

# Regional Differences in the Medieval Kingdom of Hungary (c. 1500)

## Brief Description of the NKFI K145924 Project\*

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**Abstract.** The objective of this project is to examine and delineate regional differences within the Kingdom of Hungary (the Carpathian Basin in geographical terms) at the end of the Middle Ages. Whereas statistical data comparable to the modern period are unavailable for the Middle Ages, regional inequalities (the economic activity or inactivity of a region) can be approximated using indirect indicators. Given the relatively well-documented settlement network of the Carpathian Basin in the Late Middle Ages and the abundance of available data that can be employed as indicators (proxies), the project will utilise this methodology to construct a database for the time around 1500. The database will be processed in order to make regional differences in the late Middle Ages visible by means of various geospatial methods. Furthermore, comparisons will be made with maps of earlier and later periods, using similar methodologies. In addition, new datasets will be incorporated into the database for the eighteenth century, comprising data from Croatia north of the River Save and church censuses. The project will conclude with the production of a series of maps that will facilitate the identification of long-term processes, including changes over time, as well as their variable and stable elements. Moreover, the identification of regions within the Carpathian Basin that are permanently developed (active) or underdeveloped (inactive) may provide new perspectives for the formulation of regional development strategies in the present.

**Keywords:** regional differences, Late Middle Ages, eighteenth century, Kingdom of Hungary, database, visualisation

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## Introduction

A new research project, funded by the NKFIH, was launched in January 2024 with the aim of investigating regional differences in the medieval Kingdom of Hungary around 1500. In addition, the database will be linked to the already existing databases of the eighteenth–twentieth centuries, developed in the framework of several previous research projects.<sup>1</sup> They will be complemented with additional datasets (ecclesiastical data and data for modern Croatia) in order to facilitate comparative research. The composition of the research team reflects the complexity of the research questions and the variety of analytical tools to be used. In addition to the principal investigator, the research team includes Katalin Szende and Judit Majorossy (urban and social history), Béla Zsolt Szakács (art history), Géza Hegyi (church and settlement history of Transylvania), Péter Haraszi Szabó (schools and peregrination), Gábor Demeter (eighteenth-century data), Péter Földvári (cliometrics), Zsolt Pinke (environmental history), and Zsolt Szilágyi (modern history). The base maps will be prepared by Gábor Németh; István Papp will participate in the GIS analysis, and the relational database and web map will be developed by Gergő Gyula. Further cooperation will be established with researchers with special interests in Hungary and abroad to validate the data in the database.

## State-of-the-art

In historical narratives, the picture of late medieval Hungary in terms of settlement network and economy is usually rather static and not based on a systematic analysis of all (possible) data. Since our sources are inconsistent both spatially and temporally and, in addition, the appropriate tools for carrying out such a systematic analysis were not available, earlier historians often opted for extrapolating studies carried out for a region at a specific point in time. However, considering a single phenomenon (or process) valid for the entire country might lead to misinterpretations and false generalisations. A classic example of this is the phenomenon of settlement desertion in the Late Middle Ages, which spread in the historical literature following the research of István Szabó, who mainly focused on the Great Hungarian Plain and whose findings represented the late medieval decline of the Kingdom of Hungary for a long time.<sup>2</sup> However, even in medieval times, regional differences seem to have been much more significant, and changes must have been much more dynamic.

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1 HAS RCH Lendület/Momentum Ten Generations <https://10generacio.hu/hu/>, ELKH Proof of Concept <http://gistahungarorum.abtk.hu>, NKFI 111766 Elaboration of GIS for supporting researches on Austria-Hungary and Hungary (1857–1910), [www.gistory.hu](http://www.gistory.hu)

2 Cp. Kubinyi, “A Magyar Királyság,” 154.

Recent investigations have shown that medieval Hungary's regions were diverse in terms of development level, and the location of peripheries and cores shifted in space and time.<sup>3</sup> Even though an absolute picture of development levels, expressed in incomes, cannot be reconstructed due to the lack of appropriate sources,<sup>4</sup> the extent of internal inequalities can be measured,<sup>5</sup> and the location of the peripheries can be identified. According to literature in social sciences, internal inequalities (be it social or spatial) can substitute welfare or can serve as a proxy for it.<sup>6</sup> This statement has been verified even for the eighteenth century in regions lacking proper sources for quantifiable income.<sup>7</sup> Furthermore, measuring regional inequalities is a better indicator than welfare or income: even prosperous countries may show substantial regional inequalities, which refers to an unstable socio-political situation despite high incomes in general.<sup>8</sup>

Thanks to the dynamically broadening spatial datasets and improving processing methods, the possibilities of comparative regional analyses in historical periods have broadened substantially since the first attempts by Fernand Braudel and George Pollard.<sup>9</sup> Historical GIS-research becoming widespread allows a shift in focus from vertical (social) to horizontal (regional) structures.<sup>10</sup> However, while research on the country level or focusing on social inequalities is gaining more importance also in history, investigations on internal regional inequalities from a diachronic, historical perspective are still rare. Despite the general interest in long-term spatial analyses and the broadening of its geographical scope,<sup>11</sup> there are still numerous obstacles to overcome. Either the scale of studies is not sufficiently detailed and does not reach the district level,<sup>12</sup> or if they are detailed enough and apply a complex approach,

3 See F. Romhányi et al., "A Magyar Királyság regionális különbségei"; Mikle and Demeter, "Területi egyenlőtlenségek."

4 For the 1330s, it is possible to approximate incomes using the value of proportional taxes per area, based on the papal tithe list, but there is no similar source covering the entire kingdom for the period around 1500. Cp. F. Romhányi, "Spatial transformations."

5 Demeter, "Területi egyenlőtlenségek."

6 Williamson, "Regional Inequality"; Milanovic et al., "Measuring Ancient Inequality."

7 Canbakal and Filiztekin, "Wealth and inequality"; Coşgel and Ergene, "Inequality of Wealth"; Pamuk, "Estimating GDP per Capita."

8 Demeter, "Jövedelmi viszonyok"; Milanovic et al., "Measuring Ancient Inequality."

9 See Clout, "The Land of France."

10 Philips et al., "The Regional Occupational Structure."

11 Scargill, "Regional Inequality" and Dormard, "Economic Development" for France; Bukowski et al., "Urbanization and GDP per Capita" for Poland; da Silva, "Regional Inequalities" for Brazil.

12 van Zanden et al., "The Changing Shape"; Reis, "Historical Perspectives"; Nagy, "Regional Structure"; Rumpler and Urbanitsch, "Soziale Strukturen."

then their timescale does not go beyond the eighteenth century.<sup>13</sup> The latter case may be due to changing administrative boundaries, the changing focus of available conscriptions, or the lack of data. *Longue durée* and, at the same time, fine resolution research on large territories is quite rare<sup>14</sup> because of such challenges as adapting a coherent methodology in the case of different sets of indicators for the analysed time horizons, the changing explanatory power of indicators in the case of recurring variables, the changing frames of spatial division, and the problems of data harmonisation in the case of investigations targeting more than one country.

In the proposed project, we offer a possible solution to these problems using municipal-level databases: approximately 15,000 territorial entities for the Kingdom of Hungary (including Transylvania and medieval Slavonia). At the same time, we illustrate development trends and shifting peripheries by comparing the results for the period around 1500 to our previous research findings for the 1330s and the eighteenth century.

## Concept and previous research

Regional differences in the Middle Ages are difficult to recognise in the Carpathian Basin, since there are hardly any datasets covering the entire territory of the medieval Kingdom of Hungary at the settlement level for the times before the start of systematic statistical data collection. A first attempt to approach similar questions was made by András Kubinyi, who identified the hierarchy of urban settlements<sup>15</sup> applying Walter Christaller's central place theory; he was followed by several historians of the younger generation. However, dynamically expanding spatial datasets and developing processing methods in computer science have expanded the possibilities of comparative spatial analysis in historical times.

Earlier research, resulting in several common publications,<sup>16</sup> demonstrated that well-selected complex datasets (composed either of qualitative or quantitative data, or even both) and carefully chosen methodology (for instance, gridding, Voronoi cells, and inverse distance weighted or IDW interpolation) are extremely helpful in visualising and interpreting medieval datasets, leading to new research questions that could not have been raised without the new methods. The complex analysis of

13 Combes et al., "The Rise and Fall."

14 Enflo and Missiaia, "Regional GDP estimates."

15 Kubinyi, "A középkori Délnyugat-Magyarország"; Kubinyi, "Városfejlődés és vásárhálózat."

16 F. Romhányi et al., "A Magyar Királyság regionális különbségei"; Papp et al., "A fejlettség regionális"; Demeter et al., "Területi egyenlőtlenségek."

the papal title register,<sup>17</sup> and of the composite database built on it was decisive in identifying research possibilities and elaborating the methodology for analysis and comparison. Though the map of the 1330s could already be compared to eighteenth- and twentieth-century maps, the gap of two centuries between 1330 and the actual end of the Middle Ages in the Kingdom of Hungary (around 1526) biased historical interpretation, since late medieval changes remained invisible. Therefore, the aim of the proposed project is to increase the number of time horizons (shrinking the gap) by creating a database for the Kingdom of Hungary around 1500.

At the same time, researchers still face problems in *longue durée* comparisons. In order to enhance the informative value of comparative analyses, we plan to further develop the existing eighteenth-century database with additional datasets, thus approximating the area covered by the data of the two periods and increasing the number of common indicators. In this way, we shall be able to detect long-term processes lying beneath the complex, divergent history of the Carpathian Basin in the sixteenth and seventeenth centuries. The results of the two periods (late fifteenth and eighteenth century, respectively), complemented with lessons of the fourteenth-century maps, may contribute to the analyses and interpretations of the Ottoman-era database, which is also in progress (see NKFIH project K132609).<sup>18</sup> This will provide a breakthrough in describing changes and continuity between the medieval and early modern Kingdom of Hungary, as well as in understanding long-term processes of regional differences.

## Research methods

Even if there is no dataset for the period in question similar to the papal title list for the 1330s, the much larger amount of data and the much better-known settlement network provide a solid basis for the spatial analysis and identification of active (developed) and inactive (backward) regions. The research will build on previous methodological and database development experience, as well as on regional geography and social science research based on modern statistical data. Methods used here are similar to those exploited by geographers to measure the hierarchical and development levels of settlements for the nineteenth and twentieth centuries.<sup>19</sup>

After having visualised and analysed the dataset of the 1330s,<sup>20</sup> the database and visualisation of the Carpathian Basin around 1220 was done as a pilot project.

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17 F. Romhányi, “Plébániák és adóporták.”

18 Cp. Demeter et al., “Creating a Database.”

19 E.g., Beluszky, “Egy félsiker”; Beluszky, “Magyar városhálózat.”

20 F. Romhányi et al., “A Magyar Királyság regionális különbségei.”

In this case, exclusively qualitative data (mostly non-weighted) for about 2,200 entities were the basis of the spatial analysis. In both cases, the methodology was elaborated by members of the proposed research team. Based on these experiences and the analysis of the 1330s database, a late medieval database can be created. In terms of size, the database planned within the framework of the proposed project will be about four times larger than that of the fourteenth century (about 15,000 settlements instead of 4,400 parishes), but its structure will be similar to the dataset showing the state of the kingdom around 1220, as it will be based solely on qualitative indicators.<sup>21</sup> We plan to collect data from published sources and already existing datasets that were either created by the participants of the proposed research project or can be included on the basis of established external cooperations. The data to be collected can be grouped as follows:

1. legal indicators: town, market town, privileged village; place of *sedria/generalis congregatio*
2. ecclesiastical indicators: presence of church hierarchy (archbishopric, bishopric, and collegiate chapter); centre of pastoral care (number of parishes, exempt or not, and orthodox church); regular provostries; mendicant and Pauline monasteries; nunneries, beguine houses; fraternities; hospitals
3. economic indicators: fair, market, toll; chamber, mint; guilds; castle, *castellum*, domain centre; mill(s); ford and bridge (if operating)
4. cultural indicators: schools; university students; places of authentication, settlements issuing charters, operational places of notaries; late Gothic building activity; prestige objects (winged altarpieces, organs, turret clocks, tombstones, and use of red marble)
5. other specific data (collected for further data processing, but not part of the development score): specific ethnic groups, such as Italians, Germans, Jews, Romanians, Ruthenians, and Cumans; places of origin of priests, monks, friars, notaries; settlements inhabited entirely or partially by noblemen

As none of the data collected can be directly linked to the types of data used in present-day statistical analysis, they will serve as proxies for measuring regional differences, as well as levels of economic activity and centrality. The function expressing the 'Overall Development Score' (ODS, in Hungarian *fejlettségi összpontszám* or FÖP) that will be used on most of the maps will be defined in a test process using the network of late medieval parishes. The results will be continuously controlled and checked to avoid anomalies that would distort the final results.

The data collection will be done at the level of the municipality, but the analyses will be carried out at the regional (at least county) level. The basic data of the municipalities (name of the municipality, county, and coordinates) will be taken from

21 F. Romhányi, *A Historical Geographical Atlas*.

Pál Engel's map. As a first step, a critical data selection has to be performed, as Engel's database also contains geometries that need to be transformed into attributes (castles, monasteries, deserted or inhabited hamlets and manors). The geometry of the data has already been partly revised and corrected by Gábor Németh, and the database will be continuously updated on the basis of the data generated by the planned research project and the data of the consortial research group led by Gábor Demeter and Éva Sz. Simon, which is processing the Ottoman-era defters and dica registers.<sup>22</sup>

The time span of the database is 1470–1530, but in specific cases, with serious justification, chronological deviation in data selection is possible in both directions.

As noted, the data types described above will be recorded on the settlement level. The weight of the single columns (in creating the ODS scores) will be defined on the basis of a sample of 1,000 records. Most of the data to be processed are qualitative proxies, and their values can be 0 or 1. There are very few variables that can take multiple values. This is the reason why an unusually large number of variables is needed (to define minimum and maximum values on a larger interval and scatter the cumulative values); however, the variables need to be handled in groups which themselves need to be weighted. Defining the weight of variables and of the groups of variables will be an iterative process. Autocorrelation between the proxies has to be thoroughly examined to exclude non-independent variables.

The eighteenth-century data will be attached to the already existing database and will comprise the following datasets:

1. database of eighteenth-century church constructions and reconstructions as an indicator of community well-being (as a counterpart of the similar medieval data)
2. settlement-level GIS map of Croatia for the eighteenth century (the medieval database contains both the medieval Slavonian territories, including Lower Slavonia and the Counties of Pozsega, Szerém, and Valkó that became part of Croatia after the Ottoman era)
3. identification and coding of the Croatian place names of the 1786 chancellery register of peasant landholdings, taxes, and duties, thereby connecting it with today's LAU and GIStA databases, as well as the Engel codes of medieval settlements. These three datasets allow the complex diachronic evaluation of the data. (Data for the Kingdom of Hungary for 1786 have already been processed by the Lendület Ten Generations research project, see: [gistahungarorum.abtk.hu](http://gistahungarorum.abtk.hu))
4. coding of the eleven counties of the 1728 census (that source does not contain the entire territory, however, as it is much closer to the end of the Ottoman

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22 Projects NKFI K132475 and K132609.

era, and it is more detailed than the *Regnicolaris Conscriptio* of 1715/1720 available for the whole territory also processed by Lendület Ten Generations; The information is necessary for to describe the dynamism of early modern transformation).

Our research area covers historical Hungary, including medieval Slavonia and the counties incorporated into Croatia after the Ottoman era (Pozsega, Szerém, and Valkó Counties), and the data are collected at the settlement level. When comparing development stages (cores and peripheries) at different time horizons, the problem of changing or missing administrative boundaries will be solved using GIS methods (for instance, the use of 10 by 10 km grid cells). From a methodological point of view, the reconstruction of the settlement network, the collection of quantifiable data (both problems are linked to sources), and the lack of precise settlement boundaries remain the main difficulties to overcome. When processing the data of the 1330s, the use of Voronoi polygons (as a substitute for settlement boundaries) enabled gridding, so that the maps of the 1330s and of 1786 became comparable at the same grid size, thus illustrating long-term shifts in centres and changes during the Ottoman conquest (1541–1699).<sup>23</sup> In the proposed project, we plan to combine actual known boundaries of higher administrative units (counties and dioceses) with Voronoi cells on the settlement level. The reason is that late medieval settlement boundaries remain largely unknown in extensive regions, especially in the central part of the Carpathian Basin; therefore, the necessity of methodological coherence prevails over the use of more precise data in single regions.

One of the goals of the project is to establish a complex relational database (using PostgreSQL) by extending the [gistahungarorum.abtk.hu](http://gistahungarorum.abtk.hu) database with the medieval layers. Connecting the medieval and eighteenth-century databases is possible based on the harmonisation of the Engel and GISTa codes (which can be automated based on which GISTa polygon each Engel point falls into, so only the control requires human resources and time). This will enable complex comparative analyses and produce the map series that are necessary to detect regional differences in the Carpathian Basin and to visualise their changes between the 1330s and the twentieth century.

## Preliminary and expected results

During the first year of the project, the geographic entities have been defined on two levels. First, the settlement network around 1500 reconstructed on the basis of Pál Engel's database, excluding non-independent entities (castles and monasteries)

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23 Demeter et al., "Területi egyenlőtlenségek."

and deserted settlements, as well as the villages that emerged later than the mid-sixteenth century, and uniting all the settlements that Engel recorded separately because of their estate history. As a result, the database contains about 15,000 settlements, almost two thirds of which have only geographic coordinates, but no other attributes. Recognising the difficulties caused by this situation, we decided to aggregate the data on the parish level, preserving, however, the unity of settlements with several parish churches (c. 4,840 entities). This led to an important first result of the project: the lowest administrative unit of the medieval Kingdom of Hungary must have been the parish, just like in England and in France in the same period, and like in Western Europe, the parish also absorbed certain lay administrative functions in the early modern period (for instance, during the eighteenth century, parsons were involved in keeping population records).

Based on the dataset and the maps to be created with different visualisation methods not only will regional differences of the late fifteenth-century kingdom become visible, but more solid long-term comparison will also be possible for several time horizons. Detecting changes in relative development levels will help us better understand social and economic processes in the fourteenth and fifteenth centuries, identify changes in relative population density, thus contributing to detecting directions of internal and external migration, and last but not least, it will also be possible to analyse the dynamics of regional differences in the last 700 years. The series of maps can thus reveal both changing and stable elements over time. A long-term analysis of this type may also contribute to answering present-day questions: for instance, the identification of regions that are permanently developed (active) or underdeveloped (inactive) may also provide new perspectives for decision making on spatial development strategies for the future.

The use of exclusively qualitative indicators in identifying regional inequalities, combined with a broad range of visualisation methods (including the use of Voronoi cells to substitute unknown administrative borders) is a novelty in historical research, as there have been no similar attempts in Europe before. Testing it on a large database will reveal not only the possibilities, but also the limits (for instance, the smallest analysable territorial unit), which is equally important for future research. Also, the complex set of methods used for both the visualisation and the statistical analysis of the medieval data, as well as the methodology of long-term comparison are innovations not only in Hungary, but also in East Central Europe.

The most important results of the proposed project will be the medieval database and the enlarged eighteenth-century database, stored in a perennial, unified format on the server of the Historical Institute of the Research Centre for the Humanities. The online visualisation (web map) will be available for both the professional and the lay public, while the database will be consultable for researchers after registration.

In addition, will produce printed and online publications. A series of a hundred maps will be published in the form of an atlas, focusing on regional differences of the medieval Kingdom of Hungary. For the eighteenth century, another eleven county atlases for 1728 (eleven by fifteen maps),<sup>24</sup> the visualisation of the schematism of the Munkács Bishopric (1806),<sup>25</sup> a national atlas, and the settlement-level Croatian atlas for the end of the eighteenth century (twenty maps) will be prepared.

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