

SLOVAKIA CATCHING-UP REGIONS

ESTABLISHING A REGIONAL SPATIAL
AND OPEN DATA INFRASTRUCTURE
IN THE PREŠOV REGION



SLOVAKIA CATCHING-UP REGIONS

ESTABLISHING A REGIONAL SPATIAL
AND OPEN DATA INFRASTRUCTURE
IN THE PREŠOV REGION

© 2019 International Bank for Reconstruction and Development / The World Bank

1818 H Street NW

Washington DC 20433

Telephone: 202-473-1000

Internet: www.worldbank.org

This work is a product of the staff of The World Bank with external contributions. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of The World Bank, its Board of Executive Directors, or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Rights and Permissions

The material in this work is subject to copyright. Because The World Bank encourages dissemination of its knowledge, this work may be reproduced, in whole or in part, for noncommercial purposes as long as full attribution to this work is given.

Any queries on rights and licenses, including subsidiary rights, should be addressed to World Bank Publications, The World Bank Group, 1818 H Street NW, Washington, DC 20433, USA; fax: 202-522-2625; e-mail: pubrights@worldbank.org.

CONTENTS

Acknowledgements	5
Acronyms and Abbreviations	6
Executive Summary	7
REPORT CONTEXT	11
PROJECT ACHIEVEMENTS AND OUTCOMES	15
Establishment of a department of ICT, including a GIS unit	17
Adopting open source software	17
Deployment of the geoportal	18
Data inventory	19
Data integration	19
Web map application	20
Uptake and benefits for the PSK	22
Establishment of key partnerships	23
Introduction to Design Thinking	23
PROJECT ACTIVITIES AND ASSOCIATED DELIVERABLES	27
Technical support and project design	28
Capacity building	28
Partnership building and user engagement	29
MAIN IMPLEMENTATION CHALLENGES AND MITIGATION MEASURES	33
Skills and capacities	34
Leadership and project management	34
Investment plan and dedicated funding	35
Barriers to open data	35
Hosting solution	35
LOOKING FORWARD	39
ANNEX 1 Geodata integration roadmap	41
ANNEX 2 Statistical data integration roadmap	43
ANNEX 3 Announcement of cooperation agreement between PSK and the University of Prešov	45
ANNEX 4 Geoportal architecture	47
ANNEX 5 List of datasets made available by PSK	48
Notes	49

BOXES

BOX 1 Regional Spatial Data Infrastructure (RSDI)	16
BOX 2 Open Source Software (OSS)	17
BOX 3 Geoportal	18
BOX 4 Open data	18
BOX 5 OpenStreetMap (OSM)	21
BOX 6 Property management	22
BOX 7 Open data and SDI in the Slovak Republic	29

FIGURES

FIGURE 1 Catalog of datasets made available on the geoportal	16
FIGURE 2 Homepage of the geoportal of the region of Prešov	19
FIGURE 3 WB and PSK teams collaborating online during a data integration sprint.	20
FIGURE 4 Web map application	20
FIGURE 5 The signing of the collaboration agreement between the University of Prešov and the PSK	23
FIGURE 6 Introduction to design thinking	24
FIGURE 7 Study visit to GeoBretagne	24
FIGURE 8 GeOrchestra Geopresov Region data sources and their flow	47

ACKNOWLEDGEMENTS

This report was prepared by Pierre Chrzanowski, with input from Jean Pommier and Florent Gravin, and coordinated by Paul Kriss, Grzegorz Wolszczak, Vladimír Benč and Agnieszka Boratyńska.

The team would like to first thank Commissioner Corina Crețu for initiating the Catching-up Regions Initiative as well the European Commission team including Andreas von Busch, Bianka Valkovičová, and Eva Wenigová for their feedback and assistance during the project.

The team is also thankful to the Deputy Prime Minister's Office for Investments and Informatization of the Slovak Republic, for their collaboration, especially Denisa Zilakova, Ladislav Šimko, as well as Peter Pastorek from the Ministry of Environment. The team would also like to thank Mr. Milan Majerský, President of the PSK for his leadership and commitment to the project implementation.

The team would next like to thank the GeoBretagne team for the study visit and the peer-to-peer exchanges, especially Fabrice Phung, and Stéphane Mével-Viannay.

Last but not least, the team is truly indebted to the PSK and the city and university of Prešov for their excellent collaboration, and their dedication in putting together a spatial data infrastructure that will benefit the development of the whole region. Special thanks go to: Jozef Cvoliga, Rudolf Bauer, Igor Wzoš, Vladimír Grešš, Miloslav Michalko, Marek Hudák, Maria Barvirčáková, Mariana Hurná, Matúš Kipikaša, Bibiana Miščíková, Simona Szaboová, Miroslav Vaško, Štefan Koco, Jakub Kovár, Kristian Rychvalský, Helena Miščíková, Monika Štoffová, Mária Biľová, Milan Darák, Zuzana Salokyová, and Jana Michalková.

The report was completed in May 2019.

ACRONYMS AND ABBREVIATIONS

CURI	Catching-up Regions Initiative
DCAT	Data Catalog Vocabulary
EC	European Commission
ESIF	European Structural and Investment Funds
EU	European Union
GIS	Geographic Information System
ICT	Information and Communication Technologies
IS	Information System
IT	Information Technology
OGC	Open Geospatial Consortium
OPIS	Operational Program Information Society
OSM	OpenStreetMap
OSS	Open Source Software
PSK	Self-Governing Region of Prešov or the Prešov Region
SDI	Spatial Data Infrastructure
SPMO	Deputy Prime Minister's Office
TAIEX	Technical Assistance and Information Exchange
WB	World Bank

EXECUTIVE SUMMARY

This report summarizes the activity of the World Bank (WB) project to support the establishment of a Regional Spatial and Open Data Infrastructure for the self-governing region of Prešov (PSK) in the Slovak Republic. The project was a part of the Catching-up Regions Initiative (CuRI) initiated by the European Commission (EC) and was implemented from May 2018 to May 2019. The project included three main activities: (i) the setup and capacity building of the Geographic Information System (GIS) unit placed under the new Department of Information and Communication Technologies (ICT); (ii) the deployment of a geoportal as a part of the technical foundation of the spatial data infrastructure (SDI) and related data integration activity; (iii) engagement with data producers and users in order to foster data collection and data demand.

Key deliverables and achievements of the project include:

In one year, the situation at the PSK evolved from no GIS unit to a team of qualified people under the responsibility of a new Department of Information and Communication Technologies. The GIS unit includes one director, one system administrator, two GIS consultants, one senior GIS officer, three junior GIS officers, and one data officer.

Another important outcome of the project was the decision by the PSK to switch to open source software (OSS). The use of OSS may prevent any vendor lock-in situation in the future. It also helps reduce spending on IT, ensure interoperability, facilitate sharing of infrastructures, and foster innovation and security.

The WB team provided technical support to the PSK in deploying the geoportal. In particular, the team helped to define, install, and set up the required hardware and software environment for the geoportal. The geoportal is now available online at <https://geopresovregion.sk> and is branded as a platform that has been made available for the entire region of Prešov, not only for the PSK administration.

The WB team helped the GIS unit and other departments within the PSK to conduct an inventory of geospatial-related data covering the whole region. The objective was to identify, assess, and categorize any geospatial data that could be useful for the development of the whole territory, and that could eventually be shared through the geoportal.

The WB team trained and supported the GIS unit to perform the data integration. Data integration is the process by which data coming from different sources and formats are integrated into a common platform so that they can be viewed and analyzed together. Through a series of training and focused coding sessions (sprints) the GIS unit learned about and conducted the data integration.

Three web map applications were designed and developed. A web map application is an application accessible online that enables users to easily interact with geospatial data. The web map applications focus on the following areas: district and municipality profiles (for instance employment, demographics), cultural heritage, and PSK facilities.

One of the most important achievements of the project was to identify and start to respond to data demand from departments of the PSK in order to foster the uptake of the SDI. The WB team supported the PSK in identifying the needs, in terms of data access, collection, analysis, and planning how to respond to them. Uptake is already effective as several departments of the PSK are already using the geoportal and collaborating with the GIS unit. This includes the Department of Property Administration which has been working with the GIS team to produce a reference register of public buildings.

The PSK and the University of Prešov signed a collaboration agreement on the GIS. The agreement includes: technical assistance and training of the PSK staff by the university; the contribution of GIS students to the PSK projects, as part of their university curriculum; and the cooperation in analyses and scientific work involving the GIS. Other collaboration agreements may follow, in particular, with the city of Prešov that has been a pioneer of open data in the country.

With support from the European Commission's Technical Assistance and Information Exchange program (TAIEX), the WB team organized a study visit to Rennes, France, to exchange ideas with the team from GeoBretagne (the Regional SDI of Bretagne). The PSK staff learned and exchanged experience about how to establish and maintain a regional spatial data infrastructure in the context of the European framework.

REPORT CONTEXT

This report articulates the challenges encountered by the self-governing region of Prešov (PSK) in establishing a spatial and open data infrastructure for the development of the region. It outlines key steps, skills, technologies, and processes that were implemented, and draws conclusions and lessons learned from a year of World Bank support.

In the Slovak Republic, the self-governing regions are a relatively new administrative structure.¹ Their scope of competencies includes most of the typical functions of a government including: regional roads and public transport; secondary, professional, and vocational education; territorial planning and regional economic development; social welfare; participation in civil defense; health; culture in the form of regional theaters, libraries, museums, galleries, and cultural centers; as well as regional tourism planning and development.

One of the tasks of the self-governing regions is to draw public money into regional development projects. This is where data, and in particular, geospatial data, has a role to play. Without detailed information on its territory, the region is left with little evidence for decision-making, and often has to rely on costly studies, or no information at all. Another pertinent issue relates to the transparency of public administration's action and collaboration with other stakeholders and citizens.

While designing the Catching-Up Regions Initiative (CuRI), the lack of data, in particular geospatial data, has been identified as a key element hindering the capacity of the PSK to better support regional development. By deciding to directly address the issue, the PSK became the first regional authority to establish and manage its own spatial data infrastructure in the country, complying with national and European-level geospatial and open data standards.

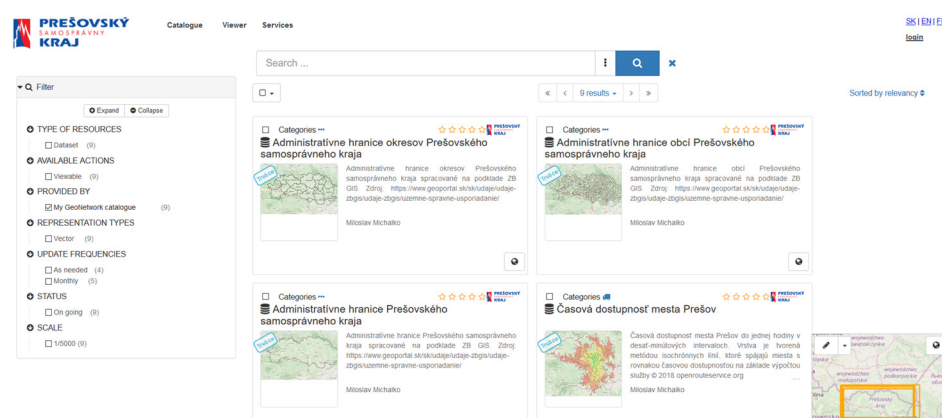
The overarching goal of the GIS component is to support local stakeholders in taking back control over the data infrastructures related to the territory they manage, for the benefit of the people who live there.

The background of the entire page is a repeating pattern of small, light yellow triangles pointing in various directions, creating a textured, geometric effect.

PROJECT ACHIEVEMENTS AND OUTCOMES

Certainly, the most important outcome behind the implementation of this project was that it made possible the establishment of a team dedicated to work on the geographic information system (GIS) at the PSK, a first for the region. It also led to the deployment of a geoportal, referencing more than 8,000 data resources, including more than 50 datasets published by the PSK. The project also helped to raise awareness about the need for improved spatial data infrastructure in the Slovak Republic, especially at the regional level where it is most needed (see Box 1). On an institutional level, the project was an opportunity to initiate key partnerships with the University of Presov and the city of Prešov. Lastly, the work undertaken on the GIS helped to tackle the broader issue of data management at the PSK. This resulted in the establishment of the first Department of Information and Communication Technologies within the institution.

FIGURE 1 Catalog of datasets made available on the geoportal



Source: <https://geopresovregion.sk/geonetwork/srv/eng/catalog.search#/search>

BOX 1 Regional Spatial Data Infrastructure (rSDI)

Geospatial data has become a key element of urban and regional development policies. Thanks to the advance of computing, satellite imagery, and data analytics, it is now used by a wide variety of stakeholders to analyze complex situations, make informed decisions, and communicate with the public.

However, public bodies are still facing a number of issues when dealing with geospatial data. In particular, data and metadata, are often missing or incomplete. Other technical, legal and economic barriers also prevent data collection, sharing and use. As a response, the EC adopted the INSPIRE Directive, an initiative to establish an infrastructure for spatial information in Europe whose primary objective is to support sustainable development.^a

SDI is defined as a framework of policies, institutional arrangements, technologies, data, and people that enable the sharing and effective usage of geographic information by standardizing formats and protocols for access and interoperability.^b In more concrete terms, the goals of an SDI are to: (i) reduce duplication of efforts among governments; (ii) lower costs related to geographic information, while making geographic data more accessible; (iii) increase the benefits of using available spatial data; and (iv) establish key partnerships between states, local governments, academia, and the private sector. There is ever-increasing evidence that such partnerships are the most efficient at the local level.^c

^a See INSPIRE portal on the European Union website, <https://inspire.ec.europa.eu>.

^b Tonchovska, Rumyana; Stanley, Victoria; De Martino, Samantha. 2012. *Spatial Data Infrastructure and INSPIRE. Europe and Central Asia knowledge brief*, issue no. 55. World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/17082> License: CC BY 3.0 IGO.

^c European Commission, Joint Research Centre, Institute for Environment and Sustainability, *Advanced Regional Spatial Data Infrastructures in Europe*, 2009, https://inspire.ec.europa.eu/documents/Study_and_Workshop_Reports/arsdi_report.pdf.

ESTABLISHMENT OF A DEPARTMENT OF ICT, INCLUDING A GIS UNIT

In one year, the situation in the PSK evolved from no GIS unit to a team of six qualified people placed under the new Department of Information and Communication Technologies. Prior to the project, the first objective for the PSK was to hire human resources capable of kick-starting the initiative. With the help of the WB, the PSK recruited one data management specialist as a full-time position, and one GIS consultant, who also occupies the position of a researcher at the University of Prešov. During the project, the team which was initially placed under the Department of Property Administration, was moved into a stand-alone GIS unit, and placed under the responsibility of the newly formed Department of Information and Communication Technologies. At the end of the project, the GIS division was composed of one director and system administrator, two GIS consultants, one senior GIS officer, three junior GIS officers, and one data officer.

ADOPTING OPEN SOURCE SOFTWARE

An important outcome of the project was the decision by the PSK to switch to an open source software solution for its spatial data infrastructure, preventing any vendor lock-in situation in the future. One of the findings of the initial assessment was that the PSK was already equipped with a geoportal, contracted in 2015, and running on proprietary software. The PSK seemed to not use this solution, hence it did not take advantage of a limited amount of geospatial data that was provided in that geoportal. Therefore, the WB team helped the PSK consider various options, and decide what to do with the legacy system. The PSK finally made the decision to switch to an open source software (OSS) solution, taking into account the numerous advantages it could bring for its SDI (See Box 2 below).

BOX 2 Open Source Software (OSS)

OSS is widely used in free or commercial software products and is a core element of internet infrastructures. OSS is a type of software in which a source code is released under a license that grants anyone the rights to view, change, copy, or distribute the source code to anyone else, for any purpose.

There is increasing evidence that OSS can help governments better manage information technology (IT). It helps reduce their spending on IT (reduction of license fees), by taking advantage of more competitive bidding, while avoiding vendor lock-in (no dependency on one proprietary technology). It also helps ensure interoperability, facilitates the sharing of infrastructures (open standards), fosters innovation (communities of open source developers) and security (first adopters of open source software in governments are often the ministries of defense^a).

QGIS, GeOrchestra, and Geonode are examples of open source software to manage spatial data. QGIS is a free software used to view, edit or analyze geospatial data. GeOrchestra and Geonode are used to deploy a geoportal, or even a complete SDI.

GeOrchestra was selected for this project because it has the advantage of being compliant with the INSPIRE directive and relies on a good community of developers in Europe, in particular, in France, where several regions are already running their SDI on this software, and contributing to its development.

^a See, for example, guidance from the U.S. Department of Defense <https://dodcio.defense.gov/Portals/0/Documents/OSSFAQ/2009OSS.pdf>.

DEPLOYMENT OF THE GEOPORTAL

The wB team provided technical support to the PSK in deploying the geoportal. In particular, the team helped define, install and set up the required hardware and software environment for the geoportal (See Box 3). It also worked on the customization and translation of the software front end. The use of the OSS, namely GeOrchestra, facilitated the transfer of knowledge and collaboration between the wB consultants and the PSK.² It also facilitated the relationship with other partners, such as the region of Bretagne in France, which is utilizing GeOrchestra in its SDI and contributing to its development. Lastly, the wB team supported the PSK in applying open data principles to its geoportal (See Box 4). The geoportal is now available online at <https://geo-presovregion.sk> (see Figure 2 for the visualization of the start page) in three languages, Slovak, English and French.

BOX 3 Geoportal

A geoportal is a GIS that focuses on sharing data on the web. It should not be confused with another type of GIS software that is more oriented toward the production and analysis of the data. In the case of the PSK, the need was to establish the whole spatial data infrastructure (SDI), including data collection, analysis, and the sharing of geospatial data internally, with different departments, and also with external stakeholders.

In more technical terms, a geoportal is a suite of software combining different components: a metadata catalog for the discovery, browsing and querying of metadata or spatial datasets, spatial services and other resources (for example, GeoNetwork); a spatial data service, serving geospatial data on the web from different sources (for example, GeoServer); a spatial database, to host and link different layers of spatial information (for example, PostGIS); and a web-map viewer, to visualize and interact with geospatial data online (for example, MapFishApp). Software like GeOrchestra combines all these different components into one package, making it easier to deploy and manage them all together.

The main difference between a geoportal and an open data portal is that it provides specific features to host, view, manage, and consume geospatial data. In practice, a geoportal can interact with other geoportals or open data portals. This is possible, thanks to the use of open data and GIS standards including the Data Catalog Vocabulary (DCAT) designed to facilitate interoperability between data catalogs published on the web, and the Open Geospatial Consortium (OGC), an organization promoting development and implementation of open standards for GIS software. In the case of the PSK, the aim was for the geoportal to serve as a central catalog for all data related to the region, but with a special focus on geospatial data. Lastly, a geoportal is not restricted to open data. Data can also be registered in the geoportal with access restricted to authorized people only.

BOX 4 Open data

Open data is data that anyone can reuse for any purpose. This means technically open (available online in open, machine-readable format), legally open (open license), and provided free of charge.

Open data is considered to benefit innovation, transparency, and accountability, as well as the performance of public services. One of the first beneficiaries of open data are the administrations themselves, who too often waste time and money finding and using, other public sector information that they could actually get for free. Acknowledging the benefits of a proactive disclosure of government data for the society and the economy, the European Union integrated open data principles into the Public Sector Information (PSI) Directive.^a

Geospatial data is among the most needed type of open data, as it forms the baseline for most of the data analysis. There is now hard evidence of the economic returns from releasing address register, or satellite imagery, as open data. This is the reason why, from Denmark to France, an increasing number of EU member states have opened up their high-value geospatial datasets (key registries), including base maps, cadastral data, buildings, and address register. The demand is also high for data about infrastructures (transportation, telecommunication, and water) and key facilities (health, social services, and education).

a A current revision of the PSI Directive is under way that should reinforce the provision for open data for all public sector information and may require governments to publish high-value datasets as open data by default. See <https://ec.europa.eu/digital-single-market/en/proposal-revision-public-sector-information-psi-directive>.

FIGURE 2 Homepage of the geoportal of the region of Prešov



Source: <https://geopresovregion.sk/>

DATA INVENTORY

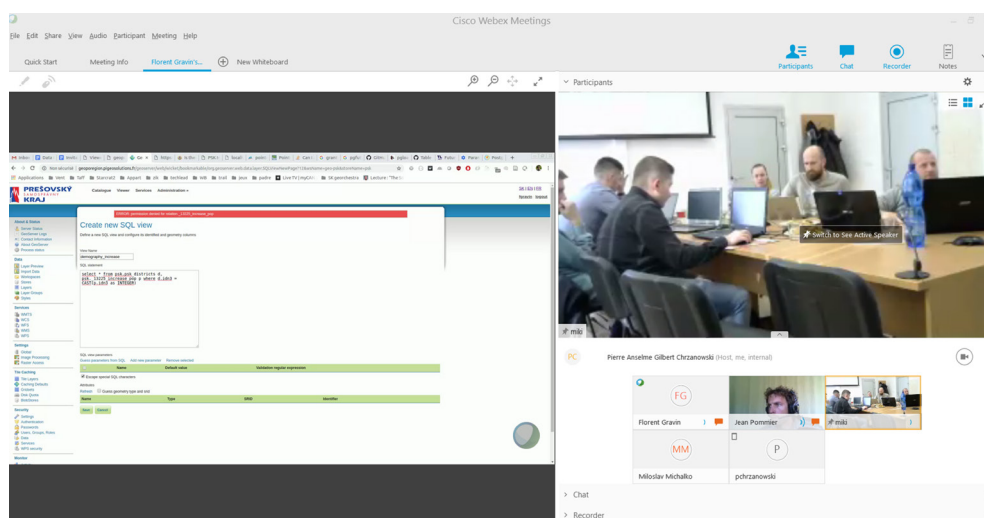
The **wb** team helped the GIS unit and other departments within the **PSK** to conduct an inventory of geospatial-related data covering the whole territory of the region. The objective was to identify, assess and categorize any geospatial data that could be useful for the development of the region and that eventually could be shared through the geoportal. The scope of the data sources was not limited, and included public and private bodies, as well as international, national, and local data producers.

At the end of the project, the data inventory contained metadata on more than 200 datasets, many of them coming from the Geodetic and Cartographic Institute Bratislava. Other data producers include the Ministry of Education, the Statistical Office, the Central Office of Labor, Social Affairs and Family, as well as the Cadastral Department within the Ministry of Interior. The data inventory also covered data producers from the private sector, academia, international and local entities, and data produced by the **PSK** itself.

DATA INTEGRATION

The **wb** team trained and supported the GIS unit to perform the data integration. Data integration is the process by which data coming from different sources and formats are integrated into a common platform so that they can be viewed and analyzed together. Through a series of training and sprints (Figure 3), the GIS unit learned how to perform data integration and also started the data integration process. This included the following tasks: (i) assess, clean and structure original data; (ii) transform and prepare data; (iii) upload data on Geoserver; (iv) publish data as a map layer; and (v) edit metadata. More than 50 datasets have been integrated and are now available on the geoportal. More should be made available soon (see Appendices 1 and 2 for the data integration roadmap). This includes a list of all the public buildings either owned, or rented, by the **PSK**, as well as most of the geo-localized statistical data from the Statistical Office of the Slovak Republic.³

FIGURE 3 WB and PSK teams collaborating online during a data integration sprint.

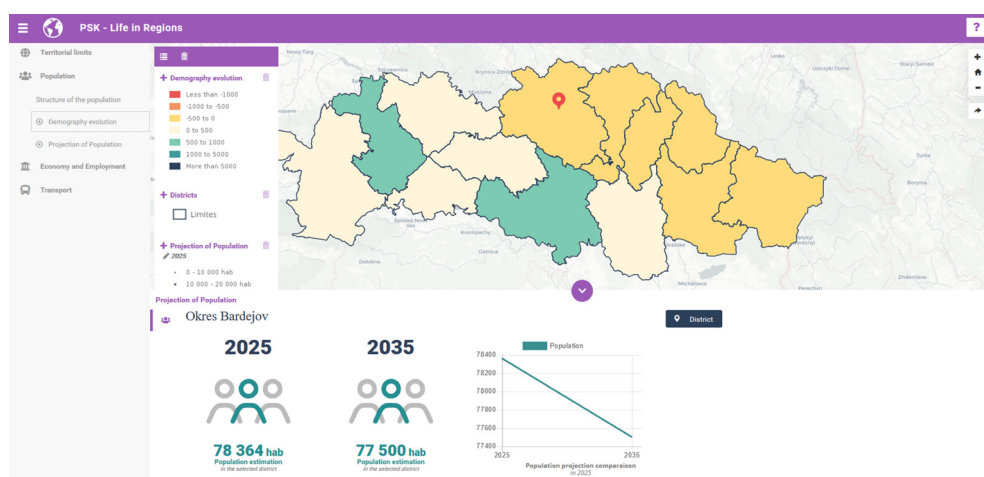


Source: World Bank

WEB MAP APPLICATION

To visualize data and facilitate their use three web map applications were developed. A web map application is an application accessible online that is based on enabling users to interact easily with the geospatial data. Figure 4 presents an example of such an app deployed by the GeoBretagne. The applications respond to needs expressed by users and at the same time promote the SDI project within the psk administration. Beyond the deployment of the geoportal, the wb team identified a need to deliver products and services tailored to the specific users, especially departments of the psk and citizens of the Prešov region. Such products help clarify for everyone what the SDI is, and what benefits it offers to the end users. The wb and psk project teams decided to develop and deliver web map applications in the following areas: district and municipal profiles, cultural heritage, and public facilities.

FIGURE 4 Web map application



Source: <https://geopresovregion.sk/mviewer/>

The GIS unit also identified and started integrating key datasets that will enable or facilitate the reuse of other geospatial data. These data products are: the address register and a related geocoder that could be used to transform any address into a GPS position, and inversely the data from the OpenStreetMap platform, used as a base layer on the geoportal that could also serve as a platform for data collection (see Box 5); and all the official geospatial layers from the ZBGIS® database from the Geodesy, Cartography and Cadastre Authority. ZBGIS® is a geospatial database that serves as official reference data for the national spatial data infrastructure. The specifications of the database, its data and metadata can be found online.⁴ It includes administrative boundaries, road networks, buildings, and other critical elements.

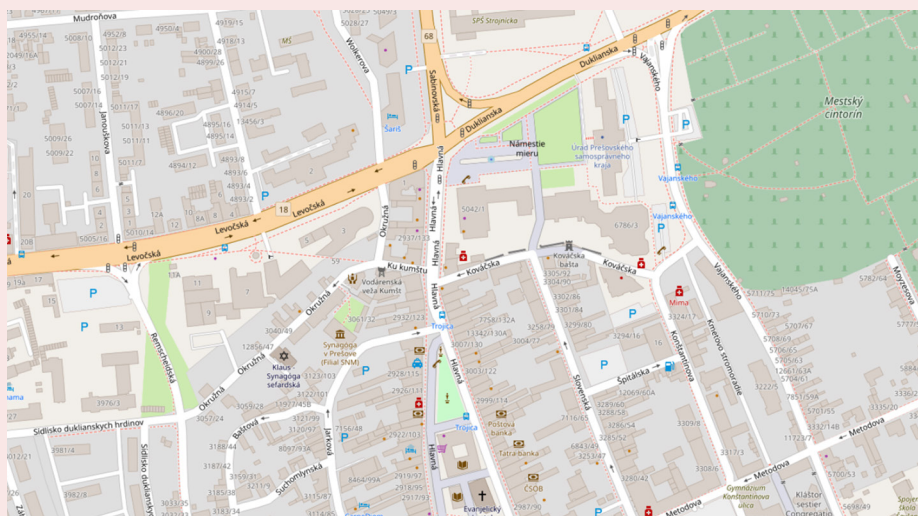
BOX 5 OpenStreetMap (OSM)

In recent years, the use of crowd-sourced geographic information in government has gained considerable attention, in particular in data-scarce countries, but also in more advanced countries, where spatial data collected by volunteer mappers is now being integrated as part of public information.^a

OSM is a collaborative project to create a free editable map of the world. OSM data is now considered of high or sufficient quality in many parts of the world, so that OSM has become a source of information for many GPS applications and public organizations, who in return, contribute or support its improvement. Data collected through OSM is made available as open data in ODbL license.^b

According to a 2017 study, all roads in the Slovak Republic were mapped on OSM.^c A rapid visual assessment of the city of Prešov also shows that a good percentage of buildings have been mapped. Because of this open access and coverage, OSM data is now being used by the PSK as one of the base maps in the geoportal.

View of Prešov city center through the OpenStreetMap



Source: <https://www.openstreetmap.org/relation/388255#map=17/48.99997/21.24079>

a See <https://povesham.wordpress.com/2018/05/28/identifying-success-factors-in-crowdsourced-geographic-information-use-in-government/>.

b The Open Database License (ODbL) is a copyleft ("share alike") license agreement intended to allow users to freely share, modify, and use a database while maintaining this same freedom for others." Excerpt from Wikipedia article. See https://en.wikipedia.org/wiki/Open_Database_License

c See <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0180698#pone.0180698.s001>.

UPTAKE AND BENEFITS FOR THE PSK

One of the most important achievements of the project was to identify and start responding to data demand from the departments of the PSK to foster the uptake of the SDI. The WB team supported the PSK in identifying its needs, in terms of data access, collection, analysis, and planning how to respond to them. The project partners decided that the project would focus on the following thematic areas in its first two years of implementation:

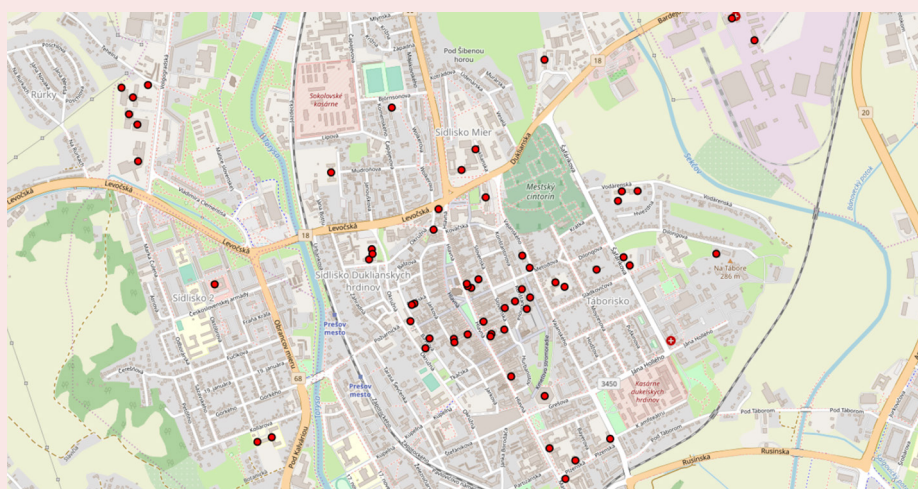
- District and municipality profiles (demographic and economic statistics at the municipal level)
- Cultural heritages (including wooden churches)
- Property management (including PSK health, education, and social services)
- Cycling infrastructure (shared, separate bike lanes and so on)
- Energy efficiency (public and private buildings)
- Socially disadvantaged communities
- Poloniny National Park
- Regional development plan (critical infrastructure)

Uptake is already effective as several departments of the PSK currently use the geoportal and collaborate with the GIS division. This includes the Department of Property Administration which has been working with the GIS team to produce a reference register of public buildings (see Box 6). This collaboration will also benefit the Departments of Education and Social Services that manage schools and social service facilities. As a next step, both departments are considering conducting spatial data analyses to support the optimization of the educational and social systems. In particular, the GIS unit is going to collaborate with the Department of Education to align the supply of vocational secondary education with the requirements of the labor market⁵, providing missing data, and necessary maps and analysis. The GIS unit has also been working with the Department of Regional Development to gather the necessary data on access to basic infrastructure, such as water, electricity, and sewage, as well as data on the populations affected by this infrastructure. This information should serve as a useful basis for preparation of an investment plan

BOX 6 Property management

The role of the Department of Property Administration in the PSK is to manage movable and immovable properties of the PSK. However, until recently, the department did not have a comprehensive register of its immovable properties (buildings and land), including their geographic coordinates. With the help of the GIS unit, the department improved and published the register of immovable properties on the geoportal, so it can now be used and viewed on a map by anyone in the PSK, or outside of it.

PSK properties as seen from the map viewer of the geoportal:



Source: <https://geopresovregion.sk/mapfishapp/>

for important infrastructure. Lastly, the Department of Regional Development also expressed interest in collecting and sharing the necessary data to support tourism activities in the Poloniny National Park. Data collection would include walking trails, protected areas, cultural heritages, as well as accommodation venues. Once collected and made available online, this data could feed popular GPS applications, as well as customized mobile applications.

ESTABLISHMENT OF KEY PARTNERSHIPS

The gradual involvement of the University of Prešov in the project has led to the signing of a collaboration agreement between the university and the PSK (see Annex 2). The agreement includes: technical assistance and the training of the PSK staff by the university; the contribution of the GIS students to the PSK projects as part of their university curriculum; and cooperation between the two entities in analysis and scientific work involving the GIS. Other collaboration agreements may follow, in particular with the City of Prešov that has been a pioneer of open data in the country.

FIGURE 5 The signing of the collaboration agreement between the University of Prešov and the PSK



Credit: Marcel Mravec for the University of Prešov

INTRODUCTION TO DESIGN THINKING

Thanks to the GIS component, the WB team was also able to assist the PSK in exploring new approaches to the design and implementation of public services. The WB team organized internal workshops between departments, as well as a study visit to the region of Bretagne, where public administration employees practice design thinking methodologies in a dedicated regional lab for public innovation (Ti Lab).⁶

Design thinking applies to methods of work that focus on users (or beneficiaries). The administration is invited to define problems, identify potential solutions, experiment, collaborate, document knowledge, and share information. This method of operation may appear to be a simple matter of common sense but is not always followed by public administrations.

In that context, it was an achievement that the PSK management acknowledged and embraced an idea that new forms of work can be introduced into business processes, that PSK staff has the capacity to adapt if they feel themselves empowered, and that the access and use of right data are central to the process.

FIGURE 6 Introduction to design thinking



Credit: World Bank

FIGURE 7 Study visit to GeoBretagne



Credit: World Bank

PROJECT ACTIVITIES AND ASSOCIATED DELIVERABLES

The wB team undertook a number of activities that generated deliverables in the following categories: technical support, capacity building and partnership building. These activities are described below.

TECHNICAL SUPPORT AND PROJECT DESIGN

- In May 2018, prior to the first mission, the wB team refined the initial scope of the support they would give to the PSK through remote exchanges, supported by a questionnaire sent to and filled in by the PSK team.
- At the end of the first on-site mission in June 2018, the wB team provided and discussed initial findings, and reviewed the scope of activities including: data inventory, deployment of the geoportal, and the training program.
- Following the first mission, an assessment report was formulated by the wB team and delivered to the PSK in September 2018. The report provides insights and discusses the readiness of the institution to run a spatial data infrastructure. The report explores the following dimensions: i) institutions and leadership, ii) laws, regulations and standards, iii) producers of geospatial data, iv) users of geospatial data, v) digital capacities, and vi) funding. It also provides a recommended action plan and delineates data activities.
- The wB team supported the PSK in establishing a new GIS team within the institution, provided sample terms of references, offered guidance on priority skills and experience needed, and accompanied the PSK in integrating the new GIS team with other IT and Information System (IS) departments.
- The wB provided technical input and guidance to help the PSK prepare for grant opportunities in data management, open data, and geospatial data. In particular, the wB team helped the PSK respond to the call for a proposal for the Operational Program Integrated Infrastructure (OPII) published by the Slovak national authorities (Deputy Prime Minister's Office, DPMO) and co-financed by the European Union.⁷

CAPACITY BUILDING

- During the June 2018 mission, the wB team organized a two-day workshop. The first day was an introduction to the concepts of spatial data infrastructure and open data (25 participants from different institutions, including the Ministry, PSK, city of Prešov, University of Prešov). The second day was dedicated to hands-on activities with the PSK departments that looked at how data can help solve priority issues (20 participants).
- The wB team supported the provision of training on a number of GIS tools and technologies, including:
 - A training course on QGIS, a free and open-source GIS application to view, edit, and analyze geospatial data.

- A series of training sessions on GeOrchestra, the underlying package of software used for the geoportal. These sessions targeted basic geoportal users (20 participants), advanced users (10), and administrators (5).
- The wB team provided capacity building support to data integration by organizing full-day sprints with the rsk team, where the participants coordinated the work through the use of online tools. A sprint can be defined as a time-boxed period of development focused on a given list of goals, where collaboration and focus are essential (one of principles of sprints is a limited access to phone and email to minimize distraction during sprint and maximize learning time). In total, four sprints were organized, and the following technical skills were addressed: (i) how to assess, clean and structure original data; (ii) transform and prepare data; (iii) upload data on Geoserver; (iv) publish data as a map layer; and (v) edit metadata.

PARTNERSHIP BUILDING AND USER ENGAGEMENT

- The wB team initially supported a series of meetings with the rsk departments in order to foster internal demand for geospatial data and collaboration with the GIS team.
- The wB team also conducted a series of meetings to build awareness of and support for the SDI among the different groups of data suppliers and users in the country, at the municipal, regional and national level. The list of stakeholders includes: the city of Prešov, the University of Prešov, the Minister's Office for Investments and Informatization of the Slovak Republic, in charge of the national open data initiative, the Ministry of Environment, in charge of the INSPIRE Directive, Geodesy, Cartography and Cadastre Authority (See Box 7), as well as open data and OpenStreetMap advocates and professionals.

BOX 7 Open data and SDI in the Slovak Republic

The government of the Slovak Republic is implementing open data and SDI initiatives at the national level that will provide a set of data, standards, and tools for online ministries, agencies, and local governments to use, and with which they must comply.

Regarding the Open Data Initiative of the Slovak Republic, a first catalog was launched in May 2012, but without either a clear open data policy, or well-defined processes, in place.^a On June 1st, 2016, a new Deputy Prime Minister's Office for Investments and Informatization was set up, with open data as one of its priorities.^b Subsequently, the National Agency for Network and Electronic Services (NASES) successfully launched the national open data portal (<https://data.gov.sk>). The portal was created within the project: "Electronic Services of the Government Office of the Slovak Government—eDemocracy and Open Government", and was financed by the European Union.

The Ministry of Environment is responsible for the implementation of the INSPIRE Directive. The inter-governmental coordination of the directive is ensured by the Coordination Committee of the National Spatial Data Infrastructure and the Expert Group of the NSDI. A 2016 assessment of the implementation of the directive notes that many datasets are already available online in digital formats, in particular, through the National Geoportal^c and the geology portal.^d However, the report also indicates that the country is facing significant challenges in harmonizing the data sharing arrangements. The main issues are: the heterogeneous interpretation of INSPIRE and its related legal framework, resistance to harmonizing and simplifying data sharing, the absence of harmonized data sharing licenses and agreements, and the lack of availability of public spatial resources in the public domain.

^a See https://successfultsocieties.princeton.edu/sites/successfultsocieties/files/JS_OGP_Slovakia_FORMATTED_012Oct2015.pdf.

^b See <https://www.vicepremier.gov.sk/index.php/informatizacia/index.html>

^c See <http://geoportal.gov.sk/>.

^d See <http://geology.sk>

- In collaboration with the GeoBretagne, and with support from the European Commission TAIEX program⁸, the wB team organized a study visit to the SDI for the region of Bretagne in France. The primary aim of this study visit was for the PSK to learn from the GeoBretagne experience in establishing and coordinating a regional SDI, in the context of the European Union framework on spatial data and access to public sector information.
- The wB team supported the signing of a partnership agreement between the PSK and the University of Prešov (effectively signed January 22, 2019), and the preparation of a multilateral agreement or charter that may include other stakeholders, such as the city of Prešov.
- The wB contributed to consultation with the Office of *Plenipotentiary for the Roma Communities* and other relevant stakeholders about the possibility of leveraging and integrating data from the Atlas of the Roma Communities into the spatial data infrastructure.

The background of the entire page is a repeating pattern of small, light yellow triangles pointing in various directions, creating a textured, geometric effect.

MAIN IMPLEMENTATION CHALLENGES AND MITIGATION MEASURES

SKILLS AND CAPACITIES

Over a one-year time period, the PSK team followed most of the steps required to establish SDI. While this situation enabled the PSK to gain the capacity and autonomy, several challenges remain. The main one is the capacity for the team to go beyond the technical infrastructure (geoportal) and drive the project from a successful product into sustainable and performing SDI with people effectively sharing and using data. This would include: the setup of a clear vision and procedures, secure GIS staff positions and partnerships, sustainable funding, and positive outcomes in terms of data reuse. A related issue is the shortage of GIS specialists in the region, and the low salary offered by public institutions. Some measures have been tested and implemented to mitigate this situation. First, while the region might be short on GIS and data experts, the country is not. The self-governing region should therefore stress the special attractiveness of the project for developers, who have a desire to contribute to the general interest. Secondly, the University of Prešov played a critical role in the project by bringing in talented people. In this regard, the partnership between the two institutions should be reinforced. Thirdly, young people in the PSK showed a willingness to learn. The institution should invest more in them, for instance, by offering training and opportunities for collaboration with other partners. Lastly, the decision to adopt open source solutions helped the PSK and the WB team to attract freelance consultants, firms, but also technical partners, such as GeoBretagne, that are more accustomed to collaborating and contributing to these software.

LEADERSHIP AND PROJECT MANAGEMENT

Difficulties in appointing a dedicated project manager penalized the operationalization of the project. Managing a spatial data infrastructure cannot be a part-time job. Like every other mission, it requires leadership and management capacities, the ability to deal with anything that needs to be addressed directly. While the situation of the GIS unit has greatly improved during the project, especially in terms of technical capacity and the number of staff, the PSK continues to face difficulties in appointing a dedicated project manager with the appropriate experience, time availability, and willingness to oversee day-to-day tasks. The WB team discussed options with the PSK: to consider the appointment of internal staff, or recruitment of an external consultant, or reinforcement of collaboration with the university and other partners. In the meantime, the team offered guidance, technical support, and methodologies and tools on how to manage the project. During the final stage of the project, the PSK appointed a full-time head of the GIS unit and there is now more clarity on who is responsible and accountable for the GIS work. Currently, it is essential for this situation to stabilize, and after some time it could be beneficial to assess the performance of the unit to help improve its performance. The WB team also identified a broader issue at the PSK related to general data management. Despite establishing the Department of ICT a proper project manager responsible for this area is still missing. It is not fully clear who is responsible for this function at the PSK, moreover, the PSK is lacking a comprehensive view of its different information systems, their functions, and the data processed. Improvement in this field is necessary to ensure sustainability of the GIS solution, enhance its scope and leverage potential benefits for the PSK and its citizens.

INVESTMENT PLAN AND DEDICATED FUNDING

The current Operational Program Integrated Infrastructure (OPII),⁹ co-financed by the European Structural and Investment Funds (ESIF), appears to be the most appropriate instrument to support GIS and open data projects. However, several issues were raised during the preparation of the application to the OPII call for proposal dedicated to data management: (i) as there is a lack of capacity at the regional level in data management, difficulties arise in understanding and preparing projects in relation to the current national eGovernment framework; (ii) in addition, there is a lack of capacity in planning investments related to data infrastructures, and doing the appropriate costing; and (iii) lastly, the uptake of IT systems deployed in the past has been weak.¹⁰ That was partially due to the fact that those applications were mainly deployed, maintained, and administered by private companies only, without dedicated product owners in charge of the applications on the PSK side. There is a need for the PSK to reinforce its capacities in managing and investing in digital projects. In that regard, the establishment of a Department of ICT, including a GIS unit, was an important first step. The adoption of a digital strategy with a clear roadmap and a related budget plan should come next. There is also a need for stronger collaboration between the national and local levels in the sector of digital government. Lastly, national and European investment programs should consider more closely the risk of vendor lock-in situations and should dedicate more funding to empower institutions to manage their own data infrastructures, including compliance and interoperability with the EU and national frameworks.

BARRIERS TO OPEN DATA

One of the main challenges has been to unlock access to the most high-value data. SDI and open data projects tend to focus too much on the data they can easily get, rather than high-value data people want or need. As a result, platforms often end up with many data layers with little reuse, and, in the end, a subsequent loss of interest in, and funding for, the project. The team should continue, therefore, to focus on acquiring and unlocking the most important datasets. The key technical, legal and cost barriers to the collection and publication of the data, need to be identified, and then the right strategy needs to be adopted to address them. The WB team supported the organization of several meetings with the data publisher at the national level, but some barriers remain—in particular, for the PSK to be able to share the data with other institutions or with the public. One specific example was the difficulty to get access to national-level building and cadastral data as open data, despite the fact, that this layer of data is a fundamental piece of information for all stakeholders engaged in the development of the region. During the future attempts to obtain access to such registries, the Deputy Prime Minister's Office for Investments and Informatization (responsible for the open data initiative) and the Ministry of Environment (which leads the implementation of the INSPIRE Directive) could provide support. The PSK should also seek support and collaboration with data users advocating for better access to data.

HOSTING SOLUTION

The question regarding where to host the new PSK's geoportal in the long term is still open. Various solutions were considered, including internal hosting on PSK servers, hosting on university servers, deployment to the cloud of the Slovak government, and a private hosting solution (private cloud). Local solutions were quickly dismissed, due to the lack of necessary IT infrastructure (server, CPU, and bandwidth), but also due to the unavailability, at this stage of the project, of a system administrator on the GIS team. At point of time, the cloud of the Slovak government was considered as the most feasible solution, and several meetings were held with the Ministry of Interior, the Ministry of the Environment, and the Deputy Prime Minister's Office for Investments and Informatization to operationalize this plan. However, it appeared that none of the cloud services

provided by the government were an exact match with the infrastructure needs of the geoportal, making any effort to migrate to the governmental cloud uncertain and time-consuming. For the time being, it was decided that the service will be launched on a private cloud financed by the PSK. This temporary solution should allow the PSK to either make a case for the government to adapt its cloud to the needs of the geoportal, or to get the necessary funding to migrate to its own infrastructure. The issue of the system administrator should also be addressed in the near future as the infrastructure needs to be managed by an individual contracted by the PSK.



LOOKING FORWARD

This one-year project helped to build the foundation of the regional SDI for the PSK. Nonetheless, much more remains to be done in order for the initiative to become a catalyst for the development of the region. The way forward is relatively clear and includes:

Strengthening the GIS unit

- Setting up a long-term vision, roadmap, and performance indicators for the GIS unit
- Capacity building in project management and investment planning for both the ICT department and the GIS unit.

Geoportal and data integration activity

- Continuous support to data integration and geoportal infrastructure management
- Development of web-based applications and services focusing on the PSK investment priorities
- Deployment of a geocoder at the regional level
- Support for the data collection activity using the OpenStreetMap platform
- Development of specific PSK-tailored participatory GIS tools
- Stronger integration with national open data and SDI initiatives.

Data demand and user engagement

- Reinforce partnerships under the SDI, through collaboration agreements with regional and national partners, “market” the PSK’s solutions to potential data contributors and users
- Organize dedicated GIS and mapathon events in the region
- Open source and open data communities: contribute to and communicate with user and developer communities to promote the platform, identify needs, and target value-added use cases.

Prešov Lab

- Establish a lab to support the design and incubation of data driven public services in collaboration with external partners.

ANNEX 1

GEODATA INTEGRATION ROADMAP

Category	#	Name of dataset		Publishing progress
Base infrastructure	1	Hranica kraja	County boundary	100%
	2	Hranica obce	Municipal boundary	100%
	3	Hranica okresu	District boundary	100%
	4	Základna infraštruktúra - cesty	Base infrastructure - roads	
	5	Základna infraštruktúra - železničné trate	Base infrastructure - railway lines	
	6	Základna infraštruktúra - vodovod	Base infrastructure - water supply	
	7	Základna infraštruktúra - kanalizácia	Base infrastructure - sewage	
	8	Základna infraštruktúra - elektrické siete	Base infrastructure - electrical networks	
	9	Základna infraštruktúra - plynovod	Base infrastructure - gas pipelines	
	10	Stavebné akcie na cestách kraja 2018	Construction work on roads 2018	100%
	11	Stavebné akcie na cestách kraja 2019	Construction work on roads 2019	
	12	Zastávky - autobusové	Bus stops	
	13	Zastávky - železničné	Railway stops	
	14	Zariadenia PSK	PSK facilities	60%
	15	Budovy PSK	PSK buildings	0%
	16	Energetická efektívnosť budov PSK	Energy efficiency of PSK buildings	0%
Culture and Tourism	17	Kultúrne inštitúcie	Cultural institutions	50%
	18	Bezbariérové kultúrne inštitúcie	Non-barrier cultural institutions	100%
	19	Cyklokostra PSK	Cycle paths	70%
	20	Drevené kostolíky	Wooden churches	80%
	21	Pútnické miesta	Pilgrimage sites	50%
	22	UNESCO	UNESCO	50%
	23	POI cestovný ruch	POI tourism	
	24	Kultúrne dedičstvo	Cultural heritage	0%
	25	Návštevnosť kultúrnych cieľov	Attendance at cultural locations	0%
	26	Turistické informačné centrá	Tourist information centers	90%
	27	Oblasťné organizácií cestovného ruchu	Regional tourism organizations	0%
	28	Miestne akčné skupiny	Local action groups	0%
	29	Najmenej rozvinuté okresy	Underdeveloped districts	

Registers & original competence	30	Register neziskových organizácií	Register of non-profit organizations	0%
	31	Register právnických osôb	Register of legal entities	0%
	32	Poskytovatelia sociálnych služieb	Social service providers	0%
	33	Poskytovatelia zdravotníckej starostlivosti	Health care providers	0%
	34	Kontaktné body ambulantnej pohotovostnej služby v Prešovskom kraji	Contact points for emergency service in the Prešov Region	100%
	35	Lekárne a výdajne zdravotníckych pomôcok	Pharmacies and dispensers of medical devices	0%
	36	Liečivé minerálne pramene	Healing mineral springs	0%
	37	Školské zariadenia	School facilities	0%
	38	Stredoškolské Internáty	Secondary school dormitories	100%
	39	Športoviská v kraji	Playgrounds in the county	0%
Environment	40	Kvalita ovzdušia	Air quality	0%
	41	Skládky odpadov	Waste landfills	0%
	42	Priemyselné parky	Industrial parks	0%
Uncategorized	43	Projekty PSK	PSK projects	0%
	44	Atlas rómskych komunít 2	Atlas of Roma Communities 2	0%
	45	Územnoplánovacia dokumentácia	Land-use planning documentation	0%
	46	Strategické dokumenty miest a obcí	Strategic documents of towns and villages	0%
	47	Časová dostupnosť mesta Prešov	Time accessibility to the city of Prešov	100%

ANNEX 2

STATISTICAL DATA INTEGRATION ROADMAP

OBSAH

	Thematic area	Dataset	Layer/indicator
1.3 Statistical data	1.3.2 Demographic profile	1.3.2.1 Number / population density	5
		1.3.2.2 Population change	11
		1.3.2.3 Age structure of population	9
		1.3.2.4 National structure of population	18
		1.3.2.5 Socially excluded communities / poverty	Under preparation
	1.3.3 Employment and labor market	1.3.3.1 Economic activity of population	3
		1.3.3.2 Employees	3
		1.3.3.3. Employees by economic activity	21
		1.3.3.4 Trader by economic activities	21
		1.3.3.5 Basic job vacancy indicators	3
		1.3.3.6 Structure of VPM according to the required profession SK ISCO-08	11
		1.3.3.7 Structure of VPM according to the required education SK ISCO-08	15
		1.3.3.8 Basic indicators of unemployment in Slovakia	6
		1.3.3.9 Basic indicators of unemployment in the SR - women	6
		1.3.3.10 Basic indicators of registered jobseekers	7
		1.3.3.11 Structure of jobseekers according to their profession (SK ISCO-08) immediately before being included in the register in Slovakia	12
		1.3.3.12 Structure of jobseekers by industry of the last employer	24
		1.3.3.13 Structure of jobseekers according to the highest achieved education in Slovakia	15
		1.3.3.14 Structure of jobseekers by age in SR	3
		1.3.3.15 Structure of UZZ - women by age in SR	3
		1.3.3.16 Structure of Disadvantaged Jobseekers in SR	9
		1.3.3.17 Structure of Disadvantaged Job Seekers in Slovakia - Women	9
		1.3.3.18 Structure of jobseekers by duration of unemployment in Slovakia	3
		1.3.3.19 Structure of jobseekers by marital status in SR	8
		1.3.3.20 Structure of jobseekers by marital status in the SR - women	8

1.3 Statistical data	1.3.4	Performance	1.3.4.1	Organizational statistics	4
			1.3.4.2	Companies by type of ownership	4
			1.3.4.3	Companies by number of employees	4
			1.3.4.4	Companies by economic activity	21
			1.3.4.5	Industrial parks	1
			1.3.4.6	Brownfield land	1
			1.3.4.7	Foreign direct investment	5
			1.3.4.8	Average monthly wages	8
	1.3.5	Infrastructure and equipment			Under preparation
	1.3.6	Environment	1.3.6.1	Emissions of basic pollutants	4
	1.3.7	Agriculture	1.3.7.1	Area, land use	13
			1.3.7.2	Livestock farming intensity	6
			1.3.7.3	Crops of selected agricultural crops	6

ANNEX 3

ANNOUNCEMENT OF COOPERATION AGREEMENT BETWEEN PSK AND THE UNIVERSITY OF PREŠOV

Kraj a univerzita pracujú na príprave kvalitného geoportálu

(Prešov, 22. január 2019). Prešovský samosprávny kraj (PSK) spoločne s Prešovskou univerzitou v Prešove (PU) rozšírili oblasť spolupráce, ktorá sa týka regionálnej infraštruktúry priestorových informácií a geografických informačných systémov (GIS). Z jej výsledkov bude profitovať občan, samospráva, akademický aj súkromný sektor.

Prešovský samosprávny kraj intenzívne pracuje na budovaní komplexnej databázy kvalitných, aktuálnych a otvorených údajov (Open Data). Tá bude slúžiť na spoznávanie regiónu, efektívnu výmenu údajov medzi inštitúciami a jednoduché sprostredkovanie dôležitých tém verejnosti. Pri tvorbe kvalitného geoportálu sa kraj rozhodol využiť kvalifikovanú pomoc odborníkov z Katedry geografie a aplikovanej geoinformatiky Fakulty humanitných a prírodných vied PU.

„Túto spoluprácu považujem za učebnicový príklad naplňania poslania našej fakulty v oblasti transferu poznatkov do praxe. Uplatňuje sa v nej odborná erudícia našich pracovníkov a využíva sa naša špičková výskumná infraštruktúra. Najviac ma však teší, že sa vytvára priestor pre zapojenie študentov geografie a aplikovanej geoinformatiky, ktorí takto získajú neoceniteľné skúsenosti, a tí najschopnejší aj pracovné uplatnenie“ uviedol René Matlovič, dekan FHPV. V rámci doterajších praktických výstupov vzájomnej spolupráce sa podarilo expertom z Katedry geografie a aplikovanej geoinformatiky pripraviť interaktívnu mapu bezbariérových prístupov do kultúrnych inštitúcií v Prešovskom kraji, ale taktiež ambulantných pohotovostných služieb, či interaktívnu mapu plánu rekonštrukcie ciest v PSK (užívateľ sa napr. dozvie, kedy bude uzávierka danej komunikácie, ako dlho bude prebiehať rekonštrukcia a pod.). „Sme prvým krajom na Slovensku, ktorý má ambíciu pomocou Open Source platformy údaje zdieľať, vizualizovať a sprístupňovať online prostredníctvom webových služieb,“ zdôraznil Jozef Cvoliga, riaditeľ Úradu PSK.

Kooperáciu medzi PSK a PU v danej oblasti dnes aj oficiálne spečatili rektor PU Peter Kónya a predseda PSK Milan Majerský podpisom zmluvy o vzájomnej spolupráci týkajúcej sa Regionálnej infraštruktúry priestorových informácií. „Prešovský samosprávny kraj vníma dnešný deň ako prelomový okamih, keďže vybudovanie regionálnej infraštruktúry priestorových informácií (rSDI) pre náš kraj považujeme za dôležitý krok smerom k širokej verejnosti a k zvýšeniu transparentnosti regionálnej samosprávy,“ vyzdvihol pri podpise Milan Majerský. „Už dlhšie obdobie intenzívne spolupracujeme s PSK vo viacerých oblastiach, preto sa teším, že naša vzájomná kooperácia sa opäť rozrastá. Bude prospešná jednak pre kraj, ako aj našu univerzitu,“ doplnil rektor Peter Kónya.

Zmluva zahŕňa spoluprácu v nasledujúcich oblastiach: metodická pomoc pri vytváraní regionálnej infraštruktúry priestorových informácií (rSDI) Prešovského kraja; poskytnutie technických a personálnych kapacít pre testovanie a nasadenie Open Source infraštruktúry geografických informačných systémov (GIS); zapojenie študentov univerzity do procesu testovania rSDI, vytvárania geodát či kreovania seminárnych a záverečných prác v súčinnosti s potrebami kraja; poskytnutie možnosti preškoľovania v oblasti Open Source GIS technológií, a to najmä softvéru QGIS pracovníkmi Katedry geografie a aplikovanej geoinformatiky; pomoc FHPV pri tvorbe analytických a strategických dokumentov PSK s presahom na priestorovo orientované dáta; spolupráca pri riešení vedecko-výskumných programov a grantov, vrátane spolupráce so spoluriešiteľskými organizáciami doma aj v zahraničí; spolupráca pri aplikácii poznatkov v spoločenskej praxi či umožnenie odbornej praxe a výučbových aktivít.

“Dôkazom úspešnej spolupráce zainteresovaných subjektov je aj spoločná organizácia školenia s názvom “geOrchestra a infraštruktúra priestorových informácií”, ktoré bude prebiehať od 22.1. do 25.1.2019 a bude vedené expertmi Svetovej banky v priestoroch moderného Open Source GIS laboratória Katedry geografie a aplikovanej geoinformatiky FHPV PU,” poznamenal Miloslav Michalko, odborový referent z FHPV, ktorý je zároveň aj GIS konzultantom PSK. Účastníci školenia budú mať príležitosť oboznámiť sa s prvou verziou regionálneho geoportálu a dozvedieť sa ako sa zdieľajú, sprístupňujú a opätovne využívajú geopriestorové údaje prostredníctvom implementácie tejto regionálnej infraštruktúry priestorových informácií. geOrchestra obsahuje geografický katalóg údajov ako aj možnosti vizualizovať a zdieľať dáta a mapy online prostredníctvom webových služieb. Uvedené oblasti spolupráce by mali pomôcť obom stranám naplniť víziu budovania spoločnej platformy priestorových informácií. Vzájomná spolupráca bude viesť k prepojeniu praxe a skúseností s riadením regiónu so znalosťami v aplikačnom využití Open Source GIS technológií ako aj k zapojeniu expertov i študentov Prešovskej univerzity do týchto procesov.

Source: <https://www.unipo.sk/jp/aktuality/31599/>

GEOPORTAL ARCHITECTURE

FIGURE 8 GeOrchestra Geopresov Region data sources and their flow



ANNEX 5

LIST OF DATASETS MADE AVAILABLE BY PSK

Below is a preliminary list of datasets published by the PSK on the geoportal, as of May 9, 2019

- Time accessibility to the city of Prešov
- Jobseekers
- Unemployment rate 2013 - 2018
- Public buildings
- Projection of population at the district level for the years 2025 and 2035
- Emergency service facilities
- Population growth at the district level for the years 1996 to 2017
- Disability access map
- Dormitory buildings
- Economically active population
- OpenStreetMap buildings
- Regional-level administrative boundaries
- District-level administrative boundaries
- Municipal-level administrative boundaries
- Buildings of the PSK (layer invalidation process)

NOTES

1. In July 1996, the country was subdivided into eight regions, or kraje, which then became self-governing regions in 2001.
2. The WB and PSK teams used the GitLab tool to collaborate on the code of the geoportal.
3. DataCube is a service provided by the Statistical Office of the Slovak Republic offering indicators of economic and socio-economic development free of charge and in an open license (CC-BY). It provides up-to-date population statistics, with the municipality as the most disaggregated level. See <http://datacube.statistics.sk/#!/lang/en>.
4. See http://www.skgeodesy.sk/files/slovensky/ugkk/geodezia-kartografia/zbgis/kto_zbgis_2013_4.pdf.
5. The support to the vocational education school was also part of the Catching-up Regions Initiative.
6. See https://www.bretagne.bzh/jcms/prod_410212/fr/ti-lab-laboratoire-regional-d-innovation-publique.
7. <https://www.opii.gov.sk/information/informatisation>
8. TAIEX is the Technical Assistance and Information Exchange instrument of the European Commission.
9. See <https://www.opii.gov.sk/calls-for-proposals>.
10. The deployment of most of the IT systems and applications in the PSK have been financed by the Operational Program Information Society (OPIS), an ESIF co-financed program that ran from 2017 to 2013, and which supported the establishment of most of the key applications and systems of the current national eGovernment framework. For more info on OPIS, see <https://www.opis.gov.sk/documents-opis/>