Article

Social innovation potential and economic power: The example of Hungarian districts

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Abstract: Our previous research on social innovation examined the process, levels, and stakeholders of social innovation, as well as its relationship with technical and technological innovation. The present study analyzes the spatial image created by the social innovation potential and investigates its relationship with the economic power of the neighborhoods. The most important conclusion of the study is that the basic territorial inequality dimensions are the same in the case of both the social innovation potential and the district's economic strength. The difference is primarily to be found in concentration, as economic power is much more concentrated in the capital and the most important economic and tourism centers than the social innovation potential. We can therefore state that developments based on social innovation can solve a lot of the highly concentrated spatial structure in Hungary.

Keywords: social innovation; economic power; measurability; Hungary; territorial inequality

1. Introduction

Innovation is key element of economic development and a key factor in social processes. Technical innovations can be identified as prerequisites and causes of social change and cannot be created without the renewal of society. The study of social innovation can be characterised as one of the significant research areas of our day. Its importance is rooted in the recognition that technical and technological innovations alone are insufficient for the creation of social well-being, and thus social innovations can and do contribute to social development as a complementary solution. The authors' previous studies of social innovation have covered both the elaboration of theoretical questions and applied research (Varga et al., 2020; Varga & Tóth, 2020). The present study's aim is to identify the process and measurability of social innovation which can be defined by input, output and impact indicators and to examine the link between social innovation and economic power. Social innovation initiatives are solutions for a sustainable future that can help reduce regional disparities, increase territorial competitiveness and promote closing the gap.

2. Literature review

Innovation, as a pivotal element in economy development, is a key factor in social processes. Schumpeter (1934) identified innovation as the cause of economic growth. In his interpretation, innovations result in economic and technological development. From the second half of the 1900's, papal encyclicals already emphasised that technological development and progress did not only mean technical innovation, but also social innovations that brought about the renewal of society. Polányi (1945) analysed the structure of economic and social processes, the interrelationships between the various processes, and emphasised the role of social transformations. In 1970, Gábor studied several types of innovations and attributed the predominance of technical innovations to the backwardness of efforts made at improving social welfare. In his opinion, social initiatives can be identified as a reform that controls innovations (Gábor, 1970). Drucker (1985) had already emphasised the significance of social innovation in the 1980's. He argues that innovation is needed in all areas of life, innovation should not be limited to technical or economic fields but it is also a social category, and with this theory he has deepened the concept of social innovation. Social innovations are inseparable companions of technical innovations, and innovations can be interpreted as complementary processes (Drucker, 1985; Freeman, 1988; Bulut et al., 2013; Kocziszky et al., 2015; Varga, 2017). New innovative bases, such as the field of social innovations, promote the implementation and efficiency of technical innovations, and while mutually increasing each other's strength, they are capable of responding to the current challenges of society (Varga, 2017). The successful implementation of social innovation depends on cultural acceptance, economic sustainability, and technological applicability (Bulut et al., 2013). In combination, technical and social innovations are capable of ensuring the well-being of society. All types of innovation have social implications, and the different types of innovation interact with each other and lead to a transformation in the economic and social relations. The most important mission of social innovation is social values generation and improvement of quality of life and sustainable development (Howaldt et al., 2014, Phills et al., 2008). Social innovation can offer valuable opportunities from which a group of people can choose and thereby improve their quality of life (Pol & Ville, 2009).

In our study, economic power refers to the ability of the Hungarian districts to improve living standards. It increases their ability to make decisions on their own that benefit them (Payne, 2016). The study's aim is to examine the relationship between social innovation and economic power in the Hungarian districts with particular attention to peripheral areas. According to Mikhajlov et al. (2022), the localization of innovation activity is influenced by a number of factors and in our opinion, one of these is the economic power.

The social and economic challenges of the 21st century go beyond the issues of previous innovation research and require a novel and carefully considered analysis of different types of innovation. The emphatic innovation research of our days also requires the analysis of innovations related to social issues. In addition to technical innovations, efforts to ensure social welfare and prosperity are at least as emphatic

(Hochgerner, 1999). Defining the measurement structure of the social innovation process is essential because:

- in addition to economic and technological innovation, the role of social innovation in research, policy-making and community life is becoming increasingly important,
- measurement helps to further analyse the interactions between economic and social innovations,
- the specific process of social innovations requires the development in the scientifically grounded and empirically verifiable indicators.

Defining a measurement structure for social innovation is a complex task that requires an analysis of the opportunities and limitations offered by the methodologies for measuring technical innovations. When measuring social innovation—in accordance with the systemic nature identified in technical innovations—the starting point is the definition of indicators and their classification as input, output and impact indicators at different levels. In addition to the input and output factors of social innovation initiatives, the analysis of the impact on society is also emphatic in the measurements. The main goal of each reviewed method is to determine the social innovation potential at the national, regional or local level. The focus is primarily on measuring the social innovation potential, which is the set of abilities that help create social innovations (Kocziszky et al., 2015; Szendi, 2018; Kleverbeck et al., 2019; etc.). It differs from the basic conditions of social innovation, which need to be in place as a precondition to the development and implementation of innovations in a given region or organisation (Szendi, 2018; Nemes and Varga, 2015; Varga, 2017; etc.). After a document analysis, this study gives a description of the measurement methods at the national, regional and local levels. During the document analysis, four methods were analysed for each level, and they are described in **Table 1**.

Table 1. Methods used in the analysis for measuring social innovation.

	Local measurement	Regional measurement	National measurement
Methods	**Social Innovation Indicators (IndiSI)** *data collection without calculation*	**Regional Innovation Capability (IndiSI)** *elaboration of indicators without calculation*	**European Social Innovation Index (ESII)** *pilot study without calculation*
	Social innovation capacity (Bund et al.) *data collection without calculation*	**Regional Vulnerability Index (SIMPACT)** *development of indicators without calculation*	**Blueprint of Social Innovation Indicator (TEPSIE)** *pilot study without calculation*
	Measurement of social innovation process according to TBL (Dainiené and Dagiliené) *elaboration of indicators without calculation*	**Regional social innovation potential (Benedek et al.)** *Examination of 15 micro-regions (social innovation potential)*	**Measuring social impact (OECD)** *pilot study without calculation*
	Complex social innovation index (Szendi) *Survey of 610 localities (social innovation potential)*	**Regional Social Innovation Index (RESINDEX)** *282 regional organisations*	**The Economist Intelligence Unit (SII)** *Survey of 45 countries (ranking)*

Source: own elaboration (based on Veresné Somosi and Varga, 2021).

Based on the measurement methods analysed at the local, regional and national level, it can be established that several experiments which focus on measuring the social innovation process and determining social innovation abilities are identifiable, however, there is no uniformly accepted methodology. After a review of the above-referenced methods, it can be established that the methodology of measuring social innovation is based on the use of different indicators at different levels. Each method may vary from country to country, mainly due to the different range of available data. There are general recommendations, however, they are mainly applicable to measurements at the national level. Most studies defining a method for measuring social innovation suggest the analysis of case studies for micro-level measurement and a statistical study for analysing macro-level aspirations. They emphasise the need to quantify the indicators involved, which, however, is not possible even at a national level for some indicators (e.g., volunteering). The use of different conceptual frameworks and the rapid formation of different legal frameworks for organisations make it particularly difficult to define a measurement methodology. The measurement method itself can also be defined as a result of a learning process. Based on the analysis of the above methods, it can be established that the measurement methods of different levels are interconnected in a hierarchical system, however, there is a difference in the applied indicators.

3. Data and methods

Measuring the social innovation process is a complex task. According to Lundström and Zhou (2011), economic and technological innovation is essentially the result of business initiatives, but these processes also have a social dimension. Nevertheless, social innovations tend to be formulated at the (self-)governmental, non-profit organisational, foundation and individual levels, and thus their measurement structure differs from the measurement methodology of technical innovations. In addition to measuring the inputs and outputs of social innovation initiatives, measurement also focuses on analysing the impact on society. The main objective of each of the methodologies examined is to identify the social innovation potential at national, regional or local level. The focus is primarily on measuring social innovation potential, which refers to the set of capabilities that facilitate the creation of social innovations (Kocziszky et al., 2015, Szendi, 2018, Kleverbeck et al., 2019, Nagy-Tóth, 2019, Varga et al, 2020). In order to measure social innovation, we compiled an indicator system following a review of the methods and based on the literature (Benedek et al., 2015). The indicator system consists of 3 parts: input, output and impact indicators. In our choice of indicators, we have primarily sought to ensure compliance with the literature and appropriate country-specific adaptation.

In our study, 8 indicators were included in each of the three groups. The indicators were compiled for the period until 2021 for the districts of Hungary (there are 197 districts in Hungary, but in the case of social innovation potential, not all data was available for the 23 districts of Budapest, only for Budapest as a whole. Thus, in the social innovation study, the capital is listed as one unit, while in economic strength, it is listed as 23 territorial units). An exception is the indicators from the census (2011). When compiling the indicator system, it had to be taken into account that the indicators

do not point in the same direction (e.g., the lower value for the unemployment rate means the positive, while in relation to the amount of tenders paid per inhabitant, the higher the value, the more positive the situation in terms of social innovation). In the case of indicators where low values represent a favorable situation, the reciprocal of the indicators is calculated. We normalized the indicators in each indicator group in order to make our data on different scales comparable with each other. We calculated the average of the normalized data in each indicator group. No weighting was done during the calculations (not highlighting any one factor to the detriment of others).

Then, the average of the normalised data was calculated for each group of indicators. The normalisation of the data series was performed according to the following formula:

$$x_i^{norm} = \frac{(X_i - x_{min})}{(x_{max} - x_{min})} \tag{1}$$

where x_i the data series under consideration, x_{min} és x_{max} is the minimum and maximum of the data series under consideration. No weighting was applied in the calculations.

The following indicators were included among the input indicators:

1) Number of Non-Govermental Organizations per 10,000 inhabitants;
2) Number of active enterprises per 1000 inhabitants;
3) Number of non-profit enterprises per 1000 inhabitants;
4) Child population as a percentage of the resident population;
5) Number of elderly persons per 100 children;
6) Age-dependency ratio (children (0–14 years) and elderly population (65 and up) as a percentage of the population aged 15–64);
7) Activity rate (taxpayers/population × 100);
8) Average number of completed classes, 2011;

The output indicators included the following indicators:

1) Amount paid per capita;
2) Proportion of participants in public employment schemes in relation to the population aged 15–64;
3) Number of participants in cultural events per 1000 inhabits;
4) Proportion of disadvantaged pupils;
5) Number of people receiving social catering per 1000 inhabitants;
6) Number of people receiving home help per 1000 inhabitants;
7) Unemployment rate;
8) Patient turnover per family doctor and family pediatrician;

The following indicators were included among the impact indicators:

1) Income per capita (thousand Hungarian forint);
2) Proportion of the population aged 7 and over with primary education (including those who have not completed school);
3) Proportion of single person households;
4) Proportion of families with three or more children;
5) Number of registered crimes per 1000 inhabitants;
6) Number of places in permanent residential care facilities per 1000 in-habitants;
7) Percentage of taxpayers earning in the income bracket 0–1 million HUF;
8) Proportion of public spaces regularly cleaned.

The complex indicator measuring social innovation was calculated from the average of the three indicator groups. The method is the same as the one used by the Hungarian Central Statistical Office in its calculations on district development. The advantages of the calculation include easy interpretation, transparency and reproducibility. An additional advantage of the method is that it does not apply weighting (in other words, it does not highlight any factor to the detriment of the others), which can easily expose the method to criticism. Its use allows the selection of the indicators that have a decisive role in the development of the individual factors and the complex indicator.

The magnitude of the complex indicator of the social innovation potential in the majority of the settlements was influenced to the greatest extent by the impact indicators.

In terms of method, the process of estimating the economic power of the settlement was the same as the estimation carried out by the staff of Eötvös Loránd University (ELTE) in Hungary for the small regions of our country and the Balaton region (Kiss, 2003; Lőcsei & Nemes Nagy, 2003).

We determined the districts' share of the total taxable income of their counties, the volume of local taxes and the number of registered businesses.

Based on the average of these proportions (% share), we calculated the estimated GDP of each districts within the GDP volume of the corresponding county—officially announced by the Hungarian Central Statistical Office.

Projected on the population, the estimated specific GDP values per inhabitant were obtained, which, as indicated earlier, is called the economic power of the districts.

We tried to compare social innovation and economic power at district level using complex cartograms (The map work was made using the ScapeToad software). In the following maps, we have modified the area of the districts according to their population and economic strength. The neighborhoods were colored according to the social innovation potential and the economic strength per inhabitant. When analyzing the spatial structure in Hungary, we considered it important to include even the most prominent fault lines. Based on Waldo Tobler's "First Law of Geography" (1970), the data of each district should be theoretically similar to the value of spatially adjacent districts. In the following figures, we also took into account the differences in social innovation and economic power between the neighboring districts and depicted their common boundary in terms of the difference. ScapeToad and ArcGIS software were used for the calculations.

4. Results

On the map, the area of the districts has been modified with their population (**Figure 1**). As can be seen on the map, the Hungarian population is strongly concentrated in the districts of the capital and its agglomerations, as well as the cities with county rights. In the distribution of the social innovation potential, we see the most important spatial inequality dimensions of Hungary reflected.

1) *The capital and countryside dichotomy.* Budapest is in an exceptionally favorable position compared to rural Hungary.

2) *West-east slope*. Districts close to the western border have a favorable position in the spatial structure of the country, while towards the east this favorable effect is constantly weakening.

3) *Differences within counties*. The districts of the county seats stand out within their county.

4) *Axes and poles*. Certain districts either have a favorable geographical location for traffic (motorways) or for other special reasons (for example, the influence of a large company)

With regard to the differences between neighboring districts, we can state that the most significant differences, that is, the most important fault lines, can be observed between the Budapest agglomeration and its neighboring districts, and between cities with county status and their neighbors. In the case of the latter, we can observe that the location of significant fault lines between the districts and neighbors of cities with county status can be observed both in the western and eastern parts of the country.
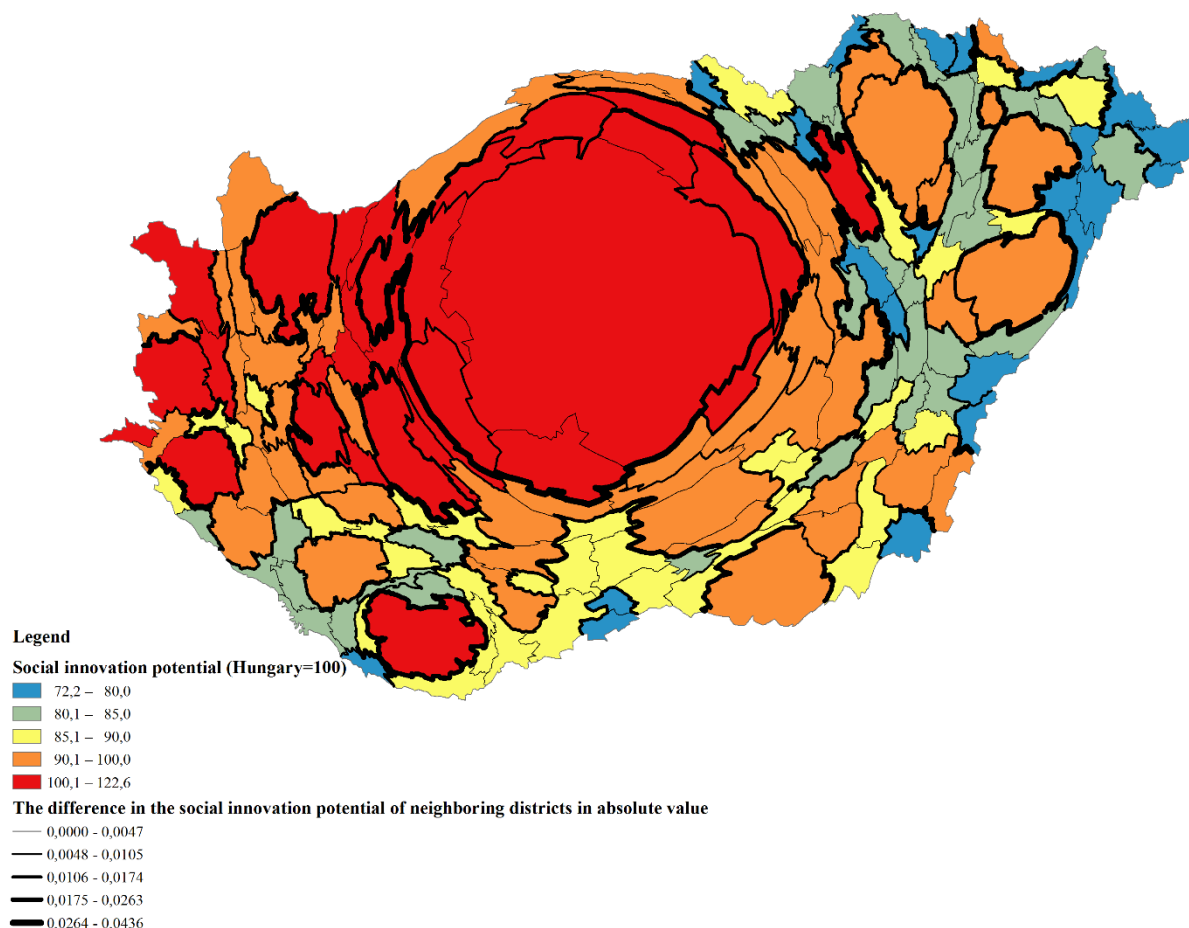

Legend

Social innovation potential (Hungary=100)
- 72,2 – 80,0
- 80,1 – 85,0
- 85,1 – 90,0
- 90,1 – 100,0
- 100,1 – 122,6

The difference in the social innovation potential of neighboring districts in absolute value
- 0,0000 - 0,0047
- 0,0048 - 0,0105
- 0,0106 - 0,0174
- 0,0175 - 0,0263
- 0,0264 - 0,0436

Figure 1. A complex indicator measuring the social innovation of Hungarian districts, 2021.

In the following, we indicate our most important findings regarding the spatial relationships of economic power along the main inequality dimensions presented in the social innovation potential (**Figure 2**). In this case, the area of the districts was modified according to their economic strength.

1) The decisive role of Budapest in terms of economic power is even more prominent than we saw in terms of population, since it dominates the spatial structure

in an economic sense. In essence, this can also be established in terms of economic power per inhabitant.

2) Although the favorable situation of the western districts is still visible in this respect, it is much less obvious than we saw in the case of the social innovation potential.

3) The differences within the counties are even greater than in terms of social innovation potential, that is, the districts of the county seats stand out from their catchment area even more than we saw previously.

4) the role of the axes and poles is much less pronounced than before, the previous three dimensions are much more pronounced.

The most important fault lines between districts can be seen primarily within Budapest, and in relation to Budapest and neighboring districts. Fault lines of great importance can be observed even between the districts of cities with county status and their neighbors.
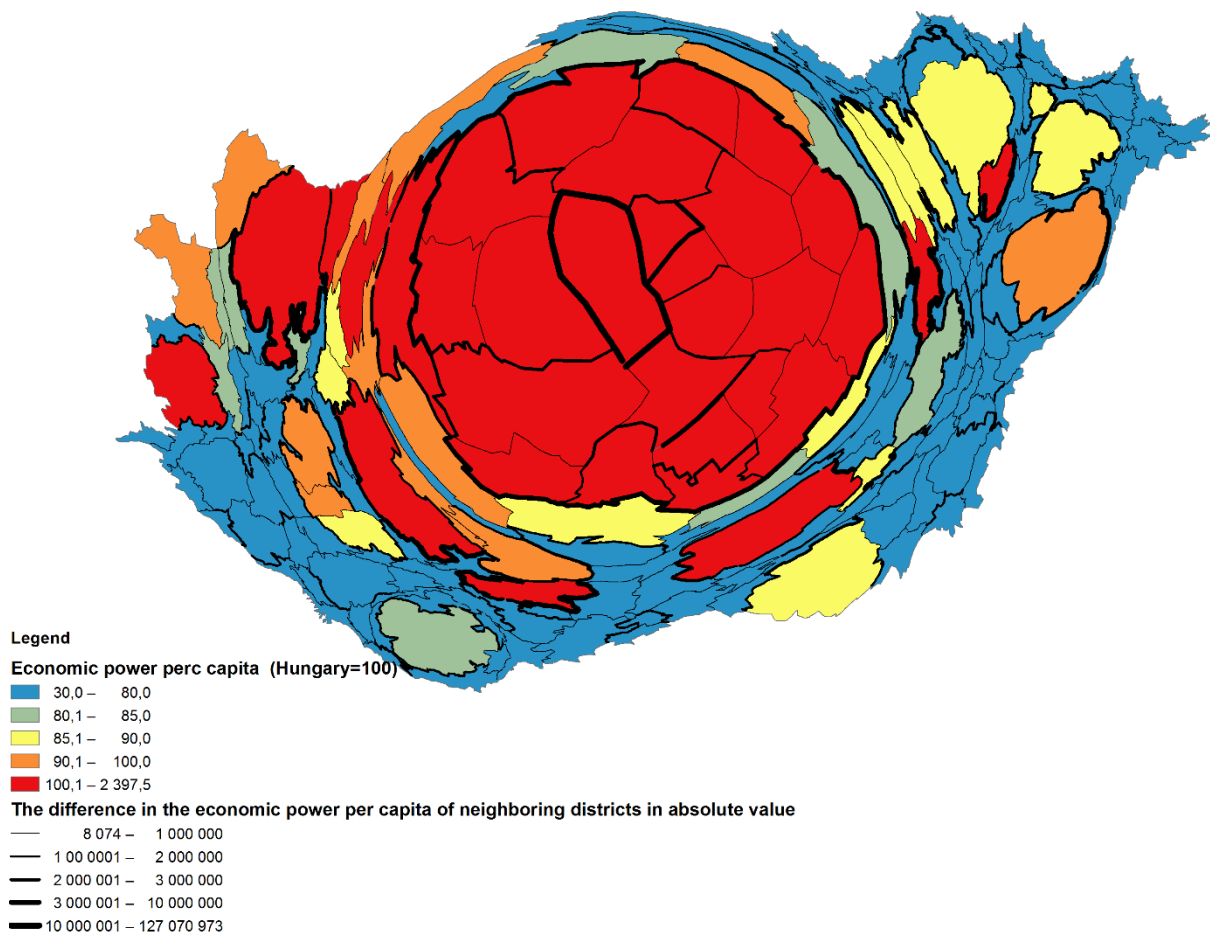

Figure 2. Economic power of Hungarian districts, 2021.

5. Discussion and conclusion

The research focused on the mesauring social innovation potential and economic power at the Hungarian districts level. According to our approach, economic power refers to the ability of districts to improve living standards. Social innovation and improving living standards are closely related concepts (Cajaiba-Santana, 2014, Pol

& Ville, 2008, Veresné Somosi & Varga, 2018, Borzaga & Bodini, 2014), however, few attempts have been made to quantify the relationship.

By comparing the two indicators, we tried to find out which regions could be the ones where the relatively favorable social innovation potential offers the opportunity to switch to economic power and thereby promote social well-being.

As with all developments—those based on social innovation, the most important goal is to resolve the excessive superiority of the capital, and thereby make the spatial structure more balanced. A significant part of the districts of northwestern Transdanubia and the districts of the county seats can be the primary field for such developments, as their population and social innovation potential significantly lags behind their real economic performance.

We consider it particularly important to solve the differences within counties, since the differences in social innovation potential within counties are much smaller than we saw in the case of economic strength. Two important areas are worth considering here. On the one hand, it is worth examining separately within the counties those districts where the social innovation potential lags behind the county seat district only to a lesser extent. The basics of the developments are clearly available here. There are several border districts in Northeast Hungary, where the lag behind the county seat district is significant in terms of social innovation potential, not only in terms of economic strength. Here, the social foundations of development are missing, which is why targeted programs and projects based on local opportunities and resources are needed. The identification of the stakeholders in the social innovation process, the role of communication (information), the planning of financial resources, attempts to change attitudes and the institutional context are of particular importance. Collaboration, taking on the role of innovator and adapting good practice are prerequisites for generating innovation.

From the point of view of generalisability, a further task is to define the general relationship between the different levels of measurement and to link their measurement methods. Further exploration of the above lines of research could lead to the discovery of important correlations that could complement the studies carried out in the present study.

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