

Endogenous Development in Hungarian Districts: Examining Elements of Territorial Capital

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In recent decades, endogenous development has gained increasing attention in the literature, particularly because of the growing role of local resources in regional development. Territorial capital is one of the main approaches used to capture these endogenous factors.

This study examines whether typical spatial patterns can be identified across different forms of capital. The results show similar spatial concentrations for economic capital, human capital, and the “human activity” dimension of social capital. In contrast, the “community activity” dimension shows a different spatial pattern, indicating that the internal dimensions of social capital may operate differently across space.

keywords: endogenous development, territorial capital, territorial pattern, region

JEL: O18; P25; R11

Introduction

The examination of regional disparities has been the subject of numerous studies for decades. At the same time, reducing territorial inequalities and identifying appropriate ways to address them continue to generate considerable debate at the European Union level (e.g. Iammarino et al., 2019; Kovács et al., 2024; Petrakos et al., 2005; Szilágyi et al., 2025; Villuendas & Campo, 2022; Vida, 2022).

Our study focuses on the territorial disparities observed among the districts of Hungary. The current relevance of this topic in the Hungarian context is clearly demonstrated by the fact that these inequalities can be encountered on a daily basis. It is widely recognised that significant territorial differences exist in Hungary between the eastern and western parts of the country, as well as between the capital and more remote areas.

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Given the size of Hungary, we considered districts to be an appropriate territorial level for conducting an in-depth analysis of the selected topic, as more pronounced territorial disparities tend to become visible when smaller spatial units are examined (Egri & Lengyel, 2024; Fratesi & Perucca, 2019; Szakálné Kanó et al., 2025; Villuendas & Campo, 2022). Such territorial disparities may “...undermine the economic performance of the entire community” (Lukovics, 2017, p. 295). Therefore, inequalities and economic divergence require new policy approaches that go beyond the existing framework (Szakálné Kanó et al., 2025).

The choice of the theoretical background is supported by the fact that, in recent years, endogenous approaches have received increasing attention within the literature on development (Bodnár, 2020; Káposzta, 2014; Lengyel, 2012; Vázquez-Barquero & Rodríguez-Cohard, 2016). Furthermore, endogenous factors also play an important role in addressing inequalities (Sávai & Bodnár, 2024). In addition, in the case of foreign direct investment (FDI), a clear relationship with economic growth has not been conclusively demonstrated (Gál, 2019).

Our research question examines whether a “usual” territorial pattern can be identified in relation to endogenous capital factors, or whether these factors display specific and individual spatial characteristics.

Theoretical Framework of Endogenous Development and Territorial Capital

The examination of the factors influencing regional development plays a key role in territorial research (Stimsons et al., 2011). Regional economic development has been analysed within several theoretical frameworks. One of these belongs to the mainstream approach and focuses on exogenous development. However, exogenous factors tend to produce only short-term rather than long-term results (Liu et al., 2025; Smetkowski, 2018).

In contrast, the theory of endogenous development has gained increasing attention compared with more traditional approaches (Bodnár, 2020; Garibaldi et al., 2021; Káposzta, 2013; Lengyel, 2012a; Liu et al., 2025; Tödtling, 2010), as endogenous factors are able to generate long-term results. The importance of these factors is also highlighted by Stimsons et al. (2011). This is further supported by evidence from Central and Eastern European countries. Although exogenous factors became more important for economic development during the financial crisis, endogenous factors play a decisive role in the long term (Smetkowski, 2018).

Regions can act as engines of development through cooperation among local actors (Vázquez-Barquero & Rodríguez-Cohard, 2016). Local residents

and institutions generally have a better understanding of local needs (Liu et al., 2025), while local initiatives may contribute to the development and catching up of disadvantaged regions (Veresné et al., 2023).

Several models of territorial development are based on factors associated with endogenous development (e.g. Camagni, 2009; Dinya, 2013; Stimsons et al., 2011). Some of the most important models are presented below. One example is the renewed pyramid model (Bodnár, 2020). In this model, the driving forces include factors characteristic of endogenous development, such as human capital, while earlier elements of the model are also retained (Lengyel & Szakálné-Kanó, 2012; Lengyel, 2016). Stimsons et al. (2011) developed a five-factor model that provides a useful framework for identifying the main elements of sustainable and innovative development (Lengyel, 2021, p. 321).

1. The availability of productive capital (PC): this corresponds to neoclassical production theory where output is determined by the traditional production factors labour and capital.

2. The presence of human capital (HC): this refers to the quality of labour input obtained by means of education, training or new skills (for example, in ICTs) and may be seen as a productivity-enhancing factor. Clearly a balanced distribution of human capital over people is of great importance

3. The access to social capital (SC): this condition comprises interaction and communication between people, socioeconomic bonds, social support systems, business networks (formal and informal), relations based on trust, and so on.

4. The usage of creative capital (CC): this may be seen as a great ability to cope with challenges and new opportunities, and is reflected in entrepreneurial spirit, new ways of thinking and acting, trend-setting artistic expressions, innovative foresights, and so forth. Such a factor is often found in a multicultural urban melting pot.

5. The existence of ecological capital (EC): this condition takes for granted that a favourable quality of life, an ecologically benign condition in a city, presence of green space and water, or an attractive living climate (for example, recreation and entertainment possibilities) contribute significantly to the innovative and sustainable potential of a region.

Territorial capital (Camagni, 2009) provides a useful framework for capturing the factors of endogenous development (Bodnár, 2013; Bodnár, 2020; Lengyel, 2021; Orsi et al., 2022), and can contribute to a deeper understanding of regional performance (Fratesi & Perucca, 2019). Territorial capital also plays an important role in policy decisions and cohesion policy (Fratesi & Perucca, 2019; Tóth B., 2023), while its soft elements are

particularly important in initiating development processes (Moretta, 2021).

Territorial capital can be examined most effectively when sufficient data are available. As mentioned in the introduction, territorial disparities tend to become more visible at smaller spatial scales (Egri & Lengyel, 2024). However, data availability is generally more limited at lower territorial levels (Fratesi & Perucca, 2019).

Selected Capital Factors

Based on the literature reviewed, we identified three capital factors as particularly important: economic, human, and social capital.

According to Bourdieu (1999), economic capital forms the basis of all other types of capital. He argues that economic capital should be regarded as the foundation of other forms of capital, while their transformed forms cannot be fully reduced to it, as they develop their specific effects partly by concealing their economic basis (Bourdieu, 1999, p. 163).

Many regions have a limited capacity to generate income due to the low number of businesses operating in the area. If a region is unable to generate sufficient income, this may also negatively affect other factors that support development. For example, investment may remain limited, while a lack of income may result in regions becoming trapped in a negative cycle of development (G. Fekete, 2005).

Human capital has been defined in several different ways. In the OECD definition, the emphasis is placed on individual knowledge, which is relatively difficult to measure (Tóth B., 2010). Human capital also strongly depends on the spread of knowledge and innovation, which may have a significant impact on other regions as well (Coradini et al., 2025). Therefore, policy decisions should place greater emphasis on the development of local human capital. This may contribute to the emergence of industries with higher added value even in less developed regions (Sávai & Bodnár, 2024).

Human capital plays an important role in economic development (Bonaccorsi, 2017; Capello, Caragliu & Nijkamp, 2011). The quality of the labour force is a key factor in the economic progress of regions (Benedek & Kurkó, 2011). In addition, health is also an important element of the quality of human capital (Szakálné-Kanó, 2018; T. Kiss, 2012; Todaro & Smith, 2009).

Social capital has also been defined in several ways depending on how it is expressed and examined (e.g. Fukuyama, 2000; OECD, 2001; Putnam, 2000). In contrast to physical capital, social capital is related to individual relationships, social networks, and the trust that develops from these connections. Putnam (2000) distinguishes between two main types of social capital: bonding and bridging social capital. Social capital may also be

reflected in participation in community events, as well as in civic and political activity (Putnam, 2000).

Methodology and Empirical Results

The indicators covered in the literature review and examined across Hungarian districts are presented in Table 1, together with their measurement and the related literature.

Table 1. Measurement of capitals

Variable	Dimensions measurement	/	Literature
Economic capital	material infrastructure, environment	well-being, business	Affuso & Camagni (2010); Bodnár (2020); Castelnovo et al. (2020); Kovács & Bodnár (2016); Tésits et al. (2021); Tóth (2013); Tóth (2014); Tóth (2023)
Human capital	highly qualified labour force, share of graduates, university students, high value-added firms, higher education institutions		Bodnár (2020); Bodnár et al. (2022); Fratesi & Perucca (2018); Kovács & Bodnár (2016); Smetkowski (2018); Orsi et al. (2022); Perucca (2014); Tóth B. (2013); Tóth B. (2014); Tóth B. (2023)
Social capital – social cohesion and stability; Social capital – cultural and community activity	economic activity, unemployment, participation in political elections, institutional trust, participation, civic activity, religiosity, crime		Affuso & Camagni (2010); Bodnár (2020); Healy, T. (2002); Kovács & Bodnár (2016); Tésits et al. (2021); Perucca (2014); Tóth B. (2014); Scrivens & Smith (2013); Sryja et al. (2005)

Source: authors' own construction

Endogenous development and territorial capital, which includes the factors of endogenous development, have been analysed using several multivariate statistical methods, such as factor analysis and cluster analysis (e.g. Bodnár, 2020; Camagni & Capello, 2012; Fratesi & Perucca, 2018; Kovács & Bodnár, 2016; Perucca, 2014; Tésits et al., 2021; Tóth B., 2023).

For our analysis, we used the SPSS statistical software package. We applied factor analysis, which became increasingly popular in Hungary from the 1970s onwards (Bodnár, 2020; Nemes-Nagy, 2005). Factor analysis is a widely used multivariate statistical method that is particularly useful for reducing and summarising large amounts of information (Molnár, 2015). The method creates subsets, or factors, from a large number of variables according to the underlying relationships between them (Shrestha, 2021).

In our study, we analysed 174 districts of Hungary. Budapest was excluded from the analysis because it performs exceptionally well across almost all indicators, which could distort the results. The data for 2023 were collected from different TeIR databases and from the Regional Statistical Yearbook. In the case of social capital, we also used data from the 2022 census and election data to measure certain dimensions of social capital.

We initially included 100 indicators, of which 17 were retained to represent the capital factors examined in the study. The variables included in the final model were those that met the requirements of the sample adequacy tests. An important practical requirement is that the sample should include at least 50–100 observations (Sajtos & Mitev, 2007). In the final model, the different types of capital were constructed separately in order to make the results easier to interpret. In the case of social capital, two components were created using Varimax rotation. This reflects the fact that social capital can be examined both from the perspective of community activity and from the perspective of social and human activity.

Before conducting factor analysis, several tests of sample adequacy are required (Bodnár, 2012). First, we examined the KMO value, which indicates whether factor analysis can be appropriately applied. If the KMO value is below 0.5, factor analysis is not considered suitable (Sajtos & Mitev, 2007). The KMO value is based on the average of the MSA values. The MSA value indicates how strongly a given variable is related to the other variables. If the MSA value is below 0.5, the variable should not be included in the factor analysis (Sajtos & Mitev, 2007; Ketskeméty & Izsó, 2005). In addition, the variables need to be sufficiently correlated. This was examined using Bartlett's test (Bodnár, 2012; Sajtos & Mitev, 2007).

Finally, the communalities of the variables also need to be examined. Communality shows how much of the information contained in a given variable is retained, and therefore how well the new factors are able to represent the original variables. Values above 50% indicate that a meaningful amount of information has been retained (Bodnár, 2012). Although these values are not presented separately for each variable, the explained variance reported for each factor indicates how much information is retained by the given component. The results of the sample adequacy tests are presented in Table 2.

For the categorisation of the factors, the range of factor scores was divided into five equal intervals. Outliers were handled by placing districts with exceptionally high factor scores into a separate category. The data were visualised on maps using the GeoDa software in order to examine the spatial distribution of the capital factors included in the analysis. The districts with the highest and lowest factor scores are presented in the Appendix.

Table 2.: List of indicators that characterize different types of capital, 2023

Factor	Variables used
Economic capital – Local economy and income potential	Number of registered limited partnerships per 1,000 inhabitants
	Number of registered limited liability companies per 1,000 inhabitants
	Number of joint-stock companies per 1,000 inhabitants
	Personal income tax base per taxpayer, in HUF 1,000
	Local tax revenue per capita, in HUF 1,000
KMO: 0.800; Bartlett's Test: Approx. Chi-Square = 595.144; df = 10; p < 0.001; MSA values between 0.744 and 0.836; Explained variance: 70.245%	
Human capital – Knowledge base and intellectual potential	Share of people aged 25 and over with a higher education degree among the population aged 25 and over, based on census data
	Number of students admitted to full-time higher education per 1,000 inhabitants, average for 2019–2023
	Number of registered enterprises in education (TEÁOR08: P) per 1,000 inhabitants, as of 31 December
	number of people with an upper secondary school qualification per 1,000 inhabitants average for 2019-2023
	Number of registered enterprises in professional, scientific and technical activities (TEÁOR08: M) per 1,000 inhabitants, as of 31 December
KMO: 0.811; Bartlett's Test: Approx. Chi-Square = 1176.410; df = 10; p < 0.001; MSA values between 0.698 and 0.867; Explained variance: 81.828%	
Social capital I – Social cohesion and stability	Number of offences committed by young offenders aged 14–17 per 1,000 inhabitants
	Number of divorces per 1,000 inhabitants, average for 2019–2024
	Number of citizens participating in single-member constituency voting per 1,000 eligible voters, based on 2022 election data
	Number of unemployed persons registered for more than 180 days per 1,000 inhabitants
Social capital II – Cultural and civic activity	Number of public cultural institutions per 1,000 inhabitants
	Number of civil society organisations per 1,000 inhabitants
	Number of participants in creative cultural communities per 1,000 inhabitants
	Number of participants in regular cultural activities per 1,000 inhabitants
KMO: 0.717; Bartlett's Test: Approx. Chi-Square = 571.000; df = 28; p < 0.001; MSA values between 0.646 and 0.868; Explained variance: 65.052%	

Source: authors' own construction

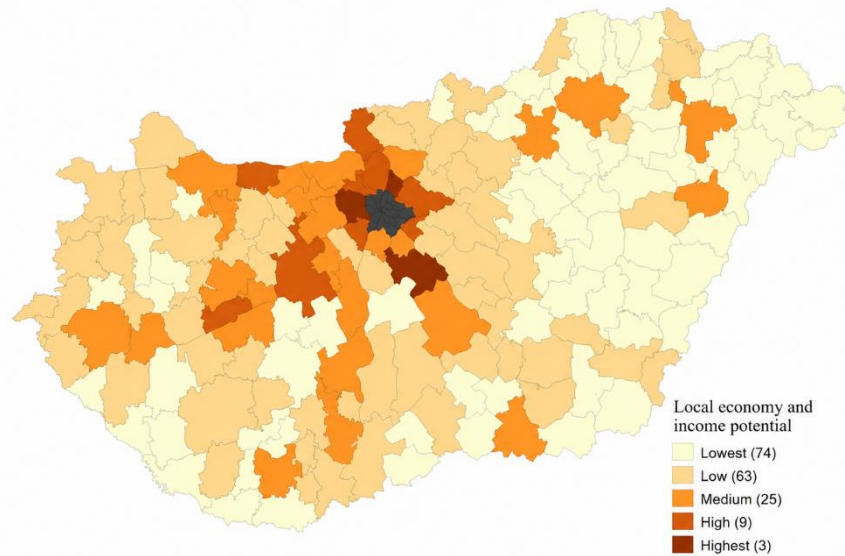
Economic Capital

Hungary shows a strong concentration of economic capital around Central Hungary and, in particular, Budapest (Figure 1), while lower levels of capital accumulation are more common in the eastern parts of the country. The results also indicate that districts located in or near the Budapest agglomeration tend to perform strongly in several indicators related to income and business activity. At the same time, individual districts may show different results across the indicators, which highlights the complex nature of economic capital.

Economic capital includes two closely related dimensions: material well-being, such as income and housing conditions, and the business environment. However, strong performance in one dimension does not necessarily result in equally strong performance in the other. For example, the income level of residents may also be influenced by employment opportunities in neighbouring districts. This confirms the important role of agglomeration effects in shaping spatial structures (Vida, 2016), while geographical distance is becoming less important in several economic and social processes (Tóth G., 2024).

Local tax revenues also play an important role in economic capital, as they reflect both the economic activity of a district and the financial capacity of local governments. Higher local tax revenues can provide municipalities with more resources for infrastructure, public services, and local development projects. At the same time, lower tax revenues may limit the ability of less developed districts to finance such investments. Therefore, local taxation is not only an indicator of the strength of the local economy, but also an important factor influencing future development opportunities.

Figure 1: Spatial structure of economic capital, 2023



Source: authors' own construction based on TeIR data.

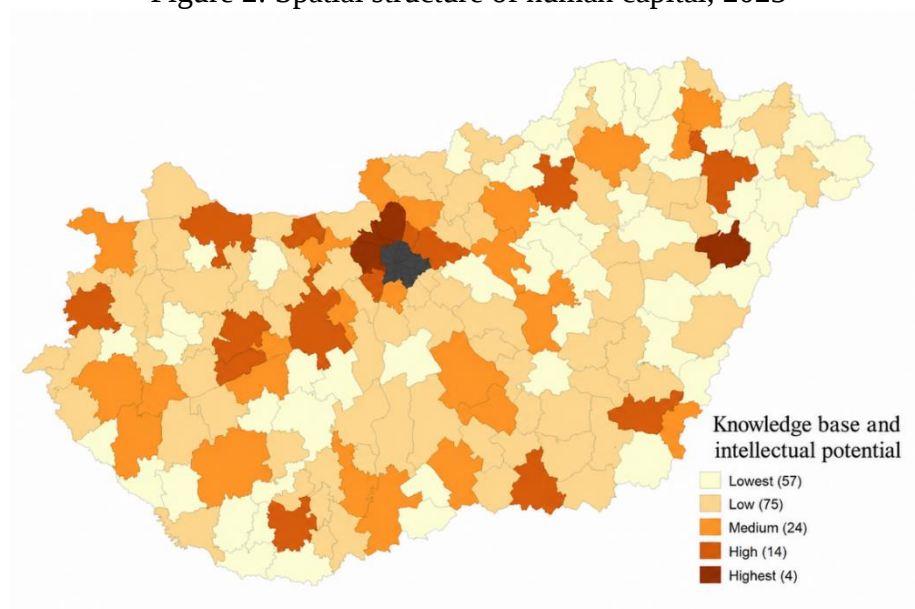
Regional differences can also be observed outside Central Hungary. Western Transdanubia benefits from favourable geographical conditions, developed manufacturing activities, and its connection to important international trade and transport routes (Gyurasincsné, 2024). In contrast, several areas in Northern Hungary continue to face structural disadvantages related to the economic transition, relatively low income levels, and the decline of traditional industrial activities (Varga, 2023; Sikos & Szendi, 2021; Kocziszky & Szendi, 2021). These patterns further demonstrate the significant territorial differences in economic capital across Hungary.

Human Capital

As mentioned in the methodology section, higher education institutions were excluded from the direct measurement of human capital because their inclusion could strongly influence the spatial pattern in districts with major universities. Instead, the analysis focused on indicators that can be interpreted consistently across all districts, such as the share of people with a higher education degree and the number of people with an upper secondary school qualification per 1,000 inhabitants. Nevertheless, districts with important university centres still tend to show stronger human capital values (Figure 2), which suggests that higher education institutions may also influence the spatial structure indirectly.

Overall, the results indicate a clear concentration of human capital in more developed and better-connected districts, particularly in and around major urban areas. At the same time, the different indicators do not always show the same spatial pattern. Some districts perform more strongly in indicators related to educational attainment, while others stand out because of the presence of firms that employ more highly qualified workers. This highlights the complex nature of human capital and shows that both the skills of the local population and the structure of local employment opportunities contribute to regional differences.

Figure 2: Spatial structure of human capital, 2023



Source: authors' own construction, based on TeIR data.

Overall, Figure 2 shows that the spatial pattern of human capital is similar to that of economic capital.

Social Capital

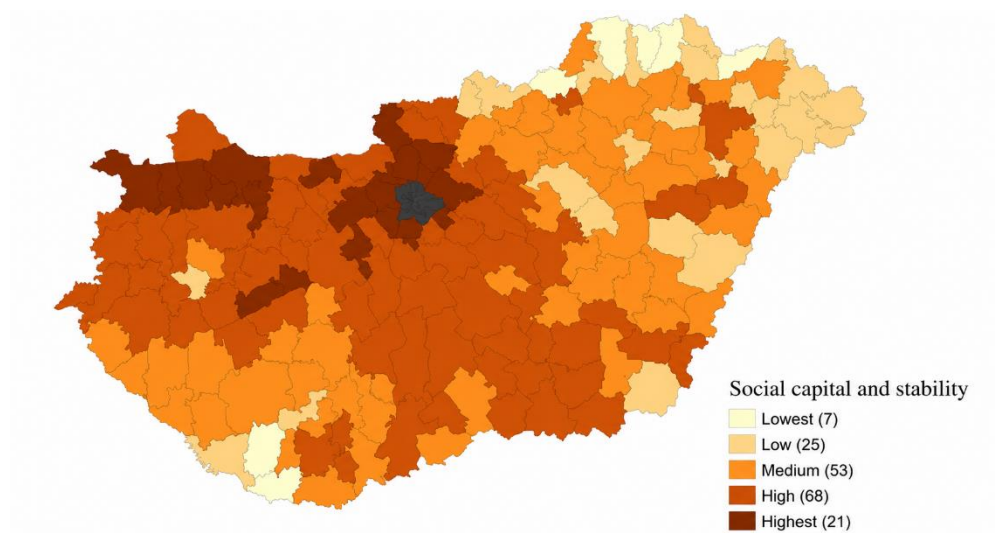
As discussed in the methodology section, social capital can be examined from several perspectives. For this reason, we represented it through two main components. The first component reflects social and economic activity together with institutional trust, while the second focuses more strongly on community participation, civic involvement, and social relationships.

The results suggest that participation in public affairs is an important element of social capital, especially in relation to civic and political activity.

At the same time, broader social and economic participation also contributes to stronger social capital. The number of young offenders can also provide useful information about social stability, as a higher level of juvenile crime may indicate weaker social integration and more serious local social problems. In this sense, it can be considered an indirect indicator of the strength of local social cohesion.

Figure 3 also indicates that several areas in Northern Hungary are in a less favourable position in terms of social capital accumulation. This pattern is consistent with the wider social and economic disadvantages of the region. In some districts, weaker connections to major centres and a less favourable human resource base may also limit the development of social capital (Lipták et al., 2019). Overall, the results show that social capital is shaped by a combination of civic activity, social stability, institutional participation, and local socio-economic conditions.

Figure 3: Spatial structure of social capital I: „Social cohesion and stability”, 2023



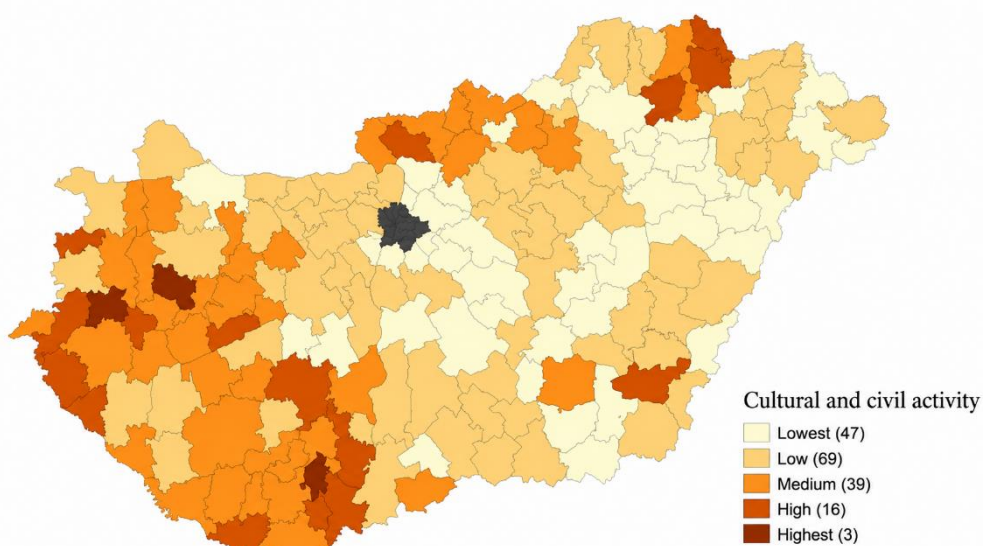
Source: authors' own construction based on TeIR data and election database.

The second component reflects community life, social relationships, and participation in local organisations. As shown in Figure 4, its spatial pattern differs from those identified for the previously examined forms of capital. A stronger concentration can be observed in the south-western part of Hungary, particularly around Pécs, while some districts in Eastern Hungary also show relatively high levels of community activity.

The area around Pécs is characterised by strong cultural participation and active community life. The city itself performs particularly well in indicators related to regular cultural participation, while nearby districts also show favourable values in indicators connected to creative cultural communities.

In contrast, districts surrounding Budapest tend to show lower values for the community activity component of social capital. One possible explanation is that residents of these districts may take part in civic, cultural, and community programmes in Budapest rather than within their own district. This suggests that the spatial pattern of community activity is influenced not only by local conditions, but also by the attraction of nearby urban centres.

Figure 4: Spatial structure of social capital II: „community activity”



Source: authors' own construction based on TeIR data.

In general, the “Community activity” dimension of social capital is strongly influenced by participation in different community events and organised programmes. Although the number of civil society organisations per 1,000 inhabitants may contribute to community activity, several districts can be identified where a high number of such organisations is not accompanied by similarly high levels of community participation, such as the Tokaj district.

Therefore, while voluntary work within civil society organisations is relevant to the “Community activity” component, the involvement of the local population in cultural activities and community events appears to play an even more important role.

Summary

In our study, we examined territorial differences in Hungary from the perspective of the factors of endogenous development. It is important to emphasise that, as in any quantitative analysis, the results are influenced by the set of indicators included in the analysis. For this reason, we considered it particularly important to carry out a broad literature review in the first part of our study, which provided the basis for the subsequent analysis. As part of this review, we presented the capital factors most frequently discussed in relation to endogenous development and introduced several models based on these factors.

Following the literature review, we presented the methodology applied in our study and its theoretical background. We used factor analysis to identify the main endogenous capital factors on the basis of the available variables. The analysis was carried out using the SPSS statistical software package.

In the final part of the study, we presented the results of the factor analysis. In the case of economic capital, a clear concentration around Central Hungary and Budapest could be observed. Budapest and its surrounding area have a particularly strong attraction effect, while the east–west divide is also clearly visible. Regarding human capital, high levels of capital accumulation can be found in districts across several larger regions. At the same time, its spatial pattern is similar to that of economic capital.

Social capital was divided into two components: “social cohesion and stability” and “Community activity”. In the case of the “social cohesion and stability” component, both the concentration around Budapest and the east–west divide were clearly visible. This pattern was especially noticeable in North-Eastern and North-Western Hungary.

The spatial structure of the “Community activity” component differed considerably from the previous three factors. In this case, a western, and particularly south-western, concentration could be observed, together with several other distinctive spatial characteristics.

Overall, the results show that economic and human capital followed the expected spatial patterns. Economic capital clearly reflected Hungary’s strong Budapest-centred structure, while the spatial distribution of human capital showed a similar pattern. Social capital was examined along two dimensions by creating a “social cohesion and stability” and a “Community activity” component. The spatial pattern of the “social cohesion and stability” component was similar to those of economic and human capital, whereas the “Community activity” component showed a clearly different spatial structure from the other three factors.

Future research could extend the present analysis in several directions. One possible approach would be to use the economic and local potential factor

as a dependent variable in a regression model, including methods such as partial least squares (PLS), in order to examine which endogenous factors contribute most strongly to local economic performance. This could provide a deeper understanding of the relationships between the different forms of capital identified in the study.

Another important research direction would be to develop a combined spatial indicator of endogenous development. Such an approach could integrate the different capital factors into a single framework and make it possible to visualise the overall level of endogenous development on one map. This could support a more comprehensive comparison of Hungarian districts and help identify areas where different strengths and weaknesses occur simultaneously.

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Appendix.

Table 1. Highest and lowest economic capital accumulation by districts

Rank	District	Rank	District
1	Budakeszi district	165	Tiszavasvári district
2	Dabasi district	166	Putnoki district
3	Dunakeszi district	167	Kemecsei district
4	Érdi district	168	Szikszói district
5	Szentendrei district	169	Edelényi district
6	Pilisvörösvári district	170	Ózdi district
7	Balatonfüredi district	171	Sarkadi district
8	Gödöllői district	172	Csengeri district
9	Siófoki district	173	Kunhegyesi district
10	Gárdonyi district	174	Cigándi district

Source: authors' own construction based on TeIR.

Table 2. Highest and lowest human capital accumulation by districts

Rank	District	Rank	District
1	Budakeszi district	165	Vasvári district
2	Szentendrei district	166	Hevesi district
3	Dunakeszi district	167	Ózdi district
4	Pilisvörösvári district	168	Jászapáti district
5	Érdi district	169	Cigándi district
6	Debreceni district	170	Letenyei district
7	Gödöllői district	171	Mezőcsáti district
8	Szegedi district	172	Sellyei district
9	Pécsi district	173	Tabi district
10	Veszprémi district	174	Kunhegyesi district

Source: authors' own construction based on TeIR.

Table 3. Districts with the highest and lowest levels of social cohesion and stability

Rank	District	Rank	District
1	Dunakeszi district	165	Putnoki district
2	Budakeszi district	166	Csengeri district
3	Érdi district	167	Hevesi district
4	Győri district	168	Bácsalmási district
5	Szentendrei district	169	Szikszerűi district
6	Pilisvörösvári district	170	Edelényi district
7	Szombathelyi district	171	Gönci district
8	Soproni district	172	Kunhegyesi district
9	Vecsesi district	173	Encsi district
10	Veszprémi district	174	Ózdi district

Source: authors' own construction based on TeIR.

Table 4. Districts with the highest and lowest levels of community activity

Rank	District	Rank	District
1	Pécsi district	165	Jánoshalmi district
2	Pécsváradi district	166	Nagykőrösi district
3	Szekszárdi district	167	Hajdúböszörményi district
4	Devecseri district	168	Kazincbarcikai district
5	Vasvári district	169	Szigetszentmiklósi district
6	Balatonfüredi district	170	Dunakeszi district
7	Bólyi district	171	Érdi district
8	Rétságai district	172	Ceglédi district
9	Zirci district	173	Tiszaújvárosi district
10	Salgótarjáni district	174	Mezőcsáti district

Source: authors' own construction based on TeIR.

Table 5. Relationships between capitals

Capital factor	Cultural and civic activity	Social cohesion and stability	Local economy and income potential	Human capital
Cultural and civic activity	1			
Social cohesion and stability	0	1		
Local economy and income potential	-0.03662	0.698963	1	
Human capital	-0.05487	0.636272	0.866679	1

Source: author's own construction based on TeIR data.