Social Progress Index in the context of regional development at the district level in the Košice region

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Abstract: *Composite indicators have recently gained substantial interest for assessing people's quality of life. While initial efforts have focused on the macro level of countries, lately these approaches have also been applied on more granular, local levels of administration. Among these approaches the Social Progress Index stands out as an applied policy tool with unique methodology and design principles. This paper documents the application of the Social Progress Index for the district level in the Košice region. The Index was applied to the entire territory of the Košice Region, which includes 11 districts and covers the period of six years 2015–2020. The indicators selected into the Index framework reflect the general principles of the SPI: they are non-economic (i.e. social or environmental), out-come-oriented, relevant to all units of observation (i.e. districts), and actionable. The results of the 2020 Košice Social Progress Index reveal a varying degree of societal outcomes across the districts. The highest performing districts of the region are the municipalities of Košice, where the Košice I district achieves the highest overall performance and Kosice II records the lowest performance within the city. The districts of Gelnica and Trebišov achieve the lowest Index score in the region. All districts of the Košice Region achieved an improvement in the Index over 2015–2020. The most significant change in SPI was in Košice IV district, in contrast, Gelnica district recorded the lowest growth. By discussing the methodology, challenges and top level results, the paper contributes to a greater understanding of the needs and challenges of regional development in the region of Košice and to the application of composite indicators on local levels. The Index provides a basis for local and regional governments for planning and decision-making activities and for better public policies to reduce regional disparities and improve quality of life.*

Keywords: *beyond GDP, Košice region, regional development, regional disparities, Social Progress Index*

Introduction

Public policies often tend to reflect political agendas and motives rather than being rooted in data and evidence. The lack of information in decision-making, insufficient availability of data, or limited ability to use data for better public policies result in unqualified decisions and weak performance of these policies.

Public policy is often drafted based on economic metrics, however, economic development does not automatically guarantee people's life satisfaction and a good standard of living. Economic growth often brings significant improvements in access to clean water, sanitation facilities, literacy, and basic education. However, too many people, regardless of their income, live without the ability to fully exercise their rights and overcome discrimination or even violence based on gender, religion, ethnicity, or sexual orientation.

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Aggregate metrics (i.e. indexes) have recently come to the forefront in assessing regional development. The European Commission has been spearheading many of these efforts with the EU Regional Competitiveness Index, the EU Regional Social Progress Index, the Gender Monitor and others. However, these metrics have only had limited application and integration at lower administrative level in the EU.

Composite indicators are increasingly recognised as useful tools for measurement in geography as well. In this context several exact and comprehensive empirical geographic studies have assessed and revealed developmental transformations of regional units at different levels in Slovakia, for example in terms of quality of life (Ira et al. 2005, Ira and Murgaš 2008, Murgaš 2009), sustainable development (Huba et al. 2003), human development, social deprivation (Michálek 2004), and happiness (Klamár and Gavaľová 2018).

The success of the Global Social Progress Index has led to increased demand for similar indexes at a lower level of administration to address the need for greater actionability and better understanding of the specific needs of communities. As a result, locally engaged stakeholders around the world have developed innovative initiatives to create more granular and contextualized Social Progress Indexes at the macro level (national), meso level (regional, municipal), and micro level (community, organizational) to influence the political decision-making process and drive social progress worldwide. The primary goal of the Social Progress Index for the districts of the Košice Region is to help regions more precisely define their priorities within regional planning and policy-making, and to identify partners at various stages of development to exchange experiences and set development priorities. The Index was created at the Office of the Košice Self-Governing Region in cooperation with experts from the international organization Social Progress Imperative. It is an integral part of the Economic and Social Development Programme of the Košice Self-Governing Region for the years 2023–2027 and serves as a basis for the creation of policies to improve the quality of life in the region.

This paper describes the methodology and challenges associated with the construction of the index, and provides a top-lever overview of the results. It begins by establishing the rationale for the Social Progress Index, continues with the description of the methodology and concludes with an overview of key results, and in so doing the paper aims to contribute to the growing body of knowledge on the measurement of societal wellbeing.

Theory

The Social Progress Index (SPI) is one of the world's most sophisticated measurements of social development. It is the first index that measures social progress independently of economic indicators. It also provides a detailed picture of whether people have access to a wide range of elements that make up social progress, such as medical care, education, housing, rights and freedom without discrimination, and more (Social Progress Imperative 2022). The index was created to complement GDP and other economic indicators and to provide a more comprehensive picture of people's needs (TED 2014).

The Index was developed in collaboration with a team of researchers led by Professor Michael E. Porter of Harvard Business School. It is used by heads of state and city leaders worldwide, including the European Commission's Directorate General for Regional and Urban Policy to set the agenda, develop policies, prioritise resource mobilisation and measure impact (Annoni, Dijkstra and Hellman 2016).

The Index provides a detailed and actionable picture of what matters most to people, regardless of their wealth. It also provides a better understanding of the two-way relationship between economic growth and social progress. Its unique framework offers a systematic and

empirical basis for governments, businesses, civil society and communities to prioritise social and environmental issues and benchmark performance against other countries, regions, cities and communities in order to shape and advocate for public policies and investments, as well as business and community decisions.

Since its creation in 2013, the Index has been applied by policy-makers on various levels of administration around the world. The European Commission adopted the Social Progress Index for the NUTS2 regions of the EU (Annoni et al. 2016, Annoni and Bolsi 2020). It has also been applied for example for the provinces of South Africa (IQbusiness 2018) or in Costa Rica (Instituto Costarricense de Turismo 2019). Smaller administrative units, such as the London's Borough of Barking and Dagenham (LBBD 2022), the city of Warsaw (Warszawa 2022) and the region of Bratislava (Helbich et al. 2022) have also used the Index. In Slovakia, an index has been tested on the NUTS3 level (Jašková 2018), although this was not the first attempt to measure differences in wellbeing across regions in Slovakia (Ira et al. 2005).

The Social Progress Index follows a conceptual framework that defines social progress and its key elements. In this context, social progress is defined as "the ability of a society to meet the basic human needs of its citizens, to create the building blocks that enable citizens and communities to enhance and maintain their quality of life, and to create the conditions for all individuals to reach their full potential" (Social Progress Imperative 2022).

The Index applies a set of unique design principles that allow for an unparalleled analysis of social progress; specifically:
– It uses social and environmental indicators only (i.e., no economic indicators are used).
– It focuses on outcomes, and not on inputs.
– Its approach is holistic and must be relevant to all communities.
– It uses indicators that are as actionable (in terms of public policy) as possible.

These design principles differentiate the SPI from other indices used to measure socio-economic development (Social Progress Imperative 2022).

The SPI is based on a framework consisting of three structural elements – dimensions. The dimensions represent broad conceptual categories that define social progress:
– The Basic Human Needs dimension assesses the ability of citizens to survive with adequate nutrition and basic medical care, clean water, sanitation, adequate shelter, and personal security. These needs are still not met in many countries and are often incomplete in more prosperous countries.
– The Foundations of Well-being dimension captures whether a society offers its citizens the building blocks to improve their lives, such as attaining basic education, obtaining information and access to communications, leading healthy lives, and living in a healthy environment.
– The Opportunity dimension records whether citizens have the rights and opportunities to make free choices. Personal rights, personal freedom and choice, tolerance and inclusion, as well as access to advanced education contribute to the level of opportunity in a given society.

Each of these dimensions comprises four components – distinct but interrelated concepts that together form the Social Progress Index Framework (*fig. 1.*). Each component consists of indicators that measure as many valid aspects of that component as possible.

This interrelated set of factors represents the basic elements that together make up a given level of the Social Progress Index. In addition to the aggregate Index, the methodology also

allows for the measurement of each component and each dimension separately, providing scores and rankings for each district in terms of the overall Index, and all dimensions and components.

Basic human needs
– Nutrition and basic medical care
– Water and sanitation
– Housing
– Personal safety

Foundations of well-being
– Access to basic knowledge
– Access to information and communications
– Health and wellness
– Environmental quality

Opportunity
– Personal rights
– Personal freedom and choice
– Inclusiveness
– Access to advanced education

***Fig. 1.** Framework of the Social Progress Index of the Košice Region;*
Source: Rosičová et al. (2022)

Methods

Geographical and temporal coverage

The Index was applied to the entire territory of the Košice Region, which includes 11 districts. The Index covers the period of six years 2015–2020, based on the availability of data for the selected indicators.

Data

The indicators selected into the Index framework reflect the general principles of the SPI: they are non-economic (i.e., social or environmental), outcome-oriented, relevant to all units of observation (i.e. districts), and actionable. In addition, indicators were reviewed to ensure their appropriate time coverage, relevance, and statistical robustness.

The selection of indicators was also guided by the conceptual and statistical fit within each component. Indicators that do not fit conceptually and/or statistically are removed from the framework. The statistical fit is tested using exploratory correlation and factor analysis.

The indicators selected into the final framework can be categorized into 3 specific groups:
– Periodically monitored indicators, available for all districts of the Košice Region on an annual basis,
– indicators that do not exactly match the administrative division: these are indicators related to justice and police, for which different territorial districts are defined (districts of Gelnica and Spišská Nová Ves create one police and justice district, therefore they share the same values for these indicatros; the same applies to Košice I–IV districts, and to Michalovce and Sobrance districts), indicators of water supply and sewerage, and internet connectivity indicators (the districts of Košice I–IV have aggregated values as the city of Košice),
– indicators with (ir)regular and less recent data collection, for which values from the latest wave of the data collection were shifted to align with the latest SPI year (2020); these are indicators mapping Roma settlements (collected in 2004, 2013, 2019), and indicators related to elections (reported in election years, i.e. in 2010, 2014, 2018).

The resulting Social Progress Index framework for the districts of the Košice Region includes a set of 46 indicators (*tab. 1*).

Tab. 1. *Selected indicators of the Social Progress Index by dimension and components for the districts of the Košice Region*

Basic human needs	Foundations of well-being	Opportunity
Nutrition and basic medical care	**Access to basic knowledge**	**Personal rights**
- Infant mortality - Neonatal mortality - Premature deaths (<65) - Hospitalizations	- Children in kindergartens - Testing of fifth graders – Slovak language - Testing of ninth graders – Slovak langue - Testing of ninth graders – mathematics	- Criminal proceedings "T" - Civil proceedings "C" - Family proceedings "P" - Municipal electoral participation - Women mayors
Water and sanitation	**Access to information and communications**	**Personal freedom and choice**
- Connection to water supply - Connection to sewerage network - Wastewater treatment	- Internet coverage - High speed internet - Active library users	- Teenage pregnancy - Abortion index - Material deprivation
Housing	**Health and wellness**	**Inclusiveness**
- Construction of housing - Housing allowance - Roma population in settlements	- Life expectancy at birth for men - Life expectancy at birth for women - Mortality from diseases of the circulatory system - Cancer mortality - Oral health index in 15-year-old children	- Young unemployment - Long-term unemployment - Gender inequality in unemployment - Employment of foreigners
Personal safety	**Environmental quality**	**Access to advanced education**
- Violent crime - Property crime - Intentional harm and injuries - Clearance rate of crimes - Accidents resulting in injury to life and limb	- Particulate emissions - Sulphur dioxide emissions - Nitrogen oxide emissions - Environmental burdens	- Graduation success rate – Slovak language - Graduation success rate – English language - University students

Source: Rosičová et al. (2022)

All selected indicators included in the SPI for the Košice Region were compiled from official and reliable sources. The list of selected indicators, their exact definitions and sources are presented in *table 5* in the Annex.

Data transformation and analysis

The calculation of the index entails several steps and calculation procedures.

Firstly, it was necessary to check distribution and possible outliers of every indicator. Indicators with high skewness or with significant outliers were transformed using a logarithmic transformation or by applying a cap (i.e., restriction of extreme values).

In the subsequent step, all indicators were standardized into unitless z-scores with a mean equal to zero and a standard deviation equal to one, following the z-score formula:

$$Z_{score} = \frac{observation - mean}{standard\ deviation}$$

Indicators negatively related to social progress (e.g., indicators reflecting mortality, crime where higher values reflect worse performance) were inverted so that higher values imply better performance. The inversion is a simple multiplication of an indicator by -1.

The Social Progress Index applies weights generated by Principal Component Factor (PCF) to aggregate indicators values into components scores (Social Progress Imperative 2022). These are calculated as the sum of the weighted indicators values. The components scores

are transformed to a scale from 0 to 100 based on the best- and worst-case scenarios defined at the indicator level. These are used in the following min-max formula:

$$\frac{X_j - Worst\ case\ scenario}{Best\ case\ scenario - Worst\ case\ scenario}$$

where X_j represents the observed values.

The score of each dimension is calculated as the arithmetic average of its four components. The aggregate Social Progress Index score is the arithmetic average of all three dimensions.

The statistical fit of indicators within components was tested using exploratory factor analysis, and by calculating the Cronbach's alpha statistic of internal consistency (Tavakol and Dennick 2011) and the Kaiser-Meyer-Olkin (KMO) measure of data sampling adequacy. As a rule of thumb, the Cronbach's alpha values should be higher than 0.7 (Cortina 1993), while the KMO should be above 0.5 (Williams, Onsman and Brown 2010). *Table 2* shows that the Cronbach's alpha threshold was met for all components, while the KMO was slightly lower than the threshold for the Personal Freedom and Choice component (0.49).

Tab. 2. *Value of Cronbach´s alfa and average KMO for components of the Social Progress Index for the districts of the Košice Region*

Dimension and components	Cronbach´s alfa	Average KMO
Basic human needs		
Nutrition and basic medical care	0.73	0.61
Water and sanitation	0.70	0.58
Housing	0.93	0.73
Personal safety	0.82	0.62
Foundations of well-being		
Access to basic knowledge	0.94	0.79
Access to information and communications	0.89	0.65
Health and wellness	0.88	0.87
Environmental quality	0.92	0.77
Opportunity		
Personal rights	0.85	0.78
Personal freedom and choice	0.81	0.49
Inclusiveness	0.81	0.69
Access to advanced education	0.83	0.68

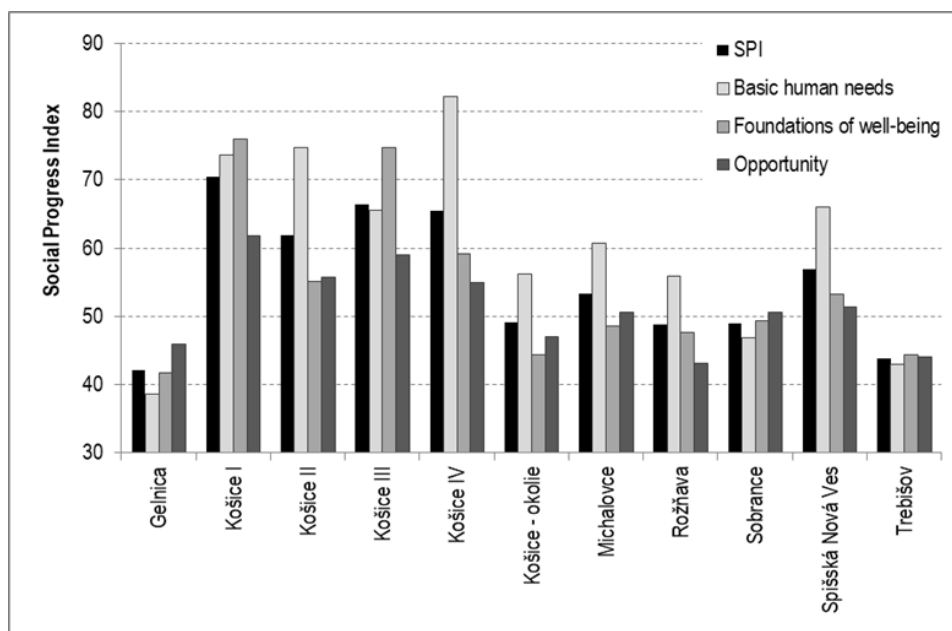*Source: Rosičová et al. (2022)*

Results and discussion

The aim of the study is to verify whether the Social Progress Index can be constructed at a lower administrative level (district), and to analyse the results. In the process of the index construction, we have reviewed and collected data for more than a hundred indicators. Availability of data at the district level in Slovakia is more challenging compared to the higher administrative levels. While conceptually suitable indicators are available on the regional level, data are not disaggregated to district level, and therefore these indicators could not be included. Despite these challenges we can conclude that the constructed index is statistically robust and conceptually captures what it purports to; it has been validated with relevant local experts.

The Index and its dimensions and components were calculated for all districts of the Košice Region for the 2015–2020 period. The detailed results for 2020 are presented in *table 3*. A graphical representation of the scores for 2020 is shown in *figure 2*.

Tab. 3. Social Progress Index, dimensions and components scores in the districts of the Košice Region in 2020

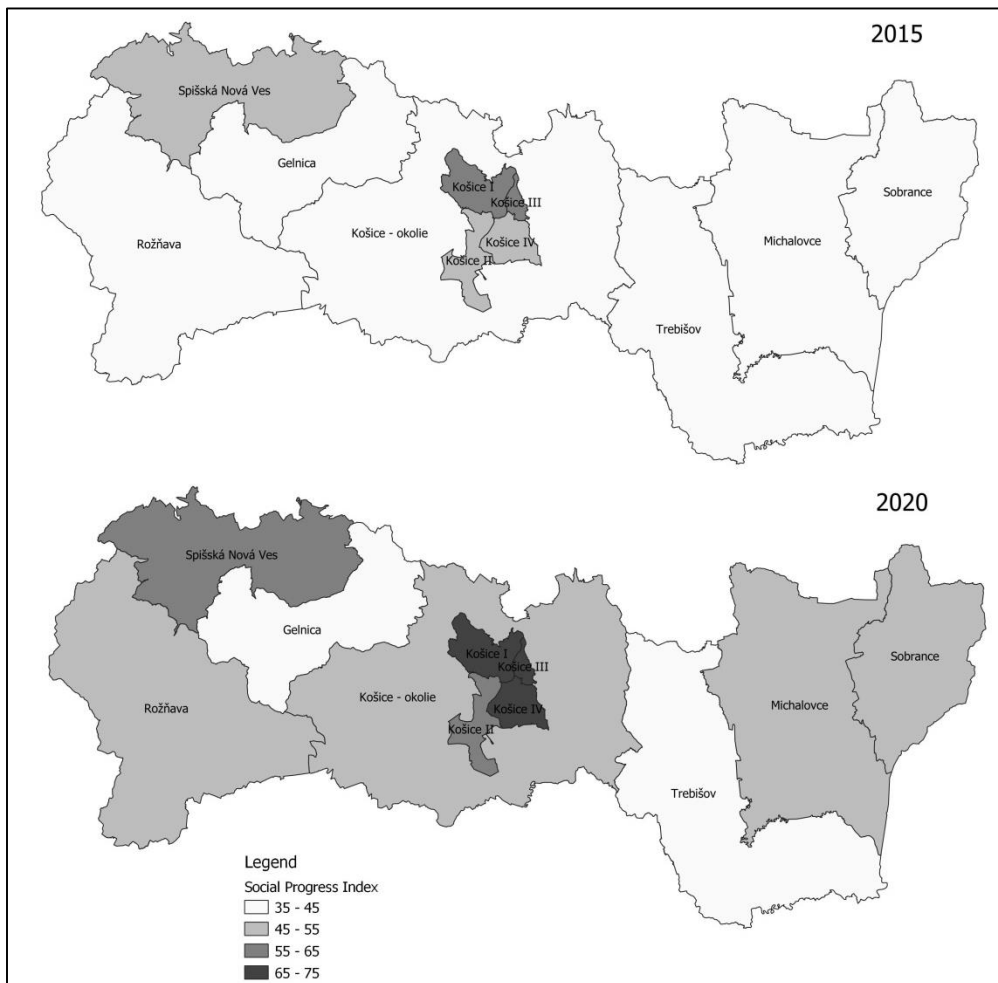| Index	District										
	Gelnica	Košice I	Košice II	Košice III	Košice IV	Košice-okolie	Michalovce	Rožňava	Sobrance	Spišská Nová Ves	Trebišov
SPI	**42.13**	**70.49**	**61.87**	**66.38**	**65.45**	**49.21**	**53.31**	**48.90**	**48.96**	**56.85**	**43.79**
Basic human needs	**38.63**	**73.67**	**74.68**	**65.51**	**82.19**	**56.18**	**60.68**	**55.93**	**46.84**	**65.95**	**42.97**
Nutrition and basic medical care	43.93	66.59	62.44	48.79	86.44	50.76	50.32	60.54	37.48	56.96	41.29
Water and sanitation	24.42	100.00	100.00	100.00	100.00	33.63	85.01	64.60	48.88	100.00	32.76
Housing	29.48	80.62	88.81	65.78	94.84	70.64	46.06	29.46	36.63	46.50	31.29
Personal safety	56.70	47.49	47.49	47.49	47.49	69.69	61.32	69.12	64.37	60.35	66.54
Foundations of well-being	**41.76**	**75.94**	**55.11**	**74.66**	**59.23**	**44.43**	**48.60**	**47.66**	**49.42**	**53.24**	**44.32**
Access to basic knowledge	26.95	85.32	66.56	74.09	73.61	41.26	51.29	41.30	47.20	55.42	38.21
Access to information and communications	32.13	77.02	77.02	77.02	77.02	36.13	48.04	36.97	36.43	40.45	40.87
Health and wellness	28.69	78.36	64.07	64.26	57.29	39.28	39.26	35.02	36.33	51.87	24.98
Environmental quality	79.26	63.06	12.78	83.25	29.02	61.06	55.81	77.35	77.71	65.24	73.24
Opportunity	**46.00**	**61.85**	**55.82**	**58.97**	**54.91**	**47.03**	**50.65**	**43.12**	**50.64**	**51.36**	**44.07**
Personal rights	53.39	15.02	13.79	8.48	20.18	41.11	53.44	65.93	59.05	57.95	52.90
Personal freedom and choice	43.67	90.90	85.23	91.00	91.26	67.60	60.94	29.68	62.11	54.28	49.20
Inclusiveness	53.69	78.96	74.81	78.08	74.90	39.50	48.33	44.71	45.32	51.24	40.91
Access to advanced education	33.26	62.50	49.44	58.31	33.31	39.90	39.90	32.14	36.05	41.95	33.28

Based on Rosičová et al. (2022)

Fig. 2. Social Progress Index, and dimension scores in the districts of the Košice Region in 2020; Based on Rosičová et al. (2022)

The results of the 2020 Social Progress Index reveal a varying degree of societal outcomes across the districts. The highest performing districts of the region are the municipalities of Košice, where Košice I achieves the highest overall performance and Kosice II records the lowest performance within the city. The districts of Gelnica and Trebišov achieve the lowest Index score in the region. However, the dimension level results differ slightly, where Košice IV is the top performer in Basic Human Needs. and Spišská Nová Ves records the best performance across dimensions outside of Košice city and Gelnica achieves the lowest scores. Foundations of Wellbeing mirrors the overall Index results where Košice I takes the top position and Gelnica the last. The Opportunity dimension is the worst performing for most districts with the exception of Gelnica where it is the best performing dimension; Košice I is the best performing district while Rožňava is the poorest performer.
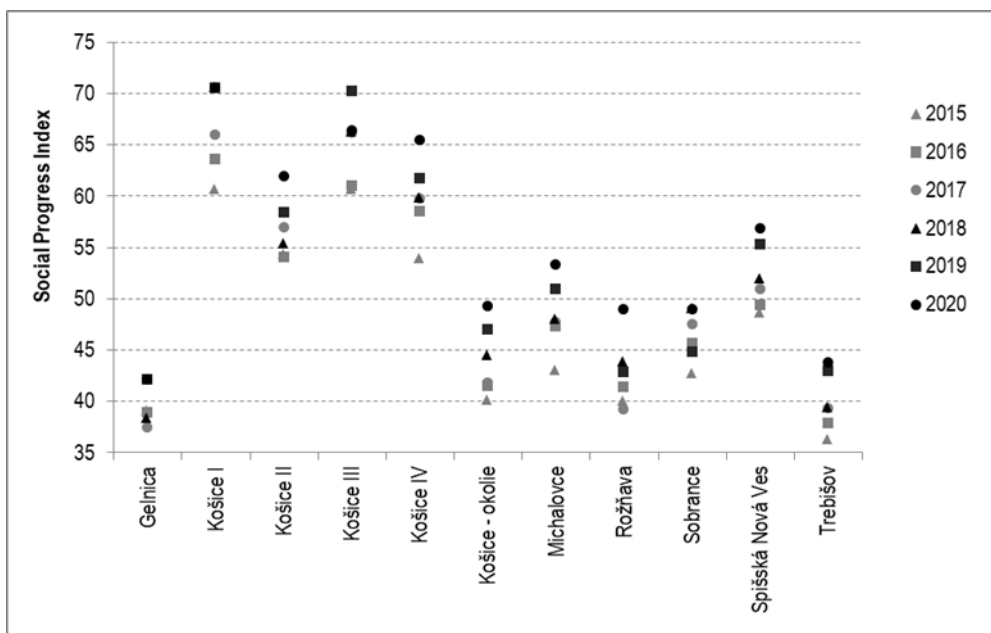
All districts of the Košice Region achieved an improvement in the Index. Changes in the overall Social Progress Index in individual districts of the Košice Region over 2015–2020 are shown in *figure 3* and *figure 4*. The most significant change in SPI was in Košice IV district, where the Index increased from a value of 53.9 points in 2015 to 65.4 points in 2020. In contrast, Gelnica recorded the lowest growth from 39.1 points in 2015 to 42.1 points in 2020.

Fig. 3. *Social Progress Index in the districts of the Košice Region in the years 2015 and 2020; Based on Rosičová et al. (2022)*

At the component level the district performance varies greatly. Overall, all districts recorded some level of improvement in 5 components: Water and Sanitation, Personal Safety, Access to Information and Communications, Personal Freedom and Choice and Inclusiveness. However, all districts declined in Personal Rights and with the exception of Košice-okolie also in Access to Advanced Education. The districts of Košice (I-IV) recorded the highest gains in Personal Safety, where the city districts share the same score due to the lack of disaggregated data on the city level (41.3 points increase) and Košice I achieved an increase of 35.0 points in Inclusiveness. However, the districts of Košice (I-IV) recorded the highest decrease in Personal Rights (-21.5, -27.8, -22.1, -24.7, respectively) while Sobrance declined by 23.4 points in Nutrition and Basic Medical Care.

Fig. 4. *Change over time (2015–2020) of the Social Progress Index in the districts of the Košice Region; Based on Rosičová et al. (2022)*

To assess the overall trends, it is also helpful to look at summary statistics on the component and dimension levels (*tab. 4*). While the Basic Human Needs dimension records the best performance across the districts (average 60.3 in 2020) and has recorded the highest gains in both average and median scores, it also achieves the lowest (38.6 Gelnica) and highest dimension-level score (82.2 Košice IV). Foundations of Wellbeing is the second-best performing dimension, though this is mostly driven by the Košice city municipalities. The Opportunity dimension ranks last, but it should be noted that its performance is slightly better or on par with the Foundations of Wellbeing for many districts outside of the city of Košice. The highest average gains (measured by the average and median) were recorded in Personal Safety, Personal Freedom and Choice, and Inclusiveness components. Personal Rights and Access to Advanced Education declined. While Access to Basic Knowledge increased on average, its median score declined which signals a greater disparity among the districts. An increase in disparity (expressed by standard deviation) is also evident in the case of Personal Rights and Inclusiveness. On the contrary, Personal Safety and Access to Information and Communications have experienced convergence of performance among the districts.

Tab. 4. *Descriptive statistics of the Index, dimension and component scores in 2015 and 2020*

Aspect	min			max			median			average			standard deviation		
	2015	2020	(Δ)	2015	2020	(Δ)	2015	2020	(Δ)	2015	2020	(Δ)	2015	2020	(Δ)
Nutrition and Basic Medical Care	22.71	37.48	(14.77)	71.11	86.44	(15.33)	49.54	50.76	(1.22)	49.50	55.05	(5.55)	13.69	13.82	(0.13)
Water and Sanitation	18.78	29.46	(10.68)	81.78	94.84	(13.06)	40.48	46.50	(6.03)	48.72	56.37	(7.65)	24.25	24.66	(0.41)
Housing	0.01	24.42	(24.41)	100.00	100.00	(0.00)	76.16	85.01	(8.85)	64.64	71.76	(7.11)	38.79	31.55	-(7.24)
Personal Safety	6.17	47.49	(41.32)	64.53	69.69	(5.16)	41.61	60.35	(18.74)	33.63	58.00	(24.37)	22.96	9.13	-(13.83)
Access to Basic Knowledge	28.18	26.95	-(1.23)	73.10	85.32	(12.22)	53.75	51.29	-(2.45)	51.88	54.66	(2.78)	15.64	18.12	(2.48)
Access to Information and Communications	6.04	32.13	(26.09)	70.82	77.02	(6.20)	22.79	40.87	(18.08)	37.78	52.65	(14.86)	26.62	19.72	-(6.91)
Health and Wellness	16.50	24.98	(8.48)	68.56	78.36	(9.80)	37.91	39.28	(1.37)	41.33	47.22	(5.89)	19.91	17.03	-(2.88)
Environmental Quality	7.39	12.78	(5.39)	83.32	83.25	-(0.07)	64.16	65.24	(1.08)	60.66	61.62	(0.96)	24.34	22.18	-(2.16)
Personal Rights	30.62	8.48	-(22.14)	75.46	65.93	-(9.53)	62.69	52.90	-(9.79)	56.17	40.11	-(16.05)	15.23	21.41	(6.18)
Personal Freedom and Choice	13.29	29.68	(16.40)	71.77	91.26	(19.50)	35.93	62.11	(26.19)	42.45	65.99	(23.54)	20.79	21.29	(0.50)
Inclusiveness	18.77	39.50	(20.73)	49.66	78.96	(29.30)	28.36	51.24	(22.88)	33.51	57.31	(23.80)	11.02	15.92	(4.90)
Access to Advanced Education	34.35	32.14	-(2.20)	64.63	62.56	-(2.07)	46.64	39.91	-(6.73)	46.52	41.84	-(4.68)	10.43	10.56	(0.12)
Basic Human Needs	32.97	38.63	(5.66)	64.06	82.19	(18.14)	47.61	60.68	(13.07)	49.12	60.30	(11.17)	10.55	13.83	(3.27)
Foundations of Wellbeing	37.51	41.76	(4.25)	71.71	75.94	(4.23)	42.95	49.42	(6.47)	47.91	54.03	(6.12)	12.31	11.67	-(0.63)
Opportunity	38.45	43.12	(4.67)	54.21	61.86	(7.65)	43.55	50.66	(7.11)	44.66	51.31	(6.65)	5.71	6.09	(0.38)
Social Progress Index	36.33	42.13	(5.80)	60.65	70.49	(9.84)	43.00	53.31	(10.31)	47.23	55.21	(7.98)	8.86	9.64	(0.79)

Based on Rosičová et al. (2022). The delta sign (Δ) indicates a change over 2015-2020.

Conclusion

The Social Progress Index measures social development independently of economic indicators and provides a detailed picture of whether people have access to the wide range of elements of social progress. The Index also allows a better understanding of the two-way relationship between economic growth and social progress. Given the success of the Global Social Progress Index, there has also been an increased demand for sub-national indices to address the need for a greater regional actionability. The SPI is used at national and regional levels in countries around the world for policy making, priority setting and impact measurement. However, there has only been limited application and integration into policy at lower administrative level in the EU.

Our aim was, therefore, to develop a Social Progress Index at the level of the districts of the Košice Region, in order to help regions to define their priorities in regional planning and policy-making in a more targeted way.

The results confirmed an overall positive advancement in social progress, however, they also highlighted the disparities and diverse dynamics in social progress across the districts of the Košice Region over 2015-2020, and across components.

The Index, however, also has its limitations. The most significant obstacle in the creation of the SPI for the districts of the Košice region was the (un)availability of indicators and data at the district level. Despite the limiting factors of poorer availability of appropriate data at the lower administrative level, it was possible to calculate the Social Progress Index at the level of districts in the Košice Region, and thus to monitor social development across individual districts over the period under review. However, some caveats need to be taken into account when interpreting the results. The choice of indicators has an impact on the resulting Index. While we tested and considered all available metrics, the results might have been very different if other indicators of societal wellbeing were available. Nonetheless, while it is true that the choice of indicators influences the results, it is also true that the aggregation of individual indicators to components, dimensions and the Index limits the influence of each individual indicator on the final components, dimensions, and Index score and the index can therefore provide a more reliable conceptual assessment of societal performance. Furthermore, the city of Košice (consisting of 4 districts) is the natural economic, educational, and social centre of the region. The overall social development of individual districts is related to the settlement structure as well as to the development axes (development regions). While this was confirmed by the SPI results, it also created some issues for the Index creation, especially in the Environmental Quality component (since the environmental pollution of some of the Košice districts is significantly larger than that of the remaining districts).

Despite these, and other limitations, the Index provides an accurate approximation of societal wellbeing on the district level in the Kosice region, independent of economic indicators and focused on the real lived experience of its population.

High regional differentiation in Slovakia is reflected in economic and societal outcomes, highly divergent levels of education, unemployment rates, employment, living standards, as well as technical and social infrastructure (Korec 2005, 2009, Gajdoš and Pašiak 2006, Vaňo and Mészáros 2004). Significant regional disparities can be observed also at the level of districts of the Košice Region, which are rooted in the long-term regional development of the territory. For example, the poorly performing districts of Gelnica, Trebišov, Rožňava and Sobrance are outside the main development axes and lag significantly behind the stronger districts. It is necessary to establish initiative to exploit the potential of these districts, to improve the quality of services (tourism, social sphere, health care) and to address the problems of socially disadvantaged population groups.

The experience from similar applications (OPSI 2018) shows that the index contributes to improved policy-making and better outcomes for citizens in various ways. (1) By shifting the focus from input to output/outcome focused indicators and indicators primarily measuring societal and environmental aspects, local authorities can better respond to the actual needs of their communities. (2) Mapping of indicators provides the understanding of issues that are not measured, and where local authorities need to redesign and improve data collection. (3) Creating a common language to align policies and stakeholders and eliminate silos.

The calculated Social Progress Index (SPI) for the districts of the Košice region should allow stakeholders at the state, regional, and local levels to draw insights and set public policies and deliver services more effectively and efficiently. By implementing more focused and efficient policies, it should become possible to foster significant social development, even in the less advantaged districts of the region, and gradually diminish the existing regional disparities. Policy attention should be given in particular to vulnerable populations and consideration should be given to successful strategies and tools and their long-term sustainability.

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Annex

Tab. 5. *The detailed list of selected indicators of the Social Progress Index for the districts of the Košice Region*

Dimension/Component/Indicator	Definition of the indicator	Source
Basic human needs		
Nutrition and basic medical care		
Infant mortality	Number of deaths under one year as a proportion of live births in the last 3 years	Statistical Office of the Slovak Republic (2022c)
Neonatal mortality	Number of deaths under 28 days old as a proportion of live births in the last 3 years	Statistical Office of the Slovak Republic (2022c)
Premature deaths (<65)	Proportion of deaths before the age of 65 out of total deaths	Statistical Office of the Slovak Republic (2022c)
Hospitalizations	Proportion of hospital admissions per 1 000 inhabitants	National Health Information Centre (2022)
Water and sanitation		
Connection to water supply	Percentage of population supplied with public water supply	Statistical Office of the Slovak Republic (2022c)
Connection to sewerage network	Percentage of population connected to the public sewerage network	Statistical Office of the Slovak Republic (2022c)
Wastewater treatment	Volume of wastewater treated per 1 000 inhabitants	Statistical Office of the Slovak Republic (2022a)

Housing		
Construction of housing	Percentage of completed housing per 1 000 inhabitants	Statistical Office of the Slovak Republic (2022c)
Housing allowance	Percentage of housing benefit recipients per 1 000 inhabitants	Central Office of Labour, Social Affairs and Family of the Slovak Republic (2022a)
Roma population in settlements	Percentage of Roma living in Roma settlements per total population	Ministry of Interior of the Slovak Republic (2022)
Personal safety		
Violent crime	Share of violent crimes per 1000 inhabitants	Regional Directorate of the Police in Košice (2022a)
Property crime	Share of property crimes per 1000 inhabitants	Regional Directorate of the Police in Košice (2022a)
Intentional bodily harm and injuries	Percentage of intentional injuries per 1 000 inhabitants	Regional Directorate of the Police in Košice (2022a)
Clearance rate of crimes	Percentage of general crime cleared	Regional Directorate of the Police in Košice (2022a)
Accidents resulting in injury to life and limb	Proportion of accidents resulting in injury to life and limb per 100 000 inhabitants	Regional Directorate of the Police in Košice (2022b)
Foundations of well-being		
Access to basic knowledge		
Children in kindergartens	Number of kindergarten pupils as a proportion of the number of children aged 3-6 years	Statistical Office of the Slovak Republic (2022c)
Testing of fifth graders - Slovak language	Weighted average achievement in the testing of fifth graders in the subject Slovak language (sum of the average achievement of each school in the district multiplied by the number of pupils in the school and divided by the sum of all pupils in the schools in the district)	National Institute for Certified Educational Measurements (2022)
Testing of ninth graders - Slovak language	Weighted average achievement in the testing of ninth graders in the subject Slovak language (the sum of the average achievement of each school in the district multiplied by the number of pupils in the school and divided by the sum of all pupils in the schools in the district)	National Institute for Certified Educational Measurements (2022)
Testing of ninth graders - mathematics	Weighted average of ninth graders' test scores in Mathematics (sum of the average scores of each school in the district multiplied by the number of pupils in the school and divided by the sum of all pupils in the schools in the district)	National Institute for Certified Educational Measurements (2022)
Access to information and communications		
Internet coverage	Minimum household internet coverage	Regulatory Authority for Electronic Communications and Postal Services (2022)
High speed internet	Percentage of households with access to the internet using fibre optic cable using FTTH and FTTB technology	Regulatory Authority for Electronic Communications and Postal Services (2022)
Active library users	Proportion of active library users out of total population	National Enlightenment Centre (2022)
Health and wellness		
Life expectancy at birth for men	Number of years that a newly born person will survive on average, assuming no change in mortality rates, at district level, 5-year average	Institute of Informatics and Statistics (2022)
Life expectancy at birth for women	Number of years on average that a newly born person will survive, assuming no change in mortality rates, at district level, 5-year average	Institute of Informatics and Statistics (2022)
Mortality from diseases of the circulatory system	Proportion of deaths from circulatory diseases (Chapter IX) per 100 000 population, standardised to the population of the Slovak Republic	Statistical Office of the Slovak Republic (2022c)
Cancer mortality	Proportion of deaths from cancer (Chapter II) per 100 000 population, standardised to the population of the Slovak Republic	Statistical Office of the Slovak Republic (2022c)
Oral health index in 15-year-old children	Ratio of the number of decayed, filled and extracted permanent teeth of children aged 15 years to the number of registered children of that age	National Health Information Centre (2022)

Environmental quality		
Particulate emissions	Volume of particulate emissions per square kilometre	National Emissions Information System (2022)
Sulphur dioxide emissions	Sulphur dioxide emissions per square kilometre	National Emissions Information System (2022)
Nitrogen oxide emissions	Nitrogen oxide emissions per square kilometre	National Emissions Information System (2022)
Environmental burdens	Number of environmental burdens per 1000 square kilometres	Slovak Environment Agency (2022)
Opportunity		
Personal rights		
Criminal proceedings "T"	Average length of criminal proceedings in district courts in months	Ministry of Justice of the Slovak Republic (2022)
Civil proceedings "C"	Average length of civil proceedings in district courts in months	Ministry of Justice of the Slovak Republic (2022)
Family proceedings "P"	Average length of proceedings in family, guardianship and care of minors cases in district courts in months	Ministry of Justice of the Slovak Republic (2022)
Municipal electoral participation	Voter participation in municipal elections in %	Statistical Office of the Slovak Republic (2022b)
Women mayors	Percentage of women mayors elected in municipal elections	Statistical Office of the Slovak Republic (2022b)
Personal freedom and choice		
Teenage pregnancy	Proportion of live births to mothers aged 13-18 years per 1,000 women aged 13-18 years, median	Statistical Office of the Slovak Republic (2022c)
Abortion index	Abortion index - proportion of abortions per 100 live births	Statistical Office of the Slovak Republic (2022c)
Material deprivation	Proportion of recipients of material hardship benefit and benefit allowances per 1000 inhabitants	Central Office of Labour, Social Affairs and Family of the Slovak Republic (2022a)
Inclusiveness		
Young unemployment	Proportion of the unemployed aged under 25 out of the total number of unemployed	Central Office of Labour, Social Affairs and Family of the Slovak Republic (2022b)
Long-term unemployment	Share of the number of unemployed registered for more than 12 months out of the total number of unemployed	Central Office of Labour, Social Affairs and Family of the Slovak Republic (2022b)
Gender inequality in unemployment	Difference between female and male unemployment rates	Central Office of Labour, Social Affairs and Family of the Slovak Republic (2022b)
Employment of foreigners	Share of the number of employed third-country nationals with a valid work permit in the Slovak Republic and EU/EEA citizens with an information card in the Slovak Republic out of the total number of employees on the register	Central Office of Labour, Social Affairs and Family of the Slovak Republic (2022c); Office of Border and Alien Police of the Presidium of the Police Corps (2022).
Access to advanced education		
Graduation success rate – Slovak language	Weighted average of matriculation pass rates in the subject Slovak language (sum of the average pass rates of each school in the district multiplied by the number of pupils in the school and divided by the sum of all pupils in schools in the district)	National Institute for Certified Educational Measurements (2022)
Graduation success rate – English language	Weighted average matriculation success rate in the subject English language - all levels (the sum of the average success rates of each school in the district multiplied by the number of pupils in the school and divided by the sum of all pupils in the schools in the district)	National Institute for Certified Educational Measurements (2022)
University students	Percentage of college students per population aged 19-25	Ministry of Education, Science, Research and Sport of the Slovak Republic (2022)

Based on Rosičová et al. (2022)