DOCTORAL (PHD) THESES

SZOMBATHELYI SÁNDOR
GÖDÖLLŐ
2025

HUNGARIAN UNIVERSITY OF THE AGRICULTURE AND LIFE SCIENCE

Spatial studies underpinning integrated, sustainable rural development strategies in the Homokhátság

DOI: 10.54598/006310

Szombathelyi Sándor
Gödöllő
2025

Doctoral school

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1. Backround and objectives of the work

Due to the rise of globalization, several processes and phenomena have been initiated and manifested in the social (e.g., the spread of acceptance of cultural trends), ecological (e.g., climate change) and economic (e.g., the appearance of international companies in smaller settlements) space, which have changed traditions, habits, routine events and processes that were previously thought to be rock-solid. It is important to note that the process of globalization, in addition to economic processes, also applies to the "spiritual-conscious-civilizational" (Bálint-Juhász, 2009) level. One proof of this is that material things have become primary, and the internet and television have acquired a decisive role in opinion formation, which only rarely undertake to mediate values. (Kapronczai, 2015) These processes affect the local rural economy from the outside, meaning they are not embedded in the local space. This results in the elements of the local space having to adapt, not the other way around, which can lead to the suppression of local values and their disappearance. The effects of globalization processes have different results in different rural settlements, because, based on the diversity of the countryside, every settlement - and thus the rural economy - is different. According to Káposzta (2020), this is mostly due to whether the effects of globalization or localization are more pronounced in a given rural economy, which is linked to the continuously evolving national or international economy. The adaptability of a settlement with a favorable location and numerous resources is much stronger than that of one that is resource-poor, especially if it is located on the periphery. In the case of the latter group of settlements, the phenomenon usually occurs that, as the quality of the roadnetwork is continuously improving, people start working elsewhere, thus they start commuting. The underlying reason for undertaking commuting is the desire to achieve a higher standard of living, which often comes at the expense of privacy and health. The unfavorable process is further reinforced by the insight into the artificial lives seen in the media. Commuting is followed by moving away from the settlement, which leads to further decline of the settlement. In addition to globalization, another important impact affecting all rural and non-rural settlements – and especially the region under study – is climate change, the effects of which we can no longer eliminate, so we must adapt to them. One such impact is desertification, which particularly affects the Homokhátság. Although desertification cannot be attributed solely to climate change, in recent decades human activity has led to the construction of canal networks draining swamps, marshes, and inland water, which has further contributed to the drying up of the region. While it was previously possible to continue agricultural production with the support of surface waters and balanced precipitation, today farmers are trying to survive by exploiting groundwater in the face of increasingly uneven precipitation distribution. Due to the decreasing trend of water supply, groundwater is being drawn into deeper layers, which are increasingly expensive to extract. However, fewer and fewer farmers can afford

the increase in irrigation costs, so they have to give up their activities, after which they are forced to locate in industries that are less embedded in the region, which can easily lead to commuting. The negative effects of globalization generally do not generate immediate, rapid depopulation and the disappearance of settlements. In most cases, settlements only lose their attractiveness and population retention power over many years or decades, and the time factor is available to reverse these changes at a decreasing rate. The less developed settlements thus formed will become the peripheries. However, the formation of these settlements in most cases takes place in rural areas, which further emphasizes that rural areas are even more exposed to the negative external effects of globalization. (Turnock, 1996) Territorial differences are mainly caused by changes in natural, economic and human resources. (Káposzta, et al, 2019) Therefore, the development of rural settlements should be carried out under all circumstances using integrated rural development methods based on local resources. However, despite the greatest goodwill, the development of the countryside cannot take place in a way where each settlement is examined separately by the government of the day, but rather, in my opinion, a settlement typification should be carried out according to the appropriate indicators. This, on the one hand, makes the development of the countryside more thorough, takes into account the processes taking place in the settlements, the characteristics of the settlements, and on the other hand, results in a more optimal allocation of resources (e.g. administration) in the policy. The categorization of settlements also helps us to understand the processes and phenomena taking place in a large number of rural settlements more thoroughly and to be able to offer solutions to several settlements struggling with similar problems at the same time. The direction of my research is also confirmed by Hoggart (1990), who raised the problem of the diversity of rural areas and the fact that the processes operating in rural areas aren't different from those operating in cities. Hoggart also formulated a solution to these problems, according to which researchers should focus on social processes and structures beyond the countryside.

In my monographic observation, I seek answers to the following questions;

- **Q1:** What economic and social factors and connections can explain the difference in development between villages and cities in the Homokhátság?
- **Q2:** Can a significant relationship be discovered between the development of settlements and the amount of European Union support received by them?
- **Q3:** How does the spatial location of settlements influence the development of their settlements today?
- **K4:** Considering the economic and social state of the Homokhátság, what direction can the future vision of its settlements take?

1.1 Hypotheses of the research

In my dissertation, I formulated the following hypotheses, which I will analyze during my research:

- **H1:** Due to the fragmentation of the rural economy of the Homokhátság, the strategic developments of the settlements cannot be handled uniformly.
- **H2:** The settlement structure of the Homokhátság is becoming more sparse, as the gravitational zone of the central regions (such as Kecskemét) generates an increasingly strong attraction.
- **H3:** Integrated rural development based on settlement typification generates sustainable development in the Homokhátság region through the cooperation of economic and social actors.
- **H4:** In the case of the settlements of the sand dunes, the correlations between the development of economic and social indicators show a significant relationship.

1.2 Objectives

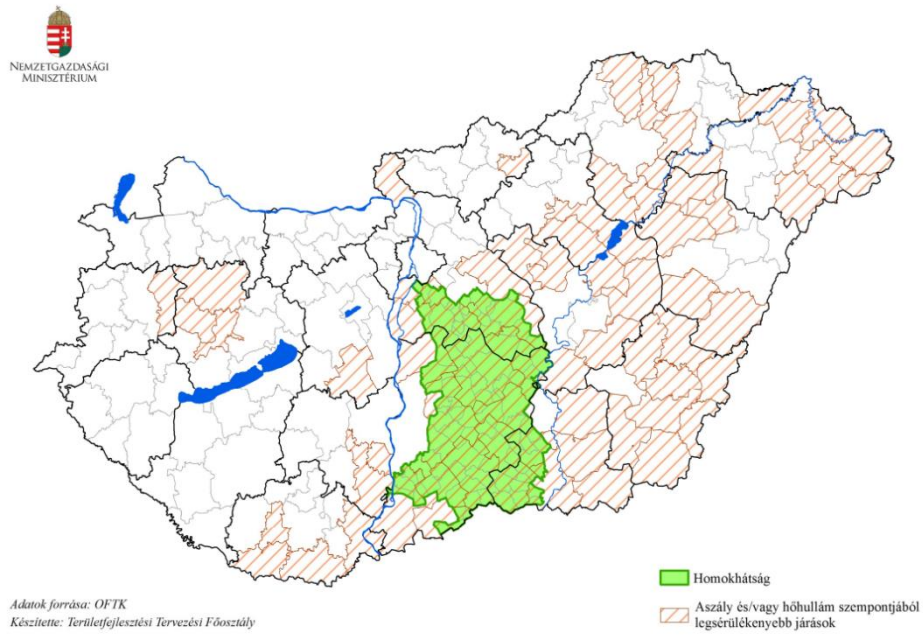
The aim of my research is to create an integrated, complex and sustainable rural development strategic model based on settlement typology, which, similarly to the LEADER program, will support the principles of rural development and effectively represent the integration of the factors of convergence. The settlement typology prepared on the basis of my research will help to solve the current high degree of diversity of the rural economy, thus trying to provide a solution for a more precise definition of appropriate development interventions. The development model proposed can increase the resilience of the Homokhátság and can be of great help in positively leveling the disadvantaged settlements. In my thesis, I interpreted the rural economy at the settlement level. The reason for this is that the geographical basis of the countryside is not the regions, but the settlements, although the rural economy can also be at the regional level, which can include several settlements. The application of the latter approach isn't justified in my present studies, for two reasons;

- On the one hand, the settlement-level study better supports a more detailed understanding of the Homokhátság.
- On the other hand, the size and fragmentation of the study area don't justify thinking in larger territorial subdivisions. The delimitation of 117 settlements is still manageable, especially in a less fragmented area like the Homokhátság, since its surface is not dissected by mountains, valleys, or rivers, so its economy, society, and natural environment are fundamentally unified.

The rural development model built on the characteristics of the settlements is a new aspect of the area, as it doesn't define point-based interventions, but rather offers an intervention package for similar settlements based on a complex approach.

2. Matherial and method

The basis for the territorial delimitation of my doctoral work was the document entitled Sustainable Development of the Duna-Tisza közi Homokhátság, prepared by ÁBKSZ Nonprofit Ltd. and Terra Stúdió Ltd. in 2007, which was a national strategic document. The study declares the Homokhátság to cover the area of three counties: the southern part of Pest, almost the entire Bács-Kiskun, and the western segment of Csongrád-Csanád county. This regional definition was later used in the National Development and Spatial Development Concept (hereinafter: OFTK) completed in 2013, as well as the Spatial Development Concept and Program of the Duna-Tisza közi Homokhátság created in 2023. (1. figure).



1. figure: 117 settlements of the Homokhátság

Source: terport.hu, 2016.

The indicators used for the analyses come from the National Spatial Development and Planning Information System (TEIR). However, the exceptions are the proportion of residents with higher education, commuters, solar-powered houses, and the domestic income per capita, as they come from the censuses. Data collection was also hampered by changes in the methodology of the indicators, or by the fact that a data item was not included for a given settlement, which I was forced to ignore because it was an outlier, which would have distorted the results of the analysis. All of the indicators used are hard indicators, which are "characterized by the fact that they change only slightly in the short term." (Hoyk et al, 2021) I obtained the data of the subsidies from the Data Warehouse function of the Integrated Administration and Control System

(IACS) and from the Széchenyi Plan Plus Map Space service. The subsidies include the following programs with a closing date of 31 January 2023;

- National Development Plan (2004-2006) (NFT)
- New Hungary Development Plan (2007-2013) (ÚMFT)
- Széchenyi 2020 (2014-2020)
- Széchenyi Plan Plus (2021-2027)
- Brexit damage mitigation program (2021-2022)
- Recovery and Resilience Plan (2022-) (RRF)

For the factor and then cluster analysis to be performed in SPSS, I had to further filter my indicators due to the sensitivity of the analysis methods, as the indicators had to be mathematically well chosen. The reason for this is that I used a multivariate mathematical-statistical method when examining the data, which therefore had to meet certain conditions explained below. (Tóth et al, 2010) This is how I came to the point where I had to reduce the 42 uploaded indicators to the 10 shown in table 1. One of the basic conditions for factor analysis performed in the SPSS program is that the sample to be examined (in this case, the number of settlements) must be at least ten times larger than the number of variables. (datas).

This is how I was able to cover thirty-two years of my work. However, one settlement is an exception, which is Móricgát, located between Bugac and Jászszentlászló. The settlement became independent after the change of regime, only on June 1, 1993, separating from the municipality of Jászszentlászló. For this reason, the number of SZJA payers and commuters per hundred inhabitants was not yet included in 1990, so I was able to use data from the 1994 census for SZJA payers and the 2011 census for commuters. The separation of the new settlement, however, distorts the population density data of Jászszentlászló, which I took into account during the study. The territorial change is almost 33 km2, and the population change is 705 people.

With the help of the selected indicators, in addition to the measurable, objective state of the settlements, conclusions can also be drawn about the immeasurable, subjective state. This way, I can get a complex, exact picture of the settlements and the settlement groups that emerge during the studies, covering almost everything - except ecology.

The value of a significant part of the ecological data to be used was zero in all databases and I only found a few settlements with a different value. Although the datasets of the European Environment Agency and the Ministry of Agriculture would have been suitable for performing the analyses from this point of view, the quality of the data entered into SPSS wasn’t adequate in either case.

However, the most accurate picture of the state of society can be obtained from demographic indicators, several of which are included in the analysis.

Examining the development of society is also important because the development of society is decided at local levels, which in turn is determined by the quality of life of the population. (Báger et al, 2010)
The situation is more nuanced when it comes to the state of the economy, as the most popular indicator is the GDP per capita indicator, which we have long known is outdated and doesn't provide a complete picture of a region or country. Among the economic indicators, I also tried to select and work on those that are of sufficient quality for the analysis.

1.Table: Indicators suitable for factor analysis

Applied indicators:
Population density change (capita/km^2) 1990-2022
Domestic income per capita (HUF) 2022
Proportion of houses with solar panels (%) 2022
Change of the graduates (%) 1990-2022
Change in the number of residents per 100 dwellings 1990-2022
Percentage of people paying personal income tax per 100 inhabitants (%) 1992-2022
Natural reproduction, weight loss (thousandths) 1990-2022
Amount of EU subsidies per capita (capita/HUF) 2023.01.31.
Change in unemployed people (%) 1990-2022
Change in the proportion of commuters (%) 1990-2022

Source: Own editing 2024.

3. Results and their discussion

3.1 Result of the Factoranalysis

The results of the factor analysis performed are shown in table 2 with the factor contents and factor names belonging to the variables.
Only those variables whose values change in the same direction were included in a factor. The reason for this is that if a variable has a low factor content, it explains less of the dispersion of the other variables. According to Tóth et al. (2010), the sign of the factor weights shows how the individual indicators affect the development of the main factor.

2. Table: Factors of the settlements of the Homokhátság

Indicators	The factor content of variables	Name of the factors
Population density change (capita/km2) 1990-2022	,798	Urban
Domestic income per capita (HUF) 2022	,816	
Proportion of houses with solar panels (%) 2022	,860	
Change of the graduates (%) 1990-2022	,848	
Change in the number of residents per 100 dwellings 1990-2022	,503	Family
Percentage of people paying personal income tax per 100 inhabitants (%) 1992-2022	,772	
Natural reproduction, weight loss (thousandths) 1990-2022	,773	
Amount of EU subsidies per capita (capita/ HUF) 2023.01.31.	,873	Economy
Change in unemployed people (%) 1990-2022	,538	
Change in the proportion of commuters (%) 1990-2022	,739	Commuting

Source: Own editing, 2024.

The first factor included population density, net domestic income per capita, the proportion of solar-powered houses, and people with a degree, so I named the factor Urban. The second factor included the number of residents per 100 apartments, the number of personal income tax payers per 100 people, and the trend in the natural increase and decrease indicator, so it was named Family. The third factor, called Economy, includes the indicators of EU subsidies per capita and the change in the number of unemployed. The last, fourth factor is called

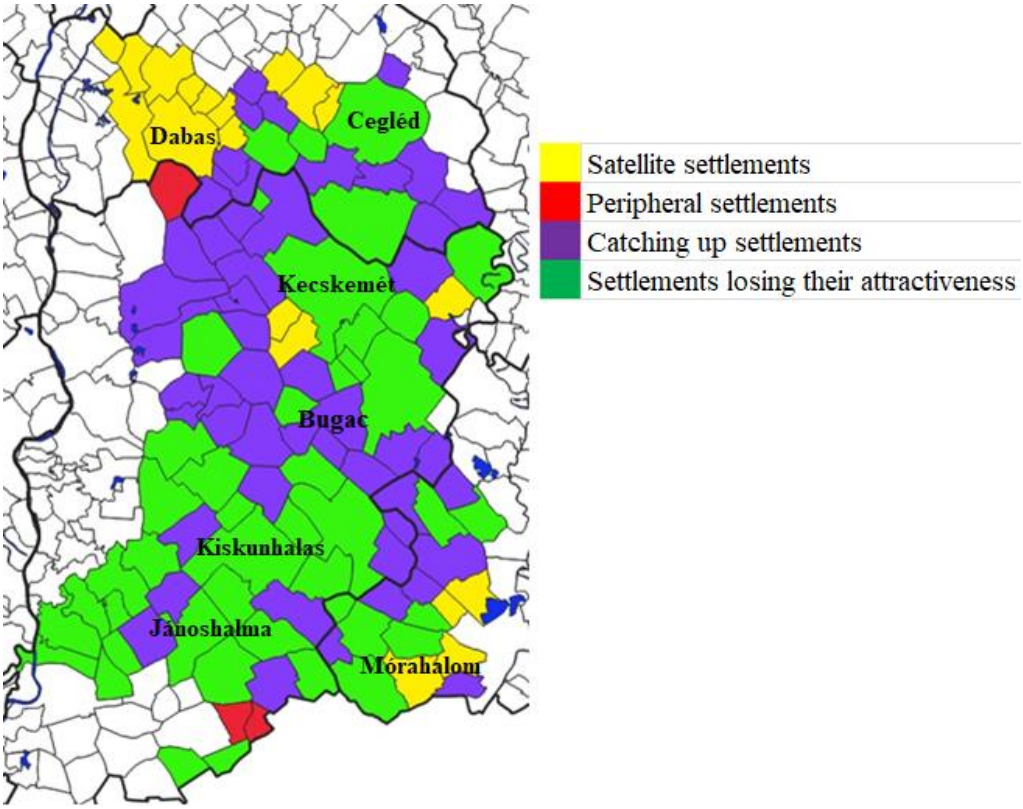
Commuting, as it includes only one indicator, the change in the proportion of commuters.
Since the sample size must be at least ten times larger than the number of variables, a lot of analysis was needed to find the set of variables with which I could analyze the changes in the rural economy of the Homokhátság.

3.2 Result of the Cluster analysis

I performed the cluster analysis with the factor coordinates created as a result of the factor analysis with four and three cluster numbers. I did this because the analysis performed according to these two cluster numbers didn't result in a cluster containing one or two settlements. However, when the larger cluster number was specified, in both cases examined (five and six cluster numbers), several settlements formed a single cluster.

3.3 Result of four cluster number studies

During this examination method, the settlements were separated as illustrated in figure 2, according to which the number of settlements marked in lemon yellow is 19 (cluster 1), the number of settlements marked in red is 3 (cluster 2), the number of those marked in purple is 50 (cluster 3), and the number of those marked in green is 45 (cluster 4).



2. figure: Settlement typification according to the four cluster number study

Source: Own editing, 2024.

Cluster 1 was named **Satellite Settlements** for two reasons. Firstly, because of their location on the map, and secondly, because of the trends they produced during the period under study. Each of them is located in the catchment area of a large city (Budapest, Kecskemét, Szeged). Although the map shows three settlements in Pest County (Albertirsa, Ceglédbercel, Pilis), which are located like islands, I still consider them to be part of the Budapest catchment area based on my experience, because due to their excellent rail and road connections, the number of people per settlement is several thousand, and in total more than ten thousand, most of whom commute to Budapest. In addition, there are students who continue their studies in the capital.

The settlements belonging to the cluster - as we can deduce from their name - have outstanding values in terms of both economic and social indicators. 47% of the settlements in the cluster have urban status.

The growth of population density, the proportion of graduates, the proportion of apartments with solar panels, the number of residents per 100 apartments, and the net income per capita are far ahead of the same indicators of the other clusters in a positive sense. However, the growth of the unemployed is only the second best, which can only be considered at first glance. This happens because, as can be seen in table 3, the already low value in 1990, which was 1,24%,

increased to 2,96% by 2022, which is still the lowest among the clusters. So, in this respect, the settlement group also brought the best value.
As for the other clusters, the growth rate was outstanding in the Peripheral settlements, which is due not only to heavy emigration, but also to the loss of jobs and the rapid, albeit slowing, rate of natural decline. The other two settlement groups will reach the national average in 2022, meaning that employment is practically full in these as well.

3. Table: Average number of unemployed people by settlement group

	1990 (%)	2022 (%)	difference (%)
Satellite settlements	1,24	2,96	1,72
Peripheral settlements	1,50	5,52	4,02
Catching up settlements	1,93	3,42	1,48
Settlements losing their attractiveness	1,57	3,50	1,93

Source: Own editing, 2024.

Although the natural decline and reproduction indicator reveals a significant slowdown in natural decline, the worst starting and ending data are in the background. As can be seen from table 4, the natural decline trend slowed down in all clusters except for the settlements that are losing their attractiveness. Among the reasons behind this phenomenon are high real estate prices and the fact that the cluster contains the settlements with the largest population in the Homokhátság, where childbearing is lower, presumably due to career building and the fashion according to which having children limits an individual's freedom and makes them financially poor. Childbearing is higher in smaller settlements, despite lower wages, higher living costs, and fewer and lower-quality local services. In smaller settlements, it is not necessarily the local intellectuals who have children, but rather the undereducated, Roma, who place a significant burden on the state and local government social care systems due to the large family model.

4. Table: Evolution of the average of natural decline and increase per settlement group

	1990 (‰)	2022 (‰)	difference (‰)
Satellite settlements	-2,95	-1,84	1,11
Peripheral settlements	-14,48	-9,41	5,07
Catching up settlements	-6,12	-4,02	2,10
Settlements losing their attractiveness	-1,90	-8,91	-7,01

Source: Own editing, 2024.

The EU subsidies per capita indicator is the only one in which the cluster came in fourth, last place. (table 5) The biggest reason for this is that the settlements of the cluster are in a more favorable financial and social situation, so they don't need EU subsidies, which otherwise represent a significant administrative burden. In addition, there were applications for which they would have needed them, but due to the low intensity of support, no application for support was submitted. This case mostly affected the settlements of Pest County, i.e. the KMR. In order to resolve this situation, in 2017, the settlements of South Pest County, led by Nagykőrös, successfully lobbied for an increase in the support intensity. Since then, applications have been implemented in many settlements of South Pest County.

5. Table: EU subsidies per capita on average for settlement groups

	EU subsidies per capita (HUF/capita)
Satellite settlements	1 947 797
Peripheral settlements	26 293 888
Catching up settlements	2 563 141
Settlements losing their attractiveness	2 662 577

Source: Own editing, 2024.

The highest value of EU subsidies per capita was recorded in the **Peripheral settlements**, which is partly due to the fact that the number of residents of the three settlements concerned – Bácsszőlős, Csikéria, Kunpeszér – is low compared to the other settlements in the Homokhátság; it ranges between 300 and 800 people. On the other hand, the settlements received significantly more resources than the average in the Homokhátság during the National Development Plan and the New Hungary Development Plan.

Although the government is apparently trying to improve the livability of these settlements, the two border settlements are in a very serious crisis, which is also supported by the fact that both are located in a district to be developed with a Complex Program (Bácsalmási district) pursuant to Government Decree

290/2014 (XI.26.), and the historical fact that Csikéria was originally a Subotica farm, which was separated from its mother settlement of Subotica as a result of the Trianon Peace Treaty, an event that had a negative impact on the development of the settlement. Another member of the cluster is Bácsszőlős, which only became an independent municipality in 1952 by merging several border districts. The settlement was prosperous when it was founded - it had almost 3.000 inhabitants - but World War II and the deportation of the German-speaking population sealed its decline forever.

The location of the settlements of the Peripheral on the map isn't uniform, they are located both on the inner and outer periphery. However, Kunpeszér is in a slightly better position compared to Bácsszőlős and Csikéria, which is also supported by the indicators. Only the per capita subsidies indicator took a value close to the cluster average.

However, the peripheral settlements don't show the most disadvantaged settlement category of the Homokhátság in terms of all indices. The number of SZJA payers per 100 people increased by 42.17%, which is the second best change, as can be seen in table 6. The change rate in the clusters of Satellite settlements is not the largest, which is mostly due to the fact that the starting data was already high. Despite this, the 2022 data stands out significantly in the Homokhátság. The indicator also increased in the Peripheral and Catching Up settlements, but as the names suggest, the growth in Catching Up significantly exceeded that of the three Peripheral settlements. The values of the settlements losing their attractiveness fully support its name, especially if we take into account that the population density of this cluster has decreased significantly, by 4.29 people/km2. Only the settlements in the Periphery produced a more unfavorable value.

According to the indicators, the nationally increased employment had its greatest impact on the Periphery and Catching Up settlements.

6. Table: Evolution of the average rate of SZJA payers per settlement group per 100 inhabitants

	1992 (capita/100 inhabitant)	2022 (capita/100 inhabitant)	difference (%)
Satellite settlements	39,21	53,29	36,27
Peripheral settlements	33,21	47,45	42,17
Catching up settlements	33,12	50,81	54,80
Settlements losing their attractiveness	39,12	49,63	27,68

Source: Own editing, 2024.

The other two favorable indicators of the cluster are the previously presented per capita subsidies and the slower dynamics of natural decline compared to the other clusters.

Peripheral settlements are threatened by many dangers, but one of the most striking is the emptying, when the population shows a decreasing trend, and thus the population density is also reduced. table 7 shows the development of population density, which also supports the names given to the clusters, as the largest increase was achieved by Satellite settlements, while the largest decrease was achieved by Peripheral settlements. We are witnessing a minimal increase in the Catching Up settlements, while the rate of natural decline far exceeds that in the Losing Up settlements, despite the fact that people move from other settlements. In the Catching Up settlements, we can speak of a kind of positive leveling, according to which their indicators are increasingly closer to those of the Losing Up settlements. Despite their name, these latter settlements are considered developed based on their otherwise favorable 2022 data, but in the meantime, a suburbanization and deurbanization process has begun in most of their settlements, which is no longer manifested only in population density. The population density of cities is rapidly decreasing, by 8.9 people/km^2. The same is true for villages, only 2.39 people/km^2. It is important to note, however, that the villages do not show a uniform picture either, as those close to large cities attract the population. This phenomenon cautiously suggests that the number of satellite settlements is increasing. My conclusion is supported by the proportion of solar-powered houses with a higher value compared to the cluster average, the higher net income per capita, and the greater increase in graduates.

7. Table: Development of the average population density per settlement group

	1990 (capita/km^2)	**2022 (capita/km^2)**	**difference (capita /km^2)**
Satellite settlements	118,35	165,77	47,42
Peripheral settlements	19,96	15,34	-4,62
Catching up settlements	42,07	42,44	0,38
Settlements losing their attractiveness	62,92	58,63	-4,29

Source: Own editing, 2024.

The small increase in the population density of the **Catching Up settlements** may give reason for cautious optimism, since, as we saw earlier, the natural decrease has decreased significantly and the value in 2022 is the second best among the clusters. The cautious optimism is also supported by the fact that the previous internal migration, which was 4.9‰ in 1990, had reversed its trend by 2022 and reached 1.0‰.

The settlements of the cluster are located on the map around the cities that are losing their attractiveness, which thus practically absorb the outflow of residents from the cities. Only six out of fifty of the settlements in the cluster have city status. However, four of these six cities (Balástya, Kerekegyháza, Lajosmizse, Örkény) are located along the M5 motorway, one city (Tompa) is next to a

major border crossing, and one (Szabadszállás) provides urban services far from larger cities in the Kiskunság region.
The commuting rate of the settlements belonging to the settlement group (table 8) increased the least, while the Peripheral settlements increased the most. However, the assessment of the indicator needs to be assessed by cluster, as an increase in the indicator does not necessarily mean something good.
The increase in the indicator for satellite settlements is inherent to the formation of the settlement group, as the people living here commute to the nearby central settlement to work. Commuting is a significant problem in these areas, as it is the cause of many regional problems. These include, among others, the significant strain on transport capacities and the natural environment. The increase in commuting is rather negative because of these. While in 1990 one third of the employed people became commuters, in 2022 two thirds became commuters.
In the case of Peripheral settlements, however, I evaluate the phenomenon more positively, since it is clear that people don't leave their residential settlements, they do not empty out even more, but they can spend the income generated in other settlements locally, which can support the local economy. In 1990, only one seventh of the settlements in the cluster were commuters, while in 2022, more than half of them were.
In terms of Catching Up Settlements, the process is rather negative, as in proportion, in 1990 approximately one-third of the employed commuted, while in 2022 almost half did.
The settlements that are losing their attractiveness, as their name suggests, have a high commuting rate. This is more likely because the otherwise more qualified employees are more mobile. (This phenomenon also applies to the Satellite settlements.) Thus, as the proportion of graduates increased, the proportion of commuters among the employed also increased. While in 1990 only one-eighth of the employed commuted, in 2022 it was almost one-third.

8. Table: Evolution of the average commuting rate by settlement group

	1990 (capita)	**2022 (capita)**	**difference (%)**
Satellite settlements	1 292	2 279	94,04
Peripheral settlements	100	144	102,56
Catching up settlements	368	659	83,44
Settlements losing their attractiveness	508	1 189	100,74

Source: Own editing, 2024.

The proportion of people with a degree has more than tripled in Catching Up settlements, which is only surpassed by Satellite settlements. Based on table 9, it can be said that the proportion of people with a degree has increased in all clusters and Catching Up settlements are slowly catching up with those that

have lost their attractiveness. The Periphery experienced the smallest increase, which supports the phenomenon that people with higher education are leaving these settlements.

9. Table: Average development of the proportion of people with a diploma by settlement group

	1990 (%)	2022 (%)	difference (%)
Satellite settlements	2,63	11,40	8,76
Peripheral settlements	1,97	3,62	1,65
Catching up settlements	1,86	6,04	4,18
Settlements losing their attractiveness	2,87	7,45	4,58

Source: Own editing, 2024.

Table 11 is roughly the same as the values in 1992 (table 10), but it can be seen that in 1992, Catching Up Settlements were at 80% of the income indicator of **Losing Attractiveness Settlements**, while by 2022 the indicator will level out at 96%, i.e. positively. The high rate of graduates and the high income indicator in Satellite settlements support the fact that more educated and higher-income people live in these settlements. The data also shows that Satellite settlements are lagging behind those losing their attractiveness, as in 1992 it was 16%, while in 2022 the difference was 34%. However, the Peripheral settlements, which have the lowest net income, also level off positively - but to a very small extent - to the Satellite settlements with the highest values. While in 1992 the Peripheral indicator was 59% of the Satellite, in 2022 it was 57%.

10. Table: Average net domestic income per capita in 1992 by settlement group

	1992 (HUF/capita)
Satellite settlements	80 227
Peripheral settlements	47 382
Catching up settlements	55 742
Settlements losing their attractiveness	69 215

Source: Own editing, 2024.

11. Table: Average net domestic income per capita in 2022 by settlement group

	2022 (HUF/fő)
Satellite settlements	2 270 554
Peripheral settlements	1 299 264
Catching up settlements	1 630 617
Settlements losing their attractiveness	1 699 168

Source: Own editing, 2024.

The next indicator, the proportion of homes with solar panels in 2022 (table 12), is roughly the same as the income indicators, meaning that despite the numerous, high-intensity subsidies, solar panels are still affordable for those with higher incomes. This is already having an impact on the natural environment as well as the income situation of households. It has an impact on the former because households powered by fossil energy are more environmentally damaging, and on the latter because households can reduce their utility bills in the long run by using a solar system correctly.

12. Table: Average number of apartments with solar panels per settlement group in 2022

	2022 (%)
Satellite settlements	32,39
Peripheral settlements	13,78
Catching up settlements	18,70
Settlements losing their attractiveness	21,46

Source: Own editing, 2024.

To better understand the indicator of the population per 100 dwellings (table 13), it is also necessary to refer to two data, which are the population (table 14) and the housing stock (table 15).

13. Table: Development of the average population per 100 dwellings by settlement group

	1990 (capita/100 apartment)	2022 (capita/100 apartment)	difference (capita/100 apartment)	difference (%)
Satellite settlements	263,83	248,87	-14,96	-6,01
Peripheral settlements	215,44	162,46	-52,97	-32,61
Catching up settlements	222,17	201,31	-20,86	-10,36
Settlements losing their attractiveness	250,58	204,04	-46,54	-22,81

Source: Own editing, 2024.

14. Table: Change in the average population per settlement group

	1990 (capita)	2022 (capita)	difference (%)
Satellite settlements	5 650	7 340	33,05
Peripheral settlements	715	568	-19,46
Catching up settlements	2 628	2 477	-9,09
Settlements losing their attractiveness	8 498	7 893	-13,37

Source: Own editing, 2024.

15. Table: Change of the average housing stock per settlement group

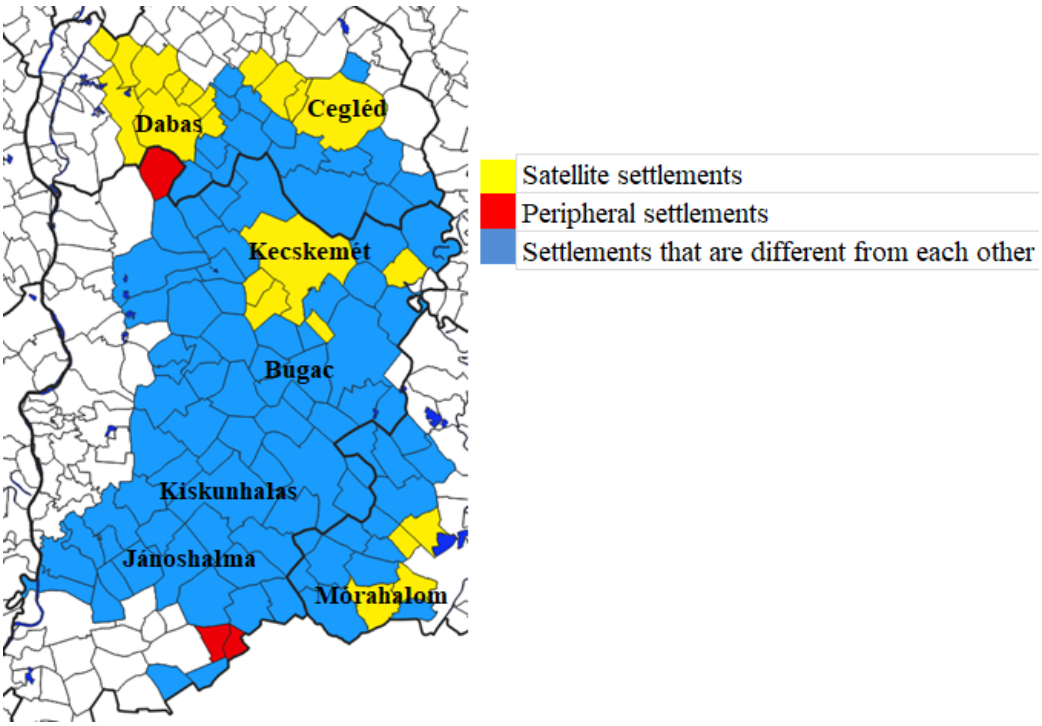
	1990 (piece)	2022 (piece)	difference (%)
Satellite settlements	2 119	2 955	41,17
Peripheral settlements	344	343	-4,96
Catching up settlements	1 122	1 174	2,54
Settlements losing their attractiveness	3 336	3 894	6,18

Source: Own editing, 2024.

The analysis of the three data shows that the population of the Satellite settlements only increased, followed by a housing stock of more than 41%. Due to this, the 6,01% decrease in the population per 100 dwellings is to be assessed as positive. However, in the other settlement groups, despite a significant decrease in the population, the housing stock increased slightly. For this reason, we can see that the indicator included in the study decreases in each cluster, but only in the Periphery, Catching Up, and Losing Attractiveness settlement groups is the decrease due to a negative trend, while in the Satellite settlements it is due to a negative trend.

3.4 Result of three cluster number studies

The results of the three-cluster analysis are illustrated in figure 3, according to which the first cluster was named **Peripheral settlements**, which includes the same three settlements as the similarly named settlement group of the previous analysis model. I have also marked these settlements in red.
The second cluster, which includes the 19 settlements marked in lemon yellow, is the **Satellite Settlements** group. The reason for this is that, with the exception of three settlements, it contains the same settlements as in the cluster of the same name in the four-cluster study. The three exceptions are Cegléd, Kecskemét, and Városföld, which in the previous analysis belonged to the Settlements Losing Their Attractiveness cluster.
The settlements highlighted in light blue on the map are the **Dissimilar settlements**, which include the 92 settlements that in the previous analysis were included in the Catching up settlements and Losing attractiveness settlement groups. The overlap is complete, except for the settlements listed in the previous paragraph, as they were part of the Losing attractiveness settlements. Therefore, the cluster got its name due to the contradictory overlap.



3. figure: Settlement typification according to three cluster number studies

Source: Own editing, 2024.

Due to the similarity of the settlements, the Periphery settlements have the same characteristics in the present analysis, but the other clusters have changed slightly. Unemployment (table 16) increased in all settlement groups, but most

in the Periphery settlements. There is very little difference between the growth rates of Satellite and Dissimilar settlements, but due to the better 1990 indicator of Satellite settlements, the 2022 indicator also illustrates a more favorable situation. There are no noticeable differences between the 1990 data, but the 2022 indicators rather reveal that a greater degree of differentiation has developed between the settlement groups.

16. Table: Average number of unemployed people by settlement group

	1990 (%)	2022 (%)	difference (%)
Peripheral settlements	1,50	5,52	4,02
Satellite settlements	1,27	2,93	1,66
Settlements that are different from each other	1,77	3,48	1,71

Source: Own editing, 2024.

The natural decline, as can be seen in table 17, slowed down everywhere except for the settlements that are different from each other, which thus show similarities with the settlements that are losing their attractiveness as determined in the four cluster number study. The difference is only in the degree, since while the acceleration rate in the present study is 2.19‰, that of the previous group is outstanding, 7.01‰. The difference between the two is that the Catching Up settlements, whose natural decline rate slowed down, were included in the Dissimilar Settlements group, and Cegléd, Kecskemét, and Városföld, whose average natural decline rate accelerated by 4.67‰, were excluded.

The Peripheral settlements also present a large natural decline slowdown in this case, but both the 1990 and 2022 indicators are the worst among the clusters, while the Satellite settlements have the most favorable values.

17. Table: Evolution of the average of natural decline and increase per settlement group

	1990 (‰)	2022 (‰)	difference (‰)
Peripheral settlements	-14,48	-9,41	5,07
Satellite settlements	-2,65	-2,10	0,55
Settlements that are different from each other	-4,23	-6,42	-2,19

Source: Own editing, 2024.

In this analysis, Peripheral settlements also received the most support per capita (table 18), which is inversely proportional to the amount of nominal support received by other settlements. This is due to the low number of settlements, three. The Satellite settlements also have the lowest value in the three cluster number analysis, also due to their level of development and the reasons previously described regarding the KMR. However, the current value of the cluster is lower, since Cegléd and Városföld were also included with their

indicators of 1.063.245,- HUF/person and 2.088.369,- HUF/person. According to them, the decrease could not be compensated by the outstanding indicator of 2.887.035,- HUF/person of Kecskemét. Due to this, the settlements that differ from each other achieved a higher amount than the average of the Catching Up and Losing Attractiveness settlements.

18. Table: EU subsidies per capita on average for settlement groups

	EU subsidies per capita (HUF/capita)
Peripheral settlements	26 293 888
Satellite settlements	1 884 954
Settlements that are different from each other	2 646 871

Source: Own editing, 2024.

The next highest rate of personal income tax payers per 100 inhabitants (table 19) was in Variable settlements, followed closely by the Peripheral settlements cluster, which also experienced significant growth. In this model, the Satellite settlements achieved the lowest growth rate, which partially coincides with what has been experienced in many studies of the four clusters, as the Satellite settlements produced the second weakest growth rate.

According to the indicator, the national increase in employment caused greater growth in Peripheral settlements and Variable settlements.

19. Table: The average ratio of personal income tax payers per 100 inhabitants by settlement group

	1992 (capita/100 inhabitant)	2022 (capita/100 inhabitant)	difference (%)
Peripheral settlements	33,21	47,45	42,17
Satellite settlements	39,63	53,25	34,79
Settlements that are different from each other	35,76	50,16	42,50

Source: Own editing, 2024.

In terms of population density (table 20), the Satellite settlements far outperform the other clusters, but if we examine the current value more closely, there is a deterioration in the background compared to the 47,42 persons/km2 established in numerous studies of the four clusters. This is due to the three settlements that were included in the cluster; Cegléd, Kecskemét, Városföld. The average decrease in population density of the two cities (4,3 people/km^2) is essentially the same as that of the settlements in the Periphery. The expansion of Városföld, however, is low, 1,7 people/km^2. The population density of the Disparate Settlements, Catching Up and Losing Attractiveness settlements decreased (1,96 persons/km^2) due to these three settlements, which resulted in a

lower value. table 26 shows that in this study, the least densely populated areas were the Peripheral settlements and they also had the largest population density decrease, while the Satellite settlements were the most densely populated and their population density continues to increase significantly.

20. Table: Development of the average population density per settlement group

	1990 (capita/km^2)	2022 (capita/km^2)	difference (capita/km^2)
Peripheral settlements	19,96	15,34	-4,62
Satellite settlements	128,29	169,13	40,84
Settlements that are different from each other	47,40	45,54	-1,87

Source: Own editing, 2024.

The commuting indicators of the settlement groups (table 21) also show a large variance in the current study. While the Periphery remained unchanged, the Satellite settlements indicator was increased by 15% by the outstanding values of Cegléd (246,47%) and Kecskemét (341,53%). However, Városföld lags far behind these values with its 75,51%. In the four-cluster model, the Satellite settlements indicator was 94,04%, which is well below the highest Periphery settlements, but it can claim the largest increase in this study. The settlements that are different from each other are slightly below the average of the two clusters used for comparison due to the cluster change of the two mentioned cities, which thus shows a smaller increase in the period under study.

21. Table: Average commuting trends by settlement group

	1990 (capita)	2022 (capita)	difference (%)
Peripheral settlements	100,00	144,33	102,56
Satellite settlements	1 301,23	2 651,00	109,44
Settlements that are different from each other	404,11	776,36	87,87

Source: Own editing, 2024.

A The reorganization of three settlements did not improve the proportion of people with higher education (table 22) in the Satellite settlements either. In the previous analysis, the growth value was 8,76%, while the average growth rate of the three settlements was 7,51%. The highest was for the county town, which was 9,03%, but Cegléd (6,33%) and Városföld (7,16%) worsened the indicators. Regardless, this cluster also has the highest starting and final values, and the worst is for the Peripheral settlements. However, in relation to this indicator, the value of the settlements that differ from each other is also lower than that of the predecessor clusters. The reason for this is that while the value

of the three settlements was low compared to the previously established Satellite settlements, the indicator of all three settlements was much higher compared to the average value of the predecessor clusters.

22. Table: Average development of the proportion of people with a diploma by settlement group

	1990 (%)	2022 (%)	difference (%)
Peripheral settlements	1,97	3,62	1,65
Satellite settlements	2,96	11,54	8,58
Settlements that are different from each other	2,25	6,52	4,27

Source: Own editing, 2024.

The net domestic income per capita did not change significantly between 1992 (table 23) and 2022 (table 24). It is lowest in the Peripheral settlements and highest in the Satellite cluster. The rearrangement of the three settlements is also visible in this case, since the Satellite settlements were lower in both 1992 and 2022 in the previous model than the cluster value determined in the current model. The same thing happened with the Dissimilar cluster as with the commuting indicator, i.e. its value became lower than the average of the predecessor clusters. So, the value of the domestic net income of the three settlements in both years significantly exceeded that of the Satellite settlements and the average of the hinterland, due to which their rearrangement into another cluster can be detected.

23. Table: Average net domestic income per capita in 1992 by settlement group

	1992 (HUF/capita)
Peripheral settlements	47 382
Satellite settlements	81 862
Settlements that are different from each other	61 143

Source: Own editing, 2024.

24. Table: Average net domestic income per capita in 2022 by settlement group

	2022 (HUF/capita)
Peripheral settlements	1 299 264
Satellite settlements	2 285 612
Settlements that are different from each other	1 639 679

Source: Own editing, 2024.

The proportions in table 25 show the same, with some differences, as the four clusters in many analyses. The three settlements caused some 0,6% difference, which is negligible even with such small cluster proportions. Although the

indicator is high in Kecskemét (32,75%) and Cegléd (37,98%), it is lower in Városföld (24,58%), which somewhat offsets the effect generated by the two cities.

25. Table: Average number of apartments with solar panels per settlement group in 2022

	2022 (%)
Peripheral settlements	13,78
Satellite settlements	32,47
Settlements that are different from each other	19,59

Source: Own editing, 2024.

The values of the Peripheral settlements and their background are the same as the previous analysis, however, the decrease in the population per 100 dwellings of the Satellite settlements (table 26) was greater due to the three migrated settlements, while the decrease in the Variable settlements was smaller. While the population of the Satellite settlements increased significantly, the housing stock also showed a significant increase, yet the ratio of the population per 100 housing units decreased. In addition, in the case of the settlements that are different from each other, the indicator decreased significantly, because although the housing stock increased slightly, the population decreased by more than 11%, as an inverse of this. Of the three settlements, the same situation is in Cegléd and Városföld, while the processes that took place in Kecskemét are the same as in the Satelit settlements.

26. Table: Development of the average population per 100 dwellings by settlement group

	1990 (capita/100 apartment)	2022 (capita/100 apartment)	difference (capita/100 apartment)	difference (%)
Peripheral settlements	215,44	162,46	-52,97	-24,59
Satellite settlements	263,95	244,18	-19,77	-7,49
Settlements that are different from each other	234,68	202,22	-32,46	-13,83

Source: Own editing, 2024.

3.5 Hypothesis examination

According to the results of my analyses, I only conduct hypothesis testing in this subsection in relation to the four-cluster analysis, as the results of the three-cluster analysis differentiated the settlements less, and thus the characteristics of villages and cities cannot prevail as much as in the model defining four clusters.

The following tables (tables 27, 28, 29, and 30) summarize the examination of the hypotheses.

27. Table: Examination of hypothesis H1

Hypothesis	Examined indicators	Result	Conclusion
H1: Due to the fragmentation of the settlements of the Homokhátság, the strategic developments of the settlements cannot be handled uniformly.	Change in population density (person/km^2) 1990-2022 Domestic income per capita (HUF) 2022 Proportion of houses with solar panels (%) 2022 Change in graduates (%) 1990-2022 Change in the number of inhabitants per 100 apartments 1990-2022 Percentage of people paying personal income tax per 100 inhabitants (%) 1992-2022 Natural reproduction, weight loss (‰) 1990-2022 Amount of EU subsidies per capita (HUF /capita) 2023.01.31. Changes in the unemployed (%) 1990-2022 Change in the proportion of commuters (%) 1990-2022	The settlements of the Homokhátság changed in different ways, thus the differentiation of the settlements took place.	Confirmed.

Source: Own editing, 2024.

48. Table: Examination of hypothesis H2

Hypothesis	Examined indicators	Result	Conclusion
H2: The settlement structure of the Homokhátság is becoming more sparse, as the gravitational zone of the central regions (such as Kecskemét) generates an increasingly strong attraction.	Number of the settlements (piece) 1990-2022 Population number (person) 1990-2022	The settlement structure of the studied area is not sparse.	Not confirmed.

Source: Own editing, 2024.

29. Table: Examination of hypothesis H3

Hypothesis	Result	Conclusion
H3: Integrated rural development based on settlement typification generates sustainable development in the Homokhátság region through the cooperation of economic and social actors.	The development of settlements.	Confirmed.

Source: Own editing, 2024.

30. Table: Examination of hypothesis H4

Hypothesis	Examined indicators	Result	Conclusion
H4: In the case of the settlements of the Homokhátság region, the correlations between the development of economic and social indicators show a significant relationship.	Change in population density (person/km^2) 1990-2022 Domestic income per capita (HUF) 2022 Proportion of houses with solar panels (%) 2022 Change in graduates (%) 1990-2022 Change in the number of inhabitants per 100 apartments 1990-2022 Percentage of people paying personal income tax per 100 inhabitants (%) 1992-2022 Natural reproduction, weight loss (‰) 1990-2022 Amount of EU subsidies per capita (HUF/capita) 2023.01.31. Changes in the unemployed (%) 1990-2022 Change in the proportion of commuters (%) 1990-2022	A significant relationship cannot always be discovered between the economic and social indicators of settlements.	Partially confirmed.

Source: Own editing, 2024.

4. Conclusions and recommendations

4.1 Answering research questions

The formulated research questions partly provide guidance in formulating new scientific results, which is why I begin the chapter by answering them.

- **Q1: What economic and social factors and connections can explain the difference in development between villages and cities in the Homokhátság?**

In addition to the fact that the population and inner areas of cities are larger, and more jobs and services are available than in villages, there are many other differences in development between the two settlement types in the Homokhátság, which are explained below.

In terms of demography, the population of cities shows a 1,6% increase, which is also reflected in the increase in population density, resulting in an expansion of 15 people/km^2. These indicators are indeed based on a positive migration of 2,7‰, but natural decline also appeared to a minimal extent, at a value of 0,3‰. In contrast, the population in villages decreased by 6,1%, which is more due to the natural decline of 1,9‰. The population density thus increased by only 3 people/km^2. What shades the picture between villages and cities, however, are the satellite settlements that have developed around the central settlements, thanks to which the rate of domestic migration exceeded 7,9‰ in the examined period, meaning that these settlements are more attractive than cities and other municipalities. Villages have 29% higher per capita subsidies than cities, while net domestic income per capita is 11% higher in cities than in villages. Income status has an impact on the proportion of homes with solar panels, as installing a solar system requires a higher wealth status. In cities, 28,1% of homes have solar panels, while in villages, 19,7% have them. Examining mobility, it can be said that the proportion of commuters among people living in villages (76,2%) increased less than in cities (139,1%), but the number of personal income tax payers per capita increased slightly (0,2%) more than in cities (40,9%). In rural areas, partly due to the low willingness to commute and the significant number of people with lower educational qualifications, the unemployment rate also increased more than in urban areas. While unemployment in urban areas was 1,4%, it increased by 1,9% in rural areas. The rate of graduates also increased more in urban areas (6,1%) than in rural areas (4,7%).

The number of residents per 100 apartments decreased in both types of settlements, only in cities because more apartments were built, while in villages it was due to a significant decrease in the population.

- **Q2: Can a significant relationship be discovered between the development of settlements and the amount of European Union support received by them?**

If we take the nominal support amount as a basis, we can conclude that eleven of the first sixteen settlements were from the otherwise developed settlements that were losing their attractiveness. The first Peripheral settlement, which appears as the seventeenth, is the village of Kunpeszér, whose economic and social processes also support its separation from the cluster, i.e. it shows development. The most undeveloped Peripheral settlements are among the first thirty settlements; Bácsszőlős is the twenty-seventh, and Csikéria is the thirtieth.
Among the twelve settlements receiving the least support, there are also mostly settlements that are losing their attractiveness, seven of which are in the category of settlements that are becoming increasingly attractive. The remaining five are in the category of Catching up settlements.
Based on this, no significant relationship can be stated between the amount of support and the development of settlements, but it is important to highlight that the most underdeveloped settlements received more support than average, a significant part of which was obtained in the period between 2014-2020, largely within the framework of the Rural Development Program.
Further examining the distribution of subsidies reveals that settlements with larger populations, over 10.000 people, received 45,5% of the subsidies, while those with under 5.000 people received 33,4%. Kecskemét received the most with 313 billion forints, followed by Mórahalom, significantly behind with 70 billion forints.
If we examine the per capita support indicator, it turns out that the first three settlements with the highest support belong to the Periphery cluster. In the first ten settlements, each cluster is represented almost equally, only two of the most developed settlements are included. The Periphery settlements are closely followed by Mórahalom, where the per capita support is more than ten million forints. Reversing the order, we can see that 40% of the settlements belong to the Satellite settlements, and 3% each belong to the Catching Up and Losing Attractiveness settlements.
The average of the indicator is 3.109.939 HUF which was achieved by a total of 32 settlements out of 117. A significant part of these 32 settlements belong to the Catching Up and Losing Attractiveness clusters.
Based on the per capita support indicator, there is only a partially significant relationship between the development of settlements and the amount of support, which is supported by the proportions of settlements in the clusters with urban status. Urban status was highlighted because the literature reviewed notes that cities are more developed than villages, which leads to the conclusion that if the proportion of cities is high, the cluster is also more developed. According to this, the Satellite settlements should be the most developed, since 47% of their settlements are cities. This is also true in this case, but these cities received only a small proportion of the subsidies, meaning that there is no significant relationship. The same is true, but vice versa, for the settlements in the Periphery, which do not have cities, but in terms of subsidies per capita, the trio of settlements received the first three largest subsidies. 33% of the settlements in

the Losing Attractiveness Settlements are cities, which is a significant indicator, but the level of development is already lower. The support indicator is also lower, but not one of the most unfavorable, so a significant relationship does exist. The situation is similar for the Catching Up Settlements, only 12% of its settlements are cities, which is the third best indicator. This is also reflected in the support data.

- **Q3: How does the spatial location of settlements influence the development of their settlements today?**

The satellite settlements were the ones that were able to exploit the situational advantages resulting from their location the most, and this is indisputable.
The disadvantageous situation resulting from their spatial location is also fully felt in the villages of Bácsszőlős, Csikéria, and Kunpeszér, which make up the Periphery settlements, and Kunpeszér has already begun to follow a path of development. The study reveals that there is a difference between the inner and outer periphery, as Kunpeszér belongs to the former. Looking at the results, the inner periphery settlements are able to break out and become their own masters, while the outer periphery settlements seem increasingly lost.
Examining the other two clusters simultaneously, it can be said that the formation of the larger cities of the Homokhátság mostly took place along important roads, at crossroads. This is a centuries-old advantage, which, although it is often eroded, does not disappear. The settlements outside these are also capable of development, but with less intensity. The settlements located closer to the cities are more attractive than those further away.

- **Q4: Considering the economic and social state of the Homokhátság, what direction can the future vision of its settlements take?**

Despite the delimitation of the region under study, it is extremely diverse, which is also supported by the establishment of settlement types, so the future vision of the settlements isn't uniform either.
Kunpeszér will emerge from the Peripheral settlements and will soon be among the Catching Up settlements, while the settlements of Csikéria and Bácsszőlős will become even more impoverished and empty.
The most developed, Satellite settlements, are prospering in terms of both economic and social indicators. The analyses show that although natural decline is present in the settlements, its extent is small and is increasingly trending towards stagnation. Despite their specific problems, the settlements of the cluster will continue to develop and grow, partly at the expense of the central settlements, almost sucking their energy.
We are witnessing slow but definite development in terms of Catching Up Settlements. The settlement group is promising in both examined aspects, but I see a more promising future for those settlements that are located closer to a large city. In terms of those, I also see the Satellite settlements joining the

cluster as a possibility in the long term. Although the cluster is positively leveled to the more developed clusters, the Losing Attractiveness Clusters and the Satellite Settlements, the former is leveled in a more negative direction.
The settlements that are losing their attractiveness will continue to produce better indicators, mainly from an economic perspective, for a long time, but the cluster is increasingly emptying, the best examples of which are the cities of Kecskemét, Kiskunhalas, or Jánoshalma. Jánoshalma is also in a better economic situation than the average in the hinterland, but people are moving away from there, for reasons that are different from Kecskemét.

4.2 Rural Development Program proposal for the 4 settlement types

In the following subsections, I would like to present a development model for the settlement types identified and described during the study. The support instruments of the Common Agricultural Policy, the EAFRD and the EAGF, are insufficient on their own to implement the developments indicated above. I myself consider a multi-fund program with EAFRD-ERDF-ESF resources and domestic co-financing to be viable, since these three financial funds cover all intervention objectives and pillars. In addition, I consider it important to implement projects financed only domestically, since the use of EU budget resources can entail a large administrative burden compared to the amount of financial resources otherwise required. In several places, my proposals include cooperation with other, mostly neighboring, settlements, for which belonging to the same settlement category is not a condition, but I set the population limit at 10.000 people.

4.2.1 Development of satellite settlements

Problems to be solved:

In the case of the Satellite settlements, the study only revealed a deficiency in terms of EU subsidies per capita, which is not necessarily a problem, since the development of the settlements is the reason for the low indicator. Regardless, there are also problems in the settlements of the cluster that are waiting to be solved and cannot necessarily be demonstrated with figures. These are the following in relation to the settlement type;

- **infrastructure development is not keeping up with the number of people moving in,**
- **it's more difficult to get to a workplace in a central settlement,**
- **recurring conflicts between new residents and old residents,**
- **attracting well-paying, more qualified jobs.**

Development program points:

- **quantitative and qualitative development of local infrastructure**
- **development of commuting to the central settlement**
- **dissemination of information, organization of community programs for new residents and old residents**
- **attracting well-paying, more qualified jobs to the location**

4.2.2 Development of peripheral settlements

Problems to be solved:

- **low incomes**
- **growing, high unemployment**
- **magas arányú természetes fogyás – elöregedő települések**
- **traffic isolation**
- **low number of job opportunities**
- **insufficient level of infrastructure**
- **low level of education**
- **energy underdevelopment of residential buildings**

Development program points:

I would develop the development of Satellite settlements in this study in the same way as in the four-cluster model, since both Városföld and Cegléd basically struggle with the same problems:

- **supporting the quality of housing**
- **renovation of public institutions**
- **creation of accessible services in geographical and financial areas**
- **development of education and healthcare**
- **improvement of the level of education**
- **increase and development of employment, improving its accessibility**
- **energy tender for private individualsFelzárkózó települések fejlesztése**

Problems to be solved:

- **low incomes**
- **lower subsidy absorption capacity**
- **underdevelopment of residential buildings in terms of solar energy**

Development program points:

The development program consists of the following pillars, which are less complex considering the improving situation of the settlement group:

- **increase income**
- **increasing the support absorption capacity**
- **energy tender for private individuals**

4.2.3 Development of settlements losing their attractiveness

Problems to be solved:

- **accelerating natural decline – aging settlements**

Presentation of the development program:

Halting and reversing natural decline in these settlements is extremely difficult, as the problem is not necessarily with infrastructure or income. This is reason the cluster includes settlements with higher populations, where many services are available in adequate quality and quantity. The number of jobs and, in many settlements, their quality are also adequate in terms of income. Although financial support can slightly increase the desire to have children, its "benefits" will fall short of the expected result. There are two reasons for this. On the one hand, for the younger generation of today's society, it is no longer just important to have a job and be able to live off their salary, but also to have better working

and living conditions. These largely determine the desire to have children. Another reason, which is one of the challenges of today, is the value system that has emerged today, which prioritizes career self-realization, and the idea that having children severely limits an individual's freedom and is also a huge financial burden. This idea is now widespread and is no longer just a problem in big cities, but also in the hinterlands. On the other hand, convincing the younger generation of the opposite of the globally spreading value system is a difficult task, for which a comprehensive, successful solution has not yet been developed, and this paper does not attempt it for length and professional reasons.

4.3 Rural Development Program proposal for the 3 settlement types

Given that the cluster named Peripheral settlements included in this study consists of the same settlements, both the problems and the proposed solutions are the same as those outlined in the study with four clusters. For this reason, the development program I proposed wasn't explained here, but in the aforementioned model.

I found a high degree of similarity between the satellite settlements revealed during the four- and three-cluster study. The similarity is not complete, however, because the cluster includes Cegléd, Kecskemét, and Városföld. Both Cegléd and Városföld fit perfectly into the cluster, but Kecskemét, as a central settlement, does not struggle with the same problems as the other settlements in the cluster due to its weight and size. The biggest problem in the county seat is the aging society caused by natural decline, which leads to a decrease in population and population density. In addition, it is important to note that the proportion of commuters in Kecskemét has increased significantly, which in the long term may turn the current domestic migration into domestic emigration. Therefore, Kecskemét is worth developing in the four-cluster study based on the model written for settlements losing their attractiveness.

I would develop the development of Satellite settlements in this study in the same way as in the four-cluster model, since both Városföld and Cegléd basically struggle with the same problems.

Knowing that the settlement group was almost entirely composed of Catching Up and Losing Attractiveness clusters - which also have different problems and development programs - predestined that the settlements of the cluster cannot be developed along the same principles. In the case of this cluster, the goal formulated by Beluszky and Sikos T. (2007), according to which the homogeneity of the variables in the groups should be maximal, was least achieved. For this reason, the development program is the program of the two previously established clusters together.

5. New scientific results

1. My research has proven that among the settlements of the Homokhátság, certain villages are more developed than cities in some areas, despite the fact that they have smaller synergies due to their size. I named these settlements Satellite settlements, in which case I proved with my analyses that they owe their superiority in terms of development to a high degree of suburbanization. I proved that population concentration resulted in several favorable processes, among which the most obvious are higher incomes, a higher proportion of apartments with solar panels, or a higher proportion of graduates.
2. During my research, it was proven that suburbanization processes were produced by three large cities: Budapest, Kecskemét, and Szeged. Of these, only Kecskemét is located in the region affected by the analysis, in connection with which we can witness the urban sprawl phenomenon, which is causing increasing problems both in the inner and outer areas of the city, despite the fact that the population has been showing a decreasing trend since 2014. As a result of urban sprawl, there is a shift in emphasis between the functions of enclosed gardens; the productive function is being pushed into the background. There are ongoing conflicts between new residents and owners who have owned enclosed garden properties for decades. In addition, the city government is under constant pressure due to the growing demand for expanding urban services.
3. My analyses revealed that the Satellite settlements have the most cities in proportion, but their territorial distribution is highly differentiated and is related to the size, energy, and resources of the central settlements. In other words, the central city with the most cities around it has the most developed suburban area. Most of the cities are located around the capital, Budapest, which accounts for seven of the nine settlements. This is followed by Szeged with two cities, meaning there are no settlements with city status in the Kecskemét area.
4. I have confirmed that not only suburbanization, but also deurbanization is present in the studied area. As a consequence of this, those settlements developing at a slow pace were identified, which were named Catching Up Settlements in my dissertation. In these settlements, not only is the population density increasing due to the positive internal migration balance, but employment-related indicators are also showing an improving trend. Although their development won't reach that of the Satellite settlements or the settlements of the center in the foreseeable future, the process of positive leveling is clear.
5. The settlement structure of the Homokhátság is sparse due to the vicissitudes of history, as a result of which the population of the settlements is also higher. In this regard, my analyses show that although most settlements are affected by the phenomena of natural decline and internal

migration, the near-term decline will affect the outer peripheral settlements in the cluster of Peripheral settlements. The reasons for this include the unfavorable history of the settlements, the inherently low population, the scarcity of job opportunities, and isolation.

6. Related publications of the author

Journal article

1. SZOMBATHELYI S. 2012: A kecskeméti Mercedes gyár a gazdaságra, a társadalomra és az ökológiára gyakorolt hatásai In: Kozma, Gábor (szerk.) Szakkollégiumok és a felsőoktatási intézmények együttműködésének új dimenziói Szeged, Magyarország: Gerhardus Kiadó, (2012) pp. 103-115., 13 p.
2. SZOMBATHELYI S. 2012: A kecskeméti Mercedes munkaerőelszívó hatása és a város jövőképe az autógyár tükrében In: Szigeti, Andrea (szerk.) A tudományos pályára történő felkészítés hatékonyságának erősítése a szakkollégiumi hallgatók képzésén keresztül Szeged, Magyarország: Gerhardus Kiadó, (2012) pp. 101-116., 16 p.
3. SZOMBATHELYI S. – MOLNÁR Á. 2018: A kecskeméti Mercedes gyár hatásának területi vizsgálatai In: STUDIA MUNDI - ECONOMICA 5: 4 pp. 44-56., 13 p. (2018)
4. SZOMBATHELYI S. 2021: Typing the settlements of Homokhátság In: STUDIA MUNDI - ECONOMICA 8: 2 pp. 84-93., 10 p. (2021)
5. SZOMBATHELYI S. 2021: A Homokhátság településeinek tipizálása a rendszerváltás után In: GAZDÁLKODÁS 65: 4 pp. 310-319., 10 p. (2021)
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1. SZOMBATHELYI S. 2013: A vidéki erőforrások helyzetfelmérése Páhi település gazdaságában In: Ferencz, Á (szerk.) "Környezettudatos gazdálkodás és menedzsment": Gazdálkodás és Menedzsment Tudományos Konferencia. I-II kötet Kecskemét, Magyarország: Kecskeméti Főiskola, Kertészeti Főiskolai Kar (2013) 1,079 p. pp. 1050-1054., 5 p.
2. SZOMBATHELYI S. 2013: A Daimler AG kecskeméti gyárának vidékgazdasági hatáselemzése In: Árgyalán, T; Illyés, Zs; Nguyen, Duc Quang; Styevkó, G; Szöllősi, A (szerk.) XXXI. Országos Tudományos Diákköri Konferencia Agrártudományi Szekció. Pályaművek Összefoglalói Budapest, Magyarország: Budapesti Corvinus Egyetem (2013) pp. 389-389., 1 p.
3. SZOMBATHELYI S. 2015: A Mercedes gyár és beszállítóinak letelepedésének társadalmi jóléti impressziói a Kecskemét környéki vidéki településekre In: Dajnoki, K; Szőllősi, L (szerk.)

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4. SZOMBATHELYI S. 2015: A kecskeméti Mercedes-Benz gyár működésének regionális társadalmi-jóléti hatása In: Solt, Katalin; Ilyésné, Molnár Emese; Kovács, Tamas (szerk.) XXXII. Országos Tudományos Diákköri Konferencia - Közgazdaságtudományi Szekció - Tartalmi kivonatok Budapest, Magyarország: Budapesti Gazdasági Főiskola, (2015) pp. 487-487., 1 p.
5. SZOMBATHELYI S. 2018: A vidékgazdaság újrastrukturálódásának esetei Erdei Ferenc egykori falutípusai között In: Egri, Zoltán; Paraszt, Márta (szerk.) Magasabb (helyi) hozzáadott érték, mint a vidék kitörési lehetősége – II. Nemzetközi Vidékfejlesztési Tudományos Konferencia: Lektorált tudományos kiadvány Szarvas, Magyarország: Szent István Egyetem Agrár- és Gazdaságtudományi Kar (2018) 406 p. pp. 211-216., 6 p.

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