



# PILOT ACTIVITY - URBAN STUDY

## TECHNICAL FRAMEWORK

D.T2.4.3

Version 08-04-2020

04 2020

Institute of Spatial Planning (IPP)

<i>CORCAP partner(s)</i>	<i>Related catchment area (area of analysis)</i>	<i>Related cross-border relations</i>
KORDIS JMK	Jihomoravský kraj	CZ-SK, CZ-AT
IPP	Bratislavský kraj, Trnavský kraj, Nitriansky kraj	CZ-SK, SK-AT, HU-SK



## TABLE OF CONTENTS

1. THEORETICAL BACKGROUND .....	3
2. APPLICATION LAYER .....	5
2.1. SDSS .....	5
2.2. GIS .....	5
3. METAINFORMATION LAYER .....	6
3.1. Documents .....	6
3.2. Data Sources .....	6
4. DATA LAYER .....	7
4.1. Thematic Areas .....	7
4.2. Temporal Units .....	7
4.3. Geographical Scope .....	7
4.4. Levels .....	7
4.5. Geodatabase .....	8
5. SOFTWARE LAYER .....	9
6. HARDWARE LAYER .....	10
7. ORGWARE LAYER .....	11
7.1. Administration .....	11
7.2. Users .....	11
8. TECHWARE/CODEWARE LAYER .....	12
A. ANNEX .....	13
1. INDICATIVE LIST OF THE INDICATORS .....	13

## 1. THEORETICAL BACKGROUND

CORCAP INFORMATION SYSTEM (IS) is the information system implemented by IPP as a partner of the CORCAP Project. The IS performs the following functions:

1. It is a tool for processing individual parts of the project, as a tool:
  - o supporting the process of regional analysis
  - o processing the urban study, where its scope will be extended to the South Moravian Region
  - o supporting the process of the capitalization plan
2. It is also a tool for presenting processed project results in the form of an Internet portal.

As far as we look at the project in terms of territorial development management, its information system (IS) supports the presentation of the state of potentials and limits of the various factors of the common environment and their expected development in order to ensure the necessary quality of the local environment. It is not only the sum of individual factors that defines the quality of the local environment, but also the interaction of these factors.

It is a concept of territorial development in terms of available methods, where in addition to the description of the current state and development of individual factors of the settlement environment based on the use of statistical methods and expert estimates, tools and methods of GIS are used. Last but not least, the project seeks to apply the methods of decision support systems (SDSS), especially in terms of assessing the impact of expected changes in the territory on the quality of the settlement environment.

Given the available resources, as well as the knowledge and experience of the research team, the use of sophisticated simulation methods is not expected. What will be expected is rather an interactive simulation, which assesses the impacts of expected changes in land use at a simulated time environment.

This approach is based on the assumption that for the management sphere, which actually decides on individual changes in land use, an information field that would provide meaningful arguments for issuing a quality decision is needed. This comes from the idea that the settlement environment is a model of the territory, its purposeful abstraction reducing its complexity to relevant factors. These factors may be measure for the past, for the present, with possible projections to the future.

In such an understanding, the settlement environment represents a large, complex, largely stochastic model, somehow intelligent, if it could be understood as self-regulation. The available resources allow to model the extent (in terms of the number of elements and their properties) and also the complexity (in terms of the number of links), their potential is limited only by the availability of relevant data. Regarding stochasticity and self-regulation, this will be solved by using the expert assessments. In contrast to the existing planning practice, such an approach is a step forward, both in terms of higher productivity of planning information and, in the case of widespread application of such an approach in planning practice, a significant increase in its effectiveness.

It should be noted that the Building Act in its original wording from 1967 ?, presupposed both the existence of the Integrated Information System on the territory, as well as the existence of a separate spatial planning background - the so-called territorial-technical documents, which were to ensure continuous monitoring of potentials and limits in the area to ensure a quality environment.



The answer to the questions why these tools has not been comprehensively resolved in spatial planning practice in the Slovak Republic is basically simple. Firstly, there were technological obstacles, mainly associated with low quality IT tools. Secondly the organizational problems associated with creating the necessary information flows in order to create a model of settlement environment. Last but not least, the reluctance of various institutions and entities to share data and information regarding the planned intentions. In principle, the change in the political and economic system that took place 30 years ago did not change anything.

The Spatial Planning Institute has long sought to modernize approaches in the field of spatial planning, both in the field of regional policy and in the field of spatial planning. It is based on the trend of the need for continuous monitoring and evaluation of the state and development of the quality of the settlement environment in the individual elements of the territory, as well as calls for increasing the transparency of the entire planning process.

While continuous monitoring increases the efficiency of the planning process, making the information system available to authorized persons, or even the general public, increases the transparency of the entire process.

The comparative analysis at the level of municipalities, districts and regions describes the current state (2020) and the development (especially the comparison of 2015, 2011, and 2001, if possible) of individual factors - represented by approximately 40 indicators - logically grouped into 10 thematic areas (see below).

The summary of all the above-mentioned factors is measured in the form of evaluation of the so-called Quality of the settlement environment (Index of the quality of the settlement environment).

The SWOT analyses of the settlement environment will be done for all the thematic areas.

The estimation of future development is processed based on simulation of development of indicators (individual factors). This will be done by means of expert evaluation of the impacts of individual development plans together with the statistical methods for extrapolation of values of individual factors for the target year of 2050.

A separate part is the description of development scenarios of the quality of the settlement environment with pessimistic, realistic and optimistic scenarios. The individual development scenarios will be described separately for the researched thematic areas.

The main output of the system for monitoring and evaluating the quality of the settlement environment is:

- system for evaluating and monitoring the individual factors of the settlement environment
- separate web map service (WMA) enabling the display of relevant data and designs

## 2. APPLICATION LAYER

The application layer consists of SDSS and GIS part. In both cases it is an online portal accessible by means of internet browser (Microsoft Edge, Internet explorer, Chrome etc).

### 2.1. SDSS

The system for evaluation and monitoring of environmental factors represents a separate output that will allow to:

1. display data in 4 defined time periods (years 2020, 2015, 2011, 2001) of individual factors of the settlement environment (a total of approximately 40 indicators) grouped according to the thematic areas and on three levels (local - municipality, district, and regional)
2. display comparisons of the above-mentioned factors in tabular as well as choropleth (cartogram) forms
3. show the expected development (2030, 2050, 2070) of individual factors of the settlement environment using the expert evaluation of the impacts of related development plans.

At the same time, a new specialized system of outputs will be created - so-called municipality profile, which will enable to display the:

1. basic general data of a given geographical unit (municipality / logistic hub/center)
2. data of individual factors of the settlement environment as well as their aggregate values
3. list of strengths and weaknesses of the settlement environment for the current state (year 2020) as well as their predictions for the target year (2050) in the form of generated SWOT analysis
4. links directly on the regional spatial plans (and their designs) of the given territorial unit (Bratislava, Trnava and Nitra Regions)
5. summary of textual evaluations of the given geographic district by particular thematic areas

Access to the portal is possible by entering the following link: <https://www.ipp-oz.sk/corcap>.

### 2.2. GIS

Another separate output is the application in the form of an online GIS web map service (WMA). It will allow to:

1. view individual layers
2. identify individual items and layers
3. access the attribute data table
4. make purposeful selections from the geodatabase
5. create purposeful outputs and then export them to various graphic or publication formats

Access to the WMA is possible through the <https://www.ipp-oz.sk/corcap>.



---

## 3. METAINFORMATION LAYER

### 3.1. Documents

The evaluation of documents and projects was part of the Regional Analysis. Bibliography is part of both the Regional Analysis and Pilot Activity as well.

### 3.2. Data Sources

Separate Table describes the data sources of statistical as well as geographical data.



## 4. DATA LAYER

Data layer consists of **GIS data** and **statistical data**. These are divided into thematic areas, 5 temporal units and 3 levels.

### 4.1. Thematic Areas

- Data is divided according to 10 themes:
- Population
- Housing
- Civic amenities
- Economic structure and labor market
- Landuse
- Environment
- Financial indicators
- Technical facilities
- Transport and Settlement structure
- Primary Data and Secondary Data

### 4.2. Temporal Units

Time periods of interest are:

- 2001 (census year)
- 2011 (census year)
- 2015
- 2020 or latest available year (> 2015)
- 2050 (extrapolation/projection)

### 4.3. Geographical Scope

The geographical scope - area of interest - is the SW Slovakia and South Moravia Region with the overlap to the whole CENTROPE Region.

### 4.4. Levels

- Local level - municipality or LAU2
- Intermediate - District or LAU1
- Regional - Region or county or NUTS3



#### 4.5. Geodatabase

A partial limitation in the assessment of the current state and the development of indicators of Housing and Housing Structure exists due to the fact, that the input data are based on census data (the last one was in 2011, the forthcoming in 2021).

Database is divided into geographical part and statistical part.

Geographical data will be provided by own (IPP) sources for the Slovak part of the territory. KORDIS will provide data for South-Moravian Region.

Data for Austria and Hungary (CENTROPE) is provided by ESRI geodatabase.

Indicative list of the indicators is attached in annex.





## 5. SOFTWARE LAYER

- ArcGIS for Server Workgroup (10.4)
- ArcGIS for Desktop Standard (10.4.1)
- ArcGIS Pro Basic (2.6)
- ArcGIS Online
- MS Office

MS Office is needed for building the statistical database and as a support tool for the geodatabase creation. The other four items are necessary to accomplish the geodatabase creation and its publication into the online web map service (WMA).



## 6. HARDWARE LAYER

The service is located on the task processor's own server and its operation is also under the responsibility of the processor (Spatial Planning Institute). Possible data update or any technical problems must be resolved directly with the operator of the service. Also, all activities associated with the maintenance and possible upgrade of the service are the responsibility of the operator.

Some limitations in the operation based on existing organizational and technical support may occur in connection with greater demand for individual requirements within both services, or in connection with requirements for their updating or upgrade as well as requirements for specific outputs.

The necessary hardware consists of:

- Desktop Workstation
- Server Workstation

## 7. ORGWARE LAYER

### 7.1. Administration

System's operation is under the responsibility of the processor (Spatial Planning Institute).

### 7.2. Users

The processed work is a spatial planning document. Although this was not explicitly required in the assignment, the work has the character of the territorial technical documents. The work was designed to facilitate the work of processors of spatial plans on regional as well as local levels (including urban studies and so-called generels).

In particular, the work may be used in the field of regional development:

- for the elaboration of Programs of Social and Economic Developments on regional or local levels
- to support the processing of project applications, both for the use of EU funds, as well as other projects for which it is necessary to provide a description of the state and development of land use.

Furthermore, it is possible to use the work for the processing of sectoral documents of a sectoral concerning the individual components of the settlement environment (e.g. in the field of transport, technical infrastructure, impact assessment on the quality of individual environmental components, project preparation within the zoning or construction procedures etc.)

An important possibility of using the work is in the area of informing the public about the state of the settlement environment.

The work also has the potential for use in the field of education to acquaint secondary school students and university students regarding region (the area of interest), its state and development perspectives.



---

## 8. TECHWARE/CODEWARE LAYER

In backend ASP.NET server with SQL database will be used. To publish the service, it is necessary to provide a server with the necessary software with a static IP address.



## A. ANNEX

### 1. INDICATIVE LIST OF THE INDICATORS

	Thematic area	Name of indicator	C B	units	CORC AP	NSK D+ 2018		
ATTRACTIVITY SUBSYSTEM	ATTRACTIVITY OF MUNICIPALITY IN TERMS OF IDEAL MULTIMODAL HUB LOCALISATION	1	Accessibility of municipality to the closest highway/expressway junction		min	1	1	
		2	Accessibility of municipality to the closest railway station lying on the main railway line		min	1	0	
		3	Accessibility of municipality to the closest TEN-T port		min	1	1	
		4	Accessibility of municipality to the closest TEN-T airport		min	1	1	
		5	Accessibility of municipality to the closest intermodal terminal		min	1	0	
		6	Population radius - 30 min		number (of inhabitants)	1	0	
		7	Existence of the functional area of industry and/or logistics in the regional or local spatial plan		number (of sites)	1	0	
		8	Aggregated indicator defined by IPP		index	1	0	
OF	9. TRANSPORT		Accessibility of the municipality to the railway station with regular passenger traffic		min	1	0	
		1	Accessibility of municipality to the closest highway/expressway junction		see above		1	
		2	Accessibility of municipality to the closest TEN-T port		see above		1	
		3	Accessibility of municipality to the closest TEN-T airport: Bratislava and Budapest		see above		1	
		4	Accessibility of municipality to the closest TEN-T airport: Wien-Schwechat and Budapest		min	0	1	
		5	Accessibility of municipality to the closest railway station, where EC/IC/EN/Ex train stops		min	1	1	
		6	Accessibility of municipality to the closest railway station, where R/REx train stops		min	1	1	
		7	Number of municipality's inhabitants per 1 bus stop		index	0	1	
		8	Number of bus stops per 1 square km of built-up area of the municipality		index	0	1	
		move to SOCIAL INFRASTRUCTURE	9	Accessibility of the municipality to the nearest town		min	1	1
		10	Accessibility of the municipality to the nearest regional seat <in SK>		min	1	1	
		3. CIVIC AMENITIES / SOCIAL INFRASTRUCTURE	1	Accessibility of the municipality to the nearest municipality with bank <in SK>		min	0	1
			2	Accessibility of the municipality to the nearest shopping gallery/hypermarket <in SK>		min	0	1
			3	Accessibility of the municipality to the nearest municipality with public library <in SK>		min	0	1
			4	Accessibility of the municipality to the nearest pharmacy <in SK>		min	0	1
5	Accessibility of the municipality to its registry office <in SK>			min	0	1		
6	Accessibility of the municipality to its seat of the district directorate of the police force <in SK>			min	0	1		
7	Accessibility to the nearest seat of the district directorate of the fire and rescue corps <in SK>			min	0	1		



	8	Accessibility of the municipality to the nearest municipality with post office <in SK>	min	0	1
	9	Accessibility of the municipality to the nearest thermal swimming pool resp. water park	min	0	1
	10	Accessibility of the municipality to the nearest secondary (high) school <in SK>	min	0	1
	11	Accessibility of the municipality to the nearest winter stadium (covered hall)	min	0	1
	12	Accessibility of the municipality to the nearest hospital	min	1	1
<b>8. TECHNICAL INFRASTRUCTURE</b>	1	4G mobile internet coverage (of municipality)	index	0	1
	2	Share of dwellings connected to water pipes	index	0	1
	3	Share of dwellings connected to sewer system	index	0	1
	4	Share of dwellings connected to sewer system that is connected to a wastewater treatment plant	index	0	1
	5	Share of dwellings connected to cable TV	index	0	1
	6	Share of dwellings connected to the natural gas pipelines	index	0	1
<b>1. DEMOGRAPHY</b>	1	Hustota obyvateľstva	index	0	1
	2	Index rastu počtu obyvateľov	index	0	1
	3	Hrubá miera celkového prírastku	index	0	1
	4	Index vitality	index	0	1
	5	Podiel trvale bývajúcich obyvateľov s najvyšším dosiahnutým vysokoškolským vzdelaním	index	0	1
<b>2. DWELLINGS</b>	1	Priemerná obložnosť bytu	index	0	1
	2	Podiel trvale obývaných bytov v rodinných domoch	index	0	1
	3	Podiel trvale obývaných bytov v bytových domoch	index	0	1
	4	Vybavenosť obývanými bytmi	index	0	1
	5	Intenzita bytovej výstavby	index	0	1
<b>4. ECONOMY</b>	1	Počet fyzických osôb podnikateľov na 1000 obyvateľov	index	0	1
	2	Podiel právnických osôb ziskových na celkovom počte právnických osôb	index	0	1
	3	Počet právnických osôb ziskových na 1000 obyvateľov	index	0	1
	4	Miera evidovanej nezamestnanosti	index	0	1
	5	Miera ekonomickej aktivity obyvateľstva	index	0	1
<b>5. LANDUSE ?</b>	1	Koeficient ekologickej stability	index	0	1
	2	Stupeň zastavanosti	index	0	1
	3	Stupeň zornenia	index	0	1
	4	Stupeň lesnatosti	index	0	1
	5	Podiel vodnej plochy z celkovej výmery obce	index	0	1
<b>6. ENVIRONMENT</b>	1	Množstvo tuhých znečisťujúcich látok na 10 km <sup>2</sup>	tonnes/10k m <sup>2</sup>	0	1
	2	Množstvo oxidov síry na 10 km <sup>2</sup>	tonnes/10k m <sup>2</sup>	0	1
	3	Množstvo oxidov dusíka na 10 km <sup>2</sup>	tonnes/10k m <sup>2</sup>	0	1
	4	Množstvo oxidu uhoľnatého na 10 km <sup>2</sup>	tonnes/10k m <sup>2</sup>	0	1
	5	Množstvo tuhých znečisťujúcich látok na 100 obyvateľov	tonnes/100 inh.	0	1
	6	Množstvo oxidov síry na 100 obyvateľov	tonnes/100 inh.	0	1
	7	Množstvo oxidov dusíka na 100 obyvateľov	tonnes/100 inh.	0	1
	8	Množstvo oxidu uhoľnatého na 100 obyvateľov	tonnes/100 inh.	0	1
<b>7. FINANCE</b>	1	Bežné výdavky na 1 obyvateľa	EUR	0	1
	2	Kapitálové výdavky na 1 obyvateľa	EUR	0	1
	3	Bilancia bežného účtu	EUR	0	1
	4	Okamžitá likvidita	EUR	0	1
<b>10. MIGRATION</b>	1	Podiel EAO odchádzajúcich za prácou z celkového počtu EAO	index	0	1



	2	Podiel žiakov a študentov odchádzajúcich za vzdelaním z celkového počtu žiakov a študentov	index	0	1
	3	Podiel EAO dochádzajúcich za prácou z celkového počtu EAO	index	0	1
	4	Podiel žiakov a študentov dochádzajúcich za vzdelaním z celkového počtu žiakov a študentov	index	0	1
	5	Podiel denne prítomného obyvateľstva na celkovom počte TBO	index	0	1