intersection of the first two levels. **Based on the above, we accept Hypothesis 1.**

3.4 Testing of the macro and partly meso-level sub-model: Assessment of the socio-economic situation of Szabolcs-Szatmár-Bereg county and its enterprise structure

After describing the *Regional Enterprise Spacial Structure Model*, we continue to *assess the relationships of the macro and (partly) meso-level sub-model.*
Based on data of the *Central Statistical Office*, we outline the changes that occurred in Hungarian counties over the previous period (*focus period between 1995-2011*) and address the causes of territorial differentiation, focusing the analysis on Szabolcs-Szatmár-Bereg county (as the meso-level). *County-level comparative studies were carried out throughout the work without including statistical data on the capital (Budapest)* in order to reduce its distortive effects due to its weight.
The main findings of the statistical analysis of socio-economic processes characterising the economic situation and development of Hungarian counties (*macro level and, partly meso-level sub-model*) and the conclusions drawn from them are summarised below:

- On the basis of the analysis of the ratio of GDP growth in counties and the national growth rate, it can be concluded that more developed counties are more susceptible to crises in the Hungarian context than less developed ones. Taking into account our forecasts for the gross domestic product of Szabolcs-Szatmár-Bereg county and the continuous decline in population, no significant growth is expected in the coming years with the possible exception of faster temporary growth to catch up with the trend line.
- In the time frame considered in the research (1995-2011), there is an increase in territorial differentiation in Hungarian counties. In Hungary, the separation of developed and disadvantaged areas and increasing territorial inequalities can only be partly attributed to the scope of territoriality and traditional economic structures. In addition to economic (material) factors, non-economic, social and socio-cultural structures and local factors are becoming increasingly prominent.
- Regarding the indicator most often used to compare economic development in terms of space, i.e. gross domestic product per inhabitant, the ranking of counties (without Budapest) is as follows: Győr-Moson Sopron, Komárom-Esztergom and Fejér county are at the top, while Szabolcs-Szatmár-Bereg is only second last to Nógrád county. We found a 2.3-fold difference between the most developed Győr-Moson-Sopron county at the top and Szabolcs-Szatmár-Bereg county at the bottom.
- In Hungary, the share of GDP spent on R&D, together with the level of innovation, is far below the 3 % target set in the Lisbon Strategy of the EU. All absolute R&D expenditure indicators show a significant correlation with the economic development of the specific region. In the case of relative indicators, the situation is more balanced, as the connections, albeit weak, are statistically verifiable. The regional allocation of R&D activities continues to be concentrated in Central Hungary, including the capital city. In rural regions, the Northern Great Plain and the Southern Great Plain, including Debrecen and Szeged, have an outstanding role.
- In the regulatory system, less developed regions are more sensitive to regional development aspects. The regulatory system of development policy focused on economic development favours the more dynamic growth of more developed counties, hence it increases territorial disparities.
- Among the main factors influencing economic performance, both the number of registered economic undertakings and the number of registered enterprises steadily increased between 1995 and 2011 nationally, regionally and in counties. In

Szabolcs-Szatmár-Bereg county, changes in the number of enterprises are sensitive to national regulation and the opportunities to establish international relations.

- The share of active businesses in registered enterprises provides a more refined view, the national average being 42%. The percentage of active enterprises in Szabolcs-Szatmár-Bereg county is shockingly low (24%).
- On the basis of secondary research carried out in Hungarian counties, we identified a significant, moderate relationship between the share of actually active enterprises out of registered companies and *per capita* GDP, which best expresses economic development (r=0.59). A significant, strong relationship has been found between the density of enterprises examined on the basis of active enterprises and gross domestic product *per capita* (r=0.7). The distribution of enterprises in areas of high population density stimulates the economy, so it has an impact on the development of a specific region. On the basis of the above, a correlation can be shown to exist between the degree of economic agglomeration and territorial development.
- The number of foreign-owned enterprises has been growing steadily since the fall of communism in Hungary, the only exception being Szabolcs-Szatmár-Bereg county, where their number had been falling since 2003 to 354 in 2011. This is a problem because at national level there is a significant, positive, very strong relationship between the number of foreign-owned enterprises and gross domestic product generated (r=0.92). The result is similar with regard to the correlation between the density of foreign-owned enterprises (foreign interest enterprises per inhabitant) and GDP *per capita* at a ratio of r=0.77. Foreign-owned companies also play an important role in employment because there is a positive, very strong correlation between their number and the number of employees (r=0.88). The county-level trend is largely explained by the evolution of entrepreneurial interest of neighbouring countries.
- There is a strong, positive correlation (r=0.78) between the evolution of the value of investment and the number of active enterprises.
- Economic structure and performance vary substantially from one area to another, which fundamentally causes wage differences. In terms of both gross and net income, the counties of Fejér, Pest and Győr-Moson-Sopron are above the average, while the county with the lowest incomes is Szabolcs-Szatmár-Bereg. There is a very strong, positive relationship first between GDP *per capita* and average monthly gross income (r=0.80) and second, between GDP *per capita* and average net income (r=0.81).
- If we look at the components of economic activity, national employment rate is very low in comparison with the EU, while unemployment rates are high, with significantly increasing differences among the country's territorial units. The county with the highest employment rate is Komárom-Ezstergom, whereas these figures have been the lowest in Szabolcs-Szatmár-Bereg county for years. There is a very strong, positive relationship between the number of registered enterprises and employment rates (r=0.99), but there is also a strong relationship between entrepreneurial activity and employment and unemployment rates, with a Pearson correlation coefficient of 0.79 and -0.77, respectively.
- Demographically, the population is expected to decline and continue to age at national, regional and also county level. Overall, there are also significant demographic differences between regions, which can also be associated with the level of development of each county. (The underlying reason for the population decline is the impact of migratory balance, as more developed areas are more attractive. The rate of natural population increase is characterised largely by a negative relationship or in some cases a U-shaped curve — in principle.) In regard to relative indicators, a moderately strong relationship can be shown first between actual population growth per thousand inhabitants

and GDP *per capita* (r=0.58) and second, between population density and relative GDP (r=0.43). There is a significant, strong relationship between the dependency ratio and GDP *per capita* (r=-0.7).

- In Hungary, the population's level of education, especially the number of graduates is dynamically increasing. Today 42 % of the population has secondary education, 12 % has a higher-education degree and very few people (2%) do not finish primary education. In Szabolcs-Szatmár-Bereg county, these figures are partly lower (35 % have at least secondary education), while the number of those with a higher-education degree corresponds to the national average at 12 %. The proportion of people who do not finish primary education is well above the national average. Towns and cities play an important role in education as evidenced by the fact that there is a strong relationship between the number of cities and the number of students in full-time higher education (with a Pearson correlation coefficient of r=0.91).
- Territorial inequalities are also manifest in the development of infrastructure. Differences between counties are most evident in the length of motorways constructed, i.e. accessibility, which is statistically confirmed by the strong correlation coefficient (r=0.76) between the length of motorways and main roads and gross domestic product. There is also a strong correlation between the number of households connected to the sewerage system and GDP *per capita* (r=0.66).
- Based on a principal-component analysis, Hungarian counties have been ranked by their economic weight: 1 Győr-Moson-Sopron, 2. Pest, 3. Komárom-Esztergom county. The target area of our research, Szabolcs-Szatmár-Bereg county is ranked 18th in the principal-component analysis based on relative indicators. Overall, the principal-component based ranking is inextricably linked to the specific features and connections of the variables used for the principal component analysis.
- An analysis of the socio-economic differences between Hungarian counties and among sub-regions of Szabolcs-Szatmár-Bereg county was carried out on the basis of inequality indicators according to three variables involved in the principal-component analysis. In regard to indicators of territorial disparities, indices measuring territorial polarisation, dispersion indices and indices for measuring divergence in territorial distribution have been defined.
- A central factor in the evolution of territorial disparities within the county is the centre–periphery dichotomy. This dichotomy is strongly reflected in income trends and in business and employment relationships. The indicators of indices at the sub-regional level are the number of active enterprises, the proportion of registered job-seekers and the income calculated for the personal income tax base per tax payer.

The economic and social factors which form the basis of the macro-level sub-model are also the sources of positive and negative local externalities, which primarily influence the entrepreneurial activity of micro- and small enterprises and shape the links and networking between existing ones. With regard to externalities, it has to be emphasised that the identification, possible manipulation and exploitation of positive elements and the implementation of regional policy based on them are a key element in the development of the county. On the basis of economic and social factors affecting the territorial development of the counties in Hungary, we formulated the following thesis.

T2: In terms of the economic and social factors that can be interpreted as a source of positive local externalities, five factors are considered to be of paramount importance in influencing territorial disparities:
1. The presence of domestic and foreign business sector (indicators: enterprise density and the resulting economic agglomeration and the ratio of active/registered enterprises);
2. Innovation potential (indicators: number of R&D sites, actual staff and R&D spending);
3. Income (indicators: gross and net wages);
4 Demographic trends (indicators: real population change, population density and dependency ratio);
5 Infrastructure deployment (indicators: length of motorways and availability of sewage system).
These five factors have a complex effect on spatial processes and together they contribute to the economic development of a given region, as there may also be a relationship or mutual dependence between individual indicators.

At the meso-level, a correlation can be shown to exist between structural characteristics of businesses and the economic and social processes affecting the economic space. **Based on this, we accept H*ypothesis 2*.**
The composite index generated on the basis of the principal-component analysis of socio-economic trends measures economic development and is able to rank Hungarian counties. In this regard, we formulated the following thesis.

T3: The economic development of Szabolcs-Szatmár-Bereg county is assessed by a complex indicator based on a principal-component analysis. The development index is a combined indicator of GDP *per capita* (the most representative economic development indicator), entrepreneurial activity and the average monthly net salary of employed persons. On the basis of this, in the context of the business sector, the position of Hungarian counties can be identified in the economic development ranking based on the principal-component analysis.

Based on the principal-component analysis, it was concluded that Szabolcs-Szatmár-Bereg county is not sufficiently developed and is a disadvantaged peripheral region with low economic potential. **This also confirms H*ypothesis 2*.**

3.5 Testing of micro-level sub-model: analysis and evaluation of the empirical research

In theory, the sub-model developed can be applied to all business sizes, so verification was carried out for all types of businesses in Szabolcs-Szatmár-Bereg county. The investigation was conducted in the form of a large-sample questionnaire survey. In the course of the empirical research, we analysed the *quantitative and qualitative characteristics* of Szabolcs-Szatmár-Bereg county companies to obtain the sample.
The empirical research showed that the endogenous characteristics of Szabolcs-Szatmár-Bereg county clearly put an emphasis on the role of agriculture. As a result of the analysis of the findings of endogenous growth theory in the context of Szabolcs-Szatmár-Bereg County, the following thesis was formulated.

T4: The empirical research revealed that the share of agricultural enterprises is above national average and sole traders and cooperative entities are over-represented compared to the whole statistical population. Capital shortage is confirmed by turnovers and the volume of balance-sheet totals. The average number of people employed in agriculture is considered to be significant compared to other sectors, while this sector involves the highest risk of redundancies as well. The ownership structure of the agricultural sector is characterised by 100% Hungarian ownership. The most critical aspect of the sector is exports and R&D as performance is very poor due to capital shortages and outdated sectoral structures. Professional knowledge and problem-solving skills are the most important requirements for employees. Apprenticeships create an appropriate link between agriculture and education.

Hypothesis 3 **on the agricultural sector is accepted on the basis of empirical research with the exception of the realisation of turnover.**

On the basis of the representative survey, enterprises in Szabolcs-Szatmár-Bereg were demonstrated to have a low level of turnover concentration (with a concentration coefficient of 0.38) and that the annual net turnover can be statistically linked to exports and research and development activities. The investigation clearly demonstrates that turnovers can be increased through more active export activity and more intensive research and development. Based on this, it can be concluded that foreign ownership entails much higher turnover than Hungarian ownership.

T5/I.: The hypothesis on turnover concentration (H*ypothesis 4*) should be discarded on the basis of the outcome of the appropriate statistical procedure. However, an analysis of the impact of exports and R&D on turnover confirms that export orientation and R&D activities play a key role in the increase in turnover.

The value of the concentration coefficient calculated according to Boldrini's approximation method is 0.77, therefore, companies in Szabolcs-Szatmár-Bereg county are characterised by a high concentration of employees, i.e. the share of micro and small enterprises in total employment is lower than their share in the statistical population. As regards large enterprises, the situation is just the opposite. This is mainly due to the high ratio of SMEs, the imperative for them to be self-sufficient, the small number of large companies and the fact that small and medium-sized enterprises are typically family businesses and their participation in employment is rather low. The few large companies in the region have relatively high employment rates compared to SMEs.
We wish to formulate the following hypothesis on the number of employees of enterprises in Szabolcs-Szatmár-Bereg County.

T5/II.: Based on a representative survey of enterprises in Szabolcs-Szatmár-Bereg county, well-capitalised, export-oriented, mainly foreign-owned limited liability companies with a high share in employment and active in industry play an important role in the development of the region. With regard to foreign-owned companies, the average number of employees is significantly higher than in Hungarian enterprises (with a high concentration of employees in the former) but undertakings with higher staff number are more likely to plan redundancies than those with fewer employees.

Our hypothesis on staff concentration (*Hypothesis 4*) has been statistically confirmed (using the Gini coefficient).

3.6 Taxonomy of enterprises with cluster analysis

Companies in Szabolcs-Szatmár-Bereg County have been classified in four distinct groups by using *cluster analysis*. The criteria for clustering were based on wide-ranging preliminary statistical calculations (mainly interconnection examinations), whereby treating the cluster variable established by the SPSS programme as a quality variable we searched for the strength of connections with the other variables included in the investigation. When choosing the number of clusters and the variables involved, we took into account clearly technical aspects, in particular the socio-economic conditions of the county.

Categorical variables: business activity, legal form, ownership, export activity, R&D activity and future employment plans of the enterprise.

Continuous variables: annual net turnover, number of employees, balance sheet total.

The following four clusters were established on the basis of the nine variables:

1. *'Marginalised enterprises'*: The companies in the first cluster are active in agriculture, trade and transport. Their share (58%) is significant within the sample. Enterprises in this cluster are exclusively sole trader businesses fully owned by Hungarian citizens and do not pursue export or R&D activities. They are characterised by a low average turnover, a low headcount and a low balance sheet total, i.e. they are predominantly micro-enterprises. They do not plan to increase staff in future but they do want to maintain the number of employees.
2. *'Enterprises providing for community needs'*: Companies in the second cluster can be considered primarily to be community service providers, therefore, they are active in the field of education, health-care and real estate. They are mainly general partnerships, limited partnerships or other legal entities, mainly owned by Hungarian citizens. Like the companies in the first cluster, these enterprises typically do not pursue export and research and development activities. Their size is similar to those of the first cluster, so they are typically micro and small enterprises.
3. *'Enterprises stimulating the economy'*: The third cluster mainly includes industrial and construction companies. In terms of legal form, they are limited liability companies, public limited companies and cooperatives and are typically foreign owned. They are export oriented, active in research and development and have a significantly higher turnover, staff number and balance sheet total than the companies of the other three clusters. In this cluster, there is a higher share of medium-sized and large enterprises. In terms of employees, most are interested in maintaining staff levels, while a smaller share may consider lay-offs or even hiring new staff.
4. *'Financial service providers'*: The fourth cluster is clearly composed of financial undertakings and, like the third group, they are dominantly owned by foreigners. While they export heavily, they lag behind in R&D. Although their turnover, headcount and balance sheet total exceed that of the first two clusters, they are still considered to be low in relation to the national average.

As we are coming to finish testing the micro-level sub-model, we formulate our last hypothesis, which summarises the characteristics of the business categories of Szabolcs-Szatmár-Bereg county.

T6: The different groups of enterprises in Szabolcs-Szatmár-Bereg county are mostly distinguished by the type of activity, ownership structure, export and R&D activities. Based on the above, four clusters have been set up: 'marginalised enterprises', 'enterprises providing for community needs', 'enterprises stimulating the economy' and 'financial service providers'. Another significant difference can be demonstrated between the four clusters based on the legal form of the company, turnover, number of employees, balance sheet total and future employment. These are the factors that essentially determine whether an enterprise is marginalised in the business environment of the county or whether it contributes to the stimulation of the economy.

The companies that clearly contribute to the development of the county belong to the third cluster, i.e. '*Enterprises stimulating the economy*'. Companies in the first cluster, that is '*Marginalised enterprises*' are lagging behind most. Companies in the second ('*Enterprises providing for community needs*') and fourth cluster ('*Financial service providers*') are in a slightly better situation but their turnover, headcount and balance sheet total are still below average, thus their capitalisation is also below the national average. **The hypothesis on setting up groups of companies (*Hypothesis 5*) should be discarded on the basis of the results of the cluster analysis, since our assumption is only partially confirmed**. In addition to the agricultural enterprises of Szabolcs-Szatmár-Bereg county, companies active in trade and transport and different service providers are also under-capitalised and underdeveloped with small-scale business activities and weak export and innovation potential. The size categories of financial providers are slightly better than those of the former sectors but they are by no means well-capitalised, either. **Thus, the importance of financial enterprises can only be partially significant**, because financial services cannot be effective and profitable in the long term without the proper operational sector.

3.7 Evaluation of the meso-level as an essential sub-system of the model

The questionnaire-based survey shows that the level of development of Szabolcs-Szatmár-Bereg county is far below the average. The business sector could have enormous potential in reducing the gap in development by creating new jobs, innovation, boosting market competition and adjusting more flexibly to the economy.

In Szabolcs-Szatmár-Bereg county, traditional sectors, such as trade and agriculture play the most important role. The county's sectoral structure is highly sensitive, mainly because it is specialised and lacks diversification. This goes back to the agricultural sector, which is a highly critical element in the sectoral structure but this sector has the most potential as well. Agricultural businesses and the whole industrial and service sector built around it play a special role in the business structure of Szabolcs-Szatmár-Bereg county. Although agriculture has gradually lost much of its importance since the fall of communism, the presence of agricultural enterprises is still above the national average. This is due, among other things, to the physical geography of the county, traditions and the culture related to agriculture. The contribution of agriculture to the GDP of the county is above the national average but the related industrial and services sectors are inadequate. Flows among individual sectors are not interconnected and they are not integrated into macro-processes.

Economic restructuring has not been fully completed in the county and no competitive and flexible economic structures have emerged. In many areas, the production technology used is obsolete, with productivity below average in general. The region has not received sufficient

external capital to modernise the economy, there is a lack of innovation, the number of truly active businesses is low and the competitiveness of many of them is limited in national terms.
An opportunity for breakthrough for the county would be one of its outstanding features, its strategic location. However, this would require the necessary technological transfer and adequately qualified human resources but, more importantly, the shortage of information and capital should be remedied.
Therefore, one of the problems is that capitalisation of sole trader enterprises and SMEs is very modest, the enterprise structure is fragmented and a large share of SMEs have been set up only due to the necessity of self-employment. A consequence of capital shortage is increasing employment problems, low technical-technological quality, lack of innovation and an inefficient use of cooperation opportunities between businesses.
Thoroughfares and connected main roads in peripheral areas of the region should be modernised to enable the development of industrial and logistic activities.
The economic potential could be boosted by the development of cooperation opportunities between small and medium-sized enterprises and their technological quality. The SME sector could be stimulated by foreign capital investments in the county and by providing high-quality services to traditional sectors (linked to agricultural). It is essential to support businesses, institutions of higher education, centres of expertise as well as research and development and innovation activities of research institutes, especially in regional development centres and their sub-centres. Small and medium-sized enterprises operating in the county play a significant role in employment, therefore, their sustainable development and their activities with high added value must be ensured.
In the *dissertation*, we collected in the framework of three sub-systems of the Regional Enterprise Spatial Structure Model, with no claim to completeness, the main objectives of Szabolcs-Szatmár-Bereg county and the related recommendations we put forward to address these issues. The objectives and recommendations are, of course, applicable not only to Szabolcs-Szatmár-Bereg county but also to other areas with similar conditionsor, some of its elements, to the national economy in general. These objectives and the related proposals for solutions highlight the problematic economic, social and business areas of Szabolcs-Szatmár-Bereg county. If the problems of these areas are properly addressed and remedied, they could significantly reduce the county's disadvantaged and peripheral situation caused by territorial inequalities.

3.8 An examination of the changes in socio-economic factors in Szabolcs-Szatmár-Bereg county since 2011

Considering the time that has elapsed since the research period, we have considered it necessary to review the changes in the major economic and social processes related to our research (mainly to the meso-level sub-model) that have since occurred and to assess the changes in trends in Szabolcs-Szatmár-Bereg county.
Accordingly, the number of registered enterprises was 116.196 in 2011, increasing to 119.981 in 2016, which translates into an average annual growth rate of 0.8 % between 2012 and 2016. In the sectoral structure of registered enterprises, there was a substantial increase of 88 % in the number of enterprises active in agriculture in 2015 compared to 2011. As regards active companies, their number was 27.628 in 2011, which hardly changed by 2015 (27.968). Here, the average growth rate was only 0.31 % per year between 2012 and 2016. The number of companies with capital from foreign direct investment was 355 in 2011, which unfortunately further decreased to 301 by 2015. This shows that between 2012 and 2015, their number decreased annually by 18, i.e. by 5.35 % on average.

Total investment increased by 3.88 % on average per year between 2012 and 2016, reaching HUF 180 billion in 2016. (This value was HUF 130 billion in 2011).
The study of the structure of the productive sector highlights the value of industrial production, which increased by 48 % between 2011 and 2016. There is also a positive trend in the construction sector with an increase of 20 % compared to 2011.
The number of research and development sites, the number of researchers and R&D spending are also variables that determine the socio-economic situation of Hungarian counties in terms of enterprises. In 2011, the number of R&D sites was 63, which decreased by 35.5 % by 2016. Between 2012 and 2016, the number of R&D sites fell by an average of 5 sites per year, i.e. by 9.26 %. The situation is no better in terms of the number of researchers. While their number was 483 in 2011, it dropped to 328 by 2016. This decrease represented an average of 30 persons, i.e. 7.5 % per year between 2012 and 2016. R&D spending decreased annually by 5.7 % on average between 2012 and 2016. This clearly demonstrated a negative trend in innovation and research and development.
Another source of positive local externalities is the monthly average net wage, which increased only slightly in Szabolcs-Szatmár-Bereg county (by 4.6 %) compared to 2011. (Calculated at a 2011 reference value, national average net wage rose by 13.8 %.) The rate of wage increase in the county was far below national levels.
Further analysis revealed that changes in labour market structure show some improvement compared to 2011. Employment rate grew annually by 4.35 % on average between 2012 and 2016, while unemployed rate fell by 5.47 %. Unemployment rate dropped from 18.2 % in 2011 to 11.6 % in 2016.
Demographic processes can also be considered to be factors integrated at the meso-level. The number of live births rose from 5346 in 2011 to 6312 in 2016. Thus, the umber of live births increased annually by 3.1 % on average between 2012 and 2016. Unfortunately, the number of deaths also increased, but in terms of intensity, at an average of only 0.62 % per year between 2012 and 2016. On this basis, the trend of natural population decrease continues though its value changed from -1159 in 2011 to -526 in 2016.
Domestic migration also shows a deteriorating trend: while in 2011, 3307 people left the county, in 2016 the number was and 3722. The international migratory spread was 841 in 2011 and 3231 in 2016, which is a phenomenon that raises much more serious concerns.
Against this background, the actual decrease was -3625 in 2011 and -1017 in 2016. This improvement is clearly due to positive changes in live births and deaths.
The dependency ratio did not change significantly, but the average age improved both for women and men. However, the ageing index deteriorated significantly as it was 79.9 in 2012 and 95.7 in 2016, clearly due to the migration of young people to the central region and to Western countries.
As regards infrastructure, the length of the motorway in Szabolcs-Szatmár-Bereg county, which has an important transit role in the east-west freight transport, has increased from 19 km to 71 km since 2011.
We examined one of the most common indices for measuring territorial disparities, the *Hoover-index* for GDP and the 2015 county data of operating enterprises. On this basis, we concluded that it would be necessary to transfer 8.24 % of GDP or of active enterprises between Hungarian counties to ensure an equal territorial distribution. This value was 5.5 % in 2011. The economic weight, population, infrastructure and capacity to attract capital of each county may not, of course, require the same distribution of indicators. On this basis, it can be said, however, that territorial differences between Hungarian counties continued to grow in terms of GDP and active enterprises.

3.9 Summary of new and novel findings of the research

The new and novel results of our research are summarised below:

- In the context of the analysis of business activities and structural features, we concluded that in today's complex world, it is crucial to *examine the activities of businesses in the interconnected system of the macro, micro and meso environment*. It is appropriate to explore quantitative and qualitative features of businesses on the basis of socio-economic mechanisms, as the *system of macro-level connections provides a basis for micro-level analyses*. The *meso-level* at the intersection of the former two levels provides a coherent framework for economic and social processes, highlighting regional spatial structural characteristics. The structural features determining the operation and activities of businesses are firmly embedded in the system of socio-economic processes, therefore, macro-, micro- and meso-level mechanisms of action cannot be ignored because of the consequences and interventions. *The characteristics and critical points of connections can be identified and quantified by means of statistical methods in the context of the relations between the enterprise sub-system and the socio-economic environment, on the basis of which the model can be placed in a coherent framework*. This approach allows the structure of enterprises characteristic of a region and its internal and external relations to be characterised as a coherent system typical of the area.
- We have developed the ***Regional Enterprise Spacial Structural Model***, which is a coherent system of three measurement sub-models (*macro, micro and meso-level*). The Model allows first for the analysis of the development of a particular region based on a sophisticated methodology as well as the position, role and development potential of enterprises within the region and, second, the identification of the direction and scale of the effects of macro and micro-level factors influencing economic and social development. The model is based on the interaction of three priority subsystems, where the business sector is embedded in the economic and social environment, in a context supported by statistical methodological tools. Regarding the operation and assessment of economic processes, businesses are actors that can be influenced by different means and by changing the factors. The aim of the model is to assess the economic activity, situation and role of enterprises in the context of business characteristics and socio-economic processes and to identify the points of intervention through which the activity, performance and, indirectly, the competitiveness of businesses can be improved. The core component of the model is entrepreneurial activity and performance, which links macro-level processes and micro-level corporate characteristics at a particular regional level.
- Based on the *macro and meso-level sub-models*, it was found, in line with other research, that socio-economic trends have led to significant differences between different regions of the country in most respects. In line with the objectives of the dissertation, during our probes we considered the level of general economic development, the general sectoral characteristics of enterprises, the structure of the labour market, income levels of the local population, the evolution of main demographic trends, the level of educational of the population and the infrastructural characteristics of the region out of the factors that determine the socio-economic situation of Hungarian counties in the context of enterprises.

  *Among the variables examined, the following can be considered to be a source of positive local external effects***:**

  - business density and resulting economic agglomeration,
  - ratio of active/registered enterprises,
  - number of R&D sites, their actual staff number, value of R&D expenditure,
  - average gross and net wages,

- actual population growth, population density, dependency ratio,
- motorway length, ratio of constructed and disused dwellings, availability of sewage system

have a statistically decisive role in the level of economic development of each region and they also reinforce the phenomenon of territorial differentiation.

- On the basis of the *principal-component analysis*, it was possible to rank Hungarian counties in order of their economic weight taking into account a number of factors: *1. Győr-Moson-Sopron County, 2. Pest County 3. Komárom-Esztergom County*. Szabolcs-Szatmár-Bereg County, which was the target of our research, is ranked 18th according to the principal-component analysis based on relative indicators.
- Socio-economic differences between Hungarian counties and between sub-regions of Szabolcs-Szatmár-Bereg county have been analysed on the basis of *inequality indices*. Based on 2011 data of the Hoover-index, it was found that 5.5 % of GDP or active enterprises should be redeployed to ensure the same territorial distribution of GDP and operating enterprises in all counties. 3.5 % of active enterprises should be transferred between the counties in order to have a similar territorial distribution of active businesses and employment. Some 28 % of R&D expenditure should be redeployed to ensure an even territorial distribution of GDP and R&D expenditure among Hungarian counties. Based on the *Robin Hood-index*, it was concluded that nearly 9 % of total income should be transferred between counties with above average and below average income to ensure an income distribution proportional to the population.
- Calculated on a sub-regional base, almost 50 % of active enterprises should be redeployed to ensure an equal distribution of active enterprises and intra-county unemployment. Furthermore, it was found that 3.3 % of taxpayers should be transferred between sub-regions to ensure a territorially equal distribution of taxpayers and the population. The income-generating capacity of poorer regions should be increased by 10 % on identical terms in order to offset income inequalities. The result can be considered significant, which confirms territorial income gaps and hence the development gap between sub-regions. Our calculations indicate more profound differences in socio-economic development at the level of sub-regions than at the level of counties, which is in line with the theoretical conclusions.
- *Testing of the micro-level sub-model*, i.e. the examination of the structure of enterprises in Szabolcs-Szatmár-Bereg county in the framework of a representative survey, produced both unexpected and less surprising results. First, we would like to underline the novelty of the research itself, since, to our understanding, this type of survey has never been conducted in Szabolcs-Szatmár-Bereg count in this subject. We know of surveys with a similar topic but focusing on different target groups and using a different methodology. Based on empirical research to test the micro-level sub-model, we found that the share of agricultural enterprises exceeds the national average and that sole trader businesses and cooperatives are over-represented in the whole statistical population. Capital shortage is reflected both in turnover and balance sheet totals. The average number of employees in agriculture is considered to be significant compared to other sectors, while the risk of redundancies is also the highest in this sector. Agricultural businesses are 100 % Hungarian owned. The most critical aspect of this sector is exports and R&D activities, whose performance is considered to be minimal due to a shortage of capital and obsolete sectoral structures. The link between agriculture and education is satisfactory given the availability of apprenticeships. Moreover, finances and industrial enterprises play a decisive role in territorial development. These companies are well-capitalised, export-oriented, pursue active research and development and are mainly foreign-owned public limited companies or limited liability companies that play an

important role in employment. The average number of employees in foreign companies significantly exceed that of Hungarian companies, i.e. there is a high concentration of employees.

- Companies in Szabolcs-Szatmár-Bereg county were classified into *four groups* by using *cluster analysis*. Clustering was mainly based on the type of business activity, legal form, ownership structure and export and R&D activity. Based on this, the following four groups of enterprises were established: *'marginalised enterprises'*, *'enterprises providing for community needs'*, '*enterprises stimulating the economy*' and '*financial service providers*'. Further significant differences can be demonstrated among the four clusters in terms of legal form, turnover, staffing, balance sheet total and future employment perspectives. These are factors which essentially determine whether the enterprises of the county are located in the periphery or are involved in the dynamism of the economy.
- Using the three sub-systems of the Regional Enterprise Spatial Structural Model, we collected the main objectives of Szabolcs-Szatmár-Bereg county (without any claim to be exhaustive) and our related proposals for solutions.

Finally, in relation to the model, we would like to emphasise that we want to present the simplified aspects and relations of spatial economics, focusing mainly on the characteristics of the business sector having prevalence in the economic space. **Our model is a novelty in that it gives priority to the spatial structure characteristics of the business sector in the territorial study of socio-economic processes.**

We hope that the new and novel results presented above will, if only marginally, contribute to the interpretation of the theoretical approaches to businesses and to the achievement of planning, implementation and control tasks concerning economic activities at national, regional and enterprise level.

3.10 Exploitation of findings

We hope that the research results of the dissertation can, if only marginally, contribute to the achievement of planning, implementation and control responsibilities involved in economic activities at national, regional and enterprise level. According to our preliminary forecasts, the findings of the research will be used in the following areas.

- Reconsideration of the *counties' business development strategy, peer review of operational tasks* and the comprehensive planning of tasks in the coming years.
- The *Regional Enterprise Spatial Structure Model* could be a tool for businesses and regional planning experts as it can provide a comprehensive view of the mechanisms of action of territorial processes on enterprises. As the effects and connections are different in time (and space) and are constantly changing, the components of the model have to be further developed from time to time and the system of relations between them needs to be redefined.
- The dissertation as a whole can be used as a *source of literature for further scientific and empirical research* into territorial development, territorial disparities and businesses.
- Another target group of the Ph.D. dissertation could be *teachers-researchers and academic and practical experts of territorial disparities, business enterprises and statistics*.
- *Higher education* should also be included in this list and in this regard it should be noted that some chapters of the thesis will be integrated into the curriculum of the subjects of '*Business Studies*' and '*Statistics*'.

However, we do not want to make irresponsible statements so we need to mention the limitations of the research. The results of the business survey conducted in Szabolcs-Szatmár-Bereg county can only be generalised under the declared reliability and accuracy boundary conditions, which may vary according to the properties of the specific period. Given the length of the reference period of the analysis, the constancy of factors can only be assumed in the short term.

Finally, we hope that our findings and conclusions will contribute to the further development of Hungarian and international scientific work on this subject. We are also confident that our work indirectly serves the achievement of the national economic, enterprise-related and individual objectives by strengthening the fundamental belief in knowledge.

4 Bibliography

1. BABBIE E. (1998): *A társadalomtudományi kutatás gyakorlata.* Balassi Kiadó, Budapest
2. CAPELLO R. (2009): *Space, growth and development*. Capello R. – Nijkamp P.: Handbook of Regional Growth and Development Theories. Eward Elgas, Cheltenham-Northampton, 529.
3. DUSEK T. (2004): *A területi elemzések alapjai.* ELTE TTK Regionális Földrajzi Tanszék, Budapest
4. EGYED K. (2009): *Egyenlőtlenségek, pályázati források és kapcsolati hálók a Sopron-Fertődi kistérségben.* Ph.D. értekezés, Nyugat-Magyarországi Egyetem, Közgazdaságtudományi Kar, „Gazdasági folyamatok elmélete és gyakorlata" Doktori Iskola
5. FREEDMAN D. – PISANI R. – PURVES R. (2005): *Statisztika - Statisztikai módszerek a társadalomkutatásban.* Typotex Kiadó, Budapest
6. HAJDU O. (2003): *Többváltozós statisztikai számítások.* Központi Statisztikai Hivatal, Budapest
7. HOTELLING H. (1993): *Analysis of a Complex of Statistical Variables into Principal Components*. Journal of Educational Psyhology
8. HUNYADI L. – MUNDRUCZÓ GY. – VITA L. (2001): *Statisztika*. Aula Kiadó, Budapest
9. KÁLLAY L. – IMREH SZ. (2004): *A kis- és középvállalkozás-fejlesztés gazdaságtana.* Aula Kiadó, Budapest
10. KRUGMAN P. (2003): *Földrajz és kereskedelem.* Nemzeti Tankönyvkiadó, Budapest
11. LENGYEL I. (2000): *A regionális versenyképesség tényezői, különös tekintettel a Dél-Alföldre.* In: Farkas B. – Lengyel I. (szerk.): Versenyképesség–regionális versenyképesség. Szeged, JATEPress, 39-57.
12. LENGYEL I. (2003): *Verseny és területi fejlődés.* JATEPress, Szeged, 256-304.
13. MADDALA G. S. (2004): *Bevezetés az ökonometriába*. Nemzeti Tankönyvkiadó, Budapest
14. MOLNÁR L. (2008): *Mintavétel a marketingkutatásban, különös tekintettel a divizív és agglomeratív rétegzésre.* In: Piskóti István, Erdélyiné Rusz Annamária (szerk.) Marketingkaleidoszkóp 2008: Tanulmányok a Marketing Intézet kutatási eredményiből. Miskolc: Miskolci Egyetem Marketing Intézet, 291-313.
15. NEMES NAGY J. (2005): *Regionális elemzési módszerek.* ELTE Regionális Földrajzi Tanszék, Budapest
16. NEMES NAGY J. (2009): *Terek, helyek, régiók.* A regionális tudomány alapjai. Akadémiai Kiadó, Budapest
17. PORTER M. E. (1990): *The competitive advantage of nations.* The Free Press, New York
18. STORPER M. (1997): *The Regional World: Territorial Development in a Global Economy.* New York: The Guilford Press. pp. 26-28.

5 List of publications

1. [2005] (Nagy Tímea) *„Az ITD Hungary bemutatja: tanácsadás felsőfokon”* Inventárium, Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Főiskolai Kar, Nyíregyháza, 58-65 oldal (ISSN 1787-7113)
2. [2005] (Nagy Tímea) *„Az EU-csatlakozás hatása az ITDH tevékenységére”* Doktoranduszok Fóruma, Gazdaságtudományi Kar szekciókiadványa, Miskolc, Miskolci Egyetem, 160-168 oldal (Nyomdaszám: ME. Tu-99/2006.)
3. [2005] (Nagy Tímea) *„Az ITD Hungary szerepe a magyar kis- és középvállalatok versenyképességének növelésében”* Ünnepi tanulmányok Czabán János professzor 70. születésnapjára, Miskolci Egyetem, Gazdálkodástani Intézet, 157-164 oldal (ISBN: 963 661 690 6)
4. [2006] (Nagy Tímea) *„A kis- és középvállalkozások jelene és jövője az Észak-Alföldi Régióban, benne Szabolcs-Szatmár-Bereg megyében”* Tudás és versenyképesség pannon szemmel, Pannon Gazdaságtudományi Konferencia tanulmánykötet II., Veszprém, Pannon Egyetem, 262-268 oldal (ISBN: 963 9696 03 X)
5. [2007] (Nagy Tímea) *„Szabolcs-Szatmár-Bereg megye vállalkozási szerkezetének statisztikai elemzése az ezredfordulón”* Inventárium, Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Főiskolai Kar, Nyíregyháza, 167-180 oldal (ISSN 1787-7113)
6. [2007] (Nagy Tímea) *„Vállalkozási jellemzők és gazdasági folyamatok közötti összefüggések feltárása Szabolcs-Szatmár-Bereg megyében”* Európai Integráció – Elvek és döntések gazdasági fejlődés Európában, II. Pannon Gazdaságtudományi Konferencia, Tanulmánykötet II., Veszprém, Pannon Egyetem, 285-293 oldal (ISBN: 978-963-9696-30-3)
7. [2007] (Nagy Tímea) *„Szabolcs-Szatmár-Bereg megye vállalkozási szerkezetének statisztikai elemzése, valamint a vállalkozási jellemzők közötti összefüggések feltárása”* XXVIII. Országos Tudományos Diákköri Konferencia Közgazdaságtudományi Szekció Doktorandusz Konferencia, Miskolc, Miskolci Egyetem, (CD kiadvány) (ISBN: 978-963-661-768-4)
8. [2007] (Nagy Tímea) *„A gazdasági folyamatok és a vállalkozási jellemzők kapcsolatának statisztikai vizsgálata Szabolcs-Szatmár-Bereg megyében”* Doktoranduszok Fóruma, Miskolc, Miskolci Egyetem, Gazdaságtudományi Kar szekciókiadványa, 120-129 oldal (Nyomdaszám: ME. Tu-59/2008.)
9. [2007] (Nagy Tímea) *„Tanulmány az Észak-alföldi Régió munkaerőpiaci helyzetéről”* Inventárium Különkiadás, Karrierkutatás 2006., Nyíregyházi Főiskola Gazdasági és Társadalomtudományi Főiskolai Kar, Nyíregyháza, 26-37 oldal (ISSN 1787-7113)
10. [2007] (Nagy Tímea) *„Small and Medium-Sized Enterprises at Present and in the Future in the Northern Great Plain Region and in Szabolcs-Szatmár-Bereg Country”* Acta Beregsasiensis, A Scholary Annual of Ferenc Rákóczi II. Hungarian Collage of Transcarpathia, Volume VI. Special Edition, 7-14 p. (ISBN: 966-7966-49-6)
11. [2008] (Nagy Tímea) *„Az összefüggés-vizsgálat módszerének bemutatása Szabolcs-Szatmár-Bereg megye gazdasági folyamatainak tükrében”* Inventárium, Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Főiskolai Kar, Nyíregyháza, 219-230 oldal (ISSN 1787-7113)
12. [2008] (Nagy Tímea) *„A gazdaságfejlesztési kutatás kérdőíves felmérésének elemzése, értékelése”* Inventárium, Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Főiskolai Kar, Nyíregyháza, 231-244 oldal (ISSN 1787-7113)

13. [2008] (Makszim Györgyné) *„A kutatás-fejlesztés szerkezetének statisztikai vizsgálata”* Inventárium, A tudásteremtő fakultás eredményei, Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Főiskolai Kar, Nyíregyháza, 233-244 oldal (ISBN: 978-963-9909-06-9)

14. [2008] (Nagy Tímea) *„Szabolcs-Szatmár-Bereg megye üzleti vállalkozásainak bemutatása idősorok elemzésével”* Szabolcs-Szatmár-Bereg Megyei Szemle XLIII. évfolyam – 2008/2, 217-228 oldal (Indexszám: 25923) (ISSN 1216-092X)

15. [2010] (Makszim Györgyné) *„Statisztikai helyzetkép Szabolcs-Szatmár-Bereg megye vállalkozási szerkezetéről”* Gazdasági és Társadalomtudományi Közlemények, Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Kar, Krúdy Könyvkiadó, Nyíregyháza, II. évfolyam 2. szám, 65-77 oldal (ISBN 978-963-9909-78-6)

16. [2011] (Makszim Györgyné) *„Kísérletek a közgazdasági vállalatelméletek magyarázatának rendszerezésére”* Gazdasági és Társadalomtudományi Közlemények, Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Kar, Bessenyei Könyvkiadó, Nyíregyháza, III. évfolyam 1. szám, 125-139 oldal (ISBN 978-615-5097-17-1)

17. [2011] (Makszim Györgyné) *„A magyar megyék gazdasági fejlettségének összehasonlító elemzése a társadalmi folyamatok összefüggésében”* Comitatus Önkormányzati Szemle, A Megyei Önkormányzatok Országos Szövetségének folyóirata, Veszprém, Nyomdakész Kft., június XXI. évfolyam 200. szám, 18-27 oldal (ISSN 1215-315X)

18. [2011] (Makszim Györgyné) *„A new Element – the Role of Networking Capital in Explaining the three main Questions of Corporate Theory”* Journal of Economic and Social Studies, Special edition in English, The College of Nyíregyháza, Faculty of Economics and Social Studies, Hungary, Nyíregyháza, 61-69 p. (ISBN 978-615-5097-25-6)

19. [2011] (Makszim Györgyné) *„Magyarország megyéinek fejlettség szerinti rangsorolása”* Gazdasági és Társadalomtudományi Közlemények, Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Kar, Bessenyei Könyvkiadó, Nyíregyháza, III. évfolyam 2. szám, 39-49 oldal (ISBN 978-615-5097-27-0)

20. [2011] (Makszim Györgyné) *„A magyar megyék rangsorba állítása főkomponens-elemzéssel, különös tekintettel Szabolcs-Szatmár-Bereg megye helyzetére”* Comitatus Önkormányzati Szemle, A Megyei Önkormányzatok Országos Szövetségének folyóirata, Veszprém, Nyomdakész Kft., október XXI. évfolyam 204. szám, 51-57 oldal (ISSN 1215-315X)

21. [2012] (Dr. Galó Miklós – Makszim Györgyné) *„Statisztika I.”* Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Kar, Bessenyei Könyvkiadó, Nyíregyháza (ISBN 978-615-5097-36-2)

22. [2012] (Galó Miklós – Makszim Györgyné) *„Szabolcs-Szatmár-Bereg megye üzleti vállalkozásainak tipizálása klaszteranalízis segítségével”* Gazdasági és Társadalomtudományi Közlemények, Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Kar, Bessenyei Könyvkiadó, Nyíregyháza, IV. évfolyam 1. szám, 71-81 oldal (ISBN 978-615-5097-47-8)

23. [2012] (Makszim Györgyné) *„Utópia, avagy realitás: a területi különbségek megyei szintű vizsgálata”* Gazdasági és Társadalomtudományi Közlemények, Nyíregyházi Főiskola, Gazdasági és Társadalomtudományi Kar, Bessenyei Könyvkiadó, Nyíregyháza, IV. évfolyam 2. szám, 95-103 oldal (ISBN 978-615-5097-59-2)

24. [2013] (Makszim Györgyné) *„Analysis of desparities in economic development and its reasons”* Kommunikáció, Média, Gazdaság, Budapesti Kommunikációs és Üzleti Főiskola (negyedéves folyóirata), 2012-2013/X. évf. 1-2. szám, 67-78 p.

25. [2014] (Makszim Györgyné) *„A vállalati elit és a kapcsolati tőke viszonyának elemzése”* In: Acta medicinae et sociologica, ISSN 2062-0284, Vol. 5., No. 14-15., 131-150. p.

26. [2017] (Makszim Györgyné dr. Nagy Tímea) *„A vállalkozási szempontú térszerkezeti vizsgálatok egy lehetséges modellje”* ICUBERD Konferencia, Pécsi Tudományegyetem, Közgazdaságtudományi kar, Konferencia előadás, 2017. november 30.

27. [2018] (Makszim Györgyné dr. Nagy Tímea – Galó Miklós – Nyilas József) *„Statisztika III. - Statisztikai módszerek számítógépes alkalmazása”* Nyíregyházi Egyetem, Gazdálkodástudományi Intézet, Nyíregyháza, Megjelenés alatt

28. [2018] (Makszim Györgyné dr. Nagy Tímea) *„A Térségi Vállalkozási Térszerkezeti Modell elméleti bemutatása”* Kommunikáció, Média, Gazdaság, Budapesti Kommunikációs és Üzleti Főiskola (negyedéves folyóirata), megjelenés alatt

29. [2018] (Makszim Györgyné dr. Nagy Tímea) *„A közfoglalkoztatás mint munkaerő-piaci eszköz fejlődése”* Comitatus Önkormányzati Szemle, A Megyei Önkormányzatok Országos Szövetségének folyóirata, Veszprém, Nyomdakész Kft., megjelenés alatt