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FUNDA

FUNCTIONAL DANUBE AREAS - Enhancing Institutional Capacities for Managing Functional Urban Areas in the Danube Region

DRP0300984

Template

Template elaborated by RDA SW Oltenia project team:

S. Cosmulescu - Project Manager
R. Petrescu - Communication Manager
R. Anghel - Expert
L. Oproiu - Financial Manager

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Table of Contents

1. Introduction

1.1. FUNDA Project

The FUNDA project (identification No. DRP0300984) is under implementation within the Interreg Danube Region Programme (DRP) - a transnational funding programme, co-funded by the European Union (https://interreg-danube.eu/), under the Programme priority “A better cooperation governance in the Danube Region” and Specific objective “4.2: Increased institutional capacities for territorial and macro-regional governance”.

The following eleven partners are involved in its implementation:

1. Lechner Non-profit Ltd. - Hungary
2. West Pannon Regional and Economic Development Public Nonprofit Ltd. - Hungary
3. Sarajevo Economic Region Development Agency - Bosnia and Herzegovina
4. Regional Development Agency for Podravje - Maribor - Slovenia
5. Urban Planning Institute of the Republic of Slovenia - Slovenia
6. Regional Development Agency South-West Oltenia - Romania
7. Regional Development Agency of Pilsen Region - Czechia
8. LOCAL ASSOCIATION OF LOCAL AUTHORITIES «PRIKARPATTIA AMALGAMATED TERRITORIAL COMMUNITIES DEVELOPMENT AGENCY» - Ukraine
9. CESCI Balkans Novi Sad - Serbia
10. City Hall of Chisinau Municipality - Moldova
11. Know-How Prešov - Slovakia

The **main objective** of **FUNDA** project is to support joint planning of Functional Urban Areas' municipalities in the Danube Region through international joint thinking, learning, and extending mutual practices, and development of a strategy and multilevel governance methodology based on the experience of a large-scale, jointly prepared pilot case study. The strategy supports not only the project participants but also all interested urban areas and decision-makers in the region as members of FUA-NET.

The project duration: 01/04/2025 – 30/09/2027

Total project budget: 2,540,082 EUR

2. Functional Urban Areas Baseline Study - General information

2.1 Purpose of the Baseline Study

The Functional Urban Areas Baseline Study aims to provide a structured overview of existing national-level information related to Functional Urban Areas (FUAs). Its purpose is to gather and synthesize experiences regarding legislative frameworks, guidelines, and methodologies governing FUAs in the following partner countries:

1. Budapest region - Hungary
2. Mosonmagyaróvár - Hungary
3. Sarajevo Region - Bosnia and Herzegovina
4. Maribor - Podravje Region - Slovenia
5. Ljubljana Urban Region - Slovenia
6. South-West Oltenia Region - Romania
7. Pilsen Region - Czechia
8. PRIKARPATIA - Ivano-Frankivska Oblast - Ukraine
9. Novi Sad - Vojvodina Region - Serbia
10. Chisinau Municipality - Moldova
11. Prešov Region - Slovakia

Based on the information collected, the Functional Urban Areas Baseline Study will be developed. Using the same approach by all FUNDA project partners, it will facilitate the integration of the findings from the partner countries in a consolidated version of the Functional Urban Areas Baseline Study having an overall image on the status of legal requirements, available planning methods and existing strategies on FUAs in the involved countries.

Methodology:

Each partner made desk-based research, and conducted interviews and administered questionnaires in their countries with organisations and authorities in the FUA related sector, to collect data and information on national legal requirements, available planning methods, and existing strategies on FUAs in Danube Region countries. Where relevant, the findings and outcomes of these conversations and collected data will be reported in the appropriate sections.

2.2 Object of Investigation

2.2.1 Main Objective

To identify the development process of the Functional Urban Areas in the partner countries, based on data and information collected on the national legal requirements, available planning methods and existing strategies on FUAs in the partner countries.

2.2.2. Specific Objectives

The situations of the Functional Urban Areas in the partner countries, in terms of legal requirements, available planning methods and existing strategies on FUAs.

2.2.3. Functional Urban Areas status quo in each country

Analysis at national level in the Functional Urban Areas-related fields/sectors in the partner countries.

2.2.4. Capacity & Capability of the Functional Urban Areas

To further develop and grow.

3. Functional Urban Areas Baseline Study - the Framework

Budapest & Mosonmagyaróvár
HUNGARY


3.1 Database of HUNGARY

3.1.1 General geographical information (country geographical location, population, administrative organization: counties/towns/villages, centralized or decentralized governance)

Hungary is a landlocked country situated in **Central Europe**, bordered by Slovakia to the north, Ukraine to the northeast, Romania to the east and south, Serbia to the south, Croatia to the southwest, **Slovenia** to the west, and Austria to the northwest.

Hungary is part of the **Danube region**. The **Danube** – Europe's second-longest river – flows through the central part of Hungary, passing through several major cities, including Budapest. Hungary is a key member of the EU Danube Strategy, which aims to promote economic, environmental, and social development in the region through cooperation among the countries along the Danube.

Covering an area of approximately **93,030 square kilometres**, Hungary is characterized by its flat plains, particularly the Great Hungarian Plain in the east, and the hilly regions in the west and north. Hungary's resident population is estimated at **9,539,502 people (**1 January 2025**)**, making it the 97th most populous country globally. The population density stands at 103 individuals per square kilometre, with about **70% residing in urban areas**, including the capital city, **Budapest, towns with county's rights and towns**. The average age is approximately 43.4 years, indicating an **aging population**, and the fertility rate is around 1.4 children per woman, below the replacement level.

Administratively, Hungary is divided into **19 counties** (vármegyék) and the capital city, Budapest, which holds a special status and is not part of any county. **Budapest** is further subdivided into **23 districts** (kerületek). The counties are the primary administrative units, each governed by a county assembly and a county government. Hungary has **3,155 municipalities** (települések); **Budapest** as capital, **25 towns with county rights** (megyei jogú városok), **323 towns** (városok), and **2,807 villages** (községek).

Hungary operates under a **centralized governance system**, with significant authority vested in the national government. While local governments have certain responsibilities, such as education, healthcare, and local infrastructure, the central government retains substantial control over fiscal policies and major administrative decisions. This centralized structure has been a subject of political discourse, with ongoing debates about decentralization and the balance of power between national and local authorities.

In the framework of the FUNDA project, the pilot area for West Transdanubia will be the city of Mosonmagyaróvár and its surrounding catchment area. Administratively, this area largely corresponds to the District of Mosonmagyaróvár (former LAU 1 / NUTS 4 level), with one additional settlement included from the neighbouring region, based on commuting patterns and historical links. The area also has its own Intermunicipal Association, primarily established to provide social care services, which will serve as the basis for implementing the pilot action. The area will be referred as Mosonmagyaróvár Region in the course of the project activities. As of 2023, it covers 930.6 km² and has a total population of 83,360 across 27 settlements.

3.1.2 Legal Framework for the Application of FUAs in Hungary

In Hungary, the concept of FUA does not appear directly in legislation, buti t is linked to several spatial planning doecuments and statutory provisions. Act CLXXXIX of 2011 on Local Governments and Act CII of 2023 on Spatial Development establish the legal framework for regional cooperation. On the basis of these laqs, county governments and special regional development councils may operatea s carriers of urban-area development.

The strategic baseline document for spatial development in Hungary is the National Development and Spatial Development Concept (OFTK), which defines long-term development objectives and directions until 2030. The National Development and Spatial Development Concept places particular emphasis on the role of large cities and their catchment areas (i.e. FUAs) in shaping a polycentric spatial structure, strengthening economic competitiveness, and promoting social cohesion. Thus, the FUA level is

incorporated into domestic development policy thinking not only as a statistical but also as a strategic planning unit.
In Hungary, FUAs are reflected in the National Development and Spatial Development Concept, in county-level spatial development concepts and programs, as well as in Sustainable Urban Development Strategies (SUDS). EU funds – within the framework of TOP Plusz – also finance programs at the urban-area level. This means that cities designated for the sustainable urban development instrument have the opportunity to use dedicated resources in an urban-area framework, which makes them available not only within the city but throughout the entire FUA, in cooperation with surrounding municipalites.
Overall, the establishment and functioning of Hungarian FUAs are closely linked to EU cohesion policy: the expectations and resource allocation logic of the EU support urban-area thinking and development programming, making it an important element of Hungarian development policy.

3.1.3 **Guidelines** for the Application of FUAs in Hungary

The concept of a Functional Urban Area (FUA) in Hungary originates from EU and international statistical and development policy frameworks, and it has primarly been embedded in domestic planning in connection with EU cohesion policy. Therefore, the management of FUAs is not an independent Hungarian legal invention but the result of multiple levels of international and domestic documents, with significant and long-standing precedents in Hungary.
The basic definition of FUAs was established in the early 2010s through a joint methodology by the OECD and Eurostat, although earlier studies on delineating urban areas had already taken place in Hungary. According to this methodology, an urban area consists of two main elements:

- the urban core (a settlement with at least 50,000 inhabitants),
- and the commuting zone, defined by daily commuting patterns.

The European Commission adopted the FUA concept within the urban development objective of cohesion policy, but its focus is fundamentally on urban development and sustainable urban development. In the 2021–2027 programming period, it is mandatory for Member States to allocate at least 8% of ERDF resources to sustainable urban development. While planning and using these resources at the urban-area level is not prohibited, it is also not compulsory. In Hungary, the county- and capital-level Integrated Territorial Programs (ITPs) and the Sustainable Urban Development Strategies (SUDSs) prepared for individual cities under these programs are based precisely on this EU guidance.
The legal and strategic foundation for applying FUAs in Hungary is provided by the Spatial Development Act (Act CII of 2023) and the National Development and Spatial Development Concept. Although the law does not use the term FUA, it allows for regional cooperation that aligns with an urban-area logic.
The strategic document defining domestic guidelines for FUAs is the National Development and Spatial Development Concept (OFTK), which aims to strengthen a polycentric urban network and achieve a more balanced urban–rural relationship, emphasizing the importance and principles of a functional urban area approach.

Regarding the use of EU funds in Hungary, guidelines related to FUAs are embodied in the Territorial and Settlement Development Operational Program Plus (TOP Plusz) and the related territorial plans (county-level and capital-level ITPs based on county development concepts and programs). TOP Plusz allows county governments that design and implement ITPs, as well as the cities involved, to apply the sustainable urban development instrument at the urban-area level. This means that cities and surrounding municipalities jointly prepare the Sustainable Urban Development Strategy and use the urban development funds at the FUA level. In two counties, three cities have taken advantage of this opportunity.
The central oversight is provided by the TOP Plus Managing Authority operating within the Ministry of Public Administration and Territorial Development, while the county and city governments concerned play a key role in urban-area planning and implementation.

The foundation for the application of FUA guidelines in Hungary is thus threefold:
1. **International statistical methodology (OECD, Eurostat)** – provides the methodology and definitions for urban areas.
2. **EU cohesion policy** – allows for FUA-level planning and resource use under urban development funding lines.
3. **Domestic strategic documents and legislation** – the National Development and Spatial Development Concept, the Spatial Development Act, as well as the territorial operational program and the Integrated Territorial Programs (ITPs) planned and implemented under it, provide the practical framework.

Overall, Hungarian FUA guidelines do not stem from a single piece of legislation but form a multi-level system, where the international methodology provides the definitional basis, EU cohesion policy supplies the resource allocation and planning framework, and domestic legislation and strategies ensure planning, institutional embedding, and implementation conditions.

3.1.4 **Methodologies** for the Application of FUAs in Hungary

The methodology of Functional Urban Areas (FUAs) aims to analyze urban spaces and plan development interventions not solely along administrative boundaries, but based on actual socio-economic relationships. In Hungary, the methodological approach to FUAs is primarily based on the European typology developed by the OECD–Eurostat, but it is adapted to the domestic planning and institutional system for practical application.
According to the OECD–Eurostat definition, an FUA consists of two components:
- **Urban core**: a densely populated settlement with at least 50,000 inhabitants,
- **Commuting zone**: settlements where at least 15% of the population commutes to the urban core for work.

This methodology ensures that an FUA represents a real functional unit rather than merely an administrative category. EU cohesion policy also refers to this definition, making it sensible for Hungarian practice to align accordingly.
In Hungary, the designation and management of FUAs is not a legal category but a planning concept and methodological practice aligned with EU requirements. The Hungarian Central Statistical Office (KSH) primarily applies the Eurostat methodology for delineating urban areas, relying on census and labour force survey data. Commuting data between settlements are of particular importance, as they indicate the level of economic and labour market integration.
In the 2021–2027 EU programming period, the urban-area approach is also feasible in Hungary under the TOP Plus territorial operational program, using the sustainable urban development instrument. Cities that commit to this approach (three cities) and their urban-

area settlements engage not only in formal partnerships but also plan and use resources based on actual functional relationships.
The practical operation of FUAs in Hungary is structured around three main methodological pillars:

1. **Statistical delineation**: based on Hungarian Central Statistical Office and Eurostat data, taking commuting thresholds into account. This is not a strict methodology; it is intended for planning-statistical purposes and is advisory in nature.
2. **Strategic planning and implementation**: the committing city (three cities) plans and executes the SUDS covering its commuting zone, using EU TOP Plusz funds.
3. **Partnership mechanism**: under the previous pillar, with the coordinating role of the city governments (three cities), surrounding municipalities also participate in planning and project implementation.

These three levels ensure that the FUA is not merely a statistical category but a functioning planning unit.
The application of the methodology is supported by the strategic objectives of the Development and Spatial Development Concept, which emphasize strengthening urban–rural relations and shaping a polycentric spatial structure. At the level of the Territorial Operational Program (TOP Plusz), the Managing Authority issued methodological guidance for cities, which included the procedural steps necessary for FUA-based planning.
The greatest challenge of the Hungarian methodology is that FUAs are not independent administrative units; therefore, cooperation between a city and its surrounding municipalities is not mandatory but optional, depending on the situation and largely influenced by the willingness and intentions of local actors to cooperate. Another difficulty lies in the timeliness of data: commuting patterns may change rapidly, while statistical base data (e.g., census data) are updated only infrequently.
Thus, the FUA methodology in Hungary is based on both national and EU methodologies. The definition developed by the OECD–Eurostat provides the fundamental statistical background, EU cohesion policy supports urban-area-based planning and implementation, and the domestic legal and strategic frameworks ensure the planning and institutional foundation.

3.1.5 Major Investor Companies and Other Stakeholders in the Sector Related to FUAs (in Industry, Services, Research, and Corporate R&D Divisions)

The FUA (Functional Urban Area) is essentially a statistical and planning category, and not an industry or economic sector directly associated with investors, companies, or research institutes. However, due to the development policy and urban planning applications of FUAs, a variety of stakeholders are involved:
In Hungary's metropolitan FUAs, multinational companies' sites, industrial parks, and service centres are typically concentrated. These large enterprises are not "FUA-specific" companies, but since FUAs serve as the basic units for EU resource allocation and development focus, investments arriving in major cities are generally concentrated in these areas.
The stakeholders related to FUAs are mainly public actors and development policy institutions, such as:

- **Ministry of Public Administration and Regional Development** – professional oversight.

- **County governments and city municipalities** – key players in FUA planning.
- **Regional development councils** – coordination of regional cooperation.

The industrial and service sectors within FUAs are highly differentiated:

- ***Industry****: automotive hubs (Győr, Kecskemét, Debrecen), pharmaceuticals (Budapest, Debrecen).*
- ***Services****: financial and business services primarily in the Budapest FUA, while regional centres host SSCs and logistics hubs.*
- ***Logistics****: FUAs are closely linked to motorway and railway network development (e.g., Budapest, Győr, Szeged as logistics FUA hubs).*

Hungary's most important research and university centres are located in FUAs:

- **Budapest**: Eötvös Loránd University, Budapest University of Technology and Economics, Semmelweis University, and institutes of the Hungarian Academy of Sciences.
- **Debrecen**: University of Debrecen, with strengths in health industry and agricultural research.
- **Szeged**: University of Szeged, biotechnology, and laser research.
- **Pécs**: University of Pécs, health industry and creative industries.

Several multinational companies operate R&D centres in Hungarian FUAs:

- **Bosch** (Budapest and Miskolc FUAs) – automotive research.
- **Ericsson and Nokia** (Budapest FUA) – telecommunications development.
- **Audi** (Győr FUA) – automotive innovation.
- **Continental** (Debrecen, Szeged, Budapest FUAs) – intelligent mobility solutions.

In summary, while the FUA is not an industry but a planning category, the largest industrial and service investments, as well as research centres in Hungary, are typically concentrated within FUAs. Therefore, the methodological management and development of urban areas are closely linked to the activities of economic and innovation actors.

3.1.6 Statistics on FUA Activities, Outcomes, Employment, etc. in Investor Sectors.

In Hungary's Functional Urban Areas (FUAs), significant industrial, real estate development, and R&D investments are concentrated – while these are not specifically "FUA companies," they play a key role due to urban-area development priorities.

- **Industrial and technological investments**: The production of electric vehicles and batteries (e.g., SK Innovation, BYD, CATL) has become a dominant sector. This segment is characterized by multi-billion-euro investments.
- **Infrastructure and urban development**: The development of Budapest Airport, major investment projects linked to the airport, railway connections, and large-scale real estate developments (e.g., Liget, Infopark, Eagle Hills) have become embedded in the landscape of Budapest and other FUAs.
- **Industry and services**: National large companies (e.g., Opus Global, MOL, OTP) demonstrate economic integration within urban areas. R&D institutions (e.g., Infopark, universities) provide the innovation background.

3.1.7 Any Specific Specializations of FUAs (e.g., IT and Digital Technologies, Automotive Industry, Aerospace, etc.)

FUAs are not only statistical or spatial-structural categories but can also be defined by their economic specializations – and in Hungary, this is increasingly the case.
Examples include:

Budapest FUA – Finance, IT, R&D, Creative Industries

Budapest is by far the country's largest and most diversified FUA, where a disproportionately large share of GDP and employment is concentrated.

- **IT and digital technologies**: *Infopark, Graphisoft Park, Bosch Budapest Innovation Campus*, the *Hungarian headquarters of Microsoft* and *IBM*. The *EIT Digital* and *EIT Health* centres are also located here.
- **Financial services**: Regional centres of OTP, K&H, Erste, UniCredit.
- **Research and development**: Headquarters of the Hungarian Academy of Sciences (HUN-REN), several universities (ELTE, BME, Semmelweis), and innovation bases of the pharmaceutical and biotech industries (Richter Gedeon, Egis).
- **Creative industries**: Film industry (Origo Studios), advertising, design, and the startup ecosystem.

Győr FUA – Automotive Industry, Automotive R&D

Győr is one of Central Europe's most important automotive hubs thanks to Audi Hungaria.

- **Automotive industry**: Audi engine and vehicle production, supplier networks.
- **R&D**: Strong cooperation with Széchenyi István University, industrial digitalization, and vehicle testing.
- **Focus**: e-mobility, automotive research.

Debrecen FUA – Pharmaceuticals, Biotechnology, Battery Production

Debrecen has become a strong industrial hub over the past decade.

- **Pharmaceuticals**: Richter, TEVA.
- **Biotechnology**: Medical research at the University of Debrecen.
- **Automotive and batteries**: BMW plant, CATL battery factory.
- **Focus**: life sciences + e-mobility.

Szeged FUA – Research, Laser Physics, Automotive Industry

Szeged's FUA is built primarily on research, but its industrial base is also expanding.

- **Research**: ELI-ALPS laser research centre, University of Szeged (life sciences, IT, medicine).
- **Industry**: BYD electric bus factory.
- **Focus**: scientific research + e-mobility.

Miskolc FUA – Heavy Industry, Engineering, Materials Science

- **Traditional industry**: steel production, machinery.
- **R&D**: University of Miskolc (materials technology, energy, environmental engineering).
- **Transformation**: Industry 4.0, engineering, and energy research.

Kecskemét FUA – Automotive Industry

- **Mercedes-Benz Manufacturing Hungary** is the largest player.
- **Supplier cluster**: hundreds of SMEs connected to the automotive sector.
- **Focus**: premium car production (Mercedes A- and B-Class, CLA, EQB).

Pécs FUA – Culture, Creative Industries, Environmental Industry

- **Cultural centre**: UNESCO heritage sites, cultural industries.
- **University**: University of Pécs (medical and arts programs).
- **Industry**: environmental technologies, renewable energy.

In summary: In the EU, FUA specialization is carried out within the framework of Smart Specialisation (S3) strategies. In Hungary, the main patterns are:

- **Budapest** – similar to Vienna, Prague, Warsaw: digital, financial, and R&D hub.
- **Győr, Kecskemét** – comparable to Stuttgart, Wolfsburg, or Bratislava in terms of automotive specialization.
- **Debrecen, Szeged** – similar to Central European biotech and research FUAs (e.g., Brno, Kraków).
- **Miskolc, Pécs** – regional industrial and cultural centres, but less aligned with the EU's leading edge.

Hungary's FUAs have clearly distinguishable specializations: **Budapest** – IT, finance, R&D, **Győr & Kecskemét** – automotive industry, **Debrecen** – biotech + automotive, **Szeged** – research + e-mobility, **Miskolc** – industry and materials science, **Pécs** – culture and environmental industry.
These specializations are closely aligned with the logic of EU cohesion policy and the S3 strategies.

3.2 Stakeholders

3.2.1 Governance Structure (Authorities, Private/Public Companies, Clusters)

The governance structure of FUAs (Functional Urban Areas) in Hungary is not a separate institutional network, but is embedded within the general territorial development and economic management system. At the same time, since FUAs concentrate industry, services, and research & development, multiple actors and forms of cooperation play a key role in governance.

Central State Governance:

- **Ministry of Public Administration and Regional Development (KTM):** the national-level authority for territorial development policy, and the main body responsible for implementing the National Development and Spatial Development Concept.
- **Sectoral ministries**
- **National authorities and agencies**

Local and Regional Level:

- **County governments:** under the new Spatial Development Act, key actors in planning, coordination, and the utilization of EU funds.
- **City municipalities:** larger cities (e.g., Budapest, Debrecen, Győr, Szeged) develop strategic development programs (e.g., urban development strategies, Integrated Territorial Strategies - ITS).

- **Regional development councils:** major regional councils (e.g., Budapest Agglomeration Development Council, Balaton Development Council) – indirectly present in FUAs.

Economic Actors:

- Large and multinational companies
- Domestic large companies
- Small and medium-sized enterprises (SMEs)

Clusters and Networks:

FUAs in Hungary typically host **industry-specific clusters** aligned with the EU Smart Specialisation (S3) strategy logic, e.g., automotive, IT and digital technologies, biotechnology and pharmaceuticals, as well as creative and environmental industry clusters

Research and Innovation Institutions:

- **Universities** (Budapest University of Technology and Economics, University of Debrecen, University of Szeged, Széchenyi István University Győr, University of Pécs): drivers of industrial cooperation and FUA-specific specializations.
- **Hungarian Research Network (HUN-REN, former Hungarian Academy of Sciences institutes):** primarily in Budapest, but strong bases also exist in regional FUAs (e.g., Szeged, Debrecen).
- **Corporate research centres:** Bosch, Ericsson, Audi, Richter, Continental, etc.

International and EU Integration:

- **EU cohesion policy:** FUAs form one of the bases for resource allocation in programming cycles (e.g., TOP Plusz, GINOP Plusz).
- **Interreg and Horizon Europe projects:** regional innovation collaborations of universities and companies located in FUAs.
- **EIT centres** (e.g., EIT Digital, EIT Health, EIT InnoEnergy in Budapest).

Summary: The governance structure of Hungarian FUAs is multi-level:

- **State level:** ministries and agencies,
- **Regional level:** counties, municipalities, development councils,
- **Economic level:** multinational and domestic large companies, SMEs, clusters,
- **Innovation level:** universities, research institutes, corporate R&D centres.

This network aligns with the EU governance logic, which also relies on **partnerships among state, municipal, and market actors** in the development of urban areas.

3.2.2 Key Stakeholders in Functional Urban Areas: administrative authorities, ministries, municipalities, national/regional bodies, clusters, relevant companies in industry sectors, major producers related to FUAs, automotive industry, aerospace, IT, universities, research centers, specialized authorities for innovative industries, public utility companies, ports, airports, SMEs, business support centers, expert think tanks, financing institutions, innovation hubs, etc.

See previous section.

3.2.3 Patterns of Stakeholder Cooperation in Functional Urban Areas within the Country and with Functional Urban Areas in Other Countries

See previous sections. In Hungary, cooperation patterns are multi-level and networked: state – municipalities – industry – research – civil/innovation actors. These collaborations are implemented within clusters, industrial parks, research centres, and EU-funded projects. Domestic patterns are in line with EU examples, but the integration of civil and startup components is still expanding.

3.2.4 Other Relevant Actors Operating in the Country's Functional Urban Areas (FUAs)

3.3 National Policy on Functional Urban Areas (FUAs) in Each Country

3.3.1 Financing of Functional Urban Areas from National Programs / Other Funding Sources / Programmes / Support Schemes

Hungarian functional urban areas (FUAs) are not institutionalized in the traditional sense. At the regional scale, the financing of cooperation is multi-level and diversified: in addition to state and EU programs, private sector and cluster activities also play a key role in the development and specialization of FUAs.

3.3.2 Smart Specialization Aligned with Functional Urban Areas (Strategic Documents)

The smart specialization of Hungarian FUAs is closely linked to the National Development and Territorial Development Concept, the 2023 Spatial Development Act, and the principles of the EU Smart Specialization Strategy (S3).

Strategic documents and guidelines:

- **OFTK (National Development and Territorial Development Concept):** defines national priorities, highlighting key functional urban areas as centres of innovation and industry.
- **National Smart Specialization Strategy (S3):** in line with the EU Cohesion Policy, it identifies technological focus areas such as IT, automotive, biotechnology, and agri-innovation.
- **County and city development programs:** set territorial and urban development goals and priorities tailored to the specific characteristics of FUAs.

Overall, the smart specialization of regions, **based on strategic documents**, leveraging local assets, and linked with EU funding instruments, can ensure sustainable economic growth and innovation within FUAs.

3.3.3 All Relevant Functional Urban Areas Related to RTDI (Research, Technology, Development, and Innovation) at the National Level

This includes the legal framework, policies, strategies, methodologies, objectives, concepts, practices, and initiatives relevant to FUAs in Hungary at the national level

Key Legal and Institutional Frameworks:

- **Spatial Development Act (2023):** The law defines the directions of territorial development and the role of functional urban areas, with particular attention to RTDI activities.
- **OFTK (National Development and Territorial Development Concept):** OFTK sets out the national development directions, highlighting the role of functional urban areas in innovation and research & development.

Strategies of Related Sectors

Methodologies and Practices:

- **Smart Specialization Strategy (S3):** The S3 aims to establish regional specializations, taking into account the strengths and potential of functional urban areas in RTDI.
- **Regional Innovation Strategies:** These strategies aim to leverage local resources and assets to promote innovation and research & development.

3.4 Current Situation of Functional Urban Areas

3.4.1 Mechanisms Supporting Functional Urban Areas:

- Political decision-makers for sectors related to functional urban areas
- National authorities for sectors linked to functional urban areas
- Funding institutions associated with support programs for functional urban areas
- Business support/advisory bodies, offices of specific functional urban areas

In Hungary, political decisions regarding the development of functional urban areas (FUAs) are primarily made by ministries responsible for territorial development, mainly the **Ministry of Public Administration and Territorial Development**, which coordinates overarching territorial development policies and programs, as well as by state secretariats responsible for innovation and technology, which set guidelines for research & development, innovation, smart city initiatives, and digital development. Local municipalities and county assemblies also play a significant role in decision-making at regional and FUA levels.

FUAs related to specific sectors are overseen by various national authorities: the **Hungarian Competition Authority** regulates industrial and commercial activities, the **National Research, Development and Innovation Office (NRDIH)** coordinates R&D projects and innovation grants, while the **Hungarian State Treasury** monitors the financial aspects of grants and support processes. Additionally, transport and infrastructure authorities are responsible for regulations related to urban mobility, transport, and logistics projects.

Funding for functional urban areas comes from multiple sources. EU-funded programs, primarily **TOP Plusz**, and indirectly **GINOP Plusz**, support development projects implemented in cities and FUAs, while other direct EU sources, such as the **Cohesion Fund, Horizon Europe,** and **Interreg** programs, can provide supplementary support for city-level developments. Private investors, including industrial parks, startup ecosystems, and R&D centres, also contribute to financing R&D and innovation projects.

Business support and advisory actors, such as industrial clusters and chambers of commerce (e.g., the **Hungarian Chamber of Commerce and Industry**) or various industrial clusters, provide guidance to enterprises and innovation initiatives. This structure ensures that political governance, regulation, financing, and business support are coordinated within Hungarian FUAs, promoting sustainable development and innovation.

3.4.2 FUNDA QUESTIONNAIRE OF FUAs IN HUNGARY

SEE ANNEX

3.5 Challenges Facing the Development of Functional Urban Areas

In Hungary, regarding development and R&D activities linked to functional urban areas (FUAs), it is important to emphasize that there is no institutionalized FUA. These areas exist only as statistical, analytical, and planning units rather than as concrete, operational cooperation structures.

3.5.1 Functional Urban Areas Must Operate in a Healthy Work Environment to enhance business performance, FUAs must ensure a supportive and healthy working environment

3.5.2 Risk Management and Innovation: Challenges Facing Functional Urban Areas

3.5.3 Performance Assessment Relative to Leading FUAs and Adoption of Best Practices Most Suitable for the Specific Functions of FUAs

3.6 Opportunities and Barriers of Functional Urban Areas

Functional Urban Areas (FUAs) in Hungary offer significant opportunities for territorial development, innovation, and economic growth, yet several obstacles limit the full exploitation of their potential. It is important to emphasize that there is no institutionalized FUA in Hungary, so the currently used urban area models are primarily statistical and planning units, rather than concrete, operational cooperation structures. Nevertheless, the future potential of FUAs is substantial, particularly in the areas of integrated city and regional development, the coordination of innovation clusters, and R&D activities.

Potential advantages include economic concentration: urban areas allow collaboration among companies, research institutions, and services, which facilitates knowledge sharing, innovation, and competitiveness. Infrastructure developments concentrated in FUAs — such as transport, digital networks, and logistics capacities — enable more efficient mobility and improve the business environment. Additionally, urban areas are suitable for implementing sustainability and smart city strategies, integrating green and digital technologies, and leveraging international funding and investment opportunities. The statistical framework of FUAs supports long-term planning, the coordination of regional and urban development, and can contribute to the diversification of the local economy.

However, several barriers limit the future development of FUAs. One of the most significant is the lack of institutionalization and a legal framework, which complicates urban-area coordination, long-term cooperation among stakeholders, and the efficient use of resources. Another challenge is the fragmented financing system, as support and programs are often sectoral rather than integrated at the urban-area level. Gaps in coordination between local municipalities and state actors also slow planning and project implementation. Furthermore, disparities in human resources, local innovation capacities, and infrastructure across regions may hinder the uniform development of FUAs.

In the future, the success of FUAs will depend on their ability to establish integrated, multi-stakeholder cooperation models connecting local governments, state institutions, companies, and research actors. Proper coordination of EU cohesion policies and national development programs, adaptation of smart specialization strategies, and promotion of sustainable and innovation-oriented urban development projects are crucial for harnessing the future potential of FUAs in Hungary.

Therefore, FUAs offer a promising framework for the economic and social development of urban areas, yet addressing structural and institutional gaps, as well as coordination challenges, is essential for achieving truly integrated functionality.

3.6.1 Opportunities of Functional Urban Areas – Megatrends: environmental challenges, urbanization and megacities, aging society, energy demand and resources, changing lifestyles, etc.

Hungarian FUAs are well positioned to respond to global megatrends such as climate change, digitalization, and demographic shifts. Their concentration of infrastructure, research institutions, and industries offers opportunities to develop sustainable urban solutions, promote smart city initiatives, and strengthen resilience against environmental and societal challenges. Urban areas can also benefit from lifestyle changes and the growing demand for green and digital transitions, leveraging EU and national development programs.

3.6.2 Barriers Facing Functional Urban Areas (e.g., lack of financial resources, shortcomings in FUA financing, shortage of skilled professionals, difficulties in cooperation with authorities, weak collaboration between universities/research centres and FUAs)

Despite their potential, FUAs in Hungary face structural barriers, including the absence of a formal legal framework and fragmented financing mechanisms. Limited human resources and regional disparities hinder balanced growth, while cooperation between municipalities, state authorities, and research institutions often remains weak. The shortage of skilled professionals

and dependence on external funding further constrain the long-term sustainability and competitiveness of FUAs.

3.7 Functional Urban Areas – SWOT Analysis in HUNGARY

SWOT Analysis – Hungarian Functional Urban Areas (FUAs)

STRENGTHS +	WEAKNESSES –

• **Strategic policy integration:** FUAs are embedded in Hungary's national development framework (National Development and Spatial Development Concept, Act CII. of 2023 on Spatial Development) and EU cohesion policy, providing a strong strategic and planning basis.
• **Access to EU funding:** FUAs can leverage EU funds (TOP Plusz, GINOP Plusz, Cohesion Fund, Horizon Europe, Interreg) for integrated urban-regional development and sustainable city projects.
• **Functional and statistical definition:** OECD-Eurostat methodology ensures FUAs represent actual socio-economic interactions (urban core + commuting zone), enabling more accurate planning.
• **Economic concentration:** FUAs concentrate major industries, research institutions, and service sectors, facilitating innovation, collaboration, and knowledge sharing.
• **Specialized industrial clusters:** FUAs exhibit clear sectoral specializations aligned with Smart Specialization Strategy (S3) priorities:
  ○ Budapest: IT, finance, R&D, creative industries
  ○ Győr, Kecskemét: automotive industry
  ○ Debrecen: biotech + automotive
  ○ Szeged: research + e-mobility
  ○ Miskolc: heavy industry, materials science
  ○ Pécs: culture, creative industries, environmental sector
• **Innovation and research potential:** Presence of universities, corporate R&D centres, and research institutes supports RTDI activities.
• **Multi-level governance structures:** Combination of national ministries, county governments, city administrations, clusters, and private sector actors enables coordinated planning potential.
	• **Lack of institutionalization:** FUAs are not legal entities; cooperation between cities and surrounding municipalities is voluntary, leading to inconsistent engagement and planning.
	• **Fragmented financing:** Funding streams are multi-source (national, EU, private), often sectoral rather than integrated at FUA level, complicating coordinated investment.
	• **Limited data updates:** Reliance on census and commuting data that may become outdated quickly, reducing the precision of planning.
	• **Variability in local capacity:** Differences in governance, human resources, and innovation capacity between FUAs hinder uniform development.
	• **Partial integration of stakeholders:** Civil society, startups, and some private actors are not fully integrated into planning processes.

OPPORTUNITIES +	**THREATS –**

• **Integrated urban-regional development:** FUAs provide a framework to coordinate infrastructure, mobility, and spatial planning across city and peri-urban areas. • **Innovation-driven growth:** Concentration of research centres and high-tech industries allows for cluster-based economic development and technology transfer. • **EU and national policy alignment:** FUAs can act as implementation units for Smart Specialization Strategy (S3) and sustainable city initiatives. • **Green and digital transition:** FUAs offer a platform for sustainable urban development, digitalization, and smart city technologies. • **Knowledge and skills spillovers:** Cross-sector collaboration within FUAs fosters knowledge sharing and workforce development. • **Benchmarking and adoption of best practices:** Hungarian FUAs can learn from leading EU FUAs in governance, financing, and innovation.	• **Coordination challenges:** Voluntary nature of FUA collaboration may lead to fragmented projects and inefficiencies. • **Unequal regional development:** Stronger FUAs (e.g., Budapest) may attract most resources, leaving smaller or less specialized FUAs behind. • **Funding volatility:** Dependence on EU programs and fluctuating national budgets can impact sustainability of FUA initiatives. • **Talent and capacity gaps:** Limited availability of skilled professionals in some FUAs may hinder innovation and project execution. • **Institutional inertia:** Lack of a dedicated legal framework for FUAs may slow the implementation of integrated strategies. • **Rapid socio-economic changes:** Shifts in commuting patterns, industrial focus, or demographic trends may outpace planning mechanisms.

Results

The baseline study of Hungarian Functional Urban Areas (FUAs) highlights that they are recognized primarily as statistical and planning units rather than formal legal entities. Nevertheless, their role in development policy is significant, as they are embedded in both national (OFTK, Spatial Development Act) and EU (cohesion policy, Smart Specialisation Strategy) frameworks. The analysis identified that FUAs in Hungary concentrate the majority of the country's industrial, research, and service capacities, hosting specialized clusters in sectors such as automotive (Győr, Kecskemét, Debrecen), biotechnology and pharmaceuticals (Debrecen, Szeged), ICT and financial services (Budapest), heavy industry (Miskolc), and culture and environmental technologies (Pécs).

The study also revealed a strong potential for innovation-driven growth due to the presence of universities, R&D centres, and multinational companies, which provide fertile ground for smart specialization. However, institutional gaps remain: FUAs lack a dedicated legal framework, stakeholder cooperation is voluntary, and financing is fragmented across multiple sources. The

SWOT analysis demonstrated that while FUAs have clear strengths and opportunities in terms of integrated development and innovation, they also face threats from unequal regional development, dependence on EU funding, and talent shortages.

Overall, the results show that Hungarian FUAs provide a critical spatial framework for planning and development, but their full potential can only be unlocked through stronger institutionalization, integrated financing, and sustained multi-stakeholder cooperation.

Conclusions

The analysis of Functional Urban Areas (FUAs) in Hungary shows that, although they are not institutionalized as legal entities, they play a key role in national and EU development policy. FUAs provide a framework that better reflects real socio-economic relationships than administrative boundaries, supporting evidence-based planning and integrated urban–regional development. Their strengths include a strong strategic and legal embedding through the National Development and Spatial Development Concept and EU cohesion policy, significant economic concentration, and a clear pattern of specialization in sectors such as automotive, biotechnology, ICT, and creative industries. At the same time, the lack of formal institutionalization, fragmented financing mechanisms, and unequal regional capacities limit their full potential. The future effectiveness of FUAs will depend on enhanced multi-level cooperation, better integration of stakeholders (including SMEs and civil society), and more consistent resource allocation. Strengthening their role could provide Hungary with a competitive advantage in the green and digital transitions while ensuring more balanced territorial development.

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Territorial and Settlement Development Operational Program Plus (TOP Plusz)

National Smart Specialisation Strategy (S3), Hungary

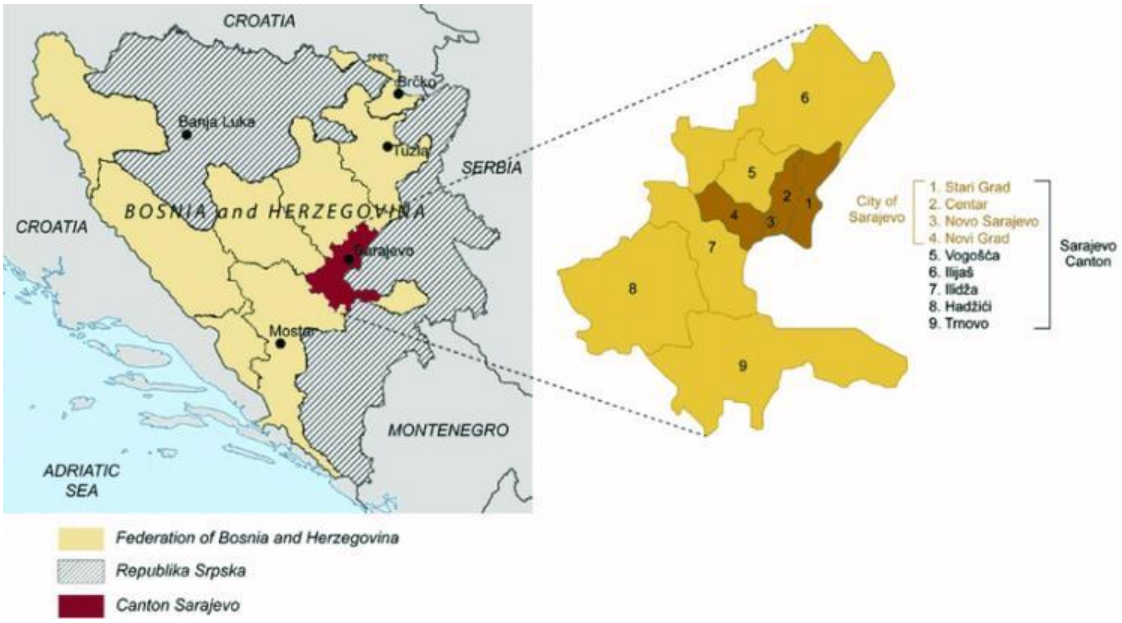
Sarajevo Region
BOSNIA and HERZEGOVINA


3.1 Database of BOSNIA and HERZEGOVINA

3.1.1 General geographical information (country geographical location, population, administrative organization: counties/towns/villages, centralized or decentralized governance)

Bosnia and Herzegovina (BiH) is located in Southeastern Europe, on the western Balkan Peninsula. Country is named after two historical and geographic areas - Bosnia (northern and centra part) and Herzegovina (part on south). It borders with Croatia to the north and west, Serbia to the east and Montenegro to the southeast. The country is mostly mountainous, encompassing the central Dinaric Alps. The northeastern parts reach into the Pannonian Basin, while in the south it borders the Adriatic. The Dinaric Alps generally run in a southeast–northwest direction and get higher towards the south. The geological composition of the Dinaric chain of mountains in Bosnia consists primarily of limestone (including Mesozoic limestone) with deposits of iron, coal, zinc, manganese, bauxite, lead, and salt present in some areas, especially in central and northern Bosnia. Overall, nearly 50% of Bosnia and Herzegovina is forested. Most forest areas are in the centre, east and west parts of Bosnia. Herzegovina has a drier Mediterranean climate, with dominant karst topography. Northern Bosnia (Posavina) contains very fertile agricultural land along the Sava river(tributary of the Danube River) and the corresponding area is heavily farmed. This farmland is a part of the Pannonian Plain stretching into neighbouring Croatia and Serbia. The country has only 20 kilometres of coastline, around the town of Neum in the Herzegovina-Neretva Canton. Although the city is surrounded by Croatian peninsulas, by international law, Bosnia and Herzegovina has a passage to the outer sea. Climate is mostly Continental in the interior with hot summers and cold winters, on mountain there is Mountain climate with long and snowy winters and in the south (Herzegovina) climate is Mediterranean with mild winters and hot dry summers.

Bosnia and Herzegovina is a highly decentralized country with a complex administrative structure resulting from the Dayton Peace Agreement (1995). It consists of two main entities and a special district Federation of Bosnia and Herzegovina (FBiH), Republika Srpska (RS) and Brčko District. FBiH is Divided into 10 cantons, each with its own government. Cantons are further divided into municipalities and cities. Republika Srpska (RS) is organized into municipalities and cities, no cantons. Brčko District is a self-governing administrative unit. Approximate population (2024 estimate): 3.2 million.



Canton Sarajevo is located in central part of Bosnia and Herzegovina, within the Federation of Bosnia and Herzegovina (FBiH). Terrain in mountainous and hilly, surrounded by the Dinaric Alps, with altitudes ranging from 450 to 2,067 metres above the sea level. The average altitude is 537 metres. Sarajevo valley lies between major mountains *Trebević, Igman, Bjelašnica, Jahorina* and *Teskavica*. The landscape is very diversified and is classified as mountain and hilly terrain type

State capital Sarajevo is situated in Canton Sarajevo which has 413,000 inhabitants (2023) on 1,276 km² area. Canton Sarajevo has rich hydrography, with main river Miljacka, which flows through the city of Sarajevo and others rivers Željeznica and Bosna. Hydrography belongs to Danube basin. Canton Sarajevo has 5 Nature & Protected Areas: *Vrelo Bosne Nature Park*, *Bijambare Cave* (karst caves and forests), *Skakavac spring* (Nature monument), *Mountain Trebević* and *Bentbaša* (upper flow along the Miljacka river). Canton Sarajevo is rich in forests, especially pine and beech with wildlife where dominant species are deer, fox, wild boar, and various birds. There are two types of climate continental climate at altitudes of up to 600 metres above the sea level and Continental-mountain type and Alpine climate at altitudes exceeding 600 metres above sea level.

Sarajevo is the largest urban, economic, cultural, and political centre of Bosnia and Herzegovina with high level of urbanization and infrastructure development. It is important regional centre in higher education, ICT, finance, tourism, and culture. Canton has well-developed road and rail network with other regions and main roads connect Sarajevo to Mostar, Tuzla, Zenica. The Sarajevo International Airport for passenger and cargo transport, records more than 1 million passengers and 2 million kg of cargo per year.

Sarajevo Canton is located on the Corridor Vc (European route E73) which is part of the Pan-European Corridor connected to the TEN-T network (Trans-European Network), linking the Sarajevo Canton and Bosnia and Herzegovina with the European road networks in the North and the sea in the South. Corridor Vc (E73) – Budapest (Hungary) – Osijek (Croatia/EU) - Sarajevo (BiH) – Ploče (Croatia/EU) that connects northern Europe with the Adriatic Sea and the future Adriatic- Ionian route intersects on the Zagreb-Belgrade highway with Corridor X (E70) that is connecting Western with Central and Southern Europe.

Sarajevo Canton is composed of nine municipalities: Centar, Novi Grad, Novo Sarajevo, Stari Grad, Hadžići, Ilidža, Ilijaš, Vogošća, and Trnovo. Among them, four central municipalities—Centar, Novi Grad, Novo Sarajevo, and Stari Grad—constitute the City of Sarajevo as a distinct local government unit. Each municipality functions as a local self-government unit with its own elected municipal council and mayor (or municipal chairman).
The Cantonal Assembly, consisting of 35 deputies, serves as the legislative body, while executive authority is exercised by the Cantonal Government, headed by a Premier. Judicial responsibilities are carried out by cantonal-level courts. The canton holds jurisdiction over a range of internal affairs, including education policy, policing, spatial planning, municipal services, tourism, culture, social welfare, local energy, and economic development. In addition, it shares competencies with the Federation of Bosnia and Herzegovina in areas such as healthcare, transportation, environmental protection, citizenship, and other joint responsibilities.

3.1.2 FUAs legislative framework applicable in the country

Bosnia and Herzegovina and Canton Sarajevo does not have a formal legislative framework specifically regulating Functional Urban Areas (FUAs). FUAs are not a legal-administrative category like municipalities or cantons. There are important indirect mechanisms and strategic documents that recognize or incorporate FUA principles, especially in urban planning, spatial development, transport, and EU-aligned policy frameworks.
Urban planning in Bosnia and Herzegovina is decentralized, with primary responsibilities divided between cantonal and municipal levels of government. In Federation of BiH each canton enacts its own spatial planning legislation, aligned with the overarching Spatial Planning and Land Use Law at the entity level. Within this framework, municipalities are responsible for preparing urban development plans, establishing zoning regulations, and issuing construction permits. In Republika Srpska, the system is more centralized, with the entity-level Ministry for Spatial Planning overseeing key aspects of spatial development, including Municipal and city spatial plans and regulatory and legislative frameworks. While municipalities are responsible for adopting urban plans, these must be developed in close coordination with the entity ministry to ensure alignment with overarching policies. In contrast, the Brčko District operates under a special legal regime. It combines elements of the legal frameworks of both entities—Republika Srpska and the Federation of Bosnia and Herzegovina—but maintains full administrative and legislative autonomy.
Relevant Laws (Indirectly Applicable to FUAs) in Federation of Bosnia and Herzegovina (FBiH) are **The Law on Spatial Planning and Land Use (2017)** establishes the legal basis for spatial planning at the cantonal and municipal levels. While it does not explicitly reference Functional Urban Areas (FUAs), it enables inter-municipal and inter-cantonal cooperation, which can serve as a foundation for FUA-type governance models. Additionally, each canton adopts its own spatial planning legislation. Sarajevo Canton has developed its own planning framework and strategies, which may take into account functional linkages across municipalities, particularly in areas such as transport, housing, and public services. In Republika Srpska (RS) there are t**he Law on Spatial Planning and Construction (2013, as amended)** follows a centralized model, with urban plans developed by municipalities under the supervision of the entity-level Ministry for Spatial Planning. While FUAs are not formally recognized, regional and inter-municipal cooperation is permitted, offering space for functionally integrated planning. Brčko District operates under a hybrid legal

regime that incorporates elements from both the FBiH and RS frameworks. Though it lacks specific provisions for FUAs, its autonomous urban planning system allows for interjurisdictional cooperation and coordination with surrounding areas.

Canton Sarajevo has following legislative framework:

- **Law on Spatial Planning of Sarajevo Canton** (2017). This is the core cantonal law regulating spatial and urban planning. While FUAs are not explicitly mentioned, the law defines the obligations of municipalities to align with cantonal spatial strategies, allows for integrated planning across administrative borders, especially for transport, environment, and land use. Encourages coordination between the Canton and municipalities for strategic development (e.g., metropolitan zones like Sarajevo urban core and suburbs).
- **Spatial Plan of Sarajevo Canton 2003–2023** *(new plan in preparation)* This plan defines the functional relationships between urban and peri-urban zones of Sarajevo Canton. Identifies Sarajevo metropolitan area as a functionally interdependent unit, including municipalities such as Ilidža, Novi Grad, Vogošća, Ilijaš, and Hadžići. Provides a conceptual basis for FUA-type development in practice, particularly for housing, transport corridors, economic zones, and infrastructure networks.
- **Cantonal Development Strategy 2021–2027.** Strategically addresses territorial cohesion, mobility, environmental sustainability, and urban-rural linkages—core elements of FUA governance. Promotes polycentric development and balanced urban growth, in line with EU's Territorial Agenda 2030. Encourages cooperation among municipalities and horizontal governance models within the canton.

3.1.3 FUAs guidelines applicable in the country

Bosnia and Herzegovina (BiH), while not an EU Member State, has increasingly aligned with EU frameworks and methodologies—including the OECD and European Commission's Functional Urban Areas (FUA) approach—especially in the context of urban development, regional policy, and EU integration. Although there's no explicit legal framework for FUAs in BiH, several laws and strategies support or intersect with the FUA concept:

- Law on Spatial Planning and Construction (at entity/cantonal levels): Encourages regional coordination, which is crucial for FUAs.
- Entity Development Strategies - Promote inter-municipal cooperation, indirectly supporting FUA-type planning.
- Integrated Urban Development Strategies in some cities (e.g. Sarajevo, Banja Luka) align with FUA logic.
- EU IPA-funded projects in BiH often use FUA as a reference planning unit.

BiH's statistical institutions (like Agency for Statistics of BiH and entity-level statistical institutes) do not currently publish official FUA delineations, but FUA mapping has been conducted by international partners:

- ESPON, OECD, and World Bank have proposed FUA maps for BiH
- Sarajevo is most often referenced as the key FUA
- Other urban centres like Banja Luka, Tuzla, Mostar, and Zenica are also seen as potential FUAs

In BiH uses UNECE and UN-Habitat Urban Guidelines as soft-law frameworks to encourage integrated urban planning and to promote FUA-based regional development and better municipal cooperation. BiH adopted several urban development principles in alignment with “City Region Approach” and “Territorial Cohesion”. Entities (FBiH and RS) have spatial planning laws that encourage inter-municipal cooperation. There is mentioned functional linkages, but do not formally adopt FUAs as in the EU sense.
The European Commission conducted pilot mapping of FUAs in the Western Balkans(by DG REGIO & JRC, 2022–2024), including BiH, identifying 36 Functional Urban Areas in BiH, including Sarajevo, Banja Luka, Tuzla, Mostar. Based on commuting zones and daily urban systems. These maps support EU IPA programming, Smart specialisation (S3) and Green and digital transitions in urban zones.

3.1.4 FUAs methodologies applicable in the country

Bosnia and Herzegovina does not have an official national methodology for FUAs, but international approaches—especially those developed by **OECD**, **European Commission (EC)**, and **ESPON**—have been adapted in the country’s urban and regional analyses.

Identification of the Urban Core / Using population density data from the most recent censuses and satellite imagery to define continuous built-up areas. Urban cores are usually municipalities or city centres with relatively high population density and urban infrastructure. **Definition of Commuting Zones** / The commuting zone consists of surrounding municipalities or settlements from which a significant share of the workforce (typically 15% or more) commutes daily to the urban core. Due to limitations in detailed commuting data in BiH, supplementary sources such as: surveys, traffic studies, mobile phone data (when available), regional transport patterns, are used to estimate functional ties. FUAs have been mapped for Sarajevo in EU and donor-funded studies. These analyses support regional transport planning, environmental policy, and integrated urban development.

3.1.5. Major investor companies, other players in the FUAs-related sector, in the field of industry, services, research, research departments within the companies)

Canton Sarajevo attracts major investors across industry, services, and research, with key players shaping urban development and innovation, particularly within manufacturing, energy, engineering, and metal-processing sectors.

Major Investor Companies in Canton Sarajevo

Bosnalijek d.d. Sarajevo (Pharmaceutical sector) Largest domestic pharma company; strong R&D, export-oriented
AS Holding (Food industry) - Major investor in food/agri-sector
Avaz Roto Press (Media & Real Estate) - Investments in real estate, printing, and media
BBI Real Estate d.o.o. (Real estate) - Owned by Islamic Development Bank partners;
Energoinvest d.d. Sarajevo (Engineering & Energy) Specializes in power generation, transmission, civil construction, process and industrial plant engineering, and ICT services. Long-standing exporter with international projects.

BH Telecom d.d. **(**Telecommunications) - leader in the field of telecommunications and digitalisation in BiH
Al Shiddi Group (Real Estate) - Investor in shopping, hotel, business
Telemach BiH (United Group) **(**Telecommunications) Foreign-owned telecom provider; strong in digital infrastructure
Authority Partners **(**IT Services) One of Sarajevo's biggest IT employers; ongoing expansions
Mistral Technologies **(**IT/Software) High-value IT services; foreign acquisition brought new investment

Key Players in Industry, Services & Research

Volkswagen Sarajevo d.o.o. - Automotive / Manufacturing
Pretis d.d. Vogošća - Weapons production and military equipment
Coca-Cola HBC B-H d.o.o. Sarajevo – soft drinks manufacturing
BH Holding d.o.o. Sarajevo – trade and industrial production
Alternativa d.o.o. Sarajevo – Construction material production
Sarajevo Airport d.d. Sarajevo – International airport in Sarajevo
Konzum d.o.o. Sarajevo – Trade and distribution
Telemah BH d.o.o. Sarajevo – Telecommunication operator
ASA Finance – Financial services
Atlantic Argeta d.o.o. – Meat industry & food production
Veritas Automotive d.o.o. – Automobile industry production
Magros Veletrgovina – Food and other good distributor
ITX BH d.o.o. – IT equipment and technological solution
KGI- Konstrukt d.o.o. Construction and infrastructure project
Akova Impex d.o.o. - Food production and distribution
DM Drogerie Markt d.o.o. – Trade chain for cosmetic and healthcare products
Holdina d.o.o. Sarajevo – Import, distribution, and trade with oil and gas products
Penny Plus d.o.o. -Trade and distribution
Prevent Group / Prevent CEE Sarajevo (Automotive components, textiles) Important regional employer with export-driven production.
BOSNAPLAST d.d. Sarajevo (Plastic and rubber production) supplies domestic and regional markets; active in technical innovation.
Zrak d.d. Sarajevo (Optomechanics and defense technology) Historically significant company with defense and precision instrument focus.

Research & Innovation Departments

University of Sarajevo UNSA (Higher education and research) Hosts faculties with R&D activities, including technical and medical sciences.
Sarajevo Innovation Centre (CIR) (Innovation and entrepreneurship support) supports startup growth and tech transfer
IUS Innovation and Entrepreneurship Centre (IAE) - International University of Sarajevo, the IAE supports startup incubation, accelerator programs, tech transfer, social entrepreneurship, and networking between academia and the industry.
Mozaik Foundation / Lonac.pro – youth innovation and social entrepreneurship
UNDP/UNICEF Labs (e.g. Smart Sarajevo, Smart Schools) – urban innovation and energy research

3.1.6 Statistics about FUAs activity, results, employment etc. in investor sectors etc.

The Sarajevo Canton has a population of about 413.593 and generates approximately 37–45% of Bosnia and Herzegovina's GDP, making it the strongest economic centre in the country. In 2022 there were 155,775 employed persons in Sarajevo Canton, representing the highest concentration (28.5%) of jobs in the Federation of Bosnia and Herzegovina (FBiH). The employment rate of the total population of Sarajevo Canton was 36.2%, which is higher than that of the Federation of BiH – 24.4%. The administrative unemployment rate in Sarajevo Canton was 27.8%, which is lower than the unemployment rate in the Federation of BiH – 36.5%.
In 2023, Sarajevo Canton recorded total investments exceeding 1.3 billion BAM, marking a 13% increase compared to 2022, a decade-high record for the canton. Economic growth projections for 2024 pointed to a nominal GDP rise of 5.6% and real GDP growth of 2.9%, alongside higher exports and consumption. According to the development index prepared and published by the Federal Institute for Development Programming, Sarajevo Canton was ranked first among the ten cantons in the Federation of BiH in 2019. Most municipalities within Sarajevo Canton were placed in the first group in terms of development level.

Key sectors in Canton Sarajevo include tourism, manufacturing, food processing, IT, and services, anchored by firms such as BH Telecom, Bosnalijek, Energoinvest. Sarajevo Canton strength stems from a diversified economy favouring services and industry, with substantial commuting flows shaping its functional reach. Commuting zones enhance labour pools for industrial zones, corporate offices, and public sector employment in the urban core. Investor-led infrastructure (e.g., water, transport, tourism) financed via multilateral instruments supports sectoral growth across FUAs.

3.1.7. Any specific specialisation of the FUAs (eg IT & Digital Technologies, automotive, aerospace etc.)

Canton Sarajevo combines a service-led economy, growing ICT sector, moderate industrial base, and strong research and education ecosystem. Its role as the capital makes it a focal point for investment, innovation, and regional development in BiH. Public administration, education, healthcare, and tourism form the backbone of Sarajevo's economy. ICT and financial services are rapidly growing, with many companies choosing Sarajevo as their base due to the talent pool and infrastructure. Tourism has rebounded strongly post-pandemic, driven by the city's cultural heritage, winter sports, and conference tourism. While not as industrialized as some other regions, Sarajevo Canton has a mix of light and medium industries, including:

- **Metal processing and manufacturing** (e.g., tools, components, and metal structures)
- **Construction materials and civil engineering**
- **Textile and leather** manufacturing (with a focus on exports)
- **Food and beverage** processing

These industries often serve both the domestic market and export, particularly to EU countries.

ICT and Innovation

Sarajevo has emerged as an **ICT hub** in BiH. Dozens of **startups and established companies** operate in software development, digital services, and outsourcing. Presence of **business incubators** and international projects (e.g., EU-funded smart specialization, digital transformation programs). Growing emphasis on **cybersecurity, AI, and e-governance** solutions.

Research & Higher Education

Sarajevo is home to major universities such as the University of Sarajevo, which hosts faculties of engineering, natural sciences, medicine, and social sciences. Active research institutes in the fields of energy, civil engineering, environmental sciences, and biotechnology. International collaboration with EU Horizon Europe, Interreg, and other research frameworks. Recent emphasis on linking academia with industry through technology transfer centres and science parks (e.g., VERLAB Institute, Technological Park INTERA and startup support structures).

Transport and Infrastructure Hub

Sarajevo is a central transport node, with international connections via Sarajevo International Airport, and road/rail corridors connecting the region with the Adriatic coast, Serbia, and Croatia. Ongoing and planned infrastructure investments (e.g., urban mobility, green infrastructure, digital connectivity) contribute to Sarajevo's FUA (Functional Urban Area) relevance.

International Organizations and Donor Activity

Strong presence of **international institutions**, NGOs, and development agencies (UNDP, GIZ, USAID, EU Delegation), which play a role in shaping policy, innovation ecosystems, and funding.

3.2 The stakeholders

3.2.1 Governance structure (public authorities, private/public companies, clusters)

Sarajevo Canton is a federal unit within the Federation of Bosnia and Herzegovina entity, with its own constitution**,** legislature, and executive government**.** It governs areas such as education, health, urban planning, public transport, and local economic development.

Canton Sarajevo governance structure

Institution	**Role**
Assembly of Sarajevo Canton (Skupština KS)	Legislative body (parliament) – 35 members elected by proportional representation; adopts laws, budget, and policies; oversees the work of the Cantonal Government; can vote on the appointment/dismissal of ministers and the Prime Minister.
Government of Sarajevo Canton (Vlada Kantona Sarajevo)	Executive body that implements laws and manages public services, Headed by the Prime Minister; Formed by a coalition of political parties elected to the Assembly
Prime Minister	Head of Government; leads cantonal ministries
Cantonal Ministries	12 ministries responsible for policy implementation (1.Finance,2.Culture & Sports,3.Justice & Administration, 4.Economy,5. Communal Economy Spatial Planning, Construction & Environmental

	Protection,6. Transportation,7.Veterans' Affairs,8. Education,9.Science&high education 10.Health,11.Interior, 12.Social Policy&Displaced Persons
Constitutional Court of the Canton	Ensures legal compliance with the Cantonal Constitution
Public Companies / Agencies	Semi-autonomous entities under cantonal control (e.g., transport, utilities, investment)
Judicial and Oversight Institutions	
Cantonal Court of Sarajevo	Highest court in the canton, deals with civil, criminal, and administrative cases
Prosecutor's Office of Sarajevo Canton	Investigates and prosecutes criminal activity.
Constitutional Court of Sarajevo Canton	Handles disputes regarding the cantonal constitution
Ombudsman's Office	Protects citizen rights in cases of administrative misconduct.

Canton Sarajevo relationship with Municipalities

Sarajevo Canton is divided into 9 municipalities, each with its own municipal council and mayor **-** Stari Grad (Old Town), Centar, Novo Sarajevo, Novi Grad, Ilidža, Vogošća, Ilijaš, Hadžići, Trnovo. Municipalities handle local services like waste management, local roads, primary education, and zoning at the local level. Cantonal government coordinates cross-municipal infrastructure and broader policies (healthcare, public transport, police) Sarajevo Canton operates under the Federation of Bosnia and Herzegovina (FBiH)**,** which is itself one of the two entities of Bosnia and Herzegovina**.**
Federal level oversees: Defense, Customs, Banking, Inter-entity issues and Inter-cantonal coordination
State-level (Bosnia and Herzegovina) has jurisdiction over Foreign affairs, National defense, International treaties, State border control.
Canton Sarajevo has its own Institute for Development Planning of the Sarajevo Canton, that is a public institution engaged in strategic planning and development of the Sarajevo Canton. Its primary role is to provide expert support in the preparation, monitoring, and evaluation of strategic documents and policies that contribute to the sustainable development of the Canton. Key responsibilities and activities are development of strategic plans, monitoring and evaluation, coordination and Support to Institutions, data collection and processing and EU Integration and international cooperation.

3.2.2 Main stakeholders involved in the Functional Urban Areas: public authorities, ministries, municipalities, national/regional boards, clusters, relevant companies from industry-related sectors, major manufacturers in FUAs-related sectors, automotive, aerospace, IT, universities, research centres, specialized authorities in innovative industry sectors, public services companies, ports, airports, SMEs, business support centres, expert think-tanks, funding institutions, innovation poles etc.

Sarajevo Canton features a multi-level, cross-sectoral ecosystem of stakeholders — from public authorities and international donors to universities, research centres, private enterprises, civic platforms, and support infrastructure. Key focal points include **automotive**, **IT and telecom**, **innovation hubs**, **smart-city pilots**, and **academia-industry collaboration**.

Public Administration Institutions

Government of Sarajevo Canton – responsible for development policies and decision-making
Assembly of Sarajevo Canton – the legislative body that adopts strategic documents
Ministries of Sarajevo Canton, particularly: Ministry of Economy, Ministry of Transport, Ministry of Communal Economy, Infrastructure, and Spatial Planning, Ministry of Education, Science and Youth
Institute for Development Planning of Sarajevo Canton – coordinates and technically prepares development documents
Municipalities in Sarajevo Canton - Municipalities play a key role in local development and the implementation of cantonal strategies (Centar, Stari Grad, Novo Sarajevo, Novi Grad, Ilidža, Vogošća, Ilijaš, Hadžići, Trnovo)

Public Institutions and Companies

Communal infrastructure providers - **Sarajevogas** (natural gas operator), **GRAS** (public transportation company) **Toplane Sarajevo** (district heating company), **Vodovod i kanalizacija** (water and sewage operator company)
Sarajevo Canton Employment Service – Labor market policy
Public institutions in healthcare, education, and social protection

Academic and Research Community

University of Sarajevo – nation's largest public university, key to research-driven urban planning and development.
School of Economics and Business, University of Sarajevo – provides academic, economic, and policy research support
Sarajevo School of Science and Technology (SSST) – private university with computer science, engineering, and IT programmes
Institute for Genetic Engineering and Biotechnology (INGEB) – public research institute affiliated with University of Sarajevo engaged in biotech and innovation
Economic Institute – public research institute affiliated with University of Sarajevo

Innovation & Smart City Platforms

Smart Sarajevo Initiative — launched by City of Sarajevo and UNDP, fostering dialogue between citizens, authorities, private sector, and academia on digital urban development
City Mind Lab — a multidisciplinary, volunteer civic platform (120+ members) driving innovation ideas and co-design of urban solutions
The Urban Transformation Project Sarajevo supports the modernizing of the urban planning in the Canton of Sarajevo by proposing a digital decision-making Design tool for planning the city over the next 30 years. Through its different initiatives and work, the project contributes to the revitalization of Sarajevo and to creating better conditions for a sustainable and climate-resilient economic development. The multifaceted project includes a recently established work and event

space «*Urban Design Studio Sarajevo*»; a decentralized research, data collection and educational laboratory «*Studio Mobil*»; a *Digital Twin* of the whole City of Sarajevo
Net Zero Mission for the Sarajevo Functional Urban Area - European cities initiative striving to achieve climate neutrality by 2030.

Development Agencies, Think-Tanks & Cluster Initiatives

Sarajevo economic region development agency SERDA - regional development agency that supports the economic development and regional competitiveness of the Sarajevo region, with a focus on sustainable growth, innovation, and employment. It operates in line with EU policies and regional development standards.
Foreign Investment Chamber (FIC) – engaged in drafting Sarajevo Canton's Development Strategy 2021–2027, in coordination with chambers of commerce, ministries, and real-sector actors; supports innovation, export readiness, IT sector focus
Chamber of Commerce of the Federation of BiH & **Sarajevo Canton Employment Service** – key partners in cluster and workforce development efforts

Funding Partners & International Institutions

European Bank for Reconstruction and Development (EBRD), **European Investment Bank (EIB)** – co-financing urban regeneration projects like the University campus redevelopment and modern tram infrastructure in cooperation with Canton Sarajevo and Busch institutions
European Commission / EU Missions – notably through the **"100 Climate-Neutral and Smart Cities by 2030" mission**, partnering with Sarajevo FUA on its **Climate City Contract** initiative (finalised June 2025), and including international financial institutions, embassies, civic platforms, and citizen forums
The Urban Transformation Project Sarajevo supports the modernizing of the urban planning in the Canton of Sarajevo by proposing a digital decision-making Design tool for planning the city. The multifaceted project includes a recently established work and event space «Urban Design Studio Sarajevo»; a decentralized research, data collection and educational laboratory «Studio Mobil»; a Digital Twin of the whole City of Sarajevo; small-scale and prototypical architectural interventions; teaching at the Federal Institute of Technology Zurich and the University of Sarajevo; and a recently established eCity Action Lab that allows citizens to help map the current state of the city, its development process and their ideas for the city.

Private Sector - Large and medium-sized companies in IT, construction, tourism, energy, and manufacturing sectors

Chamber of Economy of Sarajevo Canton and other business networks
Startup community and HUBs (Sarajevo Innovation Centre, HUB387)
Volkswagen Sarajevo (Vogošća) – automotive manufacturer producing chassis components and electric van bodies, active in Sarajevo FUA's industrial ecosystem
Private sector innovators, IT companies, telecom providers – involved in Smart City pilot projects, from air-quality monitoring to digital urban mobility solutions

International and Non-Governmental Organisations

UNDP, GIZ, EU Delegation, World Bank, USAID – project support and technical assistance
Local and international NGOs focused on community development, environment, and human rights

3.2.3 Stakeholders' cooperation patterns in FUAs within the country but also with FUAs from other countries

While BiH does not yet have a fully formalized national FUA policy, several cooperation patterns have emerged—particularly in EU-aligned development efforts, regional projects, and cross-border collaboration. Stakeholders cooperate through both formal and informal mechanisms at the **national, entity, local** and **international** levels.

National Cooperation

Horizontal Cooperation (City-to-City, Municipality-to-Municipality Canton-to-Canton)

Joint infrastructure projects (transport, utilities, digital infrastructure), shared services (e.g. waste management, economic zones), common development strategies (especially among municipalities in Sarajevo, Tuzla, and Banja Luka urban zones)

Vertical Cooperation (Local–Cantonal–Entity–State)

Coordination between local authorities and cantonal/entity governments for strategic development documents, funding (e.g. IPA, IFIs, national grants) and Statistical harmonization (monitoring)

Public–Private Partnerships (PPPs)

SMEs, chambers of commerce, and clusters partner with public institutions for Innovation hubs, startup support, Business zone development and Green transition projects.

Cooperation with FUAs from Other Countries (Cross-border / EU Integration Context)

Participation in EU-Funded Programs (Interreg, IPA CBC, Danube Transnational Programme) focused on Urban innovation, Sustainable mobility (e.g. low-carbon transport), climate adaptation and smart specialization.
Networks and Platforms - EUROCITIES, Covenant of Mayors, Green Cities Network, Projects under URBACT and Horizon Europe. Sharing best practices with cities from the Western Balkans and EU member states. Thematic and Sectoral Cooperation related to Urban resilience, Circular economy, Energy transition and Tourism and cultural heritage

3.2.4. Other relevant players in the country's FUAs

National level

Ministry of Foreign Trade and Economic Relations (MoFTER) – coordination of EU and international economic development policies, environment, and energy (in absence of a dedicated Ministry for Regional Development)
Agency for Statistics of BiH (BHAS) – provides data relevant for defining and monitoring FUAs (population, commuting, services access)

Entity-Level (FBiH & RS)

Federal Ministry of Spatial Planning (FBiH) and Ministry for Spatial Planning, Construction and Ecology (RS) – spatial strategies and legislative frameworks

Federal Institute for Development Programming (FZZPR) – leads strategic and territorial development in FBiH
Republic Institute for Urbanism and Spatial Planning of the RS – spatial development in Republika Srpska

Cantonal/Regional Level

Institute for Development Planning of Sarajevo Canton – strategic planning, coordination and GIS-based monitoring of development in Sarajevo FUA

Cantonal ministries (economy, transportation, environment) – sectoral development and investment management

Municipal Level

City governments and municipal administrations – key implementers of local development projects

Development Agencies and Planning Institutions

- SERDA – Sarajevo Economic Region Development Agency
- REDAH – Regional Development Agency for Herzegovina
- NERDA – Northeast Regional Development Agency
- RARS – Agency for Regional Development of Republika Srpska

These agencies coordinate strategic development projects, SME support, cross-border cooperation, and urban/regional planning.

Academic and Research Institutions

Universities (e.g. University of Sarajevo, Banja Luka, Tuzla, Mostar) – hubs for research, innovation, urban resilience, and smart specialization
Institutes for planning, transport, architecture, and environment – support evidence-based policy and project design

Private Sector and Economic Actors

Chambers of Commerce (e.g. Chamber of Economy of FBiH, Chamber of Commerce of RS) – support business participation in FUA development
Large enterprises in construction, energy, ICT, tourism – partners in infrastructure and innovation projects
Tech hubs and incubators: HUB387 (Sarajevo), INTERA (Mostar), BIT Centre (Tuzla)

Civil Society and Local Initiatives

NGOs and local development organizations – promote participatory planning, green urbanism, social inclusion (Green Council, Mozaik Foundation, CRP, LIR Evolution)

International Organizations and Donors

UNDP, GIZ, EU Delegation to BiH, World Bank, EBRD, USAID, SIDA – provide funding, technical assistance, and policy alignment.

The Swiss State Agency for Economic Affairs (SECO) is funding the UTPS project with the aim of modernizing urban planning, introducing transparency and climate resilience through participatory processes with collaboration with Helvetas**,** ETH Zurich and Urbanplan contribute to the co-creation and implementation of urban transformation policies of the Sarajevo region.

3.3 National Policy on FUAs in BOSNIA and HERZEGOVINA

3.3.1 Funding for Functional Urban Areas by National Programmes / other funding programmes / support schemes

National Funding Programmes / Entity and Cantonal Budgets

Cantonal and municipal budgets provide core funding for local infrastructure, spatial planning, and public services within FUAs.

Development Funds and Agencies

Development Bank of the FBiH - operates as a financial institution that manages the development funds of the FBiH
Investment and Development Bank of the Republic of Srpska (IRBRS) - central institution for managing development funds of the Republic of Srpska. Fund for environment protection FBiH and Fund for environment protection and energy efficiency RS – fund project in environment protection and development
Regional Development Agencies

EU-Funded Programmes and Support Schemes

Bosnia and Herzegovina, as a candidate/potential candidate country, benefits from multiple EU funding instruments relevant to FUAs:

IPA (Instrument for Pre-accession Assistance), supports regional development, cross-border cooperation, and territorial cohesion.
Interreg (Cross-Border Cooperation Programmes), promotes cooperation in BiH and neighbouring countries (Croatia, Serbia, Montenegro). Focus on sustainable urban development, green infrastructure, and smart cities.
Horizon Europe & URBACT - Research, innovation, and urban development networks and projects including FUA actors. Support innovative solutions for smart, sustainable urban areas.

Other International Donors and Multilateral Support

World Bank and EBRD - Investment loans and grants for urban infrastructure, transport, and environmental projects

UNDP, GIZ, USAID, SIDA, SECO, JICA - Technical assistance, capacity building, and pilot projects in urban development, climate adaptation, and employment.

Private Sector and Public-Private Partnerships (PPP)

Growing but still limited role in funding. PPPs mainly in infrastructure (roads, energy, utilities) and innovation hubs development.

3.3.2 Smart specialisation fit with regards to Functional Urban Areas (strategy documents)

Bosnia and Herzegovina is focusing on aligning its national development goals with the UN's Sustainable Development Goals (SDGs), aiming for smart economic growth, social cohesion, infrastructure development, environmental sustainability, good governance, poverty reduction, and human capital development. The country emphasizes digital transformation across all sectors to drive economic growth, enhance competitiveness, and improve public services. Despite the strategic planning, challenges such as complex governance structures, limited resources, and the need for enhanced digital infrastructure persist. However, BiH recognizes the opportunities digitalization presents in traditional sectors and aims to leverage these for broader economic and social benefits. Bosnia and Herzegovina is still in the early stages of formulating and adopting S3. Current efforts are directed towards setting up a working group and defining the strategic sectors that will drive economic development. The process involves extensive stakeholder engagement and aligns with European Union frameworks, aiming to pinpoint areas where BiH can leverage its unique strengths and competitive advantages. Although implementation challenges such as governance complexity and resource limitations exist, the S3 initiative is seen as crucial for fostering innovation and technological adoption. Strategic sectors such as ICT, automotive, energy, and agriculture are central to BiH's S3. The choice of these sectors is strategic, aiming to harness specific regional strengths and meet global demand trends. For instance, the ICT sector is seen as a catalyst for modernization across other sectors, while the energy sector's focus on renewables aligns with global sustainability goals. Similarly, the traditional agricultural sector's transformation through digital technologies could lead to significant efficiency gains and output increases, helping to stabilize rural economies and improve food security.
Development Strategy of Sarajevo Canton (2021–2027) demonstrates a strong alignment with the principles of smart specialization by prioritizing innovation, digital transformation, and the green economy as core development drivers. It leverages key instruments such as the Sarajevo innovation ecosystem, cluster development, and research and development partnerships to foster knowledge-based growth. A functional urban approach is incorporated into strategic areas such as sustainable mobility, environmental management, and the development of integrated economic zones.

3.3.5 RTDI funding available for Functional Urban Areas (funding at regional/national level for research or for specific Functional Urban Areas)

3.3.6 Classify, categorize, and record all relevant Functional Urban Areas RTDI related to legal framework, policies, strategies, methodologies, objectives, visions, practices, at national level

Bosnia and Herzegovina has a fragmented but gradually developing system for funding RTDI activities, driven by entity, cantonal, international, and private sector sources. Although there is no unified national RTDI fund, various funding streams are available for research institutions, startups, companies, and public bodies—especially in urban and innovation-focused areas.

National and Entity-Level Public Funding

Ministry of Education and Science of FBiH - Competitive grants for scientific research, publication support, and international cooperation
Federal Ministry of Development, Entrepreneurship and Crafts - Funds for innovation, product development, and technology modernization in SMEs
Cantonal Ministries (e.g., Sarajevo Canton) - Innovation funds, digital transformation support, co-financing for R&D projects
Innovation Fund of Republika Srpska - Startup and SME support, incubation, and innovation infrastructure co-financing
Brčko District - Smaller-scale, project-based support via the Department for Education and Government, participation in international RTDI initiatives encouraged
Development Bank of the Federation of BiH - Offers credit lines and manages public funds for business development and innovation projects
Investment and Development Bank of RS (IRBRS) - Provides concessional loans and investment incentives for innovation, tech-based SMEs, and industrial modernization
Regional Development Agencies (RDAs) provide technical support and access to external RTDI funding, but also EU project development (Interreg, Horizon, IPA), Innovation ecosystem facilitation and Cluster development and technology transfer support.

EU and International RTDI Funding Sources

Through programmes IPA III (2021–2027), Interreg CBC, Horizon Europe, URBACT, LIFE, COSME, Digital Europe, World Bank, EBRD, UNDP, GIZ, USAID

Private Sector & Innovation Infrastructure Funding

Business Angels and Early-Stage Investors: Limited activity but growing in Sarajevo, Banja Luka
Innovation Centres and Tech Parks (HUB387, INTERA, BIT Tuzla)
Chambers of Commerce & Industry Associations: Co-finance innovation-related services (training, consulting, certification)

3.4 The current situation of the Functional Urban Areas

3.4.1 Functional Urban Areas support mechanisms:

- Policy makers in Functional Urban Areas related sectors
- National authorities in Functional Urban Areas related sectors
- Funding institutions related to Functional Urban Areas support schemes
- Business support/consulting boards, offices for specific Functional Urban Areas

Policy Makers in FUAs-Related Sectors

Since BiH has a complex, multi-level governance system, FUA-related policy making is fragmented and often driven by **entities, cantons, municipalities, and international partners**.

1. Urban Planning, Spatial Development & Environment

National level
Ministry of Foreign Trade and Economic Relations (MoFTER) - Coordinates spatial planning only in terms of international cooperation and EU projects. No direct authority over land use or urban development.

Entity Level
Federal Ministry of Spatial Planning (FbiH) Oversees urban development policies
Federal Ministry of Environment and Tourism (FBiH) - Environmental standards, sustainability, and climate resilience.
Ministry of Spatial Planning, Civil Engineering and Ecology (Republika Srpska) - Full control over urban development, land use, and ecology.

Cantonal Level
Ministry of Spatial Planning, Construction and Environmental Protection

Municipal Level

City and Municipality Planning Departments - Direct implementation of zoning, permits, and local spatial plans.

2. Transport and Infrastructure

Entity Ministries of Transport and Communications - Develop transport policy and infrastructure at entity level. Responsible for highways, railways, and regional transport strategy.
Cantonal & Municipal Transport Departments - Oversee public transport, urban mobility, and road maintenance.

3. Economic Development and Innovation

Entity and Cantonal Ministries of Economy - Support SMEs, industrial zones, smart specialization.
Foreign Investment Promotion Agency (FIPA) - Promotes economic zones and urban-industrial integration.
Chambers of Commerce (BiH, FBiH, RS)- Influence regional economic policy and provide support to urban enterprises.

4. Regional and Urban Development

Regional Development Agencies (RDAs)

Directorate for European Integration (DEI) - Coordinates IPA funding and harmonization with EU Cohesion and Regional Policy.

5. Statistical and Spatial Data Institutions

Agency for Statistics of BiH (BHAS) - Provides key data for defining FUAs based on population, commuting zones, etc.
Entity Statistical Institutes (FBiH, RS) - Support with detailed territorial and socio-economic data.
Geodetic Administrations - Maintain spatial databases, cadastre, and urban land systems.

6. Academic and Research Institutions

Universities and Institutes - Provide technical expertise, research, and innovation policy support.

7. International Actors

European Union Delegation to BiH / IPA Support Offices - Funding and guidance for sustainable urban development, FUA pilot projects.

UNDP, GIZ, World Bank - Technical assistance in regional governance, smart cities, resilience.

National authorities in Functional Urban Areas related sectors

Local governments / **Municipalities and cities (**Mayors / municipal heads, Municipal/city councils, Departments for urban planning, public utilities, transport, etc.) **manage local policies**
Cantonal and entity-level institutions responsible for Spatial planning, Transport, Education, Health, Infrastructure and Utilities

Funding institutions related to Functional Urban Areas support schemes

European Union (EU) - The largest and most influential funder of FUA-related initiatives in BiH. Promotes multi-level governance **and** inter-municipal coordination and encourages spatial data sharing and joint planning

UN-Habitat - Active in urban development and integrated spatial planning. Supports urban labs, capacity building, and sustainable urban mobility

UNDP (United Nations Development Programme)-Supports local development, green infrastructure, resilience, and e-governance

UNICEF, WHO - contribution in cross-sectoral urban planning related to health, youth&education

GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) - Implements urban development**,** governance**, and** inter-municipal cooperation programs
JICA (Japan International Cooperation Agency) - Funded FUA-related projects in public transport**,** land use**,** and urban mobility (especially Sarajevo and surrounding municipalities)
World Bank - Supports regional and local development planning (especially spatial data systems). Promotes digital transformation of spatial planning
European Bank for Reconstruction and Development (EBRD) - Funds urban transport**,** energy efficiency, and public utilities. Often supports municipalities through Green City Action Plans (GCAPs)
European Investment Bank (EIB)- Financing for infrastructure**,** urban resilience**,** wastewater**,** mobility and technical assistance through several programs.
Entity-level development or environment funds **(e.g. Environmental Protection Funds of FBiH and RS)**
Business support/consulting boards, offices for specific Functional Urban Areas

In **Bosnia and Herzegovina**, **Functional Urban Areas (FUAs)** do not yet have formalized administrative structures, so **business support or consulting boards specific to FUAs** are **not**

institutionalized as they might be in EU countries with metropolitan governance bodies. However, there **are business support institutions and consulting bodies** that **operate in practice within specific urban areas** (such as Sarajevo, Banja Luka, Tuzla, Mostar) and often serve the **broader functional area**, even if they are not officially labeled as "FUA offices."

3.4.2 FUNDA QUESTIONNAIRE of FUAs in BOSNIA and HERZEGOVINA

See ANNEX

3.5 The challenges the Functional Urban Areas face to develop

3.5.1 FUAs need to work in a sound working climate to improve the business performance assured by the FUAs

While Bosnia and Herzegovina does not have an official national FUA framework, the concept is increasingly relevant for Regional development, EU integration, urban-rural coordination and accessing funding (IPA, cross-border cooperation). Challenges of development and establisment of (FUAs) in BiH are:

Fragmented Governance Structure / The complex and decentralized political-administrative system of BiH—comprising the state, entities, cantons, and municipalities—poses significant challenges to coordinated planning and decision-making across urban and peri-urban areas. Currently, there is no institutional framework to facilitate inter-municipal or inter-entity collaboration within FUAs.

Lack of Legal and Strategic Recognition / FUAs are not officially acknowledged in BiH's legal or policy frameworks. There is no dedicated strategy or formal integration of FUAs into spatial, economic, or transport planning legislation at any administrative level.

Limited Administrative and Technical Capacities / Many local governments lack the institutional capacity, technical tools, and human resources necessary for effective cross-boundary coordination. Additionally, data related to mobility, service provision, land use, and socio-economic trends is often incomplete, outdated, or inconsistently collected.

Inadequate Financial Frameworks / FUAs lack access to targeted funding instruments or joint investment schemes. Budget planning and the use of external (including EU) funds are rarely coordinated among central cities and their surrounding municipalities, limiting the potential for shared development initiatives.

Weak Cooperation Culture / Institutional fragmentation is compounded by a lack of trust and collaborative culture among local authorities. Political and administrative divisions often hinder the formation of functional partnerships based on shared territorial and economic interests.

Unfavorable Working Environment / FUAs require a stable, transparent, and business-enabling environment to thrive. In its absence, efforts to improve business performance, stimulate entrepreneurship, and attract investment remain constrained.

Urban-Rural Disparities / There is a lack of integrated policies that address the needs of both urban cores and surrounding rural or suburban areas. This leads to uneven access to

infrastructure, services, and economic opportunities, further deepening spatial and social inequalities within FUAs.

3.5.2. Managing Risk and Innovation: the Challenge for Functional Urban Areas

To effectively manage risk and unlock innovation, in process of development/establishment of FUAs in BiH, governance mechanisms and cross-jurisdictional collaboration must be strengthen, enabling frameworks for innovation, research, and digitalization must be established, risk awareness and resilience planning across sectors improved, flexible funding instruments and public-private partnership accessible and innovation in local development strategies embedded.

Governance and Institutional Risk / Weak inter-municipal coordination and fragmented administrative responsibilities create uncertainty and hinder risk-informed decision-making. Limited institutional capacity reduces FUAs' ability to anticipate and respond to external shocks (economic, environmental, or political).

Innovation Gaps and Unequal Access / Innovation ecosystems in BiH are underdeveloped and highly concentrated in a few urban centres. Many FUAs lack structured support for startups, digital infrastructure, research institutions, and knowledge transfer between academia and industry.

Financial and Investment Risk / Inconsistent or delayed access to funding—particularly EU and donor support—impedes long-term innovation planning. FUAs rarely manage pooled or flexible resources that allow experimentation and risk-taking in public policy or infrastructure development.

Low Risk Tolerance in Public Administration / Local administrations tend to prioritize short-term, low-risk interventions due to political and institutional constraints. This limits their ability to engage in forward-looking strategies, test new models of governance, or adopt innovative solutions.

Vulnerability to External Shocks / FUAs in BiH are increasingly exposed to climate-related, economic, and demographic pressures. Lack of integrated urban resilience planning leaves them vulnerable to crises (e.g., floods, migration, market shifts).

Innovation Without Strategic Alignment / Existing innovation initiatives often lack alignment with regional development strategies or smart specialization priorities. Without clear governance and coordination, innovation efforts remain isolated and fail to generate systemic impact.

3.5.3 Benchmarking against leader FUAs, to adopt best practice for specific functions of the FUAs

Establishment and development of Functional Urban Areas (FUAs) in Bosnia and Herzegovina should undertake **systematic benchmarking** with successful FUAs across the EU and wider region. This approach enables the **adaptation of proven best practices** aligned with specific functional needs, such as urban mobility, innovation, sustainable land use, digital governance, and inter-municipal cooperation. **Priority Actions should be Identification of comparable FUAs** with similar demographic and economic characteristics, **Assess leading models** in governance, strategic planning, and investment, **Adaptation and implementation of transferable solutions** in areas like integrated transport, climate adaptation, business support, and digital public services. **Join EU-supported learning platforms and networks**, such as URBACT, EUROCITIES, and Urban Innovative Actions. By engaging in structured peer learning,

FUAs in BiH can **accelerate institutional development**, **minimize implementation risks**, and **foster more resilient, innovative, and inclusive urban systems**.

3.6 Opportunities and obstacles of Functional Urban Areas

3.6.1 Opportunities for Functional Urban Areas - Megatrends: environmental challenges, urbanization & megacities, ageing society, energy demand and sources, changing lifestyle etc.

Opportunities in Establishing Functional Urban Areas (FUAs) in BiH

1. Improved Inter-Municipal Cooperation

FUAs encourage collaboration across municipal and entity boundaries, allowing urban cores and surrounding areas to jointly plan infrastructure, services, and development.

Helps overcome fragmented governance and duplication of efforts.

2. Integrated Spatial and Economic Planning

FUAs allow for more coordinated and evidence-based planning that reflects real commuting zones, service use, and economic linkages. Leads to more effective land use, transport, housing, and business development.

3. Better Access to EU and International Funding

Establishing FUAs aligns with EU-OECD methodologies, opening doors to pre-accession, cross-border cooperation, and cohesion funds. FUAs can be platforms for absorbing funds related to smart cities, green transition, and innovation.

4. Targeted Public Service Delivery

FUAs enable shared service models (e.g., waste management, public transport, health services) across municipalities, improving quality and efficiency. Reduces disparities between urban centers and their suburban or rural surroundings.

5. Support for Innovation and Competitiveness

FUAs can become hubs for innovation by fostering links between businesses, universities, research institutions, and local governments. Encourages clustering, knowledge transfer, and smart specialization at the regional level.

6. Enhanced Urban-Rural Synergies

FUAs create structured links between urban markets and rural production zones, supporting local value chains, food systems, and tourism. Strengthens territorial cohesion and reduces regional inequality.

7. Greater Institutional Visibility and Influence

Recognized FUAs are better positioned to represent regional interests in national policy-making and international cooperation. Creates a stronger voice for functional regions rather than isolated municipalities.

8. Resilience to Demographic and Environmental Challenges

FUAs allow coordinated responses to challenges like aging populations, youth emigration, natural hazards, and climate adaptation, which require joint action.

3.6.2 Obstacles for Functional Urban Areas (ex. lack of financial sources, gaps in Functional Urban Areas financing, missing qualified personnel, difficult collaboration with the public authorities, weak collaboration between universities/ research centres and Functional Urban Areas

Obstacles to the Establishment of Functional Urban Areas (FUAs) in BiH

1. Fragmented and Complex Governance Structure

BiH's administrative setup (state, entities, cantons, municipalities) leads to overlapping responsibilities and jurisdictional fragmentation. No legal or institutional mechanisms exist to support inter-municipal or inter-entity cooperation on a functional urban basis.

2. Lack of Legal Recognition for FUAs

FUAs are not defined or recognized in national, entity, or cantonal laws. Absence of a legal basis prevents formal planning, coordination, or funding allocation for FUAs.

3. Weak Inter-Municipal Cooperation

Many municipalities operate in isolation, with limited tradition or incentive for cooperation. Political and ethnic divisions further complicate partnerships across administrative or entity lines.

4. Limited Institutional Capacity

Municipalities often lack the technical expertise, human resources, or financial tools to initiate or manage joint planning processes. Data needed to define and manage FUAs (e.g., commuting flows, service usage) is fragmented or outdated.

5. No Dedicated Funding Mechanisms

There is no financial framework for shared infrastructure or joint development initiatives within FUAs. EU and donor funding is often accessed separately by municipalities, leading to competition rather than coordination.

6. Resistance to Change and Power-Sharing

Local political actors may resist FUA formation due to fear of losing control, resources, or visibility. Institutional inertia and short-term political interests often outweigh long-term functional cooperation.

7. Lack of National Policy or Strategy

No national or entity-level FUA strategy exists to guide their identification, governance, or development. FUAs are not integrated into spatial planning, regional development, or public service frameworks.

8. Public Awareness and Stakeholder Engagement Gaps

Citizens, businesses, and civil society are often unaware of the FUA concept or its potential benefits. Lack of stakeholder involvement leads to low ownership and implementation difficulties.

9. Inconsistent Data and Planning Tools

No unified system for collecting, analysing, and sharing data on functional relationships between urban cores and surrounding areas. Planning tools remain focused on administrative boundaries rather than functional logic.

3.7 Functional Urban Areas - SWOT ANALYSIS in BOSNIA and HERZEGOVINA

SWOT Analysis: Establishment of Functional Urban Areas (FUAs) in BiH

Strengths	Weaknesses
▪ Increasing relevance of FUAs in EU integration and regional development strategies. ▪ Existence of urban centres with functional ties to surrounding areas (e.g., Sarajevo, Banja Luka, Tuzla). ▪ Growing awareness among institutions and donors of the importance of urban-regional cooperation.	▪ Fragmented governance and complex administrative structure (state–entity–canton–municipality). ▪ FUAs not legally or institutionally recognized in BiH legislation. ▪ Weak inter-municipal cooperation culture and limited incentives for collaboration. ▪ Lack of technical, financial, and human capacity at local government level. Inadequate and inconsistent data systems.
Opportunities	**Threats**
▪ Alignment with EU-OECD FUA methodology opens access to pre-accession and cohesion funds. ▪ Potential to improve service delivery, infrastructure, and economic development through joint planning.	▪ Resistance from political actors due to perceived loss of autonomy or resources. ▪ Institutional inertia and short-term political agendas may block reforms. ▪ Risk of overlapping or conflicting mandates among administrative levels.

▪ Encourages innovation, smart specialization, and integrated territorial development. ▪ Supports urban–rural linkages, social inclusion, and environmental sustainability. ▪ Facilitates participation in EU programs (e.g., URBACT, Interreg, Horizon Europe).	▪ Potential for increased regional disparities if FUAs are not strategically and inclusively developed ▪ Limited public awareness and stakeholder engagement may undermine legitimacy and support.

Results

The **baseline study of Functional Urban Areas (FUAs)** in BIH and Canton Sarajevo provides **critical insights** into urban development, governance, and economic trends.

Results from FUAs Baseline Study in Bosnia and Herzegovina shows that administrative structure is decentralized and complex. Urban areas often overlap entity and canton borders.This creates challenges in integrated urban planning, data collection, and service delivery. BiH does not have a formal legislative framework regulating Functional Urban Areas (FUAs). FUAs are not a legal-administrative category like municipalities or cantons. There are important indirect mechanisms and strategic documents that recognize or incorporate FUA principles, in urban planning, spatial development, transport, and EU-aligned policy frameworks. Functional Integration is weak and coordination between municipalities and canton/entities is poor.

Legal Framework Assessment reviews existing **urban planning laws, governance models, and interjurisdictional cooperation**.

Development Trends – Identifies **economic and demographic trends**

Infrastructure & Mobility Analysis – Evaluates **transport networks, connectivity, and smart city initiatives**.

Economic Competitiveness – Examines **sectoral strengths** and investment trends.

Social & Environmental Challenges – Highlights **climate resilience, energy transition, and urban sustainability**.

Results from FUAs Baseline Study in Canton Sarajevo

Canton Sarajevo is in many studies recognized as FUA **which spans multiple municipalities and cantons**. This baseline study shows:

Regional Inequality Assessment – Identifies **economic disparities and infrastructure gaps**.

Economic & Sustainability Trends – Evaluates **economic trends**

Urban Development & Mobility – Analyses **regional transport networks and connectivity**.

Innovation & Smart Specialization – Status of integration of **digitalization, energy efficiency, and business competitiveness**.

Funding & Investment Strategies – Reviews **EU-funded projects and private sector engagement**.

Conclusions

Conclusions from the FUAs Baseline Study in Bosnia and Herzegovina

The baseline study highlights several **key findings** regarding BiH's Functional Urban Areas (FUAs):

- **Urban Governance Reform –** No legal status for FUAs, Functional area–based cooperation mechanisms
- **Urban Development Needs** – Harmonized and integrated urban planning across administrative boundaries, especially on mission of establishment of FUAs
- **Economic Competitiveness** – contribute significantly to **national GDP**
- **Monitoring and Evaluation** - Outdated or inconsistent urban data; weak monitoring and evaluation frameworks.
- **Infrastructure & Mobility** – Investments in **transport networks especially regional commuting networks, smart cities, and green infrastructure** (bike lanes, pedestrian zones)
- **Innovation & Digitalization** – FUAs must accelerate **technology adoption and research collaborations**.
- **Funding & Investment Gaps** – **EU funding** plays a crucial role, but **private sector engagement** needs improvement and more engagement of Private private partnerships

Conclusions from the FUAs Baseline Study in Canton Sarajevo

Canton Sarajevo FUA recognized area face **unique challenges and opportunities**:

Governance and Cross-Border Coordination - Metropolitan governance mechanisms or inter-municipal councils; Data sharing and cross-entity coordination (especially on transport and environment), Strengthening of urban planning and permitting institutions

Resilient and Climate-Ready Infrastructure - Flooding and Urban heat islands need to be solved with Nature-based solutions, Flood defenses and early warning systems and Local Climate Action Plan implementation.

Digitalization and Smart Urban Services - Legacy infrastructure limits innovation and limited real-time urban data and citizen engagement tools need smart traffic management systems, open data portals for urban services and digital urban planning tools and public participation platforms

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Podravje Region
SLOVENIA


3.1 Database of SLOVENIA

3.1.1 General geographical information (country geographical location, population, administrative organization: counties/towns/villages, centralized or decentralized governance)

The Republic of Slovenia is strategically located in Central Europe, serving as a natural crossroads between four major geographical and cultural regions: the Alpine, Pannonian, Dinaric, and Mediterranean areas. This unique position gives Slovenia a diverse landscape, ranging from high mountains and alpine valleys to fertile plains and a short Adriatic coastline. The total land area of Slovenia covers 20,271 square kilometres, making it a relatively small but geographically varied country.

As of 2025, Slovenia's population is estimated to be approximately 2,130,850 inhabitants, with a median age of 44.4 years, reflecting an aging population trend similar to many European countries.

The capital and largest city is Ljubljana, a political, economic, and cultural centre, followed by other important urban areas such as Maribor, Celje, and Kranj.

Administratively, Slovenia is divided into multiple levels: two cohesion regions (NUTS2), twelve statistical regions (NUTS3), and 212 municipalities (Local Administrative Units - LAU), out of which 12 municipalities hold the status of urban municipalities due to their size and economic significance. The country is further subdivided into over 6,000 settlements ranging from large cities to small rural villages.

Slovenia is a **unitary state** with a **decentralized governance system** designed to balance national coordination and local autonomy. The decentralization is governed by the ZSRR-2B Act (Law on the Promotion of Balanced Regional Development), which promotes regional development through designated development regions. These regions serve as coordination units rather than politically autonomous entities. The basic units of governance and local development planning are the municipalities; Slovenia does not have administrative counties or provinces as some other countries do.

Slovenia does not recognize Functional Urban Areas (FUAs) as distinct entities. Instead, the country promotes regional development through twelve designated regions, of which only two qualify as FUAs. One of these is the Podravje Region, which includes the Municipality of Maribor and is also a pilot area in the FUNDA project. This area meets the definition of a FUA, consisting of a city and its commuting zone. Whenever possible, we will refer to Slovenia. However, in cases where this is not feasible, such as in a SWOT analysis, we will focus on the Podravje region instead.

3.1.2. Legislative framework for FUA in Slovenia

Functional Urban Areas (FUAs) in Slovenia function within a comprehensive legislative framework aimed at fostering **balanced regional development and decentralization**. The primary legal basis is the ZSRR-2B Act, which formally defines development regions, their structures, and their roles in regional planning and coordination.

Under ZSRR-2B Act, development regions such as Podravje are granted legal recognition but are not autonomous political units with independent legislative power. Instead, they operate through **Regional Councils** (Svet regije) and **Regional Development Councils** (Razvojni svet regije), which include representatives from municipalities and other regional stakeholders. These bodies are responsible for programming, strategic planning, coordinating inter-municipal projects, and managing the implementation of national and EU funds within their territory.

The Constitution of Slovenia provides for **municipal autonomy** (Article 9), affirming the self-governing role of municipalities. However, regional governance and development coordination rely on statutory laws rather than constitutional regional autonomy, underscoring the unitary nature of the Slovenian state while enabling functional decentralization for development purposes.

Regional spatial planning began to be introduced in Slovenia in 2018 with the adoption of the Spatial Planning Act. Due to the absence of the implementation of local self-government at the regional level, it relies on systemic solutions provided by the policy of balanced regional development of the country.

The **regional spatial plan** is a strategic document in which the state and municipalities agree on the spatial development of a specific region and determine key development opportunities. It establishes the vision and objectives of regional spatial development, its design, and the directions and measures for subsequent spatial planning. The purpose of elaborating the RSP is to discuss and define its contents in more detail, in accordance with Article 75 of the Spatial Planning Act (ZUreP-3) and the Resolution on the Spatial Development Strategy of Slovenia 2050 (ReSPR50), at the regional level. The RSP will define key regional spatial challenges and orientations. The RSP project will run until mid-2027, by which time it must be officially approved and published in the Official Gazette. Preparing the RSP involves the cooperation of different levels of government, whereby the state and municipalities agree on spatial arrangements for individual development regions. This involves coordinating spatial planning designs, with municipalities defining local regulations such as important economic zones and state departments coordinating spatial solutions of national importance.

Regional-level spatial planning is key to coherent regional development and balanced spatial development of the country. The elaboration of regional spatial plans is partially financed by the state budget (60%), with the remainder coming from municipalities, whose contributions are divided according to the number of inhabitants and other criteria. The process also includes a participatory approach, taking into account the participation of interested stakeholders.

3.1.3 FUAs guidelines in Slovenia

Slovenia's approach to managing FUAs is closely aligned with the broader regional development policies and strategies embedded in the Regional Development Programmes (RRPs). These programmes are formulated and coordinated at the development region level by the Regional Councils and Development Councils.

FUAs follow guidelines that emphasize sustainable and balanced territorial development, focusing on creating dynamic and creative regions with distinct identities. The Slovenian Development Strategy 2030 serves as the guiding document for these efforts, targeting increased economic competitiveness, social cohesion, environmental protection, and improved quality of life.

Key guidelines for FUAs include:

- Promoting economic efficiency combined with social justice and environmental sustainability.
- Encouraging regions to become **recognizable and specialised** by capitalizing on their unique assets.
- Supporting effective management and fostering the ability to detect and exploit global development opportunities.
- Focusing on reducing development disparities and ensuring convergence with broader European development levels.

- Facilitating **international cooperation and integration** with neighboring regions and within the European Union framework.

3.1.4 FUAs methodologies in Slovenia

The methodology applied for FUAs in Slovenia is characterized by a **multi-level, bottom-up approach** to regional development. This approach integrates local, regional, national, and EU levels of governance to create a coherent yet flexible framework for development activities.

Key features of the methodology include:

- **Territorial focus** with tailor-made measures respecting the unique characteristics of individual urban and rural areas within FUAs.
- Emphasis on **partnership and cooperation** among municipalities, business sectors, civil society organizations, and public institutions.
- **Programme-oriented development incentives** that align national priorities with regional strategies.
- Continuous **monitoring, evaluation, and adaptation** to respond effectively to emerging challenges and opportunities.
- Ensuring **regional autonomy** in decision-making regarding project selection and financing within the limits set by national and EU regulations.
- Promotion of **integration within FUAs and with external regions**, including cross-border and interregional cooperation.
- Clear division of responsibilities with the national level focusing on policy steering and coordination, while local and regional levels handle planning and implementation.

This methodology supports the sustainable growth of FUAs, ensuring that they contribute effectively to Slovenia's overall territorial cohesion and competitiveness.

3.1.5 Selected players in the FUA Podravje region

Since Slovenia does not officially recognize FUAs as distinct entities, the Podravje region serves as a clear illustration. Located in northeastern Slovenia and centered on the city of Maribor, Podravje is economically significant, hosting major industrial, service, and research actors. Each FUA features its own set of local stakeholders, reflecting specific economic, institutional, and spatial characteristics.

Economic Performance

In 2023, the average value added per employee in Podravje was €48,681, compared to the national average of €56,709. Even in the main observed sectors (C, G, H, M), the region trailed by €5,729 per employee. Workforce concentration in low value-added activities remains higher than the national average.

Sectors with the highest value added in Podravje include:

- Energy supply (D35).
- Basic metals (C24)
- Chemicals (C20)
- Beverages (C11)
- Real estate (L68)
- Health (Q86)
- Machinery (C28)
- ICT (J61, J62, J63)
- Paper (C17)
- Scientific research and development (M72)

Podravje accounts for only 2.2–3.3% of Slovenia's total R&D tax relief amounts, despite 9–10% of participating companies. Investments remain heavily concentrated in just eight sectors, reflecting limited diversification.

Key Industrial Actors

Company	Value added per employee (2023)	Total income (2023)	Employees (2023)	Sector
PERUTNINA PTUJ d.o.o.	€47,092.68	€267,268,000	2,158	C10
IMPOL PCP d.o.o.	€64,630.11	€135,640,470	424	C25
Aluminium Kety Emmi d.o.o.	€46,073.74	€43,517,179	398	C25
BJG MONT d.o.o.	€50,841.97	€2,518,366	34	F41
PLOJ d.o.o.	€69,702.28	€19,619,041	116	H49
IMPOL FT d.o.o.	€70,457.62	€79,957,125	218	C25
GEBERIT proizvodnja d.o.o.	€82,611.27	€52,777,470	276	C22
MTC FONTANA d.o.o.	€92,669.79	€9,557,770	68	Q86
ŠPEDICIJA GOJA d.o.o.	€46,089.24	€20,551,139	132	H49
PALFINGER d.o.o.	€58,181.95	€240,297,611	841	C28

Source: Pučnik, B., Študija propulzivnih podjetij. RRAPM, 2025

Services Sector:

Key service-related sectors in Podravje include health, IT, engineering/consulting, and transport/logistics. Major actors are:

- MTC FONTANA d.o.o. – Health services (Q86)
- DIGITALNA SLIKOVNA DIAGNOSTIKA d.o.o. – Medical imaging / diagnostics (Q86)
- MDT & T d.o.o. – Health services (Q86)
- INOVA IT d.o.o. – IT & software development (J62)
- INFORMATIKA d.o.o. – IT & information services (J63)
- HSE INVEST d.o.o. – Engineering & consulting (M71)
- ŠPEDICIJA GOJA d.o.o. – Transport & logistics (H49)
- KAASS – PREVOZI d.o.o. – Transport services (H49)
- KO-TRANS d.o.o. – Transport services (H49)

Research and Innovation:

The University of Maribor is the cornerstone of research and innovation in the region. As Slovenia's second-largest university, it offers strong programs in engineering, IT, materials science, and health sciences, and actively supports applied research, technology transfer, and entrepreneurship.

Between 2020 and 2024, the University of Maribor and its faculties secured €14.8 million across 604 projects, representing 86.7% of all ARIS allocations to the region.

Institution	Projects (2020-2024)	Funding (EUR)	NACE
UM, Faculty of Chemistry and Chemical Engineering	107	€3,383,729	P85.422
UM, Faculty of Electrical Engineering and Computer Science	96	€3,146,767	P85.422
UM, Faculty of Medicine	76	€2,047,942	P85.422
UM, Faculty of Mechanical Engineering	75	€1,988,011	P85.422
UM, Faculty of Arts	76	€1,472,585	P85.422
UM, Faculty of Natural Sciences and Mathematics	66	€1,267,092	P85.422

Institution	Projects (2020-2024)	Funding (EUR)	NACE
University Medical Centre Maribor	44	€697,339	Q86.100
UM, Faculty of Agriculture and Life Sciences	55	€622,127	P85.422
Alma Mater Europaea	20	€491,533	P85.422
National Laboratory for Health, Environment and Food (NLZOH)	34	€304,108	Q86.909

Source: Pučnik, B., Študija propulzivnih podjetij. RRAPM, 2025

Regional or intermunicipal organizations:

- **Chamber of Commerce and Industry of Štajerska**: Represents and supports businesses in the Podravje region through networking, advocacy, and development initiatives.
- **Chamber of Crafts and Small Businesses Maribor**
- **Regional development agency for Podravje – Maribor**
- The **Skupna občinska uprava Maribor (Joint Municipal Administration Maribor)** brings together **18 municipalities** in the wider Maribor area and provides joint services across **six key fields**: inter-municipal inspection, municipal enforcement, environmental protection, internal auditing, spatial planning, and civil protection with fire safety. This cooperation allows municipalities to share expertise and resources, ensuring more efficient service delivery and stronger institutional capacity at the regional level.

3.1.6 Selected statistics

Since Slovenia does not recognize FUAs as distinct entities, we can only present selected statistical data for the Podravje region and illustrate some issues that the pilot action will address. Podravje region is the second most populated statistical region with 16% of Slovenia's population in 2023. In terms of area, with 2,170 square kilometres it is the fifth largest region. Its population density was 152 inhabitants per square kilometre[1].

Recent demographic data show that Podravje's population has been growing since 2015, maintaining a stable 15–16% share of Slovenia's total. While the share of children (0–14) remains below the national level and stable, the proportion of older residents (65+) has risen from 17.9% to 22.1%. The natural population increase has declined from -1.7 in 2015 to -3.8 in 2025, the mean

[1] SURS

age has reached 44.9 years, and the ageing index stands at 169.7, reflecting an overall ageing trend in the region.

In 2024, 19.4% of Podravje's workforce commuted outside the region, below the national average of 22.5%, indicating a relatively stable labour market. The activity rate stood at 56.8% (vs. 58.7% nationally), while unemployment was higher at 5.4% compared to 3.7%. Wages were modestly lower (€2,155 vs. €2,306 nationally), and GDP per capita reached €24,527, below the Slovenian average of €30,158. Podravje contributed 13.4% of all registered companies and a total GDP of €8.1 billion, though only 0.99% went to regional and rural development, compared to 2.13% nationally, pointing to investment gaps.

3.2 The stakeholders

Types of Stakeholder	Organisations	Description
Local public authority	Municipalities	Local self-governments responsible for spatial planning and local public services
Regional public authority	Regional Council	Key decision-making body at the level of the development region, consisting of mayors of all municipalities of the region
	Regional Development Council	Consisting of members from local self-governments, industry representatives, NGOs, and development programmes, it is the key stakeholder coordinating development initiatives and interests in the region
National public authority	Ministry of Cohesion and Regional Development	The Ministry is responsible for the implementation of the European cohesion policy and regional development. It handles the absorption of funding provided by the European Structural Funds and the Cohesion Fund, as defined by the applicable legislation of the European Union.
	Ministry of Natural Resources and Spatial Planning	The Ministry is responsible for the management of the natural environment, water resources and physical space.
Sectoral agency		The Agency is entrusted with the regulatory, expert and development tasks

	SPIRIT Slovenia - Slovenian Business Development Agency	serving to increase competitiveness of Slovenia's economy in the area of investment, entrepreneurship, and internationalisation.
	Regional Development Agencies	The Agencies are the primary development actor in the specific region.
Research and educational institutions	University of Ljubljana	The University of Ljubljana is the largest university in Slovenia.
	University of Maribor	The University is located in the city of Maribor. It plays an important role in regional development and for the pilot area of Podravje.

Table: Selected stakeholders

3.3. National Policy on FUAs in SLOVENIA

3.3.1. Funding and Instruments for Functional Urban Areas in Slovenia (2021-2027)

National and Regional Coordination Instruments
Regional development agreements (RDAs) are key tools to implement Slovenia's regional policy objectives, especially improving quality of life. Funding sources include national budgets, EU Cohesion Policy, and other instruments. Three main tools support this:

- Regional development agreements
- Programmes for disadvantaged border areas (DBAs)
- Temporary support for high-unemployment areas

DBAs face socio-economic challenges and are far from main corridors. Support aims to revitalize these regions through investment and job creation, reduce daily migration, and improve demographic conditions.

Temporary support is activated when unemployment exceeds 17% in a local administrative unit. Past examples include Maribor, Pokolpje, and Pomurje.

Bottom-Up Approaches
Community-led local development (CLLD), as a framework for implementing bottom-up territorial approaches, both in terms of the definition of (functional) territorial units and in terms of governance, are defined in the context of the programming of the EU Common Agricultural Policy for Rural Development and Fisheries and the EU Cohesion Policy for the current programming period. In Podravje, several local action groups (LAGs) operate under this model, seven to be exact. Special development programmes also target national minorities (Italian, Hungarian, Roma), though not currently implemented in Podravje.

Development Through Property Transfer
The state may transfer public property to municipalities for development. Applications must detail planned activities, investment amount, and goals such as job creation or improved infrastructure.

Regional Entrepreneurship Support
The regional pillar complements national entrepreneurship tools. The Public Fund of Slovenia for Regional and Rural Development manages microloans and guarantees tailored to regional needs.

Public Fund's Strategic Focus
The fund supports regional and rural development through financing aligned with national policy and acts as Certifying Authority for EU cross-border programmes (Slovenia–Austria, –Hungary, –Croatia).

Regional Aid Map 2022–2027
The cohesion region Vzhodna Slovenija is classified as Area "a" (max. 30% aid for large firms). Zahodna Slovenija includes some "c" areas (15–25% max aid). SMEs receive additional bonuses (10–20%).

These limits apply only to regional state aid and do not restrict other EU-permitted state aid forms (e.g. R&D, energy, education, innovation).

European Territorial Cooperation (ETC)
ETC programmes continue to promote cross-border collaboration and institutional capacity, helping address shared territorial challenges. They remain a vital tool for reducing disparities and fostering innovation across borders.

3.3.2. Smart specialisation

The **Slovenian Sustainable Smart Specialisation Strategy (S5)** promotes innovation-driven, sustainable growth, aligning national priorities with EU policy.

Key Objectives
The key objectives of Slovenia's Sustainable Smart Specialisation Strategy (S5) are to boost innovation capacity, strengthen cooperation between academia and industry, accelerate both green and digital transitions, and leverage regional strengths to enhance national and regional competitiveness.

Strategic Areas
The strategic focus of S5 strategy includes smart health, factories of the future (including robotics and automation), sustainable mobility, circular economy solutions, digitalisation and Industry 4.0, as well as sustainable food systems. These priority areas reflect both regional potential and alignment with broader national and EU-level innovation and development goals.

The University of Maribor and regional actors collaborate via innovation hubs and platforms.

Implementation and Funding
S5 is executed through ARIS-funded public calls, RDI project support, and EU programmes (e.g. Horizon Europe). It supports local SMEs, living labs, circular pilot projects, and digital innovation hubs.

The strategy is fully integrated into Podravje's Regional Development Programme (2021–2027), aligning local development with national innovation policy.

3.3.3. Selected relevant Functional Urban Areas RTDI

Slovenia's Development Strategy (SDS) 2030 (2017): sets the national framework for sustainable development, defining key goals and directions for Slovenia's long-term progress.

Spatial Development Strategy of Slovenia 2050 (2023): outlines principles for integrated, participatory spatial planning and governance, identifying instruments for cross-sectoral coordination in spatial development.

Smart Specialisation Strategy (S4) (latest update 2023): focuses development investments on areas with strong knowledge, capacity, and innovation potential, aiming to position Slovenia globally in sustainable technologies and services for healthy living.

European Cohesion Policy Programme in Slovenia 2021–2027 (CCI: 2021SI16FFPR001) (2021): defines EU cohesion policy implementation in Slovenia's two cohesion regions, targeting reduction of development disparities through territorial approaches like ITI, CLLD, and DRR.

Regional Development Programme (RDP) 2021–2027 of the Podravje Region (2021): a fundamental strategic development document at the regional level, which defines development orientations in the economic, socio-social, environmental, and spatial areas of the region. Based on an assessment of the situation, it defines the region's development advantages, its development vision and strategic goals, its development priorities, and the financial framework for implementing the programme.

Investor Attraction Strategy (IAS) for the Podravje Region (latest adoption 2023): prioritises attracting targeted investors to address issues such as low added value, low wages, limited high-skilled job opportunities, and brain drain. The aim is to boost economic competitiveness and retain talent.

3.4. The current situation regarding FUA in SLOVENIA

3.4.1. Functional Urban Areas support mechanisms

3.4.1.1. Policy Makers in FUA-Related Sectors

Regional Council (Svet regije)

- A political body, composed mainly of mayors of municipalities in the region.
- Focuses on political coordination, representation of municipalities, and ensuring that local interests are aligned at the regional level.
- Decides on broad development priorities and represents the region externally.

Regional Development Council (Razvojni svet regije)

- A strategic and partnership-based body, composed not only of mayors, but also of representatives from the economy, chambers, universities, NGOs, and other key stakeholders.
- Prepares, debates, and adopts the Regional Development Program (RRP), which is the main planning document for EU and national funds.
- Ensures that regional development is inclusive and coordinated across different sectors, not just municipalities.
- Has a formal role in approving projects for EU cohesion funding and monitoring their implementation.

Municipal Urban Planning Departments (e.g. City Municipality of Maribor Urban Planning Department) implement land-use policies, mobility strategies, and housing initiatives that reflect the needs of the broader functional area.

Inter-municipal Cooperation Councils (Council of Maribor Urban Municipality and Surrounding Municipalities) is a platform where mayors and city planners from different municipalities collaborate on cross-boundary issues such as transport, environmental protection, and economic development.

3.4.1.2. National Authorities in FUA-Related Sectors

- **Ministry of Cohesion and Regional Development** provides guidance, legal frameworks, and coordination for regional development projects within FUAs.
- **Ministry of the Environment, Climate and Energy** oversees sustainable mobility plans, climate adaptation strategies, and environmental protection measures in urban regions. **Slovenian Infrastructure Agency** supports major transport infrastructure projects linking the Podravje FUA to other parts of Slovenia and neighbouring countries.

3.4.1.3. Funding Institutions Related to FUA Support Schemes

- **Slovenian Regional Development Fund** offers loans, guarantees, and equity financing for infrastructure and innovation projects in FUAs.
- **EU Cohesion Policy Funds (ERDF, Cohesion Fund, ESF+)** provide co-financing for urban renewal, public transport, environmental protection, and social inclusion projects in the Podravje region.
- **Slovenian Enterprise Fund** supports SMEs and start-ups in FUAs through grants, seed capital, and guarantee schemes, especially for innovation and green transition.
- **Public-Private Partnership (PPP) Mechanisms** facilitate joint investment between municipalities and private investors in urban regeneration, cultural infrastructure, and tourism development.

3.4.1.4. Business Support / Consulting Boards and Offices for FUAs

- **Regional Development Agency** is an advisory and coordination body for strategic projects, EU funding applications, and investment promotion in the region. ZAKON!!!
- **Chamber of Commerce and Industry of the region** offer business advisory services, export promotion, and sector-specific networking for companies within the region.
- **Chamber of Craft and Small Business Maribor.**

3.5. The development challenges in Podravje region

Since Slovenia does not recognize FUAs as distinct entities, we can only present the development challenges in the Podravje region.

Podravje faces a range of complex development challenges that hinder its economic, social and spatial potential. The low level of inter-municipal cooperation has led to the fragmented planning and implementation of development projects, reducing the effectiveness of regional policies. Since the adoption of the Regional Development Programme, several issues with the have already been addressed.

The region is characterised by the emigration of highly skilled labour, particularly in science, technology, engineering and mathematics (STEM) fields, to other countries — notably Austria — which weakens its development capacity. A mismatch between educational programmes and the needs of the economy results in significant labour market gaps, while a lack of suitable business zones and inadequate transport infrastructure limits the attraction of new investments.

Tourism is unevenly distributed across the region, with most overnight stays concentrated in only a few municipalities, which reduces the utilisation of the region’s full potential.

The region also lacks a comprehensive sustainable mobility plan and public transport links are insufficient, which limits accessibility and connectivity. Significant disparities in development exist between different parts of the region, with less developed areas having limited access to basic services.

Negative demographic trends, particularly population ageing, further burden the labour market and social services.

Despite having considerable potential for food self-sufficiency and processing agricultural products, these opportunities remain underutilised.

Natural and cultural heritage is often inadequately protected and insufficiently integrated into tourism development.

3.6 Opportunities and obstacles of Podravje region

Since Slovenia does not recognize FUAs as distinct entities, we can only present opportunities and obstacles of the Podravje region and illustrate some issues that the pilot action will address. The Podravje region faces a variety of opportunities for sustainable growth, as well as challenges that could hinder its socio-economic and spatial development.

Opportunities: Podravje holds strong potential for economic diversification, with growth prospects in green technologies, sustainable mobility, tourism, and local food self-sufficiency. Its strategic location along major European transport corridors offers advantages for trade, logistics, and investment, while the presence of universities provides opportunities to strengthen synergies between academic research and industrial innovation, particularly in STEM fields. The region's cultural and natural heritage can be more effectively promoted through integrated tourism strategies, with added value from embedding heritage into destination marketing. In addition, Podravje's agricultural base supports expansion of local food production and resilience strategies, while leadership in the green transition could position the region as a model in ecotourism, renewable energy, and sustainable practices.

Obstacles: Regional development faces challenges, including weak inter-municipal cooperation, brain drain of skilled STEM professionals, and a mismatch between education curricula and labor market needs. Infrastructure is limited, with insufficient business zones, underdeveloped public transport and cycling networks, and no regional sustainable mobility plan. Tourism remains concentrated in four municipalities, while social pressures increase due to an ageing population and resulting labour shortages. Agricultural and food processing potential is underused, and natural and cultural heritage often lacks adequate protection. Moreover, economic and social disparities persist across the region, with certain areas lagging in infrastructure, services, and investment.

3.7 SWOT ANALYSIS - SLOVENIA

Since Slovenia does not recognize FUAs as distinct entities, we can only present SWOT Analysis of the Podravje Region. It is based on the Regional Development Programme 2021–2027[2].

Strengths:

- Strategic geographic location and transport connectivity (motorways, railways, potential of Maribor Airport)
- Accessible and evolving educational infrastructure, university presence, lifelong learning opportunities
- Rich natural and cultural heritage, preserved landscape, biodiversity, NATURA 2000 sites
- Strong ethnogastronomic traditions and local products
- Developed business and support networks (chambers, SPOT offices, development agencies)
- Growing cultural and creative sector (CCS) with increasing awareness of its value
- Favourable natural conditions for a healthy lifestyle (year-round climate, hiking/cycling routes)
- Existing public transport services and sports/tourism infrastructure

Weaknesses:

- Poor condition of transport and environmental infrastructure, weak railway connectivity, lack of park & ride, outdated equipment
- Low productivity in agriculture due to fragmentation and ageing farmers
- Demographic challenges: ageing population, negative growth, high youth and elderly unemployment
- Lack of quality jobs, especially for young and highly educated people
- Low investment in R&D, weak cooperation between businesses and research institutions
- Undermaintained cultural heritage, low level of digitisation, weak CCS market connectivity

[2] Regionalna razvojna agencija za Podravje. (2022). Regionalni razvojni program Podravje razvojne regije 2021–2027. Regionalna razvojna agencija za Podravje. https://www.rra-podravje.si/regionalni-razvojni-program

- Low public responsiveness to health and physical activity programmes
- Weak cross-sector collaboration in regional development (e.g. health, culture, education)

Opportunities:

- Development of sustainable mobility and transport strategies, including multimodal hubs and cycling networks
- Effective use of natural resources for tourism, recreation, and sustainable farming
- Digitalisation, green transition and development of Industry 4.0
- Stronger collaboration between business, education, and research sectors
- Increased food self-sufficiency and diversification of rural activities
- Revitalisation of cultural heritage and growth of cultural tourism
- Promotion of a healthy lifestyle through regional programmes and centres
- Utilisation of EU and national funds to support regional development and vulnerable groups

Threats:

- Difficulties in acquiring permits and legal documentation (spatial plans, environmental approvals)
- Lack of coordination and integration among stakeholders
- Outmigration of skilled professionals and creatives (due to better opportunities elsewhere)
- Ineffective implementation of digital and sustainable measures
- Climate change impacts on agriculture and tourism
- Centralisation of development activities outside the region
- Degradation of nature and heritage due to overexploitation or poor protection

Poor absorption of EU funds due to weak project management

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South-West Oltenia Region
ROMANIA


3.1 Database of ROMANIA

3.1.1. General geographical information (country geographical location, population, administrative organization: counties/towns/villages, centralized or decentralized governance)

- Romania is located in Southeastern Europe, bordered by Ukraine, Moldova, Bulgaria, Serbia, and Hungary, with access to the Black Sea.
- Total area: 238,391 km², ranking 12th in Europe.
- Estimated population (2024): 19.06 million.

Romania is located in Southeastern Europe, bordered by Ukraine to the north, Moldova to the east, Bulgaria to the south, Serbia to the southwest, and Hungary to the west, with the Black Sea coastline to the southeast. Romania covers an area of 230,170 square kilometers, and has a population of approximately 19 million people as of 2024. Danube River flows for 1,075 km through Romania, forming part of its southern border and eventually emptying into the Black Sea through the Danube Delta.

Location of Romania in EU

Satellite Map of Romania

Development Regions of Romania

- Romania's geography is characterized by diverse landscapes, including mountains, plains, and hills, which are roughly evenly distributed. The Carpathian Mountains dominate the center, with the Danube River and its delta in the southeast. The country also features a temperate continental climate with influences from the Mediterranean and the Black Sea.
  Administrative organization:
  - According to the Constitution of Romania, its territory is organized administratively into communes, cities and counties:[1]
  - As of 2009, Romania is divided into 41 counties and one municipality which are assigned as NUTS III-level divisions. Currently, Romania has no NUTS-4 units, the counties being composed directly of cities (some of which with municipality status) and communes.
  - At the town / commune level: 103 municipalities and 217 other cities (for urban areas), and 2,856 communes (for rural areas). Municipality *(municipiu)* status is accorded to larger towns, but it does not give their administrations any greater powers.
  - Below communal or town level, there are no further formal administrative subdivisions. However, communes are divided into villages (which have no administration of their own).
  - There are 12,957 villages in Romania. The only exception is Bucharest, which has six sectors, each with an administration of its own.
  - Romania, in the NUTS scheme, is divided into:

✓ NUTS I level: 4 macroregions (*macroregiune* in Romanian), used for appropriation of European development funds
✓ NUTS II level: 8 development regions, with an average population of 2.8 million inhabitants per region, although not administrative divisions *per se*, have been used for decades for statistical purposes by the Romanian National Commission of Statistics (NCS). Recently they also exist to co-ordinate regional development and appropriation of European development funds
✓ NUTS III level: 41 counties and one municipality (Bucharest, the national capital) reflecting Romania's official administrative-territorial structure
✓ LAU I level: not used, as territorial units associations have not been identified yet;
✓ LAU II level: 217 cities and 103 municipalities (for urban areas), and 2,856 communes (for rural areas)
An exception to this structure is the Municipality of Bucharest, which is a secondary division (rather than a tertiary division like other municipalities) and is officially divided into six sectors, each sector having a local government and council.

- Officially, the eight regions are Nord-Est (North-East), Sud-Est (South-East), Sud - Muntenia (South - Muntenia), Sud-Vest Oltenia (South-West Oltenia), Vest (West), Nord-Vest (North-West), Centru (Centre), and București - Ilfov (Bucharest - Ilfov).

Governance:

▪ Semi-centralized system with increasing decentralization
▪ Local autonomy is granted to counties and municipalities under Law 215/2001 and the Administrative Code (GEO 57/2019)

3.1.2. FUAs legislative framework applicable in the country

In Romania, Functional Urban Areas (FUAs) are primarily governed by legislation related to urbanism, territorial planning, and local public administration, with a focus on metropolitan areas. Key aspects include the formation and operation of metropolitan areas, the development of urban and peri-urban areas, and the coordination of infrastructure and services across administrative boundaries.

Key Legislation and Frameworks:

- The **Law no. 215/2001** of the local public administration, Official Monitor of 23 May 2001.
- FUAs are recognized under the **Law on Metropolitan Areas (2022)**, which formalizes their governance and financing.
- **The Law no. 350/ 2001** regarding territorial planning and town planning, Official Monitor, 373.
- The **Law 351/2001** and **Law 315/2004** provide the basis for urban hierarchy and regional development.
- **The Government Decision no. 998/ 2008** for the designation of growth poles and urban development poles in which priority investments are made from programs with community and national funding, Official Monitor, 621, hereafter referred to as GD 998/2008.
- FUAs are supported by **Integrated Territorial Investments (ITI)** under EU Cohesion Policy 2021–2027.
- The **Administrative Code (GEO 57/2019)** outlines the legal competencies of local and county councils within FUAs.
- **The Law no. 246/ 2022** regarding metropolitan areas, as well as for the modification and completion of some normative acts, Official Monitor, 745.
- The draft of the normative act Law for the approval of the Spatial Planning, Urban Planning and Construction Code (CATUC) 2022, hereafter referred to as CATUC.

- The Territorial Development Strategy of Romania: Polycentric Romania 2035 - Cohesion and territorial competitiveness, development and equal opportunities for people, Annex no. 1, Version 4, hereafter referred to as SDTR 2035.

3.1.3. FUAs guidelines applicable in the country

- Functional Urban Areas (FUAs) in Romania are defined by the interplay between a central city and its surrounding areas, primarily based on commuting patterns and economic linkages. The concept acknowledges the limitations of solely relying on administrative boundaries when planning for urban development, particularly in areas experiencing significant urban sprawl. FUAs in Romania are governed by a mix of legal frameworks, including urban planning regulations (PUG, PUZ, PUD) and strategies focused on integrated urban development.

- In essence, the guidelines for functional urban areas in Romania involve:
✓ Recognizing the functional interdependencies between cities and their surrounding areas.
✓ Using a combination of legal and strategic frameworks to guide development within the FUA.
✓ Fostering cooperation and coordination among different administrative entities within the FUA.
✓ Addressing challenges related to fragmentation and disparities to ensure sustainable urban development.

- Guidelines are aligned with **EU's Urban Agenda** and **OECD's FUA delineation methodology**.

- Romania follows the **ESPON** and **World Bank** recommendations for defining FUAs based on commuting flows and economic integration.

- The **Functional Areas Toolkit (2024)** provides strategic planning, governance, and funding guidance for FUAs.

- FUAs are encouraged to develop **Integrated Urban Development Strategies (IUDS)** and **Climate Neutrality Action Plans**.

3.1.4. FUAs methodologies applicable in the country

- In Romania, the identification and evaluation of Functional Urban Areas (FUAs) utilizes methodologies primarily based on the EU-OECD definition and spatial analysis techniques, with a focus on commuting patterns and economic interdependence between urban and surrounding areas.

- Methodologies include:
    - **GIS-based commuting analysis** (ArcGIS 10.3)
    - **Polycentricity Index** using employment, population, and accessibility data
    - **Box-Cox regression models** for spatial autocorrelation

- Functional delineation is based on:
    - **45-minute travel time radius**
    - **Employment density and facility distribution**
    - **Urban-rural linkages and service accessibility**
- In essence, the methodologies used in Romania for defining and evaluating FUAs combine spatial analysis techniques with an understanding of economic and functional relationships between urban centres and their surrounding areas, informing planning and development strategies.

3.1.5. Major investor companies, other players in the FUAs-related sector, in the field of industry, services, research, research departments within the companies)

- **Iulius Group** and **Atterbury Europe**: major developers in Cluj-Napoca and Timișoara FUAs
- **Microsoft, Oracle, Amazon**: tech giants with operations in Bucharest, Cluj, and Iași
- **Continental Automotive**, **Bosch**, **Ford Romania**: key players in Timișoara, Brașov, and Craiova FUAs
- **EBRD**: €180M investment in Cluj-Napoca's Rivus urban regeneration project
- **World Bank**: technical assistance for Constanța and other FUAs

3.1.6. Statistics about FUAs activity, results, employment etc. in investor sectors etc.

FUA	Population	GDP Share	Employment Share	Migration Trend
Bucharest	2.1 Million	25%	20%	High Influx
Cluj-Napoca	445,000	6%	5%	Fast Growth
Timișoara	320,000	5%	4.5%	High Influx
Iași	400,000	4%	4%	Moderate Growth
Constanța	545,000	4%	3.5%	Declining
Craiova	300,000	3%	2.8%	Slight Decline
Brașov	300,000	3%	2.8%	Slight Decline

- **41% of Romania's population lives in FUAs**, generating over **90% of national GDP.**

- FUAs attract **67% of commuters** and 61**% of employment**

3.1.7. Any specific specialisation of the FUAs (eg IT & Digital Technologies, automotive, aerospace etc.)

No	FUA	Specialisation Areas
1	Bucharest	IT & Digital Technologies, Finance, Services
2	Cluj-Napoca	Software Development, AI, Urban Innovation
3	Timișoara	Automotive, Electronics, Cultural Industries
4	Iași	Education, Healthcare, BPO
5	Brașov	Aerospace, Tourism, Green Manufacturing
6	Constanța	Logistics, Maritime, Oil Refining
7	Craiova	Automotive (Ford), Engineering

3.2 The stakeholders

3.2.1. Governance structure (public authorities, private/public companies, clusters)

In the context of accelerated urbanization processes and the need for balanced territorial development, **functional urban areas (FUAs)** have become a key tool for planning and implementing public policies.

The concept of **functional urban area (FUA)** is used to describe areas that go beyond the administrative boundaries of a city, including neighbouring localities that are strongly influenced by the urban centre.

Functional Urban Areas (FUAs) are defined based on commuting, economic and social flows between localities and main cities. In the context of EU and Romanian regional development policies, FUAs are essential tools for:

- Coherent spatial planning;
- Accessing European funds;
- Promoting balanced territorial development;
- Improving cooperation between local administrations.

In Romania, FUAs reflect the socio-economic realities of the interdependence between large cities and neighbouring localities. They do not have their own administrative status, but are recognized within territorial planning and European programs. The governance of these areas involves

complex cooperation between public authorities, private companies and intermediary organizations (such as clusters), in order to coordinate territorial and economic development.

The governance of functional urban areas involves several actors at different levels:

A. Central Public Authorities - Government of Romania:

▪ *Ministry of Development, Public Works, and Administration (MDLPA)* - coordinates territorial and urban policies

▪ *Ministry of Investments and European Projects (MIPE)* - coordinates the policies and programmes through strategic use of EU funds. Ensure efficient absorption of funds across sectors such as SMEs, innovation, urban development, education, energy efficiency, infrastructure, integrated territorial development.

▪ *Ministry of Environment, Waters and Forests (MEWF)* - contributes to the development of strategic environmental assessments (SEA) for urban development projects in the FUAs.

▪ *Ministry of Transport* - supports regional infrastructure

▪ *Ministry of Culture* – protects cultural and natural heritage

B. Local and regional public authorities

▪ *County and municipal councils* – the main decision-makers in spatial planning and the development of local strategies;

▪ *Intercommunity Development Associations (IDAs)* – may include several ATUs (Administrative-Territorial Units) from a FUA, having a coordination role for public services (water, sanitation, transport);

▪*Regional Development Agencies (RDA)* – 8 development regions (e.g. RDA South-West Oltenia, RDA Centre, etc.) that facilitate access to European funds and coordinate regional plans.

C. Other relevant actors

▪ *Clusters and public-private partnerships* – contribute to integrated economic development. Clusters are groups of companies, research institutions, universities and authorities that collaborate for innovation and development. These clusters influence local and regional policies, promoting economic initiatives and investments.

▪ *Public utility companies (e.g. water, energy, sanitation)* – often operated or regulated in public-private partnership.

▪ *Universities and research centres* – provide expertise and data for planning;

▪ *Local NGOs* – involved in participatory processes and urban projects

▪ *Private companies* – contribute to the economic dynamics of the FUA, especially in peri-urban industrial or logistics areas.

The governance of the ZUF at the national level faces a number of challenges, such as:

- **Administrative fragmentation** – numerous ATUs with divergent resources and interests;
- **Lack of a legal framework for metropolitan areas and FUAs** – which limits the capacity for integrated planning;
- **Insufficient funding for inter-community projects**;

- **Weak collaboration between local administrations** in the absence of formal joint decision-making mechanisms.

Functional urban areas represent an essential model for smart, coherent and sustainable territorial development in Romania.

Although they do not have a clear legal status, they are gaining increasing importance in planning strategies and public investments. ZUFs are not explicitly legally regulated in Romania, but are recognized in:

- Romania's Territorial Development Strategy (RTDS)**;**
- National Strategy for Sustainable Development**;**
- EU Cohesion Policies 2021–2027**.**

For the FUAs to function effectively, it is necessary to strengthen governance at all levels – national, regional, and local – through a coherent legislative framework, inter-municipal cooperation mechanisms, and the active involvement of all actors in the territory. In this regard, it is important to consider a series of recommendations, such as:

- Adoption of a **clear legal framework for the FUAs** and metropolitan areas;
- **Encouraging the establishment of functional ADIs** with extended powers;
- **Increasing local administrative capacity** for integrated planning;
- **Digitalization of governance processes** for transparency and participation;
- **European funding** directed towards functional areas;
- **Promoting smart and sustainable cities** within the FUAs.

3.2.2 Main stakeholders involved in Functional Urban Areas: public authorities, ministries, municipalities, national/regional councils, clusters, relevant companies in industrial sectors, major manufacturers in sectors related to the FUA, automotive, aerospace, IT, universities, research centres, authorities specialized in innovative industrial sectors, public service companies, ports, airports, SMEs, business support centres, expert groups, financing institutions, innovation poles, etc.

Functional urban areas (FUAs) imply an integrated territorial development model, in which cooperation between multiple stakeholders is essential for coherent, balanced and sustainable planning. These actors come from the public and private sectors and have complementary roles in the configuration and functioning of extended urban areas.

The main stakeholders involved in Functional Urban Areas are:

1. Central public authorities (ministries, agencies, regulators)

They establish the legislative and strategic framework for urban and territorial development, manage funds, and evaluate the impact of projects in the FUA:

- **Ministry of Development, Public Works, and Administration (MDLPA)** – coordinates urban policies and European funds for urban development;
- **Ministry of Environment** – approves urban development projects, supports sustainable mobility, and protects green spaces;

- **Ministry of Transport** – invests in road, rail, airport and port infrastructure relevant to the ZUF;
- **Ministry of Culture** – regulates interventions in protected areas and on built heritage;
- **Ministry of Economy / Ministry of Research and Innovation** – supports clusters, innovation poles, and industrial development within the ZUF;
- **Specialized authorities** – such as ANRE (energy), APM (environment), ARF (rail transport), etc.

2. Local and regional public authorities

These are directly responsible for planning and implementing urban development policies within the ZUF:

- **City halls and local councils** – administer the cities and communes that make up the ZUF;
- **County Councils** – coordinate inter-community projects and infrastructure at the county level;
- **Regional Development Agencies (RDAs)** – plan regional development and manage European funds;
- **Intercommunity Development Associations (ADI)** – organize common services in transport, water, waste, etc.;
- **Metropolitan Areas / Metropolitan Councils** – associative forms (especially in large cities) that can manage the ZUF in an integrated manner.

3. Universities and research centres

They provide scientific support, expertise, data and innovation for territorial development, digitalization, smart industry, and green economy projects:

- **Large universities** in urban centres: Politehnica University Bucharest, Babeș-Bolyai Cluj, University of Craiova, etc.
- **Research institutes**: INCAS (aerospace), ICECHIM (chemistry), URBAN-INCERC (urban development);
- **Science and technology parks**: support the transfer of knowledge and innovation to companies and local administrations.

4. Relevant companies in strategic industrial sectors

They generate jobs, economic infrastructure and have a major impact on mobility, the environment and local resources in the FUA, such as:

- **Automotive industry**: Ford Otosan (Craiova), Renault Group (Mioveni), Star Transmission (Cugir);
- **Aerospace industry**: Romaero, Aerostar Bacau, Elbit Systems Romania;
- **IT&C**: Bitdefender, Endava, UiPath, Banca Transilvania TechHub;
- **Agri-food industry**: Smithfield, Agrisol, Cris-Tim – important in rural or mixed FUAs;
- **Logistics and distribution**: companies with hubs around major cities (e.g. DB Schenker, DHL, FAN Courier).

5. Clusters and innovation poles

Represents forms of cooperation between enterprises, public institutions, universities and research centres for technological and economic development in the ZUF:

- **Automotive Cluster Oltenia** – supports the automotive industry in southwestern Romania;
- **iTech Transilvania Cluster** – IT & digital innovation;
- **Green Energy Cluster** – development of sustainable energy solutions;
- **BioDanubius Cluster** – organic agriculture and bio economy.

6. Public service companies

They play an essential role in providing basic infrastructure for the population and economy of the ZUF:

- **Metropolitan public transport companies** (STB Bucharest, RAT Craiova, CTP Cluj);
- **Regional water, sewer, sanitation, thermal energy operators**;
- **Energy and telecommunications companies** – Electrica, Enel, Orange, Digi, etc.

7. Major logistics infrastructure (ports, airports, train stations)

These function as strategic nodes in the ZUF mobility network, connecting urban centres to the rest of the country or to international networks:

- **Airports**: Henri Coanda (Bucharest), Avram Iancu (Cluj), Traian Vuia (Timisoara);
- **Ports**: Constanta, Giurgiu, Brăila;
- **Train stations** – modernized through the SUMP in the major FUAs.

8. SMEs, start-up, and business support centres (business incubators and accelerators)

It represents the flexible and innovative economic base of the ZUF, quickly adapted to local and regional needs:

- **Incubators and accelerators**: support entrepreneurial initiatives;
- **Business and co-working hubs**: provide infrastructure and networks for SMEs;
- **Chambers of Commerce and economic NGOs:** provide consultancy and intermediation for companies in the ZUF.

9. Expert groups, urban consultants, and planning institutions

It plays an important role in the development of urban and territorial development strategies and plans.

Examples:

- **Consultants in urban mobility, GIS, urban regeneration**;
- **Architecture and urban planning offices**;
- **Institutions such as the World Bank, EBRD, European Investment Bank** – which provide expertise and financing for large projects in the FUA.

10. Financing institutions and financial support

This category of stakeholders, involved in the development of functional urban areas, makes possible investments in the infrastructure and services necessary for the functioning of the FUA:

- **European Structural and Investment Funds** (ERDF, ESF+, Cohesion Fund);
- **Regional Operational Program (ROP) and PNRR**;
- **Development banks** (EBRD, EIB, IFC);
- **Private investment firms** – in real estate, technology, green infrastructure developments.

Functional urban areas cannot function effectively without a network of stakeholders working together in a coordinated manner. Each actor – from central authorities, city halls, industrial companies, universities, to SMEs and clusters – contributes a specific role to the integrated development of the FUA. The success of a FUA depends not only on plans and resources, but especially on **collaboration, shared governance, and a long-term vision** between all these actors.

3.2.3 Stakeholder cooperation models in the country's FUAs, but also with FUAs from other countries

Stakeholder cooperation models in **Functional Urban Areas (FUAs)** in Romania and other countries involve **organized ways of collaboration** between public, private and civil society actors, with the aim of **coherently planning, managing, and developing an extended urban territory,** beyond the administrative boundaries of a city.

These models differ depending on the legislative context, level of decentralization, administrative culture, and degree of urbanization, but they share some **fundamental principles** and **institutional tools**.

Cooperation models involve the formation of **associative structures or partnerships** between:

a. The central municipality and neighbouring communes/cities (UATs);
b. Public institutions and central/decentralized authorities;
c. Private companies and investors;
d. Universities, NGOs, and the local community.

These associative structures can take the following forms:

1. Intercommunity Development Associations (IDA)

These are associative structures of the ATUs in a FUA whose objectives are the joint management of services (water, transport, and sanitation), the development of common strategies.

2. Metropolitan Areas / Metropolitan Councils

They are organized in large cities (e.g. Bucharest, Iași, Timișoara), but the lack of a unified legislative framework limits the efficiency of these entities. The lack of a **metropolitan authority with a decision-making role** and its own budget leads to dependence on local political initiative.

Example: *Cluj Metropolitan Area* – one of the most efficient ADIs, involving over 20 ATUs, with joint projects on urban mobility, digitalization, and urban regeneration.

3. Cooperation with academia and research centres

Universities contribute to urban planning, applied research and innovation. They are involved in "smart city" projects and support incubators and innovation hubs. Example: *The University of Craiova* participates in automotive and smart mobility projects in collaboration with the local administration and Ford Otosan.

4. Cooperation with civil society

NGOs and civic groups contribute to transparency, participatory planning and public consultation. Example: OPTAR Association in Bucharest collaborates with local authorities to develop cycling and pedestrian infrastructure within the Bucharest–Ilfov Urban Area.

5. Public-private partnerships

Joint projects between public authorities and companies are developing in areas such as: infrastructure, transport, energy, industrial and logistics parks. Example: *Tetarom Cluj Industrial Park* – cooperation between Cluj County Council, local administration and IT and manufacturing companies, supported by the Technical University.

Stakeholders collaborate within **joint decision-making mechanisms**, where common strategic objectives are established (e.g. pollution reduction, metropolitan mobility), responsibilities are clearly divided between actors, financing and resource allocation mechanisms, monitoring and evaluation of results.

Frequently used cooperation tools are:

- Integrated Urban Development Plans (IUDPs);
- Sustainable Urban Mobility Plans (SUMPs)**;**
- Joint projects financed from European funds (ZIT, ITI, POR)**;**
- Common databases and digital platforms (GIS)**;**
- Partnership contracts between ATUs and the private sector**.**

In Romania, cooperation models primarily involve voluntary cooperation, as most of the current forms (ADIs, metropolitan areas) are based on the political will of the ATUs. There is no specific law on metropolitan areas/ZUF, which limits efficiency.

Cooperation is also taking place between the main city and the surrounding localities (especially for mobility, infrastructure, sanitation, water supply).

In other countries, models assume a much broader and more flexible approach to cooperation.

a. France – institutionalised cooperation

- Metropolises have legal personality, their own council, budget, and extensive powers;

Examples: Lyon Metropolis

- Administrative entity with legal personality, its own budget, and extensive powers (transport, urban planning, education, economy)
- It brings together 59 municipalities
- It has an elected metropolitan council**,** which provides stability and democratic legitimacy.

b. Germany – legal and strategic regional cooperation

- Entities like *the Verband Region Stuttgart* coordinate regional policies;
- Legally regulated collaboration between cities and municipalities;
- Emphasis on integrated territorial planning and metropolitan mobility.

c. Poland – cooperation through Integrated Territorial Instruments (ITI)

- Clear agreements between ATUs for the implementation of joint projects;
- EU funds are accessed through functional structures and territorial partnerships;
- Ex: Poznań, Wrocław, Gdańsk.

d. Sweden – cooperation in flexible functional regions

- *Kommunförbund* (inter-municipal associations) administer public services on a metropolitan scale;
- Emphasis is placed on transparent and participatory planning.

Effective cooperation in the FUA (national and international) requires several key elements, such as:

●A ***shared vision:*** actors have aligned territorial objectives and common action plans

●A ***clear legal instrument:*** the cooperation structure is legally recognized (e.g. metropolis, ADI)

● ***Shared budget and resources:*** resources are collected and managed together, not separately

●***Extended participation:*** involvement of civil society, business, academia

●***Transparency and open governance:*** decisions are documented, consulted and accessible

The coherent development of functional urban areas requires **strategic, institutional, and financial collaboration** between several types of actors. Western countries offer examples of **formalized metropolitan governance**, with dedicated institutions and their own budgets, while Romania is still in an **intermediate phase**, with a predominantly voluntary cooperation and lacking a specific legal framework.

3.2.4 Other relevant actors in the country's FUAs

In Romania FUAs are complex urban ecosystems in which **not only** the main actors already mentioned (public authorities, ministries, large companies, universities, clusters, etc.) matter, but also a series of **secondary or complementary actors,** which play an essential role in shaping the territorial, economic and social development of these areas: NGOs, decentralized directorates, media, foundations, education, think-tanks, local experts. Effective collaboration between these actors is essential for a functional, coherent, and adapted development to the real needs of the territory.

1. County departments and decentralized state institutions - ensures the application of national policies in the territory and collaborates with local authorities in the development of urban and regional plans:

- **County Departments of Culture (DJC)** – approve interventions on heritage;
- **Environmental Protection Agencies (EPAs)** – issue approvals for projects in the ZUF;

- **County School Inspectorates** – plan educational networks;
- **Public Health Directorates (PHD)** – involved in planning health infrastructure.

2. Civil society organisations - NGOs, civic associations and informal citizen groups have an increasingly important role in public participation and oversight of urban development:

- **Pro Infrastructure Association, Optar.ro** (alternative transport);
- **Environmental protection associations** (Eco-Civica, Bankwatch Romania);
- **Local civic groups**: "SOS Orașul", "Timișoara Initiative", "Declic", etc.

3. The Order of Architects of Romania (OAR) and other professional structures (Register of Urban Planners of Romania, Order of Geodesists, Association of Urban Planners) – have a role in:

- Assessing the quality of architectural projects;
- Organizing competitions for solutions for public spaces;
- Supporting urban regeneration in the FUA.

4. Foundations and think tanks in the field of urban planning and sustainable development - these entities provide analyses, studies, public policy proposals for the functional development of cities and regions. Examples:

- **URBASOFIA, UrbanizeHub** - European think tank in urban planning;
- **Friedrich Ebert Foundation Romania** - studies on urban cohesion;
- **Civitta Romania**, **MKBT: Make Better** - urban consultancy.

5. Pre-university educational institutions and school networks

The development of the FUAs also involves an educational network adapted to territorial dynamics (mobility, neighbourhood expansion, commuting). Examples:

- Technical or vocational high schools in peri-urban areas;
- Modern schools in metropolitan areas (e.g.: American School – Bucharest, “Avram Iancu” Theoretical High School – Cluj-Napoca);
- School-industry partnerships in clusters (e.g. in the automotive or IT field).

6. Employers' organizations, chambers of commerce and trade unions:

- **County Chambers of Commerce and Industry** – support local SMEs in the FUAs;
- **National Council of SMEs in Romania (CNIPMMR)** – present in the major FUAs;
- **Trade union federations** – involved in managing labour and social conditions in urban industrial centres.

7. Local and regional media - play an important role in:

- Informing the public about projects in the FUAs;
- Facilitating debate and transparency;
- Supporting campaigns for sustainable development.

8. Real estate investors and urban developers - have a significant influence in the expansion of urban areas, especially in the construction of collective housing and residential neighbourhoods, logistics parks and shopping centres, office buildings in the economic poles of the ZUF.

9. International networks and associations active in Romanian cities - participation in European networks of functional cities and regions increases access to good practices and funding. Examples:

- **Eurocities** – large cities such as Cluj, Bucharest, Timișoara are members;
- **URBACT** – thematic networks for urban development;
- **Smart Cities Network in Romania** (Smart City Romania);
- **Green Cities Network** – focused on sustainability.

10. Other examples of local actors in the FUAs:

- Hospitals and regional medical networks – with a role in planning and adapting to demographic needs in the FUAs
- Churches and religious communities - social involvement in metropolitan neighbourhoods

3.3 National Policy on FUAs in ROMANIA

In the context of European territorial dynamics and the ongoing administrative and urban reform processes at national level, Functional Urban Areas (FUAs) represent a key component in Romania's development strategy. FUAs are extended urban zones characterized by economic, social, and functional interdependence between the central city and surrounding localities, playing a strategic role in promoting territorial cohesion, smart specialization, and green transition.

The implementation of national policies related to FUAs is carried out through a series of operational programs, sectoral strategies, and methodological tools that contribute to strengthening local administrative capacity, stimulating innovation, and attracting investment in urban infrastructure. These policies are aligned with European Union directives, particularly within Policy Objective 5 – "A Europe closer to citizens."

The South-West Oltenia Region – composed of the counties of Dolj, Gorj, Mehedinți, Olt, and Vâlcea – stands out for its diverse urban landscape, emerging urban centres, and economic potential in strategic sectors such as energy, tourism, and automotive industry. By capitalizing on regional resources and effectively implementing integrated urban development strategies, FUAs in this region can become pillars of sustainable and intelligent territorial transformation.

In Romania, FUAs are recognized as territorial engines of development, being integrated into national and regional strategies through:

The National Urban Policy 2020–2035

The National Strategy for Integrated Urban Development 2022–2035

The Partnership Agreement 2021–2027 with the European Commission

The transversal integration of functional urban areas (FUAs) into the architecture of national financing programs represents a mature public policy approach that reflects the need to think about development in terms of spatial interdependence, economic cohesion, and institutional adaptability. By directing national and European funds towards FUAs, Romania seeks to reduce regional disparities, including between municipalities and marginalized peri-urban areas; support the green transition through sustainable mobility, energy efficiency, and ecological infrastructure; and accelerate digitization through investments in IT infrastructure, smart city platforms, and innovation ecosystems. Thus, FUAs are not merely geographical areas—they are urban development ecosystems capable of catalysing change.

Integrated and coordinated implementation through Integrated Territorial Strategies (ITSs) provides a coherent framework based on real diagnoses. Local actors cooperate more effectively under the FUA umbrella, reducing fragmentation. FUAs become attractive to investors due to integrated infrastructure and workforce potential, while the presence of a large urban centre is facilitating the regional economic opportunities. Health, energy, or demographic crises can also be managed more efficiently through zonal-type interventions.

Romania's Regional Development Reform in the 2021–2027 Financial Framework

Within the 2021–2027 financial framework, Romania marks a milestone with the launch— for the first time—of eight distinct Regional Programmes, directly managed by the Regional Development Agencies (RDAs). This administrative reform carries transformative potential by decentralizing responsibilities and strengthening decision-making capacity at the regional level. Each RDA serves as a Managing Authority, assuming key responsibilities in coordinating, monitoring, and evaluating projects that reflect the specific territorial needs and opportunities. This model provides greater flexibility in defining regional priorities and attracting European funding, contributing to more balanced and sustainable regional development.

Regional Programme – South-West Oltenia (PR SV Oltenia) 2021–2027

This programme is built on the region's existing needs and challenges, taking into account conclusions from the Territorial Reform (RT) of 2019/2020. It aligns with EU Cohesion Policy guidelines for 2021–2027 and supports the achievement of European-level policy objectives. The strategic goal of PR SV is to enhance the region's economic competitiveness, social cohesion, and accessibility, aiming to improve citizens' quality of life.

The programme's strategy focuses on leveraging the region's competitive advantages and addressing key bottlenecks in specific sectors (such as transport, education, mobility, energy efficiency, and urban regeneration). Accordingly, the strategy encompasses six specific regional objectives (SROs) contributing to the EU's policy priorities and the implementation of UN Sustainable Development Goals (4, 5, 7, 8, 9, 11, 17).

Total allocation: €1.208 billion
Key funding priorities for FUAs:

Priority	Area	Examples of Interventions
P1	Competitiveness & Innovation	Support for SMEs, incubators, tech transfer

P2	Digitalisation	Smart city initiatives, digital public services
P3	Energy Efficiency	Building renovation, green infrastructure
P4	Urban Mobility	Public transport, bike lanes, e-ticketing
P5	Regional Connectivity	County roads, TEN-T network links
P6	Education	School and university infrastructure
P7	Territorial Development	Urban regeneration, tourism, heritage sites

FUAs such as Craiova, Slatina, Drobeta Turnu-Severin, Târgu-Jiu, and Râmnicu-Vâlcea receive dedicated allocations across these priorities, with a focus on Integrated Territorial Strategies (ITS) and Sustainable Urban Mobility Plans (SUMPs).

Regulated by Government Emergency Ordinance no. 156/2020, the urban development funds are distributed as follows:

- County capitals: receive earmarked allocations (35% equally + 65% population-based)
- Municipalities and towns: access competitive calls separately
- Minimum 8% of ERDF is reserved for integrated urban development

Each FUA must develop a Territorial Development Strategy (TDS) to access dedicated national and EU funds for integrated urban development. This strategy is not merely administrative—it's a medium- and long-term planning tool built around the community's real needs.

Recommended TDS Structure is

- **Local Needs Analysis**
  - Detailed mapping of territorial challenges: poor infrastructure, social exclusion, economic inequality, climate pressures, migration, and lack of access to services
  - Use of quantitative/qualitative data from Urban Barometer, SAT4SUD, INS, and stakeholder consultations
  - Identification of vulnerable groups (NEET youth, elderly, marginalized communities) and zones with economic/ecological potential
- **Project Prioritization**
  - Projects must align with EU objectives: green transition, digitalisation, social inclusion, sustainable mobility
  - Clear selection criteria: socio-economic impact, sustainability, available co-financing, scalability
  - FUAs may opt for integrated interventions like urban regeneration, public building rehabilitation, leisure area development, and improved public transport
- **Stakeholder Involvement**
  - Participatory process involving: civil society (NGOs, community groups, volunteers), academia (universities, research centres), private sector (entrepreneurs, clusters, investors)
  - Engagement through territorial workshops, public forums, and digital feedback platforms

Stakeholder involvement boosts the strategy's quality and ensures post-investment support and sustainability. A well-grounded Territorial Development Strategy helps FUAs secure grants, build trust between authorities and citizens, and implement solutions tailored to local realities.

Romania's National Recovery and Resilience Plan (PNRR)

The National Recovery and Resilience Plan (PNRR) balances EU priorities with Romania's development needs following the COVID-19 crisis. Its general objective is to foster national development through key projects that strengthen resilience, crisis preparedness, adaptability, and growth, funded via the Recovery and Resilience Facility.

Key PNRR investment areas:

- Urban mobility
- Energy efficiency
- Digitalisation
  Indirect benefits for FUAs include infrastructure and education projects.

Relevant Thematic Programmes:

Transport Programme - Direct impact on FUAs through road infrastructure, bypass roads around major cities, and integration of local networks into TEN-T corridors and promotes functional connectivity, reduces commute times, optimizes logistics flows, boosts regional attractiveness

Education & Employment Programme Supports human capital development in FUAs via educational infrastructure, vocational excellence centres, lifelong learning enables funding for educational campuses and public-private partnerships to reduce dropout rates and increase youth employability, strengthens local competitiveness and supports smart specialization

Social Inclusion & Dignity Programme -addresses territorial cohesion's social dimension, critical for FUAs with marginalized communities or vulnerable populations, funds community centres, social housing, integrated assistance services, and public health interventions, reduces socio-economic polarization and fosters spatial equity,

Just Transition Programme facilitates ecological transformation in mono-industrial areas, especially in Dolj and Gorj counties, investments in clean technologies, professional retraining, and green entrepreneurship, turns FUAs into laboratories for circular economy and renewable energy, enhancing employment and innovation

Sustainable Development Programme -Essential ecological dimension for FUAs, supports green infrastructure, climate adaptation, sustainable resource management, projects include urban ecological corridors, rainwater systems, energy-efficient buildings, public space repurposing, boosts territorial resilience and environmental quality

In the context of territorial reform and the growing role of regions in implementing public policies, Functional Urban Areas (FUAs) hold a central place in the architecture of national funding programmes. Thanks to their polycentric nature and the economic, social and infrastructural interdependencies between core cities and peri-urban zones, FUAs provide an ideal framework for integrated investments with regional impact.

City of Craiova, as the main development hub of the South-West Oltenia region, plays a key role in this dynamic. With notable economic and academic potential and expanding infrastructure, Craiova acts as a growth engine for the entire functional urban area. The national operational programmes launched for the 2021–2027 period—Transport, Education & Employment, Social Inclusion, Just Transition, and Sustainable Development—reflect this integrated approach and offer real opportunities to strengthen territorial cohesion and improve quality of life for the surrounding communities.

Craiova FUA can become a model of territorial planning based on urban–rural complementarity, where investments are not directed exclusively toward the urban core, but toward the overall functionality of the system. Through its Integrated Development Strategy and allocations from operational programmes (POIDS, PEO, POCID, etc.), Craiova can stimulate: Demographic rebalancing and increased attractiveness for youth, green and digital transition of public services and strengthening intercommunal partnerships.

FUAs are increasingly becoming territorial laboratories for public policy—spaces where social cohesion, green transition, and digitalisation take tangible shape. Through a strategic approach tailored to each area's specific context, Romania can transform FUAs from mere administrative entities into urban excellence hubs and models for sustainable development.

3.3.1. Funding for Functional Urban Areas by National Programmes / other funding programmes / support schemes

-**National and Regional Programmes**

Romania supports FUAs primarily through its Regional Programmes (RPs) and national investment schemes, coordinated by the Ministry of Investments and European Projects (MIPE) and regional development agencies.

Key instruments include:

Regional Programmes 2021–2027 (e.g. PR Centru, PR Sud-Vest Oltenia etc.)

Examples of interventions:

-Investments in green and blue infrastructure in urban environments
-Sustainable urban mobility in cities and FUAs
-Integrated urban development through public space regeneration, cultural infrastructure, and tourism

These calls are tailored to municipalities and urban partnerships within FUAs.

-**National Recovery and Resilience Plan (NRRP)**

Supports FUAs through investments for:

-Urban regeneration and energy efficiency

-Digital infrastructure and smart city solutions

-Climate adaptation and green mobility

Funding is channelled via Component C10 – Local Fund, which prioritizes integrated territorial development.

-**Other Support Schemes**

-InvestEU and EBRD Romania Strategy 2025–2030 provide blended finance and technical assistance for urban sustainability projects

-EIT Urban Mobility RIS Romania - offers innovation grants and pilot support for mobility and liveability improvements in urban areas

-Eligible Beneficiaries

-Urban municipalities and inter-municipal associations

-County-level authorities coordinating FUAs

-Public-private partnerships with clear territorial impact

-NGOs and SMEs involved in urban innovation and sustainability

-**Strategic Focus Areas**

-Green infrastructure and nature-based solutions

-Low-carbon transport and mobility

-Circular economy and resource efficiency

-Cultural heritage and tourism valorisation

-Social inclusion and access to services

3.3.2. Smart specialisation fit with regards to Functional Urban Areas (strategy documents)

-Strategic Context

Romania's approach to Smart Specialisation is defined by the National Strategy for Research, Innovation and Smart Specialisation 2022–2027, which emphasizes regional innovation ecosystems, digital transformation, and green growth. Also, the 8 regions adopted the 8 Regional Smart Specialisation Strategies (RIS3) or S3, which are complementary and harmonised with the National Strategy for Research, Innovation and Smart Specialisation. FUAs, as dynamic urban territories, are increasingly recognized as natural hubs for smart specialization, due to their concentration of talent, infrastructure, and economic activity.

-**FUAs as Innovation Anchors**

FUAs host universities, research centres, SMEs, and public institutions, making them ideal for piloting smart specialisation domains.

-Urban areas like Cluj-Napoca, Iași, Timișoara, Craiova, and Brașov are already integrating S3 (RIS3) priorities into their local development strategies.

-FUAs support cross-sectoral innovation, especially in digitalisation, mobility, energy, and circular economy - all key S3 domains.

-**Strategy Alignment**

The Integrated Urban Development Strategies (IUDS) for FUAs include smart city components that overlap with S3 priorities:

-Smart Mobility and Green Infrastructure

-Digital Public Services and e-Governance

-Creative Industries, ICT, and Bioeconomy

Regional Programmes (2021–2027) encourage FUAs to align local investments with smart specialization domains, especially through Priority Axis 1 – Innovation and Technology Transfer.

-**Implementation Tools**

-RIS3 Platforms at regional level facilitate stakeholder engagement and project generation within FUAs.

-Urban Innovation Labs and Living Labs are being piloted in several FUAs to test smart solutions in real-world settings.

-Funding instruments such as Horizon Europe, Interreg, and Smart Cities Calls support FUA-led innovation aligned with S3.

-**Outlook**

Romania's FUAs are increasingly positioned as territorial engines of smart specialisation, capable of translating regional innovation strategies into tangible, place-based impact. The synergy between S3 and FUAs strengthens the country and regions' capacity to deliver on EU cohesion, climate, and digital goals.

3.3.3. Classify, categorize, and record all relevant Functional Urban Areas RTDI related to legal framework, policies, strategies, methodologies, objectives, visions, practices, at national level

-Legal Framework

Law no. **351/2001** on spatial planning and urban development: foundational for defining urban hierarchies and metropolitan cooperation.

Emergency Ordinance no. **31/2025**: streamlines urban planning and permitting, enabling faster deployment of RTDI infrastructure in FUAs.

Law on Metropolitan Areas (draft stage): aims to formalize FUAs as planning and investment entities, with implications for innovation governance.

-**National Strategies**

-National Strategy for Research, Innovation and Smart Specialisation (2022–2027):

-Promotes regional innovation ecosystems centred around urban hubs.

-Encourages FUAs to act as territorial anchors for smart specialization domains.

-National Urban Policy (NUP):

-Recognizes FUAs as key platforms for integrated territorial development.

-Supports RTDI through urban regeneration, digital infrastructure, and green innovation.

-**Methodologies & Planning Instruments**

-RIS3 (Smart Specialisation Strategies) of 8 Development Regions:

Applied at regional level, but increasingly integrated into FUA-level planning.

FUAs are encouraged to host Living Labs, Urban Innovation Hubs, and pilot projects.

-Integrated Urban Development Strategies (IUDS):

Include RTDI components such as smart mobility, circular economy, and digital public services.

Serve as operational tools for accessing EU and national funding.

-**Objectives & Visions**

Position FUAs as innovation-driven growth poles.

Foster cross-sectoral collaboration between academia, business, and public authorities.

Promote green and digital transitions through place-based RTDI investments.

Ensure inclusive innovation, addressing social and territorial disparities.

-Practices & Implementation

FUAs like Cluj-Napoca, Timișoara, Iași, Craiova are actively integrating RTDI into urban strategies.

Public-private partnerships and regional clusters are emerging around key sectors (ICT, bioeconomy, creative industries).

-Other Funding instruments include:

-Regional Programmes (8 Regional Programmes 2021–2027)

-National Recovery and Resilience Plan (NRRP)

-Horizon Europe and Interreg

-EIT Urban Mobility and EBRD Green City Action Plans

-**Conclusion**

Romania's FUAs are increasingly recognized as strategic platforms for RTDI deployment. While the legal status of FUAs remains under refinement, national strategies and funding mechanisms are evolving to support their role in innovation-led territorial development. The alignment between urban policy, smart specialization, and innovation governance is key to unlocking the FUAs full potential.

3.4. The current situation of the Functional Urban Areas

3.4.1. Functional Urban Areas support mechanisms:

- Policy makers in Functional Urban Areas related sectors
- National authorities in Functional Urban Areas related sectors
- Funding institutions related to Functional Urban Areas support schemes
- Business support/consulting boards, offices for specific Functional Urban Areas

In Romania, the modalities of association and cooperation of local authorities and/or public or private actors at the level of territorial administrative units are relatively limited.

Thus, the basic models on which such associations can be made are **Intercommunity Development Associations (IDAs**) and **Local Action Groups (LAGs).** The two are different in terms of constitution, functioning and competences.

Support mechanisms for the ZUF are in Romania:

Development strategies at national, regional and local level.

Territorial development plans;

Sectoral development plans such as "Economic Coordination and Competitiveness in Transport Infrastructure Plan", "Public Services Coordination Plan" etc.

1. Policy decision-makers in the FUA-related sectors:

Local councils – municipal, city, municipal;

County Councils;

Parliament and Senate through the Parliamentary Bureaus of the constituencies in which they were elected.

2. National authorities in FUA-related sectors:

Ministry of Development, Public Works, and Administration;

Ministry of Transport;

Ministry of Investments and European Projects;

Ministry of Health through the County Directorates of Public Health;

Ministry of Education, County Directorates of Education.

Ministry of Agriculture and Rural Development – County Agriculture Departments.

3. Financing institutions related to FUA support schemes;

Regional Development Agencies - RDAs;

Agency for Financing Rural Investments - AFIR;

County Councils;

Ministry of Investments and European Funds – through the Financing Programs with European funds carried out at national level.

4. Business support/advisory boards, offices for specific FUA:

NGOs – The Romanian Centre for Public Policies has developed a report "Romania needs functional urban areas. The opportunity to include them in the Territorial Development Strategy";

Association of Romanian Municipalities;

Association of Romanian Cities;

Association of Romanian Municipalities;

Representatives of the academic environment, the business environment, the banking sector;

Association of Public Service Providers

3.4.2. FUNDA QUESTIONNAIRE of FUAs in ROMANIA

See **ANNEX**

3.5. The challenges the Functional Urban Areas face to develop

3.5.1. FUAs need to work in a sound working climate to improve the business performance assured by the FUAs

Functional Urban Areas (FUAs) in Romania represent a critical engine for regional development, but their full potential is often hindered by an unstable working climate. For FUAs to improve

business performance, they must foster a predictable and supportive environment that encourages investment, entrepreneurship, and job creation.
A sound working climate involves more than just infrastructure - it includes institutional capacity, transparency in local governance, and effective collaboration between the urban core and its surrounding areas. Unfortunately, many FUAs in Romania struggle with fragmented administrative structures and overlapping competencies between municipalities, which slow down decision-making processes and limit the efficiency of local public services.
Moreover, labour market imbalances and the outmigration of skilled workers weaken the productive base of these urban regions. Business development is further constrained by bureaucratic obstacles, limited access to financing, and underdeveloped digital ecosystems. To overcome these barriers, Romanian FUAs must prioritize inter-municipal cooperation, streamline regulatory frameworks, and invest in workforce development, digital infrastructure, and public-private partnerships that stimulate innovation and business resilience.

3.5.2. Managing Risk and Innovation: the Challenge for Functional Urban Areas

Managing risk while fostering innovation is one of the most pressing challenges for Romanian FUAs. Rapid technological change, climate-related threats, and socio-economic disparities demand that urban areas become more agile and adaptive. However, the capacity for innovation management varies significantly across Romania's FUAs.
Innovation ecosystems in Romanian FUAs are often fragmented, lacking the synergies between universities, research centres, public authorities, and the private sector needed to create a sustainable model of smart development. Risk aversion is another critical issue, with local administrations frequently avoiding bold policies due to fear of failure or legal consequences.
In addition, access to European funds - while a major source of innovation financing - remains underutilized in many FUAs due to weak project design capabilities or insufficient co-financing resources. To address these issues, FUAs must establish institutional mechanisms for risk management, such as integrated urban development strategies and innovation hubs that link research and business. Encouraging pilot projects, public procurement for innovation, and the use of digital tools for service delivery can also build capacity and confidence in managing transformative change.

3.5.3. Benchmarking against leader FUAs, to adopt best practice for specific functions of the FUAs

A possible way Romanian FUAs can accelerate their development is by benchmarking against more advanced FUAs in Europe. Leading FUAs in Western Europe offer valuable lessons in governance, mobility, environmental sustainability, and economic competitiveness. Romanian urban areas can benefit greatly by identifying relevant models and adapting best practices to their specific socio-economic and geographic context.
Benchmarking, however, requires more than observation. It involves systematic performance measurement, peer learning, and a commitment to continuous improvement. Unfortunately, many FUAs in Romania lack the institutional culture and data systems necessary for effective benchmarking.

To overcome this, national and regional authorities should support Romanian FUAs in developing urban observatories and performance indicators aligned with European standards. Participation in transnational networks such as URBACT, EUROCITIES, or ESPON can also provide access to valuable expertise and funding opportunities.
In adopting best practices, it is crucial that FUAs tailor them to local realities. For instance, integrated transport systems or circular economy models that work in Copenhagen or Vienna may require adaptation in other cities due to differences in scale, infrastructure, and governance. What matters most is the willingness of FUAs to learn, experiment, and adjust policies through evidence-based approaches.

Conclusion
Romania's Functional Urban Areas are at a turning point. While they hold immense potential to drive sustainable and inclusive growth, they face significant challenges that require strategic vision and collaborative effort. By improving the working climate for businesses, strengthening risk and innovation management, and learning from successful European counterparts, FUAs in Romania can overcome existing barriers and become true engines of regional transformation.

3.6. Opportunities and obstacles of Functional Urban Areas

3.6.1. Opportunities for Functional Urban Areas - Megatrends: environmental challenges, urbanization & megacities, ageing society, energy demand, and sources, changing lifestyle etc.

Functional Urban Areas (FUAs) in Romania are currently experiencing a range of significant megatrends that present both challenges and opportunities for their development and governance. One of the main opportunities stems from the growing environmental challenges, including climate change, pollution, and biodiversity loss. These issues create a strong incentive for FUAs in Romania to adopt sustainable urban planning and management practices. This can involve the integration of green infrastructure, the development of public green spaces, and the implementation of strategies to enhance climate resilience and reduce the environmental footprint of urban areas. The focus on sustainability also encourages FUAs to seek innovative solutions in energy efficiency and waste management.
Urbanization and the expansion of metropolitan areas are important trends influencing FUAs. The rapid growth of urban populations requires coordinated and forward-looking planning across municipal boundaries to prevent uncontrolled urban sprawl, ensure efficient transport networks, and promote balanced land use. FUAs have the opportunity to become models of regional cooperation by aligning development strategies, pooling resources, and implementing joint projects that improve connectivity and quality of life across the entire functional area.
The ageing of the population in many parts of Romania also creates both challenges and opportunities for FUAs. Designing urban environments that are accessible, inclusive, and adapted to the needs of older citizens can enhance social cohesion and improve overall well-being. This demographic shift opens new markets for age-friendly services, healthcare infrastructure, and community support systems, which FUAs can plan and develop in a coordinated manner.

Energy demand and the transition towards renewable energy sources provide further opportunities for FUAs. Investments in renewable energy production, smart grids, and energy-efficient buildings can help reduce greenhouse gas emissions and increase energy security. FUAs can also promote sustainable mobility solutions, such as electric public transport and cycling infrastructure, which align with broader climate and sustainability goals.
Changing lifestyles, accelerated by technological advancements and trends such as remote work, the sharing economy, and digitalization, challenge FUAs in Romania to adapt their urban services and infrastructure. This shift offers an opportunity to redesign urban spaces to be more flexible, connected, and responsive to evolving resident needs. Digital tools and smart city technologies can facilitate more efficient governance, enhance citizen participation, and improve public service delivery within FUAs.

3.6.2. Obstacles for Functional Urban Areas (ex. lack of financial sources, gaps in Functional Urban Areas financing, missing qualified personnel, difficult collaboration with the public authorities, weak collaboration between universities/ research centres and Functional Urban Areas

Despite these promising opportunities, FUAs in Romania face several obstacles that can hinder their development and effective governance.

A critical issue is the persistent lack of financial resources specifically targeted for FUA initiatives. Many functional urban areas struggle to secure consistent and adequate funding to support infrastructure development, service provision, and administrative capacity. Funding is often complicated by the involvement of multiple municipalities and governance levels, leading to fragmented financial streams and coordination difficulties.

Another major obstacle is the shortage of qualified personnel with expertise in functional urban governance, integrated spatial planning, and multi-level policy coordination. Without skilled professionals, FUAs may find it difficult to design and implement comprehensive strategies that address their complex territorial and socio-economic challenges.

Coordination and collaboration between public authorities can also be problematic. Differences in priorities, administrative structures, and communication practices among municipalities and between local and central governments may create barriers to joint decision-making and the implementation of shared projects.

Moreover, cooperation between FUAs and universities or research institutions in Romania is often weak. This limits access to research-based knowledge, innovative solutions, and evidence-driven policy-making—elements essential to addressing the rapidly evolving challenges faced by urban areas.

Lastly, institutional, and legislative inconsistencies at national and local levels can restrict FUAs' ability to operate effectively, especially in inter-regional or cross-jurisdictional contexts within Romania. Different legal interpretations, planning regulations, and governance models may require harmonization or more flexible frameworks to support collaboration and coherent development.

To overcome these obstacles, there is a pressing need to strengthen institutional capacities within FUAs in Romania, develop dedicated and coordinated funding mechanisms, and promote multi-

level governance models that support collaboration between local authorities, academia, civil society, and other stakeholders. Improved communication channels and shared knowledge platforms can also facilitate better cooperation. By addressing these challenges, FUAs in Romania can unlock their full potential and become resilient, sustainable, and competitive urban systems that contribute significantly to national socio-economic development.

3.7. Functional Urban Areas - SWOT ANALYSIS in ROMANIA

Romania's FUAs – SWOT Analysis

Strengths	Weaknesses
• FUAs can generate over 5**0% of Romania's GDP** and attract **67% of commuters**	• **Lack of legal status and unified governance** structure for FUAs leads to fragmented planning
• Presence of strong **urban cores** (e.g. Bucharest, Cluj, Timișoara) surrounded by functional zones	• **Limited cooperation mechanisms** among municipalities within FUAs (no metropolitan councils with executive powers)
• Established **university and research hubs** in FUA cores (Craiova, Brașov, Iași)	• **Outdated regulatory frameworks** that do not recognize FUAs explicitly in law
• Inclusion of FUAs in national strategies like **POIDS**, **PR SV Oltenia**, and **PNRR**	• **Insufficient administrative capacity** for integrated planning and PPP structuring
• FUAs are targeted in EU funding via **Integrated Territorial Strategies (ITS)** and **ZIT**	• Disparities between **urban cores and surrounding communes** (infrastructure, services, workforce)
• Use of spatial planning tools (GIS, travel time radius, commuting flows)	• Weak **public transport coordination**, especially across administrative boundaries
• Growing number of **clusters and innovation ecosystems** in urban cores	• Poor **data harmonization** for policy design across FUA territories

Opportunities	Threats

• **EU Cohesion Policy 2021–2027** earmarks at least **8% of ERDF** for integrated urban development	• **Delays in adopting Spatial Planning Code (CATUC)** and Metropolitan Law
• Use of **Integrated Urban Development Strategies (IUDS)** and Sustainable Urban Mobility Plans (SUMPs)	• **Fragmented financial flows** between municipalities, hindering large infrastructure investment
• Alignment with **Green Deal and Climate Neutrality Goals** via SUMPs and building renovation	• Risk of **suburban sprawl** without coordinated land-use planning
• Implementation of **PPP portfolios** with EU blending mechanisms (ROP, POIDS)	• Migration from rural FUAs to larger urban cores, leading to uneven demographic load
• Strengthening **local administrative capacities** via PNRR and POIDS reforms	• Limited stakeholder engagement beyond urban cores (citizens, SMEs, NGOs)
• **Digitalization** and smart city pilot programs funded by Regional Programs	• Low trust in multilevel governance due to past inefficiencies and limited transparency
• Establishment of **FUA-NET** for transnational learning and benchmarking	• Competition for investment among FUAs without strategic complementarities

Results

Results: Romania's FUAs – Engines of Innovation, Green Transformation & Competitiveness, Sustainable Development and Territorial Cohesion

Romania's Functional Urban Areas (FUAs) are emerging as territorial ecosystems with immense potential to catalyse **sustainable development**, **technological advancement**, and **entrepreneurial dynamism**. Collectively, they generate **over 50% of the national GDP**, represent **61% of employment**, and are the epicentres of **smart specialisation strategies** — particularly in digitalization, green transition, and industrial modernization. With the 2021–2027 EU programming period prioritizing integrated urban development, Romanian FUAs are poised to lead transformative change in how people and goods move.

Innovation and R&D Capacity

- Romania's FUAs host **national innovation hubs** in fields like **AI (Cluj), automotive engineering (Craiova), aerospace (Brașov), and bio-economy (Iași)**.
- Universities in core cities support **technology transfer offices**, **research clusters**, and **start-up incubators**. Example: Craiova University co-develops electric propulsion systems with Ford Otosan.
- FUAs increasingly engage in **EU Horizon Europe projects**, piloting urban digital twins, carbon-neutral zones, and circular economy models.

Green Urban Development & Sustainability

- All FUAs are required to develop **Sustainable Urban Mobility Plans (SUMPs)** and **Climate Neutrality Roadmaps** under Regional Program 2021–2027.
- Investment in **green infrastructure** (e.g. riverfront regeneration in Râmnicu-Vâlcea, urban biodiversity zones in Iași) is transforming FUAs into resilient, low-carbon urban spaces.
- Craiova FUA is prioritizing **clean energy parks and building renovation programs**, leveraging Just Transition and PNRR funds.

SME Competitiveness and Strategic Investment Areas

Romania's FUAs are fostering an enabling climate for **start-ups, scale-ups, and SME transformation**, especially in:

FUA	Key Sector Strengths	Innovation Drivers
Bucharest	IT, finance, digital services	Venture capital hubs, smart city labs
Cluj-Napoca	Software, AI, biotech	EU tech accelerators, urban data platforms
Craiova	Automotive, mobility tech	Smart manufacturing, PPP with academia
Brașov	Aerospace, tourism	Green transport corridors, R&D clusters
Iași	Education, healthcare, pharma	Biohealth tech parks, startup incubators
Timișoara	Electronics, creative industries	Cross-border innovation networks
Constanța	Logistics, blue economy	Maritime innovation and energy startups

Future Growth Themes of FUAs

Romanian FUAs are adapting rapidly to global megatrends through coordinated investments:

- **Digitalization and Data Governance**: City-level platforms for urban data analytics and smart services
- **Low-Carbon Economies**: Circular economy clusters, clean tech adoption, sustainable building renovation
- **Entrepreneurship Culture**: Local accelerators, angel networks, and mentoring in Bucharest, Cluj, Timișoara
- **Innovation Infrastructure**: Co-working hubs, fab-labs, and university-enterprise alliances for tech adoption
- **Resilience and Inclusiveness**: Targeted interventions for vulnerable populations and depopulating peri-urban zones

Romania's FUAs are shifting from peripheral policy spaces to **strategic nodes of transformation**, capable of attracting investment, sustaining innovation, and delivering socio-economic resilience. With robust frameworks like the Regional Programme (ROP 2021–2027), PNRR, and POIDS, they are actively shaping the country's future around **green and digital growth**.

Long-Term Potential: Positioning Romania's FUAs as Smart Business Hubs

Romania's FUAs are aligning with European megatrends and developing transport platforms with transformative potential:

- **New Markets Creation**: Craiova and Bucharest are investing in **electric & connected vehicles**, with demonstrator corridors for smart mobility.
- **Technological Leap**: Growth in **battery manufacturing**, **urban digital twins**, and **multimodal transport apps** is strengthening the urban innovation ecosystem.
- **Global Alignment**: Participation in European projects like **ELTIS**, **CIVITAS**, and **URBACT Mobility clusters** position FUAs as viable nodes in EU smart mobility networks.

Conclusions

Romania's FUAs – From Urban Networks to Innovation Ecosystems

- Romania's FUAs benefit from a **diverse and robust research base**, anchored by major universities, technical institutes, and innovation centres across Bucharest, Cluj-Napoca, Iași, and Craiova. These institutions act as catalysts for knowledge transfer and R&D-led urban transformation.

- The emergence of **regional innovation clusters**, digital incubators, and science parks — such as Tetarom (Cluj), Ford Mobility Hub (Craiova), and Techcelerator (Bucharest) — provide growing infrastructure to support tech-driven SMEs and spin-outs. These platforms are crucial for scaling entrepreneurship and attracting venture capital.
- **Digital infrastructure has improved**, with expanded broadband coverage in urban cores, though connectivity gaps persist in peri-urban and rural fringe areas. These disparities limit inclusive digital transitions, and require targeted investment through the Regional Programmes and PNRR.
- Romania's FUAs face **critical human capital constraints**, with notable regional mismatches between skills supply and demand. While Bucharest and Cluj lead in higher education attainment, many FUAs struggle with **low tertiary enrolment, brain drain**, and uneven lifelong learning systems. Addressing these gaps is essential for increasing productivity and innovation adoption.
- **Multi-level governance and stakeholder networks** are increasingly active in Romanian FUAs. There are growing partnerships between public authorities, academia, clusters, NGOs, and SMEs — with platforms like FUA-NET and metropolitan councils fostering collaborative planning.
- Romania's ecosystem of territorial governance is gradually being shaped by a **national policy focus on innovation and smart specialization**, backed by strong funding frameworks (ROP, POIDS, PNRR). Metropolitan areas like Craiova and Timișoara are integrating sustainability, mobility, and digital innovation into their development strategies. Romania's FUAs are undergoing a structural shift — from administrative fragments to **functionally integrated innovation ecosystems**. To sustain this momentum, it is crucial to:
- Accelerate the adoption of **institutional frameworks for metropolitan governance**
- Enhance **skills development pipelines**, particularly for tech, green economy, and engineering domains
- Strengthen **research-business-public partnerships** across urban networks
- Expand access to **smart infrastructure and broadband** across functional territories
  With committed policy focus and collaborative leadership, Romania's FUAs can evolve into globally connected hubs that drive **inclusive growth, digital transformation, and green competitiveness** in the Danube Region and beyond.

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Pilsen Region
CZECHIA

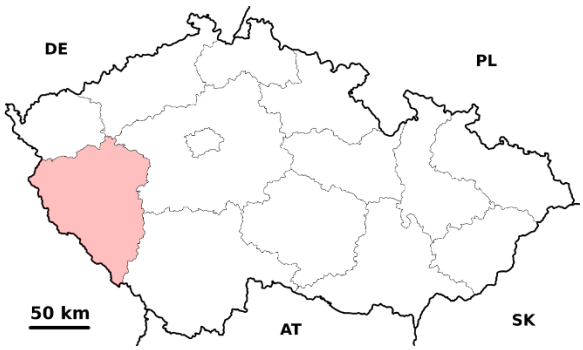

3.1 Database of CZECHIA

3.1.1 General **geographical information** (country geographical location, population administrative organization: counties/towns/villages, centralized or decentralized governance)

The **Czech Republic** is a landlocked country in **Central Europe**, bordered by **Germany** to the west, **Poland** to the north, **Slovakia** to the east, and **Austria** to the south. It has a population of approximately **10.5 million** people and covers an area of about **78,900 km²**. The country is administratively divided into **14 regions**, including the capital city **Prague**, which has a special regional status. These regions are further subdivided into over **6,200 municipalities**.

The Czech Republic has a **unitary** (centralized) system of governance, but with increasing levels of **decentralization** since the 2000s. Regions and municipalities have elected councils and enjoy varying degrees of autonomy in areas such as education, transport, social services, and spatial planning, though strategic policy and funding decisions remain largely influenced by national ministries.

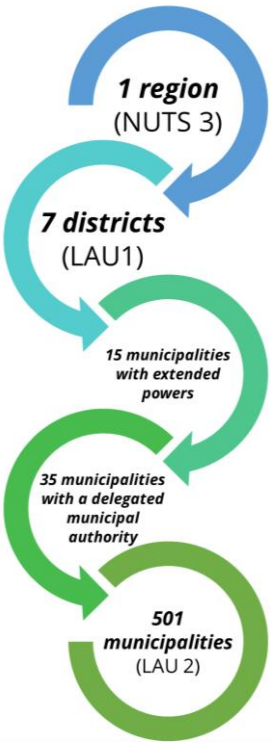
The **Pilsen Region** (Plzeňský kraj) is situated in **western Bohemia, bordering Germany (Bavaria)** to the west. It occupies a strategic location within the Czech Republic and the broader Central European space, which makes it a key area for transnational connectivity and regional development. The administrative and economic center of the region is the **statutory city of Plzeň**, the fourth-largest city in the country.



With a total area of approximately 7,561 km², the Pilsen Region ranks among the larger regions of the Czech Republic. Its landscape is geographically diverse, comprising lowlands, uplands, and mountainous areas. The **Bohemian Forest** (Šumava) along the southwestern border forms a natural frontier and contributes to the region's ecological value. In contrast, the eastern part of the region is more urbanized and agriculturally productive. The region is characterized by a **dense river network**, with the Mže, Radbuza, Úhlava, and Úslava rivers all converging in the city of Plzeň to form the Berounka River. This hydrological structure has historically influenced settlement patterns, economic activity, and infrastructure development.

Its proximity to the German border and its **internal heterogeneity** make it an important case for spatial planning and functional urban area analysis, particularly in the context of regional disparities, accessibility, and cross-border dynamics.

The urban structure of the Pilsen Region is characterized by a **strong monocentric hierarchy**, with the statutory city of Plzeň functioning as the clear dominant urban core. Plzeň serves not only as the regional capital but also as the central node of economic, administrative, educational, and cultural activity. Its population size, employment capacity, and service infrastructure position it firmly at the top of the regional urban hierarchy, and it forms the core of the only fully developed Functional Urban Area in the region as defined by both national and EU standards (e.g. ESPON, OECD-EC FUA methodology).



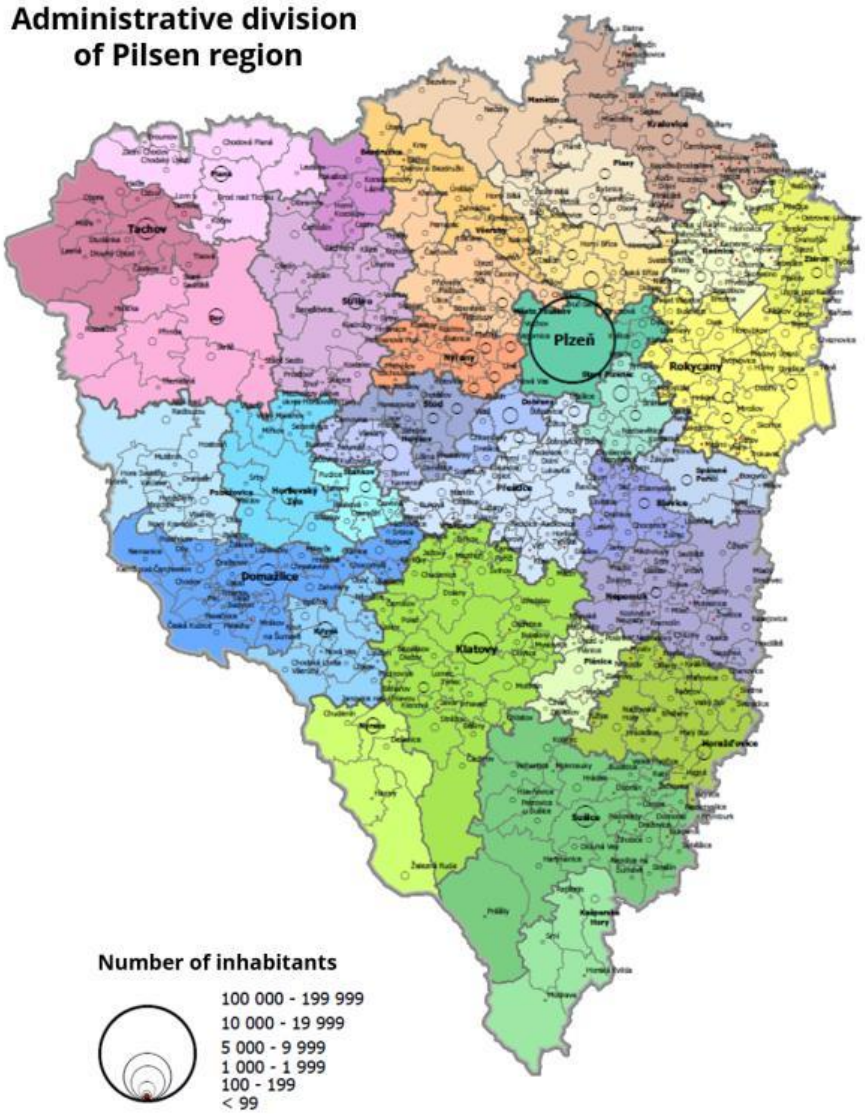
Below Plzeň, the region contains a network of smaller towns and microcentres with varying degrees of functional autonomy. These include **municipalities with extended powers** (ORP), which act as local administrative and service centres. The region is administratively divided into seven districts (okresy), which are no longer self-governing but still used for statistical and administrative purposes:

- Plzeň-město (urban core),
- Plzeň-sever (north),
- Plzeň-jih (south),
- Klatovy,
- Domažlice,

- Tachov,
- Rokycany.

However, the more relevant administrative layer for spatial planning and FUA analysis is the ORP level (currently 15 units in the region), which reflects real-world functional linkages such as commuting patterns, service provision, and institutional coordination.

This urban hierarchy reflects a **centralized model, with a pronounced dependency on Plzeň**, especially in terms of employment, education, and healthcare services. The degree of functional integration between Plzeň and surrounding municipalities suggests a metropolitan-type FUA with high daily urban system intensity. In contrast, the secondary centres exhibit limited pull and serve more localized catchments, often constrained by demographic stagnation, weaker infrastructure, or natural barriers such as the Bohemian Forest highlands.



3.1.2 FUAs **legislative** framework applicable in the country

In the Czech Republic, Functional Urban Areas (FUAs) are not yet formally defined or legislatively anchored as specific administrative or legal entities. However, they operate within a broader framework of spatial planning, regional development, and EU cohesion policy, which provides tools and indirect mechanisms for their support. Here's an overview of the legislative and regulatory framework applicable to FUAs:

FUAs as a Planning Concept (Not Legal Entities)

FUAs are used primarily as a strategic and statistical planning tool based on methodologies from the OECD and Eurostat, which define them around urban cores and commuting zones.

There is **no direct legal definition of FUAs in Czech national law**. They do not possess legal personality, administrative authority, or budgetary autonomy.

Relevant Legislative and Strategic Frameworks

a) Building Act (Act No. 283/2021 Coll., on Construction and Spatial Planning)

The new Building Act provides the legal foundation for territorial development and land-use planning. While **it does not explicitly mention FUAs**, it mandates coordination of spatial planning across municipalities and regions, which aligns with functional area thinking. Planning tools such as spatial plans and territorial analytical data must consider cross-border influences, which include functional urban dynamics.

Another issue is the absence of binding coordination mechanisms across municipalities within FUAs. **Without legal requirements for joint planning or decision-making**, many initiatives lack cohesion and may be undermined by local political or administrative fragmentation.

Furthermore, spatial and land-use planning tools, such as **zoning plans, are often developed independently by each municipality**. This leads to a lack of harmonization across the FUA, resulting in inconsistent land use, infrastructure planning, and service provision.

b) Act on Regions (Act No. 129/2000 Coll.) and Municipalities (Act No. 128/2000 Coll.)

These laws define the **competences of self-governing regions and municipalities**. Cooperation between municipalities within FUAs is enabled through voluntary agreements, associations, and development partnerships, but not mandated.

c) EU Cohesion Policy Instruments (2021–2027)

FUAs are a core concept within EU programming for territorial cohesion. Czech FUAs access **Integrated Territorial Investments** (ITI) and **Integrated Territorial Development** (ITD) frameworks, which support multi-municipality cooperation in urban agglomerations.

These are **supported through Operational Programmes** such as:

- IROP (Integrated Regional Operational Programme)
- OP Transport
- OP Environment
- Just Transition Fund (for select FUAs in coal regions)

Governance and Cooperation Mechanisms

FUAs are typically governed via **informal or semi-formal cooperation structures**, such as:

- Metropolitan councils
- Development agencies
- Urban partnerships established for ITI implementation

These bodies lack permanent legal status or statutory powers, operating **based on project-specific or strategic cooperation agreements**.

Policy and Strategic Documents

National strategies that refer to FUAs include:

- National Strategy for Regional Development 2021+
- Strategic Framework Czech Republic 2030
- Territorial Dimension Strategy 2021–2027

These strategies recognize the importance of FUAs in addressing urban–rural linkages, mobility, housing, and economic clustering.

Strategic development projects within FUAs also face difficulties due to the complexity of approval processes. Without a unified metropolitan authority or legal framework for FUAs, each project must navigate multiple administrative layers and institutional actors, which can delay implementation and weaken impact.

3.1.3 FUAs **guidelines** applicable in the country

In the Czech Republic, **FUAs are guided by a set of methodological and strategic guidelines rather than formal legislation**. These include national frameworks developed by the Ministry for Regional Development and are aligned with EU methodologies from Eurostat and the OECD. Key guidelines help define FUAs, structure cooperation among municipalities, and coordinate Integrated Territorial Investments (ITI). They support strategic planning, project implementation, and data harmonization across municipalities. While not legally binding, these guidelines play a crucial role in fostering integrated development, ensuring that urban cores and their surrounding municipalities collaborate effectively on shared challenges such as mobility, housing, and infrastructure.

3.1.4 FUAs **methodologies** applicable in the country

Eurostat and OECD Methodology for Defining FUAs

The Czech Republic applies the international FUA definition methodology developed by Eurostat and the OECD. The Czech Statistical Office (*ČSÚ*) and the Ministry for Regional Development (*MMR*) have adopted this approach for national and EU statistical, programming, and policy purposes.

National Methodological Guidelines (Ministry for Regional Development – MMR)

a) Methodology for Defining Metropolitan and Agglomeration Areas published by MMR identifies Czech FUAs and classifies them as Metropolitan areas (Prague, Brno and Ostrava) and Agglomeration areas (e.g., Plzeň, Olomouc, Liberec, etc.). The methodology is used for strategic planning, especially in the context of Integrated Territorial Investments (ITI) and the 2021–2027 EU programming period.

b) Guidelines for Territorial Dimension Implementation provides guidance for implementing the territorial dimension of EU and national strategies across different functional territories. Specifies how FUAs can be used as eligible units for funding allocation and project implementation within Operational Programmes.

c) ITI Guidelines and Operational Procedures include detailed rules for managing Integrated Territorial Investments within FUAs.

Strategic and Programming Frameworks

a) National Strategy for Regional Development 2021+ emphasizes the importance of functional areas as key units for targeted interventions.

b) Strategic Framework Czech Republic 2030 promotes coordination at the functional level for better alignment of services, infrastructure, and sustainable development.

c) Urban Policy of the Czech Republic also encourages planning at the functional scale, especially in housing, mobility, and services.

3.1.5 Major investor companies, other players in the FUAs-related sector, in the field of industry, services, research, research departments within the companies)

The Pilsen Region is home to several major companies and institutions that significantly shape its Functional Urban Areas (FUAs), especially around the urban core of Plzeň.

In **industry and innovation**, a key player is the **Škoda Group** (rail vehicles), which combines large-scale production with in-house R&D and strong ties to academia. In the automotive sector, **ZF Engineering Plzeň** stands out as a major R&D centre focused on chassis systems and autonomous technologies, reinforcing Plzeň's role as a regional engineering and innovation hub. Complementary automotive and logistics investments—such as **Daikin, Adient**, and suppliers in **Panattoni Park Pilsen West** and **CTPark Plzeň**—support employment and regional connectivity.

COMTES FHT, a leading private research institute in Dobřany in Pilsen-south district, adds to the innovation ecosystem with its focus on **advanced metallic materials and forming technologies**, serving automotive, aerospace, and energy sectors.

In terms of applied research, the **University of West Bohemia** (ZČU) plays a central role through specialized centres such as the **New Technologies Research Centre** (NTC) and **Regional Innovation Centre for Electrical Engineering** (RICE). UWB hosts also research centres such as **NTIS** (~300 researchers in ICT, mechatronics, physics). These centres engage in collaborative research with industry, particularly in areas like materials science, power electronics, and automation.

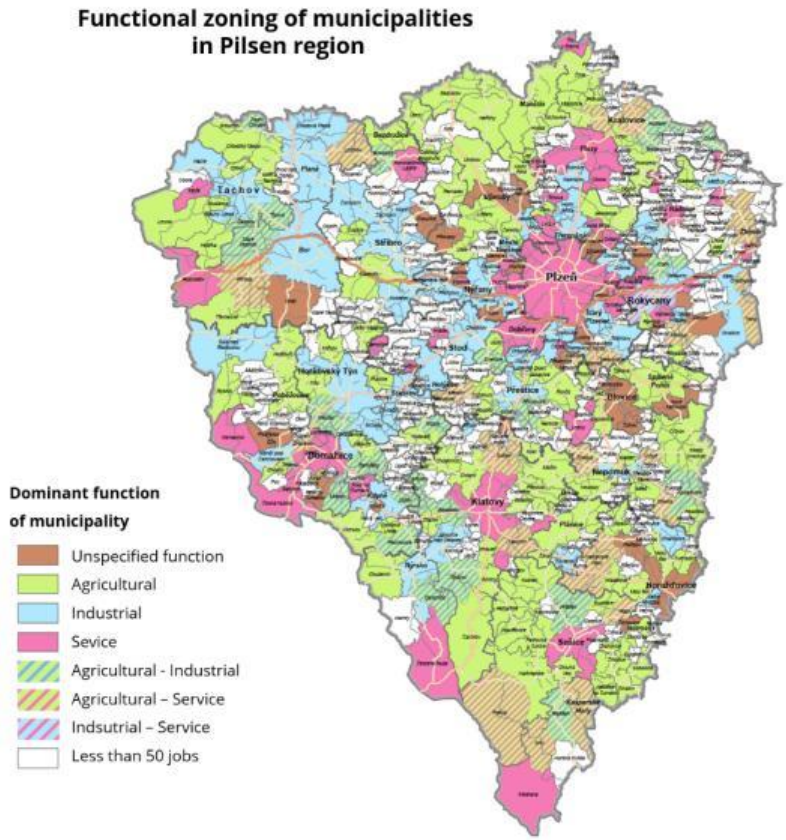
Also the **Biomedical Centre** is a key research facility of the **Faculty of Medicine in Pilsen**, part of **Charles University**. It specializes in biomedical and translational research, particularly in the areas of **oncology, regenerative medicine, molecular biology, and cardiovascular research**. The center is equipped with advanced laboratories and connects clinical practice with experimental research, contributing to the development of precision medicine and strengthening life sciences as a growing component of the regional innovation ecosystem.

In the **service and cultural economy**, **Pilsner Urquell** plays a dual role as a large employer and tourism magnet, reinforcing Plzeň's multifunctional urban character. Global service providers like Accenture, Zebra Technologies, and BlueLink, along with the **TechTower innovation park**, contribute to the growth of the knowledge economy while it supports start-ups and scale-ups in technology fields, particularly in cooperation with ZČU and private investors.

These actors collectively shape the region's urban structure, labour mobility, and innovation potential, making them key to understanding FUA dynamics in the Pilsen Region.

3.1.6 Statistics about FUAs activity, results, employment etc. in investor sectors etc.

The Czech Republic comprises **16 FUAs**, which are key drivers of the national economy. Although they cover only part of the country's territory, they concentrate nearly **50% of the population**, **31% of all employment**, and generate approximately **41% of national GDP**. The three largest FUAs—**Prague, Brno, and Ostrava**—alone account for **30% of the total population** and contribute disproportionately to innovation, productivity, and public investment absorption. This indicates that Czech FUAs serve as major economic engines, with productivity and job creation heavily concentrated in functional urban regions.



The **Pilsen Agglomeration**, as a medium-sized FUA, plays a strong role in **engineering, transport,**

energy technologies, and **manufacturing-based innovation**.

The Pilsen Region has long ranked among the most economically productive regions in the Czech Republic. In 2022, the **region's GDP reached CZK 327 billion**, accounting for approximately 4.8% of the national GDP (6th highest among regions). The **per capita GDP** in the region was around **CZK 504,354**, ranking 4th among all Czech regions. In recent years, the region has shown weaker GDP and labor productivity growth, dropping from 3rd to 5th place in productivity rankings since 2019.

The region has a predominantly **industrial character**, concentrated particularly in the city of Pilsen and along major transport corridors (especially the D5 motorway). **More than 70% of foreign direct investment flows directly into Pilsen**, primarily into manufacturing. Its advantageous location near Germany and Prague supports a strong export orientation.

Economic activity is highest in the northern part of the region, while southern and peripheral areas (e.g., Klatovy, Domažlice, Sušice) show lower levels of activity. These areas also report higher economic dependency ratios. The **index of entrepreneurial activity is highest in Pilsen** and the Bohemian Forest, where tourism boosts local entrepreneurship. Conversely, the Tachov area and northern Domažlice show low business activity and a low share of sole traders among active businesses.

Between 2011 and 2021, **employment i**n the Pilsen Region increased by 7.6%, **reaching nearly 296,000 people**. **Foreign workers accounted for 27.5%** of the employed population in 2023, significantly above the national average of 16.3%.

The **primary sector** (agriculture, forestry, fishing) maintained an above-average regional share but declined slightly to **around 2–3%** of employment, with forestry playing a particularly strong role.

The **secondary sector**, dominated by manufacturing and construction, remained the backbone of the regional economy. In 2021, **manufacturing** alone accounted for **29.7%** of employment (despite a drop of 0.7 percentage points since 2011), while **construction** fell to **6.5%**, below the national average.

The **tertiary sector** remained underrepresented compared to national levels. Key service subsectors included **trade and motor vehicle repair** (31,000 people; **~10.5%**), **health and social care** (**7.6%**), **information and communication** (**2.4%**), and **professional, scientific, and technical activities** (**4.0%**). Despite growth, these service subsectors remain below the Czech average. The **transport and storage** sector stood out with the **3rd highest regional share**, reflecting the region’s strategic logistics position. On the other hand, education and accommodation/food services ranked **13th and 11th** nationally (of 14 regions), respectively, in terms of employment share.

Major employers include:

- **Škoda Transportation**: 4,000 – 4,500 employees,
- **Faculty Hospital in Pilsen**: 4,000 – 4,500 employees,

- **Daikin Industries Czech Republic**: 2,500 – 3,000 employees,
- **Pilsner Urquell Brewery**: 2,500–3,000 employees,
- **University of West Bohemia**: 1,500 – 2,000 employees,
- **Panasonic AVC Networks Czech**: 1,500 – 2,000 employees
- **BORGERS CS**: 1,500 – 2,000 employees,
- **Doosan Škoda Power**, **Safran Cabin CZ, ZF Engineering Plzeň**: among others with 1,000–1,499 employees each

3.1.7 Any specific specialization of the FUAs (e.g. IT & Digital Technologies, automotive, aerospace etc.)

The Functional Urban Area of Plzeň is specialized in a diverse yet interconnected set of fields, with a strong focus on **engineering, applied research, and advanced manufacturing**. Its core strengths lie in **mechanical and automotive engineering, rail vehicle production, and materials science**, supported by major firms like Škoda Group, ZF Engineering, and COMTES FHT.

The FUA is also an **emerging centre for the knowledge and innovation economy**, with robust R&D capacities linked to the **University of West Bohemia** and the **Biomedical Centre at the Faculty of Medicine of Charles University in Pilsen**. The latter adds a key dimension of biomedical and clinical research, reinforcing the region's profile in **life sciences and health technologies**.

Complementing this are strong positions in **ICT, business services, and urban tourism**, with companies like Accenture and institutions like Pilsner Urquell contributing to a multifunctional urban economy. This diverse specialization supports regional labour mobility, commuting patterns, and innovation-driven growth, making the Plzeň FUA one of the most economically dynamic in western Bohemia.

3.2 The stakeholders

3.2.1 Governance structure (public authorities, private/public companies, clusters)

The governance structure of **FUAs** in the Czech Republic is characterized by a **multi-level framework** involving **public authorities, private actors, inter-municipal cooperation, and sector-specific clusters**.

Governance of FUAs in the Czech Republic is based on **decentralized cooperation**, with statutory cities as natural leaders. **National ministries** provide funding, frameworks, and coordination, while **regional and municipal actors** implement integrated strategies.

Clusters and private stakeholders complement the public governance model by fostering innovation and investment, creating a complex but flexible system that aligns with EU cohesion policy principles.

3.2.2 Main stakeholders involved in the Functional Urban Areas: public authorities, ministries, municipalities, national/regional boards, clusters, relevant companies from industry-related sectors, major manufacturers in FUAs-related sectors, automotive, aerospace, IT, universities, research centres, specialized authorities in innovative industry sectors, public services companies, ports, airports, SMEs, business support centres, expert think-tanks, funding institutions, innovation poles etc.

This robust stakeholder ecosystem underpins both national-level innovation and regional development optimization—especially within Pilsen's FUA, where education, manufacturing, and smart ecosystems intersect.

1. National-Level Stakeholders

- **Ministry of Regional Development (MMR)** - sets the strategic and legislative framework for spatial development and FUA policy and coordinates Integrated Territorial Investments (ITI), and manages cohesion policy tools.
- **Ministry of Transport, Ministry of Environment, Ministry of Industry and Trade** - influence policies on infrastructure, environment, and business support relevant for FUAs.
- **CzechInvest & TAČR (Technology Agency of the Czech Republic)** - support for innovation, business development, and investment in FUAs.

2. Regional-Level Stakeholders (Pilsen region)

- **Regional Authority of the Pilsen Region** - develops the Regional Development Strategy and Spatial Plan and coordinates transport, education, healthcare, and regional innovation.

- **Regional Development Agency of the Pilsen Region (RRA PK)** – provides technical and expert support for regional projects and supports grant preparation, strategic planning, and inter-municipal cooperation.

3. Local/Municipal Stakeholders

- **Statutory City of Plzeň** - the core city and natural leader of the Pilsen FUA that acts as the intermediate body for the Integrated Territorial Investment strategy and coordinates with surrounding municipalities on strategic development (mobility, housing, public services).

- **Surrounding municipalities in the Pilsen Agglomeration Area** - 108 municipalities participate in ITI Pilsen Agglomeration or cooperate through **Voluntary Associations of Municipalities.** They focus on shared services, transport integration, spatial planning, and infrastructure.

4. Academic and Research Institutions

- **University of West Bohemia** - major research and innovation hub in the region and partner in EU projects, R&D, and smart city development (e.g., mobility, AI, engineering).

- **Research organizations and technical institutes** - collaborate with both public institutions and companies on applied research (e.g. COMTES FHT).

- **Biomedical Centre of the Faculty of Medicine in Pilsen** (part of Charles University) - specializes in biomedical and translational research, particularly in the areas of oncology, regenerative medicine, molecular biology, and cardiovascular research.

- **National Research Nodes**:

    - **Academy of Sciences of the Czech Republic** (AV ČR) is the leading public research institution, covering basic and applied research.

    - Centres like **CEITEC, IT4Innovations, CERIT-SC** and **CIIRC** are linked to other major FUAs and support national R&D capacity.

5. Private Sector & Clusters

Industrial & Manufacturing Leaders

- **Automotive & Mobility**:

    - *Škoda Auto*, *TPCA*, and *Hyundai* are the top vehicle manufacturers nationwide.

    - *ZF Engineering Pilsen* (Pilsen) has grown to a prominent technology center with ~850 engineers working on e-mobility and telematics solutions.

- **Aerospace & Defence**:
    - *Aero Vodochody Aerospace* (Prague area) and *Evektor-Aerotechnik* (Kunovice) produce aircraft and components.
- **Electronics & Manufacturing**:
    - Major firms include *Daikin*, *Panasonic*, *JTEKT*, *Safran Cabin CZ*, *Autoneum*, *HP-Pelzer*, and *Lasselsberger*.

Innovation & Business Support

- **Pilsen Innovation Ecosystem (PINE)**:
    - Encompasses phases from youth tech engagement (SIT Port), start-ups (BIC Port), to scale-ups and internationalization.
- **Technological Initiative Pilsen** promotes collaboration with firms like *Safran Cabin CZ*, *Eurosoftware*, *ZF Staňkov*, *AIR POWER*, *Scherdel*, and *Gerresheimer*.

SMEs & Clusters

The **Czech Republic hosts over 110 clusters** and technology platforms, engaging nearly 1,800 companies and **almost 500,000 employees**. These clusters span major industries like mobility–automotive, aerospace and defense, electronics, as well as enabling technologies such as AI, advanced materials, nanotech, and industrial biotechnology

Key Clusters Across the Czech Republic:

- **Czech National Semiconductor Cluster (CNSC)**: Focuses on semiconductor value chains, R&D collaboration, and participation in EU-level initiatives.
- **Czech Smart City Cluster (CSCC)**: Promotes smart city development through partnerships across public administration, businesses, and research institutions.
- **Industry Cluster 4.0**: Specializes in digitized manufacturing and Industrial 4.0 technologies
- Other significant clusters: Hi-Tech Innovation Cluster, Energy-Technical Innovation Cluster (ETIK), Energy and Water Innovation Cluster (EWIC), Nanoprogress, Regiotex, Clutex (technical textiles), Moravian Aerospace Cluster, Moravian-Silesian Hydrogen Cluster, Czech Machinery Cluster, MedChemBio (medicinal chemistry), National Creative Cluster

Clusters in Pilsen focus on mobility, smart tech, and manufacturing. These include **Smart Pilsen**, national automotive clusters, and ecosystem platforms led by **CzechInvest**.

- **Smart Pilsen Region Cluster:** A voluntary grouping advancing Smart Region strategies—focusing on public safety, environment, mobility, and health/social access Get Smart.
- **Mechatronics Cluster:** Facilitates technology transfer, additive manufacturing, and Czech Bavarian collaboration in smart production solutions Get Smart.

- **Technological Initiative Pilsen (TIP):** A collaborative umbrella association for R&D cooperation, resource-sharing, and industrial innovation between regional actors

Funding Institutions & Think Tanks

- **Funding organizations**: CzechInvest and TAČR support business development, R&D funding, and startup acceleration.
- **Think tanks and innovation promoters**: Entities like PINE and Technological Initiative Pilsen act as local thought leaders and community enablers.

Chambers and Business Associations:

- **Regional Chamber of Commerce of Pilsen Region** - provide networking, business support, and coordinate private sector input to regional development.

6. Civic and Non-Governmental Stakeholders

- **BIC Plzeň (Business and Innovation Centre Pilsen)** is a key regional innovation and business support organization based in the **Pilsen region**, established in **1992**. BIC Plzeň is an essential **innovation hub** in the Pilsen Functional Urban Area, helping to bridge the gap between **research**, **business**, and **public support systems**.
- **Local Action Groups (LAGs)** - operate under the LEADER program; focus on rural parts of FUAs and implement community-led development strategies.
- **NGOs and urban initiatives**
    - Participate in sustainable transport, environment, housing, and social innovation projects.

3.2.3 Stakeholders' cooperation patterns in FUAs within the country but also with FUAs from other countries

1. Domestic Cooperation Patterns within the Czech Republic

Municipality-to-Municipality Collaboration

Since 2014, **Integrated Territorial Investments** (ITI) have played a crucial role in coordinating development across FUAs. This tool enables cities and their surrounding municipalities to pool EU funds and collaborate on projects in fields such as transport, education, social inclusion, environmental sustainability, and research and development. Cities like Prague, Brno, Ostrava, and Pilsen have established dedicated ITI structures to facilitate such cooperation.

Additionally, municipalities often form **Voluntary Unions of Municipalities** (DSO) to promote regional development, infrastructure management, and spatial planning. These unions enhance the harmonization of public services and land-use strategies across smaller administrative units.

Public–Private Partnerships (PPPs)

Cities increasingly collaborate with **private companies, clusters, and real estate developers** through public–private partnerships. These partnerships are focused on the redevelopment of brownfields, creation of industrial zones, construction of innovation parks, and the modernization of urban transport systems. For instance, smart city projects in Prague and Pilsen actively engage telecom firms, energy utilities, and mobility start-ups to enhance urban infrastructure and sustainability.

Academia–Business–Government Cooperation (Triple Helix Model)

In FUAs with strong academic institutions such as Prague, Brno, Pilsen, and Ostrava, the "Triple Helix" model promotes **collaboration between universities, industries, and public authorities**. A notable example includes **the University of West Bohemia (UWB) in Pilsen, which partners with Škoda Group and Doosan Škoda Power on research in energy and mobility**. Institutions like CEITEC and CIIRC also engage in joint Industry 4.0 initiatives with ICT firms and manufacturers. These partnerships are often supported by national technology agencies and EU operational programs such as OP RDE and OP EIC, as well as Regional Innovation Strategies.

Cluster Organizations and Innovation Platforms

Innovation clusters in the Czech Republic — such as the Czech Aerospace Cluster, Nanoprogress, and the Czech Automotive Cluster — act as intermediaries **connecting SMEs, multinational companies, universities, and local authorities**. These clusters promote joint research projects, personnel exchanges, and coordinated applications for European funding.

Metropolitan and Regional Development Agencies

Metropolitan and regional agencies serve as **coordinators between municipalities and various stakeholders**. For instance, the Institute of Planning and Development of the City of Prague (IPR) manages strategic and spatial planning for the capital, while the Regional Development Agency of the Pilsen Region (RRA PK) provides support for building local partnerships and preparing joint projects in the region.

2. <u>International and Cross-Border Cooperation</u>

EU-Level Initiatives

Czech FUAs actively engage in **EU-funded programs** such as URBACT, ESPON, Interreg Central Europe, Horizon Europe, and Urban Innovative Actions (UIA). These initiatives facilitate policy innovation, climate adaptation, urban mobility solutions, and digital transformation across participating cities.

Cross-Border Partnerships

Cross-border cooperation is particularly strong in border FUAs, including **partnerships between the Pilsen Region and Bavaria** (Germany), South Moravia and Lower Austria, and Liberec and Saxony. These collaborations focus on **shared public transportation**, joint waste and water management systems, coordinated emergency services, and tourism development.

Twin Cities & Urban Networks

Czech FUAs maintain numerous partnerships with cities abroad and actively participate in European urban networks such as Eurocities, the Covenant of Mayors, EURE, and the Urban Agenda for the EU. The city of Pilsen, for example, takes part in networks that support cultural development, energy efficiency improvements, and digital innovation projects.

Knowledge Sharing and Benchmarking

Czech regions frequently engage in knowledge exchanges and benchmarking practices with other European FUAs. They particularly look to advanced urban models from Germany, Austria, the Netherlands, and the Nordic countries to guide improvements in governance, technology, and sustainability.

Both domestic and international cooperation patterns within the Czech Republic can be summarized into the following table:

Cooperation Type	Key Actors	Typical Outputs
Horizontal (local)	Municipalities, DSOs (voluntary unions of municipalities)	Shared services, spatial planning, ITI
Vertical (multi-level)	Ministries, regional offices, local governments	Coordinated funding, regulations
Cross-sectoral	Academia, business, governments	Innovation projects, smart city tools
International	Cities, EU institutions, foreign partners	Best practices, joint EU projects

3.2.4 Other relevant players in the country's FUAs

In addition to municipalities, universities, major companies, and public agencies, **other relevant players** in the Czech Republic's FUAs include a wide range of organizations and institutions that contribute to development, innovation, and governance. Here's a categorized list of key players that play important roles in FUAs across the country:

Public Authorities and Governance Structures

- **Ministry of Regional Development (MMR)** – national coordination of urban policy, EU funding (e.g., ITI), and strategic planning.
- **Ministry of Industry and Trade (MPO)** – supports innovation, industrial zones, and entrepreneurship.
- **Ministry of the Environment** – influences sustainability and climate-resilient urban development.

- **Regional Authorities** – implement development strategies at the NUTS 3 level, manage infrastructure and public services.
- **Municipalities and City Councils** – local implementation of policies, strategic development, and service delivery.

Business and Industry Actors

- **CzechInvest** – national investment and business development agency, supports startups, innovation, and foreign investment.
- **Association of Small and Medium-Sized Enterprises and Crafts (AMSP ČR)** – represents SMEs across the country, often active in regional FUAs.
- **Innovation-driven large firms** – such as:
    - Škoda Auto (Mladá Boleslav – automotive)
    - Škoda Transportation (Pilsen – rail transport)
    - Honeywell (Brno, Olomouc, Prague – aerospace, R&D)
    - Siemens, ABB, and Bosch (industry & automation, multiple locations)
    - IBM, Microsoft, Oracle (IT and smart solutions)

Research and Academic Institutions

- **Academy of Sciences of the Czech Republic (AV ČR)** – national research body with institutes throughout FUAs.
- **Universities with strong regional influence**, including:
    - **Charles University** (Prague)
    - **Masaryk University** (Brno)
    - **Czech Technical University (ČVUT)** (Prague)
    - **Brno University of Technology (VUT)**
    - **University of West Bohemia (UWB)** (Pilsen)
    - **Technical University of Ostrava (VŠB-TUO)**
- **Research centres** like CEITEC, CIIRC, NTC (New Technologies Centre in Pilsen), and others tied to universities or clusters.

Clusters and Innovation Networks

- **Czech National Cluster Association (NCA CZ)** – umbrella body for Czech clusters.

- **Notable innovation clusters**:
    - Czech Aerospace Cluster
    - Czech Automotive Cluster
    - Nanoprogress (nanotech)
    - MedTech Cluster
    - IT Cluster (Ostrava)
    - Smart City Innovations Institute (SCII)
    - Energy Cluster

Business and Innovation Support Organisations

- **Regional Innovation Centres**, such as:
    - **BIC Pilsen** – supporting startups, tech transfer, incubation.
    - **JIC (South Moravian Innovation Centre)** – one of the strongest innovation ecosystems in Brno.
    - **Innovation Centre of the Ústí Region (ICUK)**
    - **Moravian-Silesian Innovation Centre (MSIC)** (Ostrava)
- **Technology Parks and Science Parks** (e.g., Science and Technology Park Brno, TechTower Pilsen)
- **Chambers of Commerce** – Czech Chamber of Commerce and regional branches.
- **Startup accelerators and incubators**, e.g., CzechStartups.org, xPORT (Prague), Impact Hub.

Cross-Border and International Partners

- **Euroregions** (e.g., Egrensis, Šumava, Nisa) – facilitate FUA-level collaboration with neighbouring countries.
- **Interreg programs**, **URBACT networks**, and **Twin city partnerships**.
- **European associations** such as Eurocities and ERRIN – represent Czech FUAs at the EU level.

Funding and Financial Institutions

- **National Development Bank** – finances infrastructure and innovation.

- **Technology Agency of the Czech Republic (TA ČR)** – funds applied research and innovation projects.
- **Czech Science Foundation (GAČR)** – funds scientific research.
- **Operational Programmes**: OP EIC, OP RDE, IROP – manage EU funds for development and innovation.

3.3 National Policy on FUAs in CZECHIA

3.3.1 Funding for Functional Urban Areas by National Programmes / other funding programmes / support schemes

In the Czech Republic, funding for Functional Urban Areas is structured around a **combination of national programmes, EU Structural and Investment Funds, and sector-specific support schemes**. These resources are coordinated primarily through the Ministry of Regional Development (MMR), the Ministry of Industry and Trade (MPO), and the Technology Agency of the Czech Republic (TA ČR). At the regional and urban level, municipalities and Regional Authorities act as key implementers.

A major feature of FUAs funding is the **Integrated Territorial Investment** (ITI) instrument, which has been in place since 2014. ITIs allow urban regions and surrounding municipalities to pool resources and coordinate investments in areas like transportation, education, innovation, environment, and social inclusion.

CzechInvest provides support for FDI, startup incubation, innovation vouchers, and business infrastructure in FUAs. In addition, **Regional Innovation Strategies** (RIS) direct regional development priorities, including funding coordination for innovation poles and clusters. For peri-urban and rural parts of FUAs the funding is provided by **Local Action Groups** (LAGs) and Community-Led Local Development (CLLD) schemes.

All funding sources are aligned under the **Partnership Agreement of the Czech Republic with the EU (2021–2027)** and the **National Strategy for Regional Development**. FUAs are expected to develop **Integrated Development Strategies** (IDS) or participate in **Metropolitan Cooperation Agreements** to maximize funding impact and cross-municipal collaboration.

Key National and EU Funding Programmes for FUAs

Integrated Territorial Investments (ITI) - primary funding tool for urban development in FUAs. It supports multi-sectoral projects that benefit entire urban regions and it is used in Prague, Brno, Ostrava, Pilsen, Olomouc, and other cities.

Operational Programme Environment (OPE) - focus on sustainable mobility, energy efficiency, and green infrastructure through supporting water management, air quality, and climate adaptation.

Operational Programme Integrated Regional Development (IROP) - targeted at improving public services, urban mobility, digital infrastructure, and housing that means it is particularly relevant for medium-sized and smaller FUAs like Pilsen Agglomeration.

Operational Programme Research, Development and Education (OP RDE) - funds cooperation between universities, research institutions, and businesses and supports capacity building in education and R&D in FUAs.

Operational Programme Enterprise and Innovation for Competitiveness (OP EIC) - managed by the Ministry of Industry and Trade. It supports innovation, smart specialisation, digital transformation, and startup ecosystems and is often used by businesses and clusters in FUAs.

Technology Agency of the Czech Republic (TA ČR) - offers applied research funding through programmes like:

- **ETA** – for social innovation and public policy.
- **TREND** – for industry-academic R&D collaboration.
- **THÉTA** – focused on energy and smart grids.

National Recovery Plan (NPO) - financed by the EU Recovery and Resilience Facility. It includes funding for digitization, green transition, education, and innovation infrastructure so that FUAs are key implementation grounds, especially for smart city and mobility projects.

State Housing Development Fund (SFRB) - supports social and affordable housing projects in urban areas.

Modernisation Fund & Just Transition Fund - focus on energy efficiency, clean mobility, and industrial transformation which make them relevant especially for FUAs in coal regions (e.g., Ostrava, Ústí nad Labem).

3.3.2 Smart specialisation fit with regards to Functional Urban Areas (strategy documents)

The **National Research and Innovation Strategy for Smart Specialisation** (RIS3) 2021–2027 targets building a knowledge-driven economy by focusing resources on high-potential sectors like advanced materials, green technologies, digitalisation, and bioeconomy. The strategy follows a dual approach:

- **Horizontal priorities**: these include foundational elements such as skills development, digital infrastructure, and innovation capacity—critical across all sectors and regions.
- **Thematic priorities:** these are sector-specific areas where the Czech Republic and its regions have strategic strengths.

A central feature of RIS3 is the **Entrepreneurial Discovery Process** (EDP), which engages businesses, universities, and public agencies in identifying and refining regional specialisations. This dynamic, inclusive method helps align research and innovation with market needs and FUA development goals.

Crucially, RIS3 is institutionalised across all governance levels. It provides the strategic basis for EU cohesion policy instruments and ensures that Operational Programmes (such as IROP and OP RDE) prioritize innovation in FUAs. Regional governments translate national priorities into Regional RIS3 strategies, enabling tailored innovation ecosystems in places like Prague, Brno, Ostrava, and Pilsen.

RIS3 establishes both the national vision and the regional tools to direct R&D and innovation investments toward smart, future-oriented sectors. Its structure and emphasis on entrepreneurial partnerships align well with FUA dynamics, where urban cores and surrounding areas collaborate on innovation-driven development. FUAs can benefit by channelling RIS3-aligned funding through EU programmes and local innovation platforms, enhancing regional competitiveness and cohesion.

The **Pilsen Region** has recently updated its smart specialization strategy in research, development, and innovation (RDI), focusing on **identifying promising sectors with the highest potential for economic competitiveness**. The update was based on a 2022 study by the Technology Centre of the Czech Academy of Sciences, which analysed global megatrends and their regional implications. The process followed the Entrepreneurial Discovery Process (EDP), engaging experts from business, research, and education sectors to identify the most prospective domains. A key outcome was the refinement of existing specialization domains and the introduction of a new one focused on energy, reflecting the region's strong tradition in power engineering and emerging innovations in energy management. Each specialization domain is supported by a Regional Innovation Platform that facilitates cooperation among stakeholders and links regional and national innovation strategies.

Description of Research and Innovation Specialization Domains in the Pilsen Region:

New Materials and Technologies

This domain focuses on leveraging the capacities of research centres like the University of West Bohemia (UWB), COMTES FHT, and the Research and Testing Institute Plzeň. Collaboration with manufacturing companies and interdisciplinary applications (e.g., in healthcare) is key. Research outcomes aim to improve production efficiency, reduce energy/material consumption, support recycling, and lower carbon footprints, particularly benefiting the region's strong manufacturing sector.

Intelligent Manufacturing Systems

Rooted in the region's industrial strength, this domain supports research, development, and innovation (RDI) linked to Industry 4.0 and 5.0. It aims to modernize production, enhance productivity, and strengthen global competitiveness. It promotes the development of energy-efficient, sustainable production models, reducing dependency on primary resources and improving ecological performance.

Smart Mobility

This domain enhances RDI in transport as a socially and economically significant area, particularly for sustainable development, safety, and efficiency. It supports advancements in electromobility, alternative drives, autonomous vehicles, intelligent transport systems, and mobility as a service. The city of Plzeň, with its strong industrial and public transport base, serves as a testbed for innovative mobility solutions.

Biomedicine and Healthcare Technologies

Driven by long-standing research programs at the Biomedical Centre of Charles University's Medical Faculty and UWB's Faculty of Applied Sciences, this domain targets health technologies with global and local applications. The University Hospital in Plzeň plays a central role. Focus

areas include aging populations and rising healthcare standards, with strong links between biomedical research and technical faculties, offering commercialization potential.

Modern Energy

This newly added domain builds on the region's engineering heritage and RDI capacity in energy technologies, control systems, and power distribution. It supports the transition to reliable, flexible, low-emission, and sustainable energy systems, aligned with evolving national energy strategies. It emphasizes interdisciplinary cooperation, environmental standards, and workforce development to meet future energy challenges across public and private sectors.

3.3.3 Classify, categorize, and record all relevant Functional Urban Areas RTDI related to legal framework, policies, strategies, methodologies, objectives, visions, practices, at national level

1. National Strategy and Governance

The **Policy Statement of the Czech Government** positions science, research, development, and innovation as foundational to national competitiveness and societal well-being. It emphasizes the establishment of a clear coordination mechanism across RTDI institutional levels, supports the creation of a new **Law on Research, Development, Innovation, and Knowledge Transfer**, and underscores the importance of integrating innovation results into policymaking and commercial outcomes.

2. Urban Policy Alignment

The **Czech Principles of Urban Policy (PUP)**, now being updated in alignment with the **New Leipzig Charter**, outline a vision for polycentric, inclusive, and cross-sectoral urban development. FUAs serve as central instruments for implementing these principles through integrated planning, ITI frameworks, and smart city initiatives.

3. RTDI Funding and Support Landscape

A robust funding ecosystem supports FUAs via several institutions and programs:

- **Technology Agency of the Czech Republic (TA ČR)**: Implements applied R&D programs such as ALPHA, BETA, GAMMA, DELTA, EPSILON, and competence centres, facilitating collaboration between industry and academia
- **Czech Science Foundation (GACR)**: Supports fundamental research, including international cooperation and early-career researchers
- **National Research, Development, and Innovation Policy (NRDIP 2021+)**: Drives ERA-aligned objectives such as promoting researcher careers, gender equality, researcher mobility, and institutional inclusivity
- **Recovery and Resilience Plan (Component 4.4 and 4.5)**: Enhances public administration efficiency and integrates cultural and creative sectors into innovation ecosystems

5. Addressing Regional Disparities

Support mechanisms such as the **Regional Development Strategy (2021+)** and **Smart Specialisation (RIS3)** ensure that FUAs play a central role in regional innovation governance. The **Regional Innovation Centres** (e.g., in Pilsen, Brno, Ostrava) align RTDI objectives with regional economic capacities

These national-level frameworks collectively shape a cohesive ecosystem for innovation-led development in Czech FUAs. They can be summarized into the following table:

Area	Description
Strategic Framework	Government policy, PUP, RIS3 strategy, urban policy alignment
Legal Instruments	New R&D Innovation Law; eGovernment Act; ITI frameworks
Funding Agencies	TA ČR, GACR, NRDIP, RRP components
Regional Innovation Focus	RIS3 alignment, Regional Innovation Centres, FUA-targeted programming

3.4 The current situation of the Functional Urban Areas

3.4.1 Functional Urban Areas support mechanisms:

- Policy makers in Functional Urban Areas related sectors
- National authorities in Functional Urban Areas related sectors
- Funding institutions related to Functional Urban Areas support schemes
- Business support/consulting boards, offices for specific Functional Urban Areas

1. Policy Makers in FUA-Related Sectors

- **Ministry of Regional Development (MMR)** drives national urban and regional policy, including the Principles of Urban Policy, smart city frameworks, and **Integrated Territorial Investments (ITI)** as a central FUA development tool. It also provides methodological and strategic support to municipalities and local authorities.
- **Working Group for Smart Cities**, operating under the Government Council for Sustainable Development, supports FUA-level innovation by coordinating methodologies, organizing expert seminars, and disseminating smart city best practices.

2. National Authorities Overseeing FUA Sectors

- **MMR's Role as National Coordination Authority** for EU Cohesion Funds ensures that national, regional, and EU funding sources align to support functional urban development, including schemes like Community-Led Local Development (CLLD) and IROP.
- **Ministry of Finance**, via the National Coordination Authority, leads negotiation of the EU Multiannual Financial Framework, shaping FUA-relevant funding priorities post-2027.

3. Funding Institutions Supporting FUAs

- **CzechInvest** (Investment and Business Development Agency) facilitates FDI, innovation grants, and supports SMEs and urban business ecosystems across FUAs.
- **National Development Bank (NRB)** offers loans and financial instruments for SME development and infrastructure in cities like Plzeň.
- **Czech Science Foundation (GACR)** finances basic research and fund programs with potential application in urban regions such as innovate-driven FUAs.

4. Business Support Structures & Consulting Bodies for FUAs

- **Prague Institute of Planning and Development (IPR)** specializes in urban planning strategies, spatial coordination, and visionary development documents for the capital FUA.
- **South Moravian Innovation Centre (JIC)** supports Brno's FUA by nurturing startups, managing incubators, offering accelerators, and fostering collaborative innovation networks.

- **Regional Development Agencies** such as **RRA PK (Pilsen region)** and **Regional Development Agency of South Moravia** provide tailored support for smart city transitions, innovation, and cross-sector cooperation.

3.4.2 FUNDA QUESTIONNAIRE for FUAs in CZECHIA

See **ANNEX**

3.5 The challenges the Functional Urban Areas face to develop

3.5.1 FUAs need to work in a sound working climate to improve the business performance assured by the FUAs

A well-functioning working climate within Functional Urban Areas (FUAs) is crucial for enhancing business performance, fostering innovation, and ensuring long-term socio-economic resilience. To achieve this, FUAs must adopt a holistic and coordinated approach that strengthens governance, boosts talent and innovation, and ensures high-quality infrastructure and services.

At the core of a sound working climate is a **strong and inclusive governance framework**. This begins with the creation of metropolitan coordination bodies that bring together local governments and key stakeholders. Clearly defining the roles and responsibilities between national, regional, and municipal authorities is essential for ensuring policy coherence. Integrated territorial instruments such as the Integrated Territorial Investments (ITI) and Strategic Frameworks should be employed to guide collaborative development. Transparency and accountability must be institutionalized through regular public communication and participatory mechanisms.

Equally important is the development of a **shared strategic vision**. This vision should be co-created by local governments, business communities, academia, and civil society to ensure broad ownership and alignment with both national priorities and EU frameworks like the Smart Specialisation Strategy (RIS3). The strategy must be informed by data, including SWOT analyses and foresight studies, to define economic priorities and sectors of comparative advantage.

A business-friendly working environment is also characterized by **efficient and accessible public services**. Municipalities and regional governments must digitize administrative processes, reduce bureaucratic barriers, and provide one-stop-shops for business registration, licensing, and advisory services. The introduction of business concierge services and transparent procurement processes will further improve the ease of doing business.

The availability of skilled labour is a key driver of FUA competitiveness. Investment in **talent development, upskilling, and labour mobility** is vital. This includes aligning vocational and lifelong learning systems with industry needs, supporting university-industry partnerships, and focusing on the development of digital, green, and technical skills. Mobility policies should ensure that talent can flow freely across and within urban areas.

A thriving **innovation ecosystem** is another pillar of a strong working climate. FUAs should support the growth of clusters, incubators, and accelerators, and create mechanisms for research institutions to collaborate with businesses. Financial incentives for innovation—such as grants, innovation vouchers, or tax credits—can stimulate private R&D. Participation in European programs like Horizon Europe and Interreg can also help connect FUAs to wider innovation networks.

Business performance also depends on **robust infrastructure and connectivity**. Investments in transport networks, digital infrastructure (including 5G and broadband), and sustainable mobility systems (e.g., intelligent transport and green logistics) are essential. FUAs should adopt smart urban planning principles to promote sustainability, reduce congestion, and enhance the overall quality of life.

To support business development, FUAs must ensure **adequate access to funding and finance**. Mapping existing support schemes and improving access to national and European funds will benefit especially SMEs and startups. Innovation vouchers, soft loans, and public-private financing mechanisms can provide tailored financial solutions for business growth.

Finally, FUAs benefit from **cross-sectoral and cross-border cooperation**. Collaboration between government, academia, and business—the so-called triple-helix model—should be institutionalized. Participation in European networks such as Eurocities, ERRIN, or the Urban Agenda for the EU allows cities to share best practices and benchmark themselves against successful peers. Regional and cross-border partnerships can further amplify impact, particularly in innovation, sustainability, and infrastructure development.

In conclusion, a sound working climate in FUAs is not a result of isolated interventions, but rather of **an integrated strategy that builds on strong governance, inclusive visioning, business-friendly services, talent development, innovation support, quality infrastructure, access to finance, and multilevel cooperation**. Only through such a comprehensive and inclusive approach can FUAs realize their full economic potential and ensure resilient, future-ready urban development.

3.5.2 Managing Risk and Innovation: the Challenge for Functional Urban Areas

Functional Urban Areas are increasingly becoming the **engines of national and regional development**, acting as **hubs for economic activity, innovation, and talent concentration**. However, with this central role comes a dual challenge: while FUAs must lead in innovation to remain competitive and resilient, they also face a complex and evolving risk landscape. These **risks range from economic shocks and technological disruptions to climate change, cyber threats, and social inequalities**. Managing innovation and risk simultaneously requires FUAs to develop forward-looking strategies that **balance opportunity with resilience**.

Innovation inherently involves uncertainty, especially when urban economies embrace emerging technologies, new business models, or green transitions. For FUAs, this means creating ecosystems where risk-taking is encouraged—but also managed responsibly. Innovation must be supported by governance **structures that allow experimentation while ensuring that failures do not lead to systemic breakdowns**. Mechanisms such as public innovation labs, regulatory sandboxes, and living labs can **offer safe spaces for testing solutions** before full-scale deployment, particularly in critical areas like mobility, energy, and health.

At the same time, risk management in FUAs must go beyond **crisis response**. It should be integrated into strategic planning processes through the **adoption of risk-aware governance frameworks**. Scenario planning, stress testing of urban systems, and early-warning mechanisms can help city leaders anticipate and mitigate risks before they materialize. In this context, **public-private collaboration is crucial**. Businesses bring agility and innovation capacity, while governments offer regulatory stability and oversight. Aligning these sectors ensures that both innovation and risk mitigation are embedded in urban development.

Moreover, FUAs must invest in **building institutional and community resilience**. This involves not only technological and infrastructure preparedness but also **strengthening social capital, trust in institutions, and citizen engagement**. Inclusive innovation, where civil society, vulnerable groups, and SMEs are involved in co-creating solutions, can help distribute both risks and benefits more equitably. Ultimately, managing risk and fostering innovation are not opposing forces; rather, they are two sides of the same coin. FUAs that can master this balance will be best positioned to thrive in a fast-changing global environment.

3.5.3 Benchmarking against leader FUAs, to adopt best practice for specific functions of the FUAs

Benchmarking against leading Functional Urban Areas is a strategic method that helps regions enhance performance by **learning from best-in-class examples across Europe**. By studying top-performing FUAs like Helsinki, Barcelona, Vienna, Amsterdam, or Munich, Czech regions can adopt innovative approaches in key sectors such as **smart mobility, sustainability, and digital governance**. This process begins by identifying relevant benchmark cities known for excellence in the specific functional area targeted for improvement, using reliable data from institutions such as OECD, Eurostat, or ESPON.

Once a benchmark FUA is selected, it's essential to define precise objectives—whether it's enhancing public transport systems, boosting SME ecosystems, or improving digital infrastructure. FUAs should analyse performance indicators such as R&D spending, transport modal shares, or startup density to understand the performance gap and set measurable goals. However, adopting successful strategies requires an **understanding of local contextual conditions**. Best practices often need to be tailored to fit local legal, institutional, or socio-economic realities.

Engaging in **peer learning platforms** like URBACT, EUROCITIES, or the EU Urban Agenda fosters knowledge exchange and collaboration through study visits, thematic groups, and pilot projects. Czech FUAs, such as Pilsen or Brno, can benefit from this engagement by learning how cities like Helsinki built their innovation ecosystems or how Vienna maintains socially inclusive urban planning.

The final step is to pilot, adapt, and institutionalize benchmarking as a routine part of urban development. Local governments should integrate benchmarking into their strategic planning, allocate roles for ongoing policy monitoring, and use digital dashboards to track progress. For example, Pilsen could benchmark its smart mobility efforts against Tallinn, or adapt Brno's university-business cooperation model to strengthen its own innovation landscape.

3.6 Opportunities and obstacles of Functional Urban Areas

3.6.1 Opportunities for Functional Urban Areas - Megatrends: environmental challenges, urbanization & megacities, ageing society, energy demand, and sources, changing lifestyle etc.

Functional Urban Areas across Europe, including in the Czech Republic, are increasingly influenced by a set of global megatrends that are reshaping the way cities and regions grow, govern, and innovate. These trends—such as **climate change, urbanization, demographic shifts, energy demands, and changing lifestyles**—pose serious challenges. However, they also present significant opportunities for FUAs to lead in developing resilient, inclusive, and sustainable solutions.

One of the most pressing megatrends is the **growing urgency of environmental and climate challenges**. FUAs can become leaders in climate action by **investing in green infrastructure, low-carbon technologies, and circular economy models**. They are uniquely positioned to pilot nature-based solutions, energy-efficient buildings, and climate adaptation strategies, serving as local platforms for implementing broader goals such as the EU Green Deal or national sustainability strategies. By integrating environmental priorities into spatial planning, FUAs can enhance both urban resilience and quality of life.

The continued **growth of cities** and the emergence of megacities offer both scale and complexity. FUAs can mitigate the risks of over-centralization by promoting polycentric development and **stronger urban-rural links**. Integrated **planning across municipal boundaries** helps manage this growth more sustainably, enabling effective land use, efficient mobility, and better service delivery. Smart mobility solutions, digital platforms, and transit-oriented development can also reduce congestion and improve access to opportunities across the functional territory.

As **societies age**, FUAs have a vital role to play in **addressing the needs of older populations**. With appropriate urban design, digital inclusion, and **innovations in health and care services**, regions can unlock the **potential of the "silver economy".** Age-friendly cities and inclusive planning allow for greater participation of seniors in community life and the workforce, while also responding to long-term demographic trends.

Energy demand and the **transition to renewable sources** present another opportunity for FUAs to lead systemic change. With the right support, regions can develop decentralized energy systems, local energy communities, and clean technology solutions. Retrofitting buildings, implementing smart grids, and supporting energy innovation are key strategies. FUAs can align their efforts with national and European climate targets, creating resilient energy systems that serve local communities.

Changing lifestyles, digital transformation, and hybrid work patterns are also reshaping the way cities operate. FUAs must adapt by **redesigning public spaces, expanding digital public services, and supporting new forms of living and working**. Initiatives such as **the 15-minute city**, co-living models, and smart governance platforms respond to evolving citizen expectations and improve daily life in both urban and peri-urban areas.

To effectively harness these opportunities, FUAs must **prioritize integrated governance, cross-sector collaboration, and innovation**. Aligning local strategies with EU and national frameworks, engaging with research institutions and businesses, and participating in international knowledge networks can strengthen the capacity of FUAs to navigate megatrends. With strong leadership and coordinated action, FUAs can transform today's challenges into pathways for smarter, more sustainable regional development.

3.6.2 Obstacles for Functional Urban Areas (ex. lack of financial sources, gaps in Functional Urban Areas financing, missing qualified personnel, difficult collaboration with the public authorities, weak collaboration between universities/ research centres and Functional Urban Areas

Despite their strategic role in fostering innovation, sustainability, and territorial cohesion, Functional Urban Areas across the Czech Republic and wider Europe face a range of persistent obstacles that hinder their full potential. These barriers affect the ability of FUAs to effectively implement integrated development strategies, support businesses, and respond to current societal challenges.

One of the most critical obstacles for FUAs is the **limited availability of flexible, long-term funding**. Often, FUAs rely on short-term project-based financing from national or EU sources, which may not align with long-term development goals. Moreover, there are gaps in financing structures, particularly in securing resources for cross-municipal or intersectoral projects. This can severely limit the implementation of infrastructure, innovation, and sustainability initiatives that require coordinated investments.

In many cases, FUAs **lack a formal legal status or institutional framework at the national level**, which complicates collaboration between municipalities within the FUA. This absence of clear governance can lead to **coordination difficulties, overlapping competences**, and inefficiencies in planning and implementation. It also creates barriers to effective engagement with higher levels of government, particularly in terms of co-financing and strategic alignment.

Many FUAs, especially outside major metropolitan areas, struggle with **insufficient access to qualified professionals in key fields** such as urban planning, innovation management, project coordination, and digital transformation. This talent gap affects the capacity of FUAs to design, implement, and manage complex development initiatives and engage with business, research, and civil society actors effectively.

Establishing trustful and **effective cooperation between FUAs and regional/national authorities** can be a challenge. Public institutions often operate in sectoral silos, while FUAs **require cross-sectoral, integrated approaches**. Furthermore, administrative complexity and lack of responsiveness may delay or block development initiatives, particularly when approvals, funding, or policy support are needed from multiple institutions.

The potential of FUAs to drive smart specialization and innovation is often underutilized due to **weak collaboration between local governments, universities, and research centres**. Barriers include **mismatched priorities, lack of communication platforms**, or insufficient incentives for

joint projects. As a result, research results are not always transferred to local industries or public services, limiting regional competitiveness and innovation uptake.

Many FUAs comprise **diverse municipalities with varying capacities, interests, and political leadership**, which can create challenges in building a shared vision or executing joint strategies. Without mechanisms for institutional coordination and political commitment, joint projects risk failure or dilution of impact.

Addressing these obstacles requires a concerted effort to **strengthen FUA governance, improve funding access, invest in human capital, and promote cross-sector collaboration**. Institutional reforms, targeted capacity building, and better integration with national and EU frameworks can empower FUAs to become engines of sustainable and inclusive regional development.

3.7 Functional Urban Areas - SWOT ANALYSIS in CZECHIA

	Positive for reaching the objectives	Negative for reaching the objectives
Internal characteristics (attributes of the region)	**S** t r e n g t h	**W**eaknesses
	EU Funding Alignment: FUAs are **target areas for Integrated Territorial Development Tools**, including ITI, CLLD (Community-Led Local Development), and IROP (Integrated Regional Operational Programme). These tools allow for prioritizing transport, energy, and innovation investments within urban agglomerations.	**Lack of Legal Recognition of FUAs:** While used as a **statistical and strategic planning concept**, FUAs are **not legally defined administrative units** in the Czech Republic. This creates a governance gap, as there is no legal obligation for municipalities to cooperate within FUA boundaries.
	Integrated Territorial Investments (ITI): FUAs, particularly those around major cities (e.g., Prague, Brno, Ostrava, Plzeň), benefit from ITI instruments co-funded by EU Cohesion Policy. These have introduced **multi-level governance and inter-municipal cooperation models** for strategic urban development.	**Fragmented Governance Structures:** Cooperation between core cities and surrounding municipalities often relies on voluntary agreements, which are not always stable or enforceable. Fragmentation undermines efforts for **coordinated spatial planning and investment prioritization.**

	Established Legal Framework for Spatial Planning and Development: The Czech Republic has a **solid legal foundation for spatial development** through the Building Act, which regulates spatial planning, land use, and urban development. **Regional and municipal spatial plans are mandatory** and are coordinated at multiple administrative levels.	**Uneven Administrative Capacity:** Many smaller municipalities within FUAs **lack the professional and technical capacity** to participate effectively in integrated planning or absorb EU funds. This leads to disparities in implementation quality and access to resources.
	Data and Analytical Tools: Use of spatial planning tools such as "UAP" – Territorial Analytical Data and **harmonized GIS systems** support planning and decision-making across FUAs.	**Limited Institutionalization of Metropolitan Cooperation:** Unlike some EU countries with metropolitan governance structures, **Czech FUAs lack formal bodies to steer integrated urban development** (e.g., no metropolitan authorities with budgeting powers).
	Highly Educated Workforce: FUAs benefit from a relatively high education level among the labour force, particularly in Prague, Brno, and other regional centres with **strong universities and research institutions.**	**Funding Inequities and Gaps**: There are **disparities in funding and development levels between Prague and other FUAs**. Smaller FUAs may struggle with underinvestment or inefficient allocation of EU funds.
	Specialization and Clustering: Czech FUAs show **high levels of specialization** in sectors such as automotive, IT, and advanced manufacturing. Strong clusters exist in these areas, supported by local and international firms.	**Insufficient Harmonization of Planning Instruments:** There is a **lack of standardized methods and procedures** for harmonizing municipal land-use plans across FUAs. **Inconsistent zoning regulations** and development strategies hinder long-term spatial coherence.
	Innovation Ecosystem: Innovative SMEs are active within FUAs and are often recipients of public funding, particularly through EU operational programs. There's a **growing trend in**	**Fragmentation and Institutional Overlap:** Overlapping competencies between municipalities, regions, and national bodies can lead to **inefficiencies in Functional Urban Area planning** and execution.

	R&D cooperation among firms and academic institutions.	
	Good Population Density and Infrastructure: Czech FUAs have optimal population densities that support **efficient public transport, service delivery, and urban planning**. This also enables economies of scale in infrastructure and services.	**Inadequate Support for SMEs in Peripheries:** While urban cores are well-integrated into innovation networks, many **surrounding municipalities or smaller urban centres lack adequate SME support infrastructure**.
	Strategic Location in Central Europe: The Czech Republic **offers good accessibility and logistic connectivity** within the EU, making its urban centres attractive for businesses and investors (e.g. TEN-T corridors).	**Public Transport Bottlenecks:** In some regions, urban transport systems are underdeveloped, especially in **linking city cores with peripheral zones**.
External characteristics (attributes of the environment)	**O**pportunities	**T** h r e a t s
	Potential for Legal Anchoring of FUAs: Future legislative initiatives could **formally recognize FUAs as planning or investment zones**, enabling more coherent governance models and allocation of state or EU funds based on functional logic.	**Competition Rather Than Cooperation**: Municipalities within FUAs sometimes **compete for investments, subsidies, or development projects**, rather than cooperating, leading to duplicated efforts, inefficiencies, and urban sprawl.
	EU 2021–2027 Programming Period: New territorial tools (e.g., Integrated Territorial Development – ITD) **emphasize functional areas, enabling stronger linkages between urban and rural municipalities** and potentially broader eligibility for funding support.	**Dependence on EU Funds**: The financing of strategic infrastructure and planning in FUAs is heavily reliant on **EU co-financing**. Any reduction or reallocation of these funds post-2027 may expose local vulnerabilities.
	EU and National Funding of innovation: Continued access to European Structural and Investment Funds (ESIF), including the **Just Transition Fund** and **Horizon Europe**,	**Financial Constraints in Smaller FUAs:** Limited local revenues and **dependency on external funding** (especially in non-metropolitan areas) may threaten the sustainability of development initiatives.

	provides FUAs with resources to invest in sustainable development and innovation.	
	Reform of Spatial Planning Law: The ongoing revision of the **Building Act** and related implementing legislation presents an opportunity to **institutionalize FUA coordination**, improve permitting processes, and ensure planning documents align across municipal boundaries.	**Instability in Legislative Environment**: Frequent amendments to planning laws and uncertainty around the **reform of the Building Act** may cause delays or incoherence in FUA planning, discouraging private and public investment.
	Standardization and Digitalization of Planning Processes: Projects like Digital Technical Map of the Czech Republic and online platform for spatial planning aim to **streamline and standardize planning tools**, enhancing cooperation and transparency across FUAs.	**Technological and Governance Gaps**: Many smaller municipalities lag in digital tools, public procurement capacity, and strategic planning skills, which may exclude them from integrated FUA development projects.
	Inter-Municipal Agreements for Service Delivery: FUAs can strengthen inter-municipal collaboration in areas like **public transport, waste management, housing policy, and digital infrastructure**, which are more efficient at the metropolitan scale.	**Weak Enforcement of Inter-Municipal Agreements**: The **voluntary nature of cooperation** creates risks of withdrawal or non-compliance, especially when political leadership changes. This undermines long-term planning continuity.
	Smart City and Digital Transformation: Trends such as **digital public services, green mobility, and data-driven urban planning** open doors for transformation in FUAs.	**Demographic Challenges**: Aging population and internal migration toward major cities can **depopulate smaller FUAs** or reduce their labour force potential.
	Integrated Transport Solutions: Advancements in mobility services (e.g., MaaS – Mobility as a Service), smart traffic systems, and urban-rural transport integration present a significant development opportunity.	**Technological Disruption without Readiness**: Rapid technological change (e.g., AI, automation) might outpace the adaptability of local firms and labour markets, especially in traditionally industrial FUAs.

	Green and Sustainable Urban Development: There is growing demand and support for reducing urban pollution, improving green spaces, and promoting low-emission transport.	**Aging Infrastructure**: While core infrastructure is solid, older neighbourhoods and peripheral towns may suffer from underinvestment in utilities, broadband, and public services.

Results

The **Baseline Study on Functional Urban Areas** in the Czech Republic, with a focus on the Pilsen Region, highlights the pivotal role these urban networks play in driving national and regional development. FUAs serve as the economic, social, and innovation engines of the country, concentrating a significant share of GDP, advanced industries, research capacities, and high-quality public services.

The Pilsen FUA, in particular, emerges as a key hub in Western Bohemia, combining a strong manufacturing base, advanced research infrastructure, and strategic cross-border links to Bavaria. While the study underscores considerable strengths such as industrial competitiveness, innovation potential, and integrated transport systems, it also reveals persistent challenges, including skills shortages, financing gaps, and uneven urban–rural development.

These findings provide a comprehensive foundation for targeted policy interventions, strategic investments, and cross-sectoral cooperation aimed at sustaining the competitiveness and resilience of Czech FUAs in a rapidly changing economic and demographic landscape.

1. <u>Results from Baseline study of FUAs in the Czech Republic</u>

- FUAs are **key economic and social hubs**, generating a disproportionate share of GDP and concentrating most high-value industries, universities, and advanced services.
- They **drive innovation and knowledge transfer**, hosting the majority of R&D infrastructure, clusters, and technology parks.
- They are essential for **transport connectivity**, acting as nodes in national and international transport corridors.
- National policy recognizes FUAs as strategic for achieving balanced territorial development, reflected in **Integrated Territorial Investments (ITI)** schemes and regional innovation strategies.

2. <u>Results from Baseline Study of FUA in Pilsen Region</u>

- The Pilsen FUA covers roughly **1,323 km²** and includes about **328,000 inhabitants**, with the city of Pilsen producing **two-thirds of the region's GDP**.

- Strong **manufacturing base** with dominant sectors like engineering, energy technology, transport systems, and automotive supply chains (e.g., Škoda Group, Doosan Škoda Power).
- Notable **innovation and research assets**, including the University of West Bohemia, NTIS research centre, and specialised industry labs.
- **Well-developed transport system**, with integrated public transport (trams, trolleybuses, regional trains) and direct connection to Germany via the D5 motorway and rail links.
- Quality of life indicators are high: good safety, affordable living costs, strong healthcare services, and cultural amenities.

Conclusions

The **conclusions of the Baseline Study on Functional Urban Areas in the Czech Republic**, with a focus on the Pilsen Region, highlight the pivotal role these urban networks play in driving economic growth, innovation, and regional competitiveness. As strategic development engines, FUAs concentrate key industries, research capacities, and infrastructure, offering significant potential for knowledge transfer and cross-sector collaboration.

The Pilsen FUA stands out for its strong industrial base, advanced research environment, and cross-border positioning, yet faces challenges in sustaining growth momentum, addressing skills shortages, and ensuring coordinated governance. At the same time, opportunities arising from EU funding, smart specialisation strategies, and international cooperation present clear pathways for enhancing resilience, competitiveness, and sustainable development in the years ahead.

FUAs as Strategic Development Engines

Functional Urban Areas in the Czech Republic are critical for national competitiveness, concentrating economic activity, innovation capacity, and infrastructure. They act as growth poles, enabling knowledge transfer, cross-sector cooperation, and international connectivity.

Pilsen's Strong but Slowing Economic Performance

The Pilsen FUA remains one of the most industrially productive regions in the country, with a strong export-oriented manufacturing base and advanced research facilities. However, its recent GDP growth and productivity gains have been slower compared to other leading FUAs, signalling the need for revitalised growth strategies.

Innovation Potential and Cooperation Platforms

The study highlights significant opportunities in leveraging Pilsen's university, research centres, and industry clusters to advance domains identified in the RIS3 Smart Specialisation Strategy, such as intelligent manufacturing, modern energy, biomedicine, and smart mobility. Strengthening triple-helix cooperation between academia, business, and government remains key.

Structural and Administrative Challenges

Skills shortages in technical fields, administrative fragmentation among municipalities, and limited long-term financing mechanisms hinder the full realisation of FUA-level strategies. More robust governance models and harmonised spatial planning tools are needed.

Opportunities from EU and Cross-Border Cooperation

EU funding instruments (e.g., Horizon Europe, Interreg, ERDF) and cross-border cooperation with Bavaria provide a unique opportunity to accelerate innovation, green transition, and sustainable mobility in FUAs.

Risks and Threats to Competitiveness

Demographic ageing, rising energy costs, environmental pressures, and inconsistent legislative frameworks could erode the competitiveness of FUAs if not addressed through adaptive, forward-looking policies.

References

FUA-related organizations

The City of Pilsen:

ITI Pilsen Agglomeration: https://www.iti-plzen.cz/

The City of Pilsen: https://pilsen.eu/government-office/city-authorities/

Urban Planning and Development Institute of the City of Pilsen: https://ukr.plzen.eu/en/

Business Innovation Centre Pilsen: https://www-bic-cz.translate.goog/?_x_tr_sl=cs&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=wapp

TechTower Pilsen: https://www.techtower.cz/en/

Pilsen Innovation Ecosystem: https://www-plzeninovativni-eu.translate.goog/?_x_tr_sl=cs&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=wapp

Technological Initiative Pilsen: https://tipilsen.cz/

Regional Authorities and Institutes:

Pilsen Region Authority: https://en.plzensky-kraj.cz/

Regional Development Agency of Pilsen Region: https://www.rra-pk.cz/

Smart Accelerator of Pilsen Region: https://www.inovujtevpk.cz/#

Employment Pact of Pilsen Region: https://www.pzpk.cz/

National Authorities and Institutes:

Ministry of Regional Development of the Czech Republic: https://mmr.gov.cz/en/homepage

Ministry of Industry and Trade of the Czech Republic: https://mpo.gov.cz/en/

Ministry of Transport of the Czech Republic: https://md.gov.cz/?lang=en-GB

Ministry of Environment of the Czech Republic: https://mzp.gov.cz/cz

Czech Chamber of Commerce: https://www.komora.cz/en/

CzechInvest: https://czechinvest.gov.cz/en?force

Technology Agency of the Czech Republic: https://tacr.gov.cz/en/

Czech Statistical Office: https://csu.gov.cz/home

Clusters:

National Cluster Association: https://www.nca.cz/en/

Mechatronics Cluster: https://www.klastrmechatronika.cz/en/

Czech National Semiconductor Cluster: https://www.semicz.cz/

Czech Smart City Cluster: https://czechsmartcitycluster.cz/index.php?menu=about&lang=

Industry Cluster 4.0: https://ic40.cz/?lang=en

Smart Pilsen Region Cluster: https://chpk.cz/clenove/

Research and Innovation Institutes:

University of West Bohemia in Pilsen: https://www.zcu.cz/en/index.html

UWB – New Technologies for the Information Society: https://www.ntis.zcu.cz/en/

UWB – Research and Innovation Centre for Electrical Engineering: https://www.rice.zcu.cz/en/About/index.html

UWB – New Technologies Research Centre: https://www.ntc.zcu.cz/en/index.html

UWB – Regional Technological Institute: https://www.rti.zcu.cz/en/

Biomedical Centre of LFP UK: https://biomedic.lfp.cuni.cz/en/

COMTES FHT: https://www.comtesfht.com/

Legislative and methodological framework

National legislation and strategic documents

Development Strategy of the Czech Republic 21+: https://mmr.gov.cz/cs/microsites/uzemni-dimenze/regionalni-rozvoj/strategie-regionalniho-rozvoje-cr-2021

Spatial Development Policy of the Czech Republic: https://mmr.gov.cz/en/ministerstvo/spatial-planning-and-building-rules

National Research, Development and Innovation Policy of the Czech Republic 2021+: https://vyzkum.gov.cz/FrontClanek.aspx?idsekce=932081

Territorial Dimension Strategy: https://mmr.gov.cz/cs/microsites/uzemni-dimenze/ud-typy/uzemni-dimenze-2021

National Research and Innovation Strategy for Smart Specialisation of the Czech Republic (RIS3 Strategy): https://mpo.gov.cz/en/business/ris3-strategy/

Spatial analytical documents of the Pilsen Region: https://geoportal.plzensky-kraj.cz/portal/uap-kraj

Development Programme of the Pilsen Region: https://www.plzensky-kraj.cz/program-rozvoje-plzenskeho-kraje-2022-schvalen

Socio-economic Atlas of the Pilsen Agglomeration: https://drive.google.com/file/d/1W1NUxIY-y9ETgsa_bdDYHzAddPNMIyCS/view

Reginal Research and Innovation Strategy for Smart Specialisation of the Pilsen Region (RIS3 Strategy): https://www.plzensky-kraj.cz/3-aktualizace-regionalni-inovacni-strategie-plzen

Other methodologies:

URBACT: https://urbact.eu/toolbox-home

EUROCITIES: https://eurocities.eu/resources_type/policy-papers/

ESPON: https://www.espon.eu/library

MECOG-CE: https://www.interreg-central.eu/projects/mecog-ce/

Functional Areas in the EU: https://functionalareas.eu/methodological-toolkit/

City of short distances, IPR Prague: https://praha.camp/en/magazine/detail/mesto-kratkych-vzdalenosti-prinasi-revoluci-moderniho-urbanismu-do-prace-obchodu-nebo-k-lekari-za-15-minut

Brno Metropolitan Area: https://metropolitni.brno.cz/

Settlement Centres of the Czech Republic: https://mmr.gov.cz/cs/ministerstvo/stavebni-pravo/stanoviska-a-metodiky/uzemni-planovani/9-zakon-c-283-2021-sb/3-uzemne-planovaci-podklady-a-jejich-aktualizace/centra-osidleni-ceske-republiky

Prikarpattia Region Ivano-Frankivska oblast
UKRAINE


3.1 Database of UKRAINE

GENERAL GEOGRAPHICAL INFORMATION

The geographical position of Ukraine defines it as a large Eastern European state, bordering seven other European states by land and washed by the waters of the Black and Azov Seas in the south. Ukraine has sufficient supply of basic natural resources for the comprehensive development of the economy, favourable flat terrain for economic development and integration of all regions by various means of communication, sufficient water, and climatic resources for the development of agricultural production.

Ukraine is located in the Northern and Eastern hemispheres, on the continent of Europe (the western part of the Eurasian continent), in the southwest of the great East European Plain (which occupies almost the entire territory of eastern Europe), occupies part of the Eastern Carpathians in the west and the Crimean Mountains in the far south.

The territory of Ukraine stretches from west to east for 1,316 km, and from north to south for 893 km.

The area of Ukraine is 603.7 thousand km², which is 5.7% of the territory of Europe and 0.43% of the land area of the world. The significant size and configuration features cause certain differences in natural conditions on the territory of the country. Ukraine lies (from north to south) in the natural zones of mixed forests, forest-steppe and steppe.

The territory of Ukraine is limited by a state border that separates the land, waters, subsoil, and airspace of the state from similar components of the territories of other states.

The total length of the Ukrainian border is 6,993.63 km, of which 5,638.63 km is land. The border runs mainly through flat areas, with mountains occupying a small area (in the west, in the Carpathians).

Ukraine is bordered to the south by the Black Sea and to the southeast by the Sea of Azov of the Atlantic Ocean. The total length of the coastline is 2,782 km. According to the 1982 United Nations Convention on the Law of the Sea (UNCLOS), the length of the country's territorial waters is set at 12 nautical miles (22.2 km).

The geographical location of Ukraine is favourable in terms of natural resources, occupies a favourable position for the life of the population and economic activity, and is characterized by a large and diverse natural resource potential.

It should be noted that the Russian invasion of Ukraine since 2014 has significantly affected Ukraine's natural resource potential. For more information on the environmental damage caused by the war in Ukraine, see , etc.

The political and geographical position of Ukraine is determined by its spatial position on the political map of the world and relations with other countries and their political groupings in terms of the implementation of political, economic, and military-strategic interests. Ukraine borders with seven other independent states: in the north - with Belarus (the total length of the common border is 1,111 km; Brest and Gomel regions), in the east - with the Russian Federation (1,944 km; Bryansk, Kursk, Belgorod, Voronezh and Rostov regions), in the southwest - with Moldova (1,202 km) and Romania (601 km), in the west - with Poland (535 km), Hungary (128 km) and Slovakia (97 km). This is slightly more than the average on the political map of the world. The total length of the state border is 5,618 km. The state border of Ukraine mostly runs through flat areas. Only with Romania, Poland and Slovakia does it extend through the mountainous areas of the Carpathians.

Population

As of 2022, the population of Ukraine was: 41,167,335 people, of which 12,473,627 were rural, and 28,693,708 were urban.

Since the start of the full-scale invasion, there have been no official data on the population of Ukraine. As of July 2024, according to data based on the indicators of three Ukrainian mobile operators, 30 million people lived in the territory controlled by Ukraine. The Ministry of Economy uses a slightly higher figure of 33 million people in the development of its macro forecasts. According to the UN, as of the end of September 2024, more than 6 million Ukrainians had temporary protection in European countries. Almost 600 thousand more Ukrainians received protection outside Europe.

Administrative organization: counties / towns / villages

Administrative-territorial structure of Ukraine:

- 1469 territorial communities: 409 urban communities with a city centre, 435 settlement communities with a village centre, 625 rural communities with a village centre (territorial communities include 28656 settlements) NUTS 4-5
- 136 districts , NUTS 3

24 regions and the Autonomous Republic of Crimea (Constitution of Ukraine Article 132. The territorial structure of Ukraine is based on the principles of unity and integrity of the state territory, a combination of centralization and decentralization in the exercise of state power, balance and socio-economic development of regions, taking into account their historical, economic, environmental, geographical, and demographic features, ethnic and cultural traditions. Article 133. The system of administrative-territorial structure of Ukraine consists of: the Autonomous Republic of Crimea, regions, districts, cities, districts in cities, settlements and villages. Ukraine includes: the Autonomous Republic of Crimea, Vinnytsia, Volyn, Dnipropetrovsk, Donetsk, Zhytomyr, Zakarpattia, Zaporizhia, Ivano-Frankivsk, Kyiv, Kirovohrad, Luhansk, Lviv, Mykolaiv, Odessa, Poltava, Rivne, Sumy, Ternopil, Kharkiv, Kherson, Khmelnytskyi, Cherkasy, Chernivtsi, Chernihiv

regions, the cities of Kyiv and Sevastopol. The cities of Kyiv and Sevastopol have a special status, which is determined by the laws of Ukraine) NUTS 2.

It should be noted that Ukraine does not have a legally established unified NUTS classification system.

Centralized or decentralized governance

The territorial structure of Ukraine is based on the principles of unity and integrity of the state territory, a combination of centralization and decentralization in the exercise of state power, balance, and socio-economic development of regions, taking into account their historical, economic, environmental, geographical, and demographic characteristics, ethnic and cultural traditions . Constitution of Ukraine (Article 132)

2014 was the start of the implementation of the decentralization process. The reform aimed at transferring significant powers and budgets from state bodies to local self-government bodies in order to have as many powers as possible in those bodies that are closer to the people. Such powers can be implemented most successfully under the conditions of estimated resources, powers, and aspects of responsibility of local authorities consisting of village, settlement, city councils, now administrative units with military administration. Temporarily lost territories, etc.

The foundations of decentralization are set out in the European Charter of Local Self-Government and the Concept of Reforming Local Self-Government and Territorial Organization of Power in Ukraine. The aim of the Concept was to determine the directions, mechanisms and deadlines for the formation of effective local self-government and territorial organization of power to create and maintain a full-fledged living environment for citizens, provide high-quality and accessible public services, establish institutions of direct democracy, meet the interests of citizens in all spheres of life in the relevant territory, and coordinate the interests of the state and territorial communities.

In practice, this has happened. In its short history, local self-government has shown itself to have a strong institutional capacity to manage territories, including urban ones.

The further process of decentralization was regulated by a number of legislative acts: , and others.

FUAs LEGISLATIVE FRAMEWORK APPLICABLE IN UKRAINE

In Ukraine, at the legislative level, the term “functional types of territories” (hereinafter referred to as FTT) is used in the following regulatory legal acts:

1. The State Strategy for Regional Development for 2021-2027, which provided for 10 functional types of territories by 2024 (Appendix 1 to the Strategy), as of 2025, the document does not fix the functional types of territories . The Strategy contains the wording "The implementation of state regional policy for the period until 2027 will be carried out on the basis of a comprehensive territorially-oriented approach, which provides that the object within the framework of regional policy are regions and territorial communities that are characterized by a specific set of social, spatial, security, environmental and economic features. To this end, the Strategy defines the main tasks aimed at the development of different functional types of territories" - without specifying which "different" ones;

Law of Ukraine "On the Principles of State Regional Policy", which records information about FTT dated 09.07.2022. Article 1. Definition of terms: "functional type of territory - a macroregion, microregion or territorial community, which are characterized by a set of common social, spatial, environmental, economic, security and other features"; Article 11 $^{-2}$. Functional types of territories ... "For planning the restoration and stimulation of the development of regions and territories, as well as for the purpose of introducing special mechanisms and tools by executive authorities and local self-government bodies, the following functional types of territories are defined: 1) restoration territories; 2) regional growth poles; 3) territories with special conditions for development; 4) territories of sustainable development." .

In the context of the issue under study, it is also worth mentioning:

- Law of Ukraine "On the Status of Mountain Settlements in Ukraine"
- Law of Ukraine "On the Principles of Domestic and Foreign Policy"
- Law of Ukraine "On Local Self-Government in Ukraine"
- Law of Ukraine "On Local State Administrations"

Law of Ukraine "On International Territorial Cooperation of Ukraine"

- Law of Ukraine "On Regulation of Urban Planning Activities"
- Law of Ukraine "On State Targeted Programs"
- Law of Ukraine "On State Forecasting and Development of Programs for Economic and Social Development of Ukraine"
- The Law of Ukraine "On the General Scheme of Planning of the Territory of Ukraine" and other laws of Ukraine, acts of the President of Ukraine, the Cabinet of Ministers of Ukraine, as well as international treaties of Ukraine, the binding nature of which has been approved by the Verkhovna Rada of Ukraine.
- *We would like to note that, given the military operations on the territory of Ukraine and its European integration vector, regulatory legal acts require updating and adaptation to EU legislation.
- The document that defines the directions of regional development and recovery policy is the Recovery Plan of Ukraine .

Ukraine is also guided in its activities by the Plan for the Implementation of the Ukraine Facility
.

FUAs GUIDELINES APPLICABLE IN UKRAINE

In the process of decentralization, territorial communities were formed - the smallest components of the administrative -territorial system. Until 2020, the process of forming territorial communities took place in compliance with the following principles: 1) constitutionality and legality; 2) voluntariness; 3) economic efficiency; 4) state support; 5) ubiquity of local self-government; 6) transparency and openness; 7) responsibility. In 2020, the process of forming united territorial communities was completed administratively.

State regional policy is implemented on the basis of the following principles: 1) legality; 2) cooperation; 3) parity; 4) openness; 5) subsidiarity; 6) coordination; 7) cohesion; 8) historical continuity; 9) ethno-cultural development; 10) sustainable development; 11) objectivity; 12) equal rights and opportunities for women and men; 13) inclusiveness; 14) integrated development.

It should be noted that in Ukraine there are no publicly available regulatory and legal acts that define the principles of activity exclusively in urban areas.

FUAs METHODOLOGIES APPLICABLE IN THE COUNTRY

Among the methodological recommendations that have both direct and indirect impact on FUNCTIONAL URBAN TERRITORIES, the following can be mentioned:

1. Methodology for forming capable territorial communities
2. Methodological recommendations on the criteria for the formation of administrative-territorial units of the subregional (district) level
3. Methodological recommendations on the procedure for developing, approving, implementing, monitoring and evaluating the implementation of territorial community development strategies

The information provided in the source is interesting for analyzing and visualizing data on FTT .

MAJOR INVESTOR COMPANIES, OTHER PLAYERS IN THE FUAS-RELATED SECTOR, IN THE FIELD OF INDUSTRY, SERVICES, RESEARCH

The fifty largest Ukrainian private companies invested UAH 224 billion in their development during the full-scale Russian invasion. The top three are DTEK, Metinvest and MHP. Ukrainian companies have invested the most in the development of their own business since the start of the war. The leader of the Top 50 largest investors during the war is DTEK, which invested UAH 41.2 billion. most of the resources are directed to supporting energy generation and heat supply. In particular, in the Carpathian region, this is the Burshtyn territorial community with the center in the mono-city of Burshtyn.

In second place in terms of investments is Metinvest with 28.1 billion UAH. In the top three, MHP is in the lead with 14.8 billion UAH. And Ferrexpo is in the lead with over 13 billion UAH .

As of today, the sources of financing of the state budget are own revenues, military bonds, loans from international financial organizations, as well as bilateral loans and grants .

A feature of the educational component is the integration of Ukraine into the European Research Area, which is part of the implementation of the Association Agreement between Ukraine and the European Union. Local players in the field of education are working to establish links to expand cooperation on the basis of bilateral agreements. Interactive map of international agreements in the field of science .

STATISTICS ABOUT FUAS ACTIVITY, RESULTS, EMPLOYMENT ETC.

The website of the State Statistics Service of Ukraine presents a number of studies that indicate the costs of scientific research and development by region, the number of researchers involved in scientific research and development in full-time equivalent by region, the number of employees involved in scientific research and development in full-time equivalent by region, the number of researchers involved in scientific research and development by region, the number of researchers involved in scientific research and development who have a scientific degree by region (2021-2024); the implementation of innovations at industrial enterprises by region, the number of innovatively active industrial enterprises by region with distribution by areas of innovative activity, innovation costs of industrial enterprises by region with distribution by types of expenses, by sources of financing (2020-2024); number of innovatively active enterprises by region (2018-2020,2020-2022,2022-2024); regional volumes of foreign trade in goods in January-May 2025; number of registered legal entities by region of Ukraine as of July 1, 2025.

ANY SPECIFIC SPECIALIZATION OF THE FUAS (EG IT & DIGITAL TECHNOLOGIES, AUTOMOTIVE, AEROSPACE ETC.

In Ukraine, the process of determining the smart specialization of regions is typical in regional development strategies 2021. Its idea is a partnership between representatives of business, government, scientific and technical institutions and the public. In 2021, the implementation of Smart Specialization was best implemented in 5 regions: Kyiv, Donetsk, Luhansk, Ternopil and Lviv.

15 regions of Ukraine joined the European Smart Specialization Platform in 2021 and actively used opportunities for development. Among them are: Lviv, Donetsk, Luhansk, Kyiv, Ternopil, Cherkasy, Chernihiv, Ivano-Frankivsk, Kharkiv, Khmelnytskyi, Kirovohrad, Vinnytsia, Poltava, Rivne and Zakarpattia. More details are available on the Platform, which can be found at **https://s3platform.jrc.ec.europa.eu/**

Smart specialization priorities in Ukrainian regions, as of 2021.

Donetsk region	Creative industries (ceramics) Engineering Information technology (horizontal priority)
Luhansk region	Chemistry Agro-industry
Lviv region	Bioeconomy Creative industries

Rivne region	Woodworking and furniture industry High-tech organic agriculture, berry growing and gardening Logistics; IT sector (horizontal priority)
Khmelnytskyi region	Light industry Food industry Mechanical engineering. Metalworking
Ternopil region	Lighting industry Dairy products Production of niche and organic products
Kyiv region	Production of innovative food products with improved consumer qualities (functional food) Innovative products for construction, design and everyday life Bioactive substances and pharmaceuticals for human health Development of energy-efficient solutions based on alternative energy sources (horizontal priority)
Zaporizhia region	Tourism (potentially) Agro-industry (potentially) Medical industry (potentially) Mechanical engineering (potentially)

However, after the full-scale invasion, the vectors of smart specialization have changed. Changes were made to the State Strategy for Regional Development for 2021-2027, and regional strategies have also undergone corresponding changes.

For example, the draft Development Strategy of Ivano-Frankivsk region for 2021-2027 identifies the following areas of smart specialization: processing industry: production of other non-metallic mineral products, wood processing and manufacture of wood and cork products, except furniture, food production, production of chemicals and chemical products, production of machinery and equipment, n.e.c.; extractive industry: extraction of crude oil and natural gas, extraction of other minerals and quarrying; electricity and gas supply: electricity production; temporary

accommodation and catering: temporary accommodation, food and beverage service activities; information and telecommunications: computer programming, consulting and related activities

Today, Ukraine has a number of state strategies/programs/plans that reflect the development vectors of the country's regions. Some of them are: National Transport Strategy of Ukraine for the period until 2030 and approval of the operational plan of measures for its implementation in 2025-2027 , National Security Strategy of Ukraine HUMAN SAFETY – COUNTRY SECURITY , Strategy for the implementation of digital development, digital transformations and digitalization of the public finance management system for the period until 2030 and approval of the plan of measures for its implementation , Strategy for the development of seaports of Ukraine for the period until 2038 , Strategy for environmental safety and adaptation to climate change for the period until 2030 , Strategy for energy security , National Strategy for the creation of a barrier-free space in Ukraine for the period until 2030 , National Economic Strategy for the period until 2030 , National Strategy for the promotion of the development of civil society in Ukraine for 2021-2026 , Strategy for the development of industrial parks for 2023-2030 , Strategy for the Digital Development of Innovative Activities of Ukraine for the Period Until 2030 and Approval of the Operational Plan of Measures for Its Implementation in 2025-2027 , Strategy for the Formation of a System for Returning from Military Service to Civilian Life for the Period Until 2033 and Approval of the Operational Plan of Measures for Its Implementation in 2025-2027 , Strategy for the Development and Expansion of Border Infrastructure with the Countries of the European Union and the Republic of Moldova until 2030 and Approval of the Operational Plan of Measures for Its Implementation in 2024-2030 , Strategy for the Recovery, Sustainable Development and Digital Transformation of Small and Medium-Sized Enterprises for the Period Until 2027 and Approval of the Operational Plan of Measures for Its Implementation in 2024-2027 , Strategy for the Food Security of Ukraine for the Period Until 2027 and Approval of the Operational Plan of Measures for Its Implementation , National Mine Action Strategy activities for the period until 2033 and approval of the operational plan of measures for its implementation in 2024-2026 , Strategy for the formation and implementation of state policy in the field of climate change for the period until 2035 and approval of the operational plan of measures for its implementation in 2024-2026 , Strategy for the development of the healthcare system for the period until 2030 and approval of the operational plan of measures for its implementation in 2025-2027 , Strategy for the development of the civil protection protective structures fund for the period until 2034 and approval of the operational plan of measures for its implementation , etc. Information on national programs is also reflected in the recovery plan of Ukraine .

3.2 The stakeholders

Governance structure (public authorities, private/public companies, clusters)

Main stakeholders involved in the Functional Urban Areas: public authorities, ministries, municipalities, national boards, clusters, relevant companies from industry-related sectors, major manufacturers in FUAs-related sectors, automotive, aerospace, IT, universities, research centres, specialized authorities in innovative industry sectors, public services companies, ports, airports, SMEs, business support centers, innovation poles etc.

The group of stakeholders who have an interest in the development and management of cities is very diverse, depending on their own or delegated powers to local governments.

Today in Ukraine there is

The Cabinet of Ministers of Ukraine, to which 15 bodies are subordinate:

State Nuclear Regulatory Inspectorate of Ukraine

State Regulatory Service of Ukraine

State Property Fund of Ukraine

National Agency of Ukraine for Civil Service

National Agency of Ukraine for Corruption Prevention

Antimonopoly Committee of Ukraine

National Agency of Ukraine for the Identification, Tracing and Management of Assets Obtained from Corruption and Other Crimes

State Statistics Service of Ukraine

State Service of Ukraine for Ethnopolitics and Freedom of Conscience

Bureau of Economic Security of Ukraine

State Service of Ukraine for Food Safety and Consumer Protection

National Commission for State Regulation in the Fields of Electronic Communications, Radio Frequency Spectrum, and Postal Services

National Commission for State Regulation in the Energy and Utilities Sectors

State Agency for Energy Efficiency and Energy Saving of Ukraine

Administration of the State Service for Special Communications and Information Protection of Ukraine);

15 ministries:

Ministry of Energy of Ukraine

Ministry of Youth and Sports of Ukraine

Ministry of Digital Transformation of Ukraine

Ministry of Economy, Environment and Agriculture of Ukraine

Ministry of Internal Affairs of Ukraine

Ministry of Foreign Affairs of Ukraine

Ministry of Community and Territorial Development of Ukraine

Ministry of Culture and Strategic Communications of Ukraine

Ministry of Defense of Ukraine

Ministry of Education and Science of Ukraine

Ministry of Health of Ukraine

Ministry of Social Policy, Family and Unity of Ukraine

Ministry of Veterans Affairs of Ukraine

Ministry of Finance of Ukraine

Ministry of Justice of Ukraine

24 services:

State Service of Ukraine for Ethnopolitics and Freedom of Conscience

National Health Service of Ukraine

State Customs Service of Ukraine

State Tax Service of Ukraine

State Audit Service of Ukraine

National Social Service of Ukraine

State Service of Ukraine for Children's Affairs

State Aviation Service of Ukraine

State Archival Service of Ukraine

State Treasury Service of Ukraine

State Migration Service of Ukraine

State Service of Maritime and Inland Water Transport and Shipping of Ukraine

State Service of Ukraine for Transport Safety

State Service of Ukraine for Food Safety and Consumer Protection

State Service of Ukraine for Geodesy, Cartography and Cadastre

State Service of Geology and Subsoil of Ukraine

State Labor Service of Ukraine

State Statistics Service of Ukraine

State Service of Ukraine for Medicines and Drug Control

State Emergency Service of Ukraine

State Financial Monitoring Service of Ukraine

State Export Control Service of Ukraine

State Regulatory Service of Ukraine

State Education Quality Service of Ukraine

16 Agencies

State Agency of Ukraine PlayCity

State Agency for Energy Efficiency and Energy Saving of Ukraine

State Agency for Tourism Development of Ukraine

Public Debt Management Agency of Ukraine

State Agency of Ukraine for Arts and Art Education

State Agency for Infrastructure Restoration and Development of Ukraine

State Agency of Water Resources of Ukraine

State Agency of Forest Resources of Ukraine

State Agency for Reserves Management of Ukraine

State Agency of Ukraine for the Development of Land Reclamation, Fisheries and Food Programs

State Film Agency of Ukraine

State Agency of Ukraine for Exclusion Zone Management

State Space Agency of Ukraine

National Agency of Ukraine for the Identification, Tracing and Management of Assets Obtained from Corruption and Other Crimes

National Agency of Ukraine for Civil Service Issues

National Agency for the Prevention of Corruption

4 Inspections

State Inspectorate of Architecture and Urban Planning of Ukraine

State Ecological Inspectorate of Ukraine

State Nuclear Regulatory Inspectorate of Ukraine

State Inspectorate for Energy Supervision of Ukraine

10 Central Electoral Commissions with special status

National Anti-Corruption Bureau of Ukraine

Administration of the State Service for Special Communications and Information Protection of Ukraine

National Commission on State Language Standards

National Commission for State Regulation in the Fields of Electronic Communications, Radio Frequency Spectrum, and Postal Services

National Commission for State Regulation in the Energy and Utilities Sectors

State Committee for Television and Radio Broadcasting of Ukraine

Antimonopoly Committee of Ukraine

State Property Fund of Ukraine

National Agency of Ukraine for Corruption Prevention

National Agency of Ukraine for Identification, Tracing and Management of Assets Obtained from Corruption and Other Crimes

3 Collegiate Bodies

National Commission for State Regulation in the Energy and Utilities Sectors

National Securities and Stock Market Commission

National Commission for State Regulation in the Fields of Electronic Communications, Radio Frequency Spectrum, and Postal Services

5 Other central executive authorities

Administration of the State Border Guard Service of Ukraine

Bureau of Economic Security of Ukraine

National Police of Ukraine

Ukrainian Institute of National Remembrance

Pension Fund of Ukraine

27 Local authorities

Vinnytsia Regional State Administration

Volyn Regional State Administration

Dnipropetrovsk Regional State Administration

Donetsk Regional State Administration

Zhytomyr Regional State Administration

Transcarpathian Regional State Administration

Zaporizhia Regional State Administration

Ivano-Frankivsk Regional State Administration

Kyiv Regional State Administration

Kirovohrad Regional State Administration

Luhansk Regional State Administration

Lviv Regional State Administration

Mykolaiv Regional State Administration

Odesa Regional State Administration

Poltava Regional State Administration

Rivne Regional State Administration

Sumy Regional State Administration

Ternopil Regional State Administration

Kharkiv Regional State Administration

Kherson Regional State Administration

Khmelnytskyi Regional State Administration

Cherkasy Regional State Administration

Chernivtsi Regional State Administration

Chernihiv Regional State Administration

Kyiv City State Administration

Council of Ministers of the Autonomous Republic of Crimea

Sevastopol City State Administration

So far, there is no separate legislation for urban areas - urban territorial communities in Ukraine. Legally, the activities of territorial communities with an administrative center in cities are regulated by the same regulatory acts as territorial communities whose administrative center is a village or settlement. According to the legislation, all territorial communities of Ukraine have both their own powers and delegated powers, which are transferred to territorial communities. The list of powers is enshrined in the Law of Ukraine "On Local Self-Government in Ukraine" .

In Ukraine, there are Associations of Local Government Bodies and their Voluntary Associations - voluntary non-profit associations created by local governments to more effectively exercise their powers, coordinate the actions of local governments to protect the rights and interests of territorial communities, and promote local and regional development .

There are also 24 Regional Development Agencies operating in the sector . Today, RDAs have been established in all 24 regions of Ukraine, 23 of which were established in accordance with the legislation - the founders are the relevant regional councils and regional state administrations .

A consolidated list of natural monopoly entities (a natural monopoly entity is a business entity (legal entity) of any form of ownership that produces (sells) goods in a market that is in a state of natural monopoly; natural monopoly is a state of the commodity market in which meeting demand in this market is more effective in the absence of competition due to technological features of production (due to a significant decrease in production costs per unit of goods as production volumes increase), and goods (services) produced by natural monopoly entities cannot be replaced in consumption by other goods (services), and therefore the demand in this commodity market depends less on changes in prices for these goods (services) than the demand for other goods (services) as of 06/30/2025 .

When studying the issue of clustering in Ukraine, we note the following:

1. At the national level, there is no publicly available information about operating clusters.

2. Information about clustering in Ukraine is available on the website of the Ukrainian Cluster Alliance (UKA). UKA was founded on March 24, 2022 on the basis of the Clusters 4 Ukraine initiative, which emerged on the platform of industrial and high-tech sectors Industry4Ukraine. The main driving force of the Ukrainian cluster movement in various formats is the Association of Industrial Automation Enterprises of Ukraine (APPAU) . Over the past 20 years, more than 120 cluster organizations have been registered in Ukraine. But at the moment, clusters that have proven their ability to unite and develop small and medium-sized enterprises and that have the characteristics of real clusters are no more than 25-30 organizations. In 2021, thanks to the strong support of GIZ, several projects were implemented in Ukraine that gave impetus to the sustainable systemic development of clusters in several regions and industries. In 2022, the cluster committee initiated the creation of UKA. Therefore, today this public association is the main coordination center for cluster development in Ukraine. Today, more than 50 clusters have joined the UCA, and although many of them are still young or “frozen” due to war conditions, the progress of clusters in 2022 is obvious. The UCA Annual Report for 2022 demonstrates the rapid growth and development of clusters in the areas of internationalization, innovative fundraising, inter-cluster cooperation and cooperation at the regional level. List of current UCA members:

1. Ukrainian Industrial Cluster
2. APPAU / Smart Industries cluster
3. Vinnytsia Instrumentation and Automation Cluster
4. Zaporizhzhia cluster of IAM
5. Kyiv high-tech cluster
6. Ukrainian automotive and mobility cluster
7. All-Ukrainian Association of Innovation and Space Clusters
8. Rivne Interregional Medical Cluster
9. Lviv Medical Business Cluster

10. Lviv cluster of energy instrument making
11. Public Organization "MSPKU" (poultry cluster)
12. Kharkiv IT cluster
13. Ukrainian Food Association (U-Food)
14. Podillya Fashion Cluster
15. Ukrainian Association of Furniture Manufacturers
16. Ukrainian cybersecurity cluster
17. Maritime Cluster of Ukraine
18. Cluster of medical equipment manufacturers "ProMedVir"
19. Thermal energy cluster of Ukraine
20. Ukrainian Photonics Cluster
21. Medical Innovation Cluster
22. International agrotourism cluster "Dniester 1362"
23. South Ukrainian reconstruction and recovery cluster.
24. Kyiv Medical-Legal Cluster
25. Ivano-Frankivsk Information Technology Cluster
26. Ukrainian dual technology cluster
27. Precarpathian Industrial Cluster
28. Lviv Transport and Logistics Cluster

List of associated members of the UKA:

1. Ukrainian Startup Association
2. Chemical and technological cluster TORSODA
3. Regional Ceramic Cluster "Ceramics of Donetsk Region"
4. Sumy Machine-Building Cluster of Power Equipment”
5. Project and Educational Center "Agents of Change" of the Vasyl Stefanyk Precarpathian National University (PNU)
6. Ivano-Frankivsk Business Association
7. Zhytomyr food cluster "POLIFUD"
8. Cluster of printing industry, publishing, and digital technologies: logistics, service, quality

9. Lviv Defense Cluster
10. Circular Economy Cluster
11. Lithuanian Food Exporters Association (LitMEA) / SMART Food Cluster
12. Alliance'DIM Construction and Energy Metacluster
13. Regional Development Agency of Odessa Region

There are 204 scientific institutions registered in Ukraine : Kyiv (135), regions: Vinnytsia (1), Dnipropetrovsk (6), Donetsk (1), Transcarpathia (1) , Zaporizhia (1) , Kyiv (6) , Lviv (12) , Odessa (8) , Poltava (1) , Sumy (1) , Kharkiv (28) , Kherson (1), Cherkasy (1) , Chernihiv (1) .

394 higher education institutions operating in Ukraine , which can be reliable partners for the development of functional urban/urbanized areas .

The issue of agglomerations - "creation of a legislative basis for the functioning and development of agglomerations, ensuring balanced spatial development of the territories included in them" is enshrined in the State Strategy for Regional Development for 2021-2027. Cities in Ukraine tried to create agglomerations at the level of the initial legislative framework, namely the laws "On Cooperation of Territorial Communities" and "On Associations of Local Government Bodies". On their basis, agglomerations were created in large cities - Odessa, Kyiv and Lviv. However, with varying success . The prospects for the development of agglomerations in projects of updated regional strategies are highlighted in the review .

In Ukraine, at the national, regional, and local levels, there are associations of trade unions, employers, a chamber of commerce and industry with structural divisions in the regions, and other institutions that have a direct or indirect impact on the activities of urban areas.

The role of stakeholders at different levels – national, regional, local – in development functional urban territories (FUNCTIONAL URBAN TERRITORIES) in Ukraine are extremely important. However, it is worth noting that today it is not possible to clearly distinguish achievements in the direction of creating and developing functional urban areas.

Despite the absence of the legislative term "functional urban territories" and special legislation, the activities of territorial communities, including urban ones, are regulated by numerous regulatory legal acts and are regulated and accompanied by a large number of stakeholders.

Today, local governments interact with dozens of stakeholders, which potentially, subject to the formation of a regulatory framework and strategic documents, can become a starting point for the development of functional urbanized territories. In the context of decentralization, cooperation with stakeholders is critically important. However, the fragmentation and lack of coordination between them is one of the key problems that, in our opinion, hinders the effective development of functional urban territories in Ukraine.

3.3. National policy on FUAs in UKRAINE

Close in essence to FUNCTIONAL URBAN TERRITORIES as such, covering both the city and the adjacent labor mobility zone, we will have the following:

- agglomeration (mentioned in regional strategies, but does not have clear legislative criteria);
- an urban community together with adjacent communities that have economic, social and infrastructural connections;
- functional territories (macroregion, microregion or territorial community, which are characterized by a set of common social, spatial, environmental, economic, security and other features).

The Law of Ukraine "On the Principles of State Regional Policy" for the purpose of planning to stimulate the development and restoration of regions and territories, as well as for the application of differentiated financial support mechanisms, defines the following functional types of territories (hereinafter referred to as FTT):

1) recovery areas;

2) regional growth poles;

3) territories with special conditions for development;

4) sustainable development areas.

The authority to determine the list of functional types of territories, as well as the requirements for indicators for assigning territories to different functional types, is vested in the Government of Ukraine. The process of determining the qualifying characteristics that will allow assigning certain territories to the corresponding functional type is still ongoing.

The law determines the mechanisms for financing state regional policy and sources of funding.

As for the mechanisms for financing state regional policy, they are:

- inter-budgetary transfers from the state budget to local budgets;
- combining on a contractual basis the financial resources of state regional policy entities, public and private partners on the principles of public-private partnership, and international institutions;
- capital expenditures of the state budget;
- state target programs;
- regional recovery and development plan;
- regional development programs and regional development programs;
- regional development projects.

Sources of financing for state regional policy may include funds from the State Budget of Ukraine, in particular the State Regional Development Fund; funds from local budgets; funds received by the state budget within the framework of assistance programs and grants of the European Union, governments of foreign states, international organizations, donor institutions; funds from international organizations; funds from other sources not prohibited by law.

State Strategy for Regional Development for 2021-2027 years defines the main tasks aimed at the development of various functional types of territories. Operational objective 1. “Ensuring integrated development of territories taking into account the interests of future generations” provides for a number of tasks in the direction of “Stimulating the development of territories”, in particular, creating a legislative framework for the functioning and development of agglomerations, ensuring balanced spatial development of territories included in them and creating conditions for socio-economic, infrastructural and environmental development of territories of the Ukrainian part of the Danube Region by taking into account the priorities and objectives of the EU Strategy for the Danube Region in sectoral strategies, state and regional development programs. The Strategy establishes the need for financing and supporting various types of territories within the framework of regional development – includes FUNCTIONAL URBAN TERRITORIES in the logic of resource provision, thus determining the priority of supporting FUNCTIONAL URBAN TERRITORIES within the framework of the State Fund for Regional Development, Ukraine Facilit y .

The Law of Ukraine "On Cooperation of Territorial Communities" regulates the possibility of unification and joint financing of projects within agglomerations. In cases where the concept of FUNCTIONAL URBAN TERRITORIES is still applied in Ukraine (for example, within the framework of international technical assistance (GIZ, UNDP, EU, etc.), when integrated planning of the development of the city and suburban area is required), the definition of FUNCTIONAL URBAN TERRITORIES is situational. The application of the provisions of the Law of Ukraine "On Cooperation of Territorial Communities" allows for integrated planning of the development of the city and suburban area, financing of joint projects within the framework of intermunicipal cooperation, forms a platform for joint financing of projects, and attracting donors.

The Law of Ukraine "On International Territorial Cooperation of Ukraine" expanded the role of local councils in the cooperation process, including participation in the creation and management of formal Euroregions or cross-border cooperation organizations (CBOs), and the right to amend the statutes of such structures.

The law establishes clear procedures for approving international agreements (for example, draft agreements) through the Ministry of Infrastructure, regulated deadlines, and explanations for communities in case of rejection of projects. The role of the interdepartmental coordination commission has also been strengthened, which now includes powers regarding state support and compliance of cross-border programs with the national strategy. Regarding financial opportunities for cross-border (inter-territorial) cooperation, participation in such programs is possible through the creation of preferential customs, tax, and currency conditions; participation in project competitions for state financial support; development and implementation of such programs. Such programs can be financed from state and local budgets; through the State Development Fund; international technical assistance or other sources not prohibited by law.

Legislative amendments to the Law of Ukraine "On Local Self-Government" introduce powers to finance cooperation between territories at the cross-border and inter-territorial levels

The concept of local self-government reform provides for the formation of an adequate territorial basis, a sufficient tax base and managerial capacity to finance local public services - this is the foundation for the financial capacity of FUNCTIONAL URBAN TERRITORIES, the possibility of direct budget planning and receiving subventions.

Methodological recommendations for the development of territorial development strategies guide communities to take into account the functional features of territories in strategies, and provide grounds for targeted funding in accordance with approved strategies.

The integrated financing system of the Ukraine Facility provides support to Ukrainian communities in the amount of €50 billion, distributed within 2024-2027 in the areas of Pilot I - Ukraine Plan (direct support to the state budget in the form of grants (€5.27 billion) and loans (€33 billion), allocated subject to the implementation of reforms and investment indicators approved in the government Plan); Pilot II - Ukraine Investment Framework (a tool for attracting public and private investments through budget guarantees, blended financing and risk coverage, supporting the modernization of critical sectors); Pilot III – Accession Assistance (technical assistance supports the adaptation of Ukrainian legislation and management system to European standards. In accordance with EU requirements, the Ukraine Plan must take into account regional and urban needs, and not only central plans. Within Pilot I, at least 15% of grant funds are directed to local governments, which significantly expands the opportunities for implementing FUNCTIONAL URBAN TERRITORIES projects. Pilot II is aimed at activating investments (including in areas with high potential, such as agglomerations), through financial guarantees and technical assistance, which allows for the implementation of large-scale infrastructure projects at the local level.

The Ukraine Recovery Plan covers the medium-term period and defines priorities, algorithms, management, and financing for recovery across the country – especially where infrastructure and vital services have been destroyed. The plan provides for a systematic assessment of territories, in particular cities and adjacent areas. The principle of “build back better” is established – to restore with sustainability in mind, including infrastructure, urban planning, design, “smart” technologies. It envisages the involvement of local communities in decision-making through mechanisms of decentralization, involvement in the Ukraine Plan, consultations with the local level. Through the DREAM system (Digital Restoration Ecosystem for Accountable Management), projects can be submitted, funding, status and quality of their implementation can be monitored – all in an open format. This will ensure effective control at the community level. In addition, the Ukraine Recovery Plan takes into account territorial challenges – differences between areas that have suffered serious damage and remote regions. For FUNCTIONAL URBAN AREAS, this means the ability to adapt regeneration based on the functional value of the area.

3.4 The current situation of the Functional Urban Areas in UKRAINE

1. Functional Urban Areas support mechanisms:

1.1. Policy makers in Functional Urban Areas related sectors

1.2. National authorities in Functional Urban Areas related sectors

1.3. Funding institutions related to Functional Urban Areas support schemes

1.4. Business support/consulting boards, offices for specific Functional Urban Areas

When studying the issue of mechanisms for supporting functional urban areas, we once again emphasize that the term “functional urban areas” is not legally enshrined in Ukraine. However, we understand these areas as the territories of communities whose centres are cities.

1.1. The strategic planning documents of the state regional policy include:

1) State Strategy for Regional Development of Ukraine;

2) regional development strategies;

3) strategies for the development of territorial communities.

The documents implementing the state regional policy include:

1) Action Plan for the Implementation of the State Strategy for Regional Development of Ukraine;

2) action plans for the implementation of regional development strategies;

3) action plans for the implementation of strategies for the development of territorial communities;

4) programs for the economic and social development of the Autonomous Republic of Crimea, regions, districts, cities of Kyiv and Sevastopol, and territorial communities.

Documents for strategic planning and implementation of state regional policy must be consistent with relevant urban planning documentation.

The development of strategic planning documents and the implementation of state regional policy must be carried out taking into account the directions of state regional policy defined by the Law, and state forecasting and state planning documents defined by legislation.

The documents being developed for the restoration and development of regions and territories affected by armed aggression against Ukraine include:

1) plan for the recovery and development of regions;

2) plans for the restoration and development of territorial communities.

Local governments are subjects of strategic environmental assessment. This is a procedure for determining, describing and assessing the consequences of implementing state planning documents for the environment, including for public health, justified alternatives, developing measures to prevent, reduce and mitigate possible negative consequences, which includes determining the scope of the strategic environmental assessment, preparing a report on the strategic environmental assessment, conducting public discussions and consultations (if necessary, transboundary consultations), taking into account the report on the strategic environmental assessment, the results of public discussions and consultations in the state planning document, informing about the approval of the state planning document and is carried out in accordance with the procedure specified by the Law of Ukraine "On Strategic Environmental Assessment" .

1.2. At the state level, those responsible for the implementation of state regional policy are:

- ministries:

Ministry of Energy of Ukraine

Ministry of Youth and Sports of Ukraine

Ministry of Digital Transformation of Ukraine

Ministry of Economy, Environment and Agriculture of Ukraine

Ministry of Internal Affairs of Ukraine

Ministry of Foreign Affairs of Ukraine

Ministry of Community and Territorial Development of Ukraine

Ministry of Culture and Strategic Communications of Ukraine

Ministry of Defense of Ukraine

Ministry of Education and Science of Ukraine

Ministry of Health of Ukraine

Ministry of Social Policy, Family and Unity of Ukraine

Ministry of Veterans Affairs of Ukraine

Ministry of Finance of Ukraine

Ministry of Justice of Ukraine

-state/national agencies, including those with special status, services, regional state/military administrations.

1.3. Financial support for state regional policy is carried out in accordance with this Law of Ukraine “On the Principles of State Regional Policy” , the Budget and Tax Codes of Ukraine .

The mechanisms for financing state regional policy are:

- inter-budgetary transfers from the state budget to local budgets;
- combining on a contractual basis the financial resources of state regional policy entities, public and private partners on the principles of public-private partnership, and international institutions;
- capital expenditures of the state budget;
- state target programs;
- regional recovery and development plan;
- regional development programs and regional development programs;
- regional development projects.

The sources of funding for state regional policy are:

- funds from the State Budget of Ukraine, in particular the State Fund for Regional Development;
- local budget funds;
- funds received by the state budget under assistance programs and grants from the European Union, foreign governments, international organizations, and donor institutions;
- funds from international organizations;
- public-private partnership resources
- funds from other sources not prohibited by law.

State support for regional development is aimed at financing:

- regional development programs and projects that ensure the implementation of the tasks of the State Strategy for Regional Development of Ukraine and action plans for its implementation, developed taking into account the characteristics of functional types of territories;
- plan for the recovery and development of regions;
- projects and regional development programs that ensure the fulfillment of the tasks of regional development strategies and action plans for their implementation;
- cooperation agreements between territorial communities;
- regional development programs and projects, which are determined as priorities by decision of the Cabinet of Ministers of Ukraine.

In order to ensure the restoration and stimulation of the development of regions and territories, an appropriate fund may be established.

When preparing the Budget Declaration and the draft State Budget of Ukraine for the relevant period, a separate budget program is provided for, aimed at financing measures to restore regions and territories, as well as regional development programs and projects and/or local development projects.

1.4. Local governments, associations of local governments, business associations, scientific institutions, educational institutions, and other entities directly and indirectly influence the implementation of state regional policy, including that relating to urban areas.

3.4.2 FUNDA QUESTIONNAIRE for FUAs in UKRAINE

See ANNEX

3.5. Challenges facing functional urban areas for development

In the process of decentralization, city, village, and settlement leaders of communities had the opportunity to work fruitfully and constructively at joint communication meetings. In the conditions of a full-scale invasion, local government bodies, without waiting for vertical coordination, evacuated people, placed, and organized fighters and necessary ammunition for defense.

Communities in Ukraine today are in difficult and challenging conditions. Cities, especially in Western Ukraine, are trying to use their potential through migration, internally displaced persons, and capital.

One of the key challenges for communities remains

migration (mechanical, natural)

insufficient level of infrastructure:

transport, logistics, energy and digital networks in many communities do not meet modern requirements

personnel shortage, lack of talent and youth

Resource management and authority

Financial gaps

School optimization

Veterans policy

Army assistance

Weak conditions for export -oriented business

Systematic export support programs have been developed only in a few cities with a population of more than 50,000. The enterprises themselves in the community require in-depth knowledge of the conditions and requirements of foreign markets. Added to this is the challenge of implementing EU environmental and social standards, which requires modernization of production, introduction of energy-efficient technologies and increased corporate responsibility, which not all economic entities are ready for.

In times of war, security risks become a separate significant factor affecting the investment climate. Thus, in order for FUNCTIONAL URBAN TERRITORIES of Ukraine to be able to fully benefit, it is necessary to create a favourable working environment in which infrastructural, regulatory, personnel and financial barriers will be gradually eliminated, and communities will receive clear mechanisms for integration into the European economic space.

For example, we can familiarize ourselves with the functioning of the Lviv agglomeration , the Kyiv agglomeration , and the Odessa agglomeration .

Today, Ukrainian FUNCTIONAL URBAN TERRITORIES operate in conditions of extremely high uncertainty. War, economic fluctuations, infrastructure destruction, climate change and rapid technological progress create an environment in which traditional approaches to development no longer guarantee stability. In such circumstances, risk management becomes not just an element of strategic planning, but a critically important task. In parallel, FUNCTIONAL URBAN TERRITORIES must find ways to integrate innovation into all areas of their activities in order not only to reduce vulnerability, but also to create new opportunities for economic and social growth.

The risks faced by Ukrainian FUNCTIONAL URBAN TERRITORIES are multifaceted. Among them are economic and often political dependence on a few large employers, which makes the territories vulnerable to market changes; infrastructure deficiencies that hinder the development of industry, logistics and tourism; the outflow of youth and skilled personnel, which exacerbates the personnel shortage, which inhibits investment attraction; limited access to financing for small and medium-sized businesses due to the lack of prepared projects; as well as environmental and climate threats that require adaptation solutions. No less important are security challenges associated with military operations and the growth of cyber threats to critical infrastructure.

At the same time, in conditions of increased risks, there is room for innovation. Ukrainian FUNCTIONAL URBAN TERRITORIES can develop economic sustainability by creating industrial and business hubs, introducing B2B cooperation platforms, fintech solutions and export support programs. The development of modern transport and energy networks, the development of smart logistics and industrial parks with ready-made infrastructure can significantly reduce the impact of

infrastructure constraints. To address the personnel shortage, it is worth introducing dual education, e-learning platforms, and local retraining centres.

Digital transformation requires special attention - the transition to electronic administrative services, automation of permitting procedures, the creation of a "single window" for investors. In the field of ecology, the implementation of nature-oriented solutions, "green" modernizations, and energy-efficient technologies are promising.

To combine risk management and innovation implementation, it is advisable for Ukrainian FUNCTIONAL URBAN TERRITORIES to create permanent coordination mechanisms, including agglomeration offices, innovation hubs, and intermunicipal ties.

Moreover, FUNCTIONAL URBAN TERRITORIES in Ukraine can significantly to win by determining relevant examples of functioning FUNCTIONAL URBAN TERRITORIES in Western and Central European countries, adapting to their to own socio - economic conditions and geographical features.

Without a clear legal status of the community remain separate administrative units, and coordination between them depends on voluntary agreements rather than on legally defined mechanisms. Therefore, the first step for effective adoption western experience should be the creation legal bases for, including the definition their powers, sources of funding and governance institutions.

Many Ukrainian urban areas lack the habit and ability to plan development for the long term, as well as systems that would constantly collect and analyse important information. This includes data on the economy, demographics, transport flows, the state of infrastructure, the environmental situation, and the needs of the population. Without such data, it is difficult to make informed decisions and determine which projects are needed first.

In addition, Ukraine still does not have established permanent structures or bodies that would coordinate cooperation between neighbouring communities within the same agglomeration. In EU countries, agglomeration offices, intermunicipal councils or development agencies are created for this purpose, which are responsible for joint planning of transport, economy, infrastructure and ecology. In Ukraine, such an institutional framework is often simply absent, so cooperation between communities depends more on personal agreements than on systematic work. By implementing the best European practices, Ukrainian communities are actually adapting them to local realities – from security and humanitarian calls.

3.6. Opportunities and obstacles of Functional Urban Areas

Global trends have a significant impact on the lives of Ukrainian cities and their environs. FUNCTIONAL URBAN TERRITORIES find themselves in the midst of global megatrends that bring both challenges and new opportunities. Among them are environmental threats, rapid urbanization, population aging, growing energy demand, and changing lifestyles under the influence of technology.

Climate change, environmental pollution, and depletion of natural resources are forcing us to look for new ways of development. Ukrainian cities can use this challenge for the transition to " green "technologies", the creation environmentally sustainable infrastructure and the implementation of a waste management system based on the principle of "zero waste". At the

same time, opportunities are opening up to attract international climate funds and invest in renewable energy.

The rapid growth of agglomerations and the expansion of megacities create a need for a new approach to planning. Here, integrated public transport, balanced development of the city and suburbs, as well as the formation of multi-centre agglomerations, where economic activity is distributed among several centres, rather than concentrated in one, come to the fore.

The aging of society is gradually changing the needs of cities. The demand for services for older generations is growing; new formats of leisure and education are emerging. Cities can respond to this by developing a "silver age economy", creating inclusive infrastructure and retraining programs for people who want to remain active after retirement.

The energy sector is becoming one of the most dynamic areas of change. Increasing energy efficiency, implementing smart grids, and developing solar and wind power can transform urban areas into more independent and sustainable ones. There are even possibilities for local energy cooperatives that operate at the community level.

Technology and new work formats are changing the rhythm of life. The spread of remote work, the emergence of innovative spaces and the growing role of digital services pose a challenge to cities to adapt their spaces and infrastructure. The priority is shifting to pedestrian and bicycle mobility, the use of big data and artificial intelligence for transport, energy, and security management.

The listed changes are a chance to create a new development model in which Ukrainian communities will become more flexible, comfortable, and competitive.

3.7. SWOT analysis in UKRAINE

It should be noted that, given the war in Ukraine, the strengths and weaknesses, opportunities and threats for the development of Ukraine in general, and functional urban areas in particular, may undergo changes.

Strengths:

decentralization and the new administrative-territorial structure have increased the financial and managerial independence of communities;

The existence of urban centres with functional connections with surrounding territories (urban territorial communities)

human capital, labour resources with different levels of qualifications in cities;

reserves of natural resources on the periphery of urban communities;

Digitalization of most services in communities;

- significant volumes for hydrocarbon storage and developed infrastructure for the generation and transit of electrical energy;

development of e-democracy, digitalization; distance learning; black soil and agricultural sector, which can increase the production of finished products;

powerful energy and military-industrial complexes of R&B;

Community centre cities (mainly the centres of those communities that had the status of cities of regional significance before the reform) are by nature growth poles that concentrate a significant share of GDP, jobs, innovations, and investments;

Regional city centres usually concentrate universities, research centres, and clusters, which contributes to the development of high-tech sectors;

urban areas have a more developed infrastructure (transport, communications, utilities) compared to settlements that are part of a territorial community, even an urban one;

despite the nationwide decline, large cities and their surrounding areas remain attractive for migration, which maintains their human capital;

the emergence and rapid development of new sectors, such as the defense-industrial complex, drone production, and innovative demining technologies;

development of the construction industry within the framework of reconstruction projects;

the presence of a developed social infrastructure (educational, healthcare, cultural institutions);

transport accessibility and nodal logistical role in regional and international transportation.

Weaknesses:

- War consequences: critical infrastructure, houses destroyed, people killed
- In the rear cities, construction and investment activity is observed, accompanied by chaotic development.
- Youth going abroad
- Gaps between education and the labour market
- the absence of a definition of "functional urban area" in Ukrainian legislation, which complicates the formation of specialized policy and management.
- political instability within cities;
- weak connection between city and village;
- Delegated powers are increasing without providing financial resources to communities;
- low level of cooperation between territorial communities;
- lack of a generally accepted national approach to assessing functional urban areas according to social, economic, environmental, and other criteria;

- difference in approaches to the formation of functional types of territories in Ukraine and the EU;
- "theoretical/artificial" implementation of EU standards;
- even in large cities, there may be facts of outdated infrastructure;
- different boundaries and statuses of territories, which complicates the analysis of the development features of functional urban territories. Uneven development of urban and suburban areas, which leads to imbalances in access to services;
- sharp contrast between regional centres and small/medium-sized cities and rural/urban territorial communities and their settlements in terms of resources, economic base, infrastructure, human resources, etc.;
- Official statistics are often collected with a delay of 1-2 years (during war, database formation is even more complicated), or do not reflect local changes - the level of territorial communities. State Statistics Service data are not always detailed to the level of functional urban areas.

Features:

- conditions for implementing a pragmatic comprehensive national economic policy for defense;
- the potential to become one of the global guarantors of security in the EU;
- attracting financial and expert assistance from the EU, international funds and programs for the development and restoration of territories;
- legislative regulation and stimulation of the creation of agglomerations will allow for effective solutions to common problems and implementation of large-scale projects;
- creation of new and support of existing clusters to increase competitiveness and innovation;
- Potential for improving service delivery, infrastructure, and economic development through collaborative planning

Threats:

- War, shelling of civilian infrastructure
- population decline and aging, migration of qualified personnel;
- environmental pollution caused by war
- instability of macroeconomic indicators

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Vojvodina Region
SERBIA


3.1 Database of SERBIA

3.1.1 General **geographical information** (country geographical location, population administrative organization: counties/towns/villages, centralized or decentralized governance)

Vojvodina region is situated in the the Danubian macro-region, in the northern part of the Republic of Serbia. Its strategic location on the Danube River and its cross-border character make it a key area for the implementation of the FUNDA project's goals.

3.1 Database of the country / region

3.1.1 General geographical information

Vojvodina is an autonomous province located in the northern part of Serbia, bordered by Hungary to the north, Romania to the east, Croatia to the west, and Bosnia and Herzegovina to the southwest. It covers an area of 21,506 km² and has a population of approximately 1.8 million people. The region is characterized by its flat plains, fertile agricultural land, and multicultural heritage, with significant Hungarian, Slovak, Croatian, and Romanian minorities. The capital and largest city is Novi Sad, which is also an important economic and cultural hub.

Key Features:

- Geographic position: Northern Serbia
- Population: ~1.8 million
- Regional organization: 7 districts, 45 municipalities
- Governance: Autonomous province with its own government and assembly

2. FUAs Legislative frameworks

- Law on Planning and Construction of the Republic of Serbia
- Law on Regional Development
- Vojvodina Provincial Secretariat for Regional Development
- EU integration policies influencing urban and regional planning

3. FUAs Guidelines

- National Sustainable Urban Development Strategy
- Vojvodina Regional Development Strategy
- Guidelines for Integrated Territorial Investments (ITI)
- Smart Specialization Strategy for Vojvodina

4. FUAs Methodologies

- GIS-based spatial planning

- Metropolitan governance models
- EU-funded project methodologies (e.g., URBACT, ESPON)

5. Major investor companies, other players in the FUAs-related sector

- Naftna industrija Srbije (NIS) – energy sector
- Fiat Chrysler Automobiles (FCA) – automotive
- Siemens, Bosch – technology and engineering
- Novi Sad Fair – business and innovation events
- Universities: University of Novi Sad, BioSense Institute

6. Statistics about FUAs activity, results, employment etc.

- Contribution to GDP: Services (60%), Industry (30%), Agriculture (10%)
- Employment: 45% in services, 25% in industry, 20% in agriculture, 10% in public sector
- Key sectors: agriculture, food processing, automotive, ICT

7. FUAs-related sectors

- Agricultural machinery and food processing
- Automotive and manufacturing
- ICT and digital innovation
- Logistics and transport

8. Any specific specialization of the FUAs

- Agricultural technology (AgTech)
- Automotive manufacturing
- ICT and software development

3.2 The stakeholders

3.2.1 Governance structure

- Vojvodina Provincial Government:

The Vojvodina Provincial Government serves as the executive body of the Autonomous Province of Vojvodina, operating with considerable autonomy in accordance with Serbia's constitutional framework. It consists of a President and 18 secretariats responsible for various policy areas including economy, agriculture, education, and European integration. The Government plays a pivotal role in coordinating regional development strategies and implementing EU pre-accession funds through its specialized units. It maintains legislative initiative in areas of provincial competence and oversees the implementation of adopted laws and policies. The Government's administration employs over 2,000 civil servants who manage day-to-day operations and policy implementation. It cooperates closely with national ministries while preserving Vojvodina's autonomous status in managing regional affairs. The Government also represents Vojvodina in international cooperation, particularly within Danube Region initiatives. Its budget allocation process involves careful balancing of developmental priorities across the province's diverse regions. Recent reforms have focused on enhancing administrative capacity for EU integration processes.

- Ministry of Public Administration and Local Self-Government:

This national ministry holds crucial competence for designing and implementing local government reforms across Serbia, including Vojvodina. It develops legislative frameworks regulating municipal competencies, financing, and administrative procedures applicable to all local self-governments. The ministry manages the system of fiscal decentralization and determines criteria for distribution of central government transfers to local budgets. It oversees the implementation of the Law on Local Self-Government and monitors municipal performance through standardized indicators. The ministry provides technical assistance and capacity-building programs for local administrations, particularly in areas of public service delivery and digitalization. It coordinates with international donors supporting public administration reform and manages EU-funded projects aimed at strengthening local governance. The ministry maintains the national register of local self-government units and oversees boundary changes or municipal reorganizations. It plays a key role in promoting good governance practices and anti-corruption measures at local level. Recent initiatives have focused on improving public service accessibility and administrative simplification.

- Local self-governments (municipalities):

Vojvodina's 45 municipalities exercise substantial authority in local economic development, urban planning, and public service delivery under Serbia's decentralized governance system. Each municipality operates through an elected assembly and executive organs responsible for local regulation and administration. Municipal competencies include spatial planning, local economic development, maintenance of public infrastructure, and delivery of essential services such as water supply, waste management, and local transportation. They prepare and implement local development strategies aligned with provincial and national priorities while addressing specific community needs. Municipal administrations employ professional staff managing various sectors

including urbanism, economy, and social services. They generate revenue through local taxes, fees, and transfers from higher government levels, with varying fiscal capacities across the province. Municipalities actively participate in inter-municipal cooperation mechanisms and cross-border partnerships, particularly within Euroregion structures. They serve as primary points of contact for citizens and businesses requiring administrative services or development permits. Recent challenges include building capacity for EU fund absorption and addressing disparities between urban and rural municipalities.

3.2.2 Main stakeholders involved

- Public authorities: Provincial Secretariat for Economy, Secretariat for Education:

The Provincial Secretariat for Economy serves as the primary government body responsible for economic policy formulation and implementation within Vojvodina. It develops regional economic development strategies, manages investment promotion activities, and coordinates with national economic institutions. The Secretariat implements provincial economic programs supporting SMEs, entrepreneurship, and innovation through various grant schemes and technical assistance measures. It maintains regular dialogue with business associations and chambers of commerce to address economic challenges and opportunities. The Secretariat also manages EU pre-accession funds related to economic development and competitiveness.

The Secretariat for Education plays a crucial role in human resource development and skills formation aligned with regional economic needs. It oversees the implementation of educational policies across all levels, from preschool to higher education institutions in the province. The Secretariat collaborates with the economy sector to identify future skill requirements and develops targeted educational programs. It manages projects enhancing digital skills, vocational education, and lifelong learning opportunities for the regional workforce. The institution also facilitates partnerships between educational institutions and private sector companies.

- Ministries: Ministry of Economy, Ministry of Innovation:

The Ministry of Economy of the Republic of Serbia sets the national economic policy framework and creates conditions for sustainable economic growth. It develops national strategies for industrial development, entrepreneurship, and investment promotion that directly impact Vojvodina's economy. The Ministry manages national incentive programs for investments, export promotion, and technological development. It coordinates with international financial institutions and manages bilateral economic cooperation agreements. The Ministry also oversees the implementation of important infrastructure projects of national significance.

The Ministry of Innovation and Technological Development drives Serbia's transformation toward a knowledge-based economy. It develops policies and programs supporting research, innovation, and digitalization across all economic sectors. The Ministry manages national innovation funds,

technology transfer programs, and startup support initiatives accessible to Vojvodina's ecosystem. It coordinates Serbia's participation in EU research and innovation programs such as Horizon Europe. The Ministry also facilitates international cooperation in science and technology and supports the development of innovation infrastructure

- Municipalities: Novi Sad, Subotica, Zrenjanin, etc.:

Novi Sad, as the capital of Vojvodina, plays a pivotal role in regional development with its concentration of economic, educational, and cultural institutions. The city administration implements local economic development policies supporting entrepreneurship, innovation, and investment attraction. It manages the development of industrial zones, business incubators, and urban infrastructure projects. Novi Sad actively participates in international city networks and implements EU-funded projects. The city also hosts major cultural and business events that enhance its regional importance.

Subotica's strategic location near the Hungarian border makes it crucial for cross-border cooperation and economic integration. The municipality focuses on developing its tourism potential, agricultural processing industries, and logistics capabilities. It maintains active cooperation with Hungarian partners through various Euroregion initiatives and cross-border projects. The city administration implements local development strategies emphasizing multilingual education and cultural diversity. Subotica also benefits from its proximity to Lake Palić, which offers opportunities for recreational tourism development.

Zrenjanin serves as an important industrial centre in Central Banat with strong traditions in manufacturing and food processing. The municipality actively works on revitalizing its industrial zones and attracting new investments in advanced manufacturing. It collaborates with educational institutions to develop skills needed for modern industrial production. Zrenjanin faces challenges related to industrial transition and environmental protection of its surrounding natural areas. The city also focuses on improving its transportation connectivity and urban infrastructure.

- Clusters: Vojvodina ICT Cluster, Agricultural Cluster:

The Vojvodina ICT Cluster brings together companies, educational institutions, and research organizations in the information technology sector. It facilitates networking, knowledge sharing, and collaborative projects among its members. The cluster implements capacity-building programs, organizes industry events, and represents members' interests toward government institutions. It actively participates in regional innovation ecosystems and international technology partnerships. The cluster also supports startup development and digital transformation of traditional industries.

The Agricultural Cluster connects farmers, processors, equipment suppliers, and research institutions in Vojvodina's dominant agricultural sector. It promotes sustainable agricultural

practices, technological modernization, and value-added production. The cluster facilitates access to new markets and develops collective branding initiatives for regional agricultural products. It organizes knowledge transfer events and demonstrations of advanced farming technologies. The cluster also participates in policy dialogue affecting agricultural development and rural communities.

- Companies: NIS, FCA, Siemens:

NIS (Naftna Industrija Srbije), majority-owned by Gazprom Neft, operates as one of Serbia's largest energy companies with significant operations in Vojvodina. The company invests in modernizing its refinery in Pančevo and developing renewable energy projects across the province. NIS implements extensive corporate social responsibility programs supporting local communities and environmental protection. It collaborates with educational institutions on workforce development and research projects. The company also contributes significantly to regional energy security and economic stability.

FCA (Fiat Chrysler Automobiles), through its Serbian subsidiary Fiat Automobili Srbija, operates a major manufacturing plant in Kragujevac with extensive supply chain connections in Vojvodina. The company sources components from numerous suppliers across the province, particularly in metalworking and electronics sectors. It maintains partnerships with vocational schools and universities for technical education and research collaboration. FCA's operations significantly impact regional employment and industrial development. The company also implements environmental and safety standards across its supply chain.

Siemens maintains a strong presence in Vojvodina through various divisions including energy, digital industries, and smart infrastructure. The company provides advanced technologies and solutions for industrial automation, energy efficiency, and digital transformation. Siemens collaborates with educational institutions on curriculum development and practical training programs. It participates in major infrastructure projects and supports the development of smart city solutions in the region. The company also promotes innovation through startup partnerships and technology transfer initiatives.

- Universities: University of Novi Sad, Novi Sad School of Business

The University of Novi Sad, as the second largest university in Serbia, plays a crucial role in human resource development and research innovation. It comprises 14 faculties and conducts research across numerous scientific disciplines relevant to regional development. The university maintains strong industry partnerships through collaborative research, consulting services, and technology transfer activities. It participates in international research networks and EU framework programs. The institution also contributes to regional policy development through expert analyses and recommendations.

The Novi Sad School of Business specializes in economics, management, and business education aligned with market needs. It offers undergraduate, graduate, and executive education programs focusing on practical business skills. The school maintains close relationships with the business community through internship programs, joint projects, and advisory services. It conducts applied research in areas such as entrepreneurship, innovation management, and regional economics. The institution also organizes business conferences and professional development events.

- Research centres: BioSense Institute:

The BioSense Institute has established itself as a centre of excellence in agricultural and biological engineering research. It develops advanced sensor technologies, precision agriculture solutions, and digital farming platforms. The institute operates extensive research infrastructure including experimental fields and laboratory facilities. It participates in major European research projects and maintains international partnerships with leading research institutions. BioSense also supports startup creation and technology transfer in agri-tech sector.

- Ports: Port of Novi Sad:

The Port of Novi Sad serves as an important logistics hub on the Danube River, handling various types of cargo including containers, bulk materials, and project cargo. It benefits from its strategic location along the Rhine-Main-Danube waterway connecting Western Europe with the Black Sea. The port facilities include modern terminals, storage areas, and intermodal connections. It plays a crucial role in regional transportation networks and international trade facilitation. The port authority continuously works on infrastructure improvements and operational efficiency enhancements.

- Airports: None international; relies on Belgrade Airport:

Vojvodina currently lacks international airport facilities, requiring businesses and travellers to use Belgrade Nikola Tesla Airport located approximately 80 km from Novi Sad. This situation creates logistical challenges and additional costs for regional connectivity. Several initiatives have been proposed to develop international airport capabilities in the province, particularly near Novi Sad. The current reliance on Belgrade Airport affects regional accessibility and economic development opportunities. Improved ground transportation connections help mitigate some of these challenges.

- SMEs: Various in technology, agriculture, and manufacturing:

Small and medium enterprises form the backbone of Vojvodina's economy, employing the majority of the regional workforce. Technology SMEs are increasingly important, particularly in software development, ICT services, and digital solutions. Agricultural SMEs range from family farms to processing companies adding value to regional agricultural production. Manufacturing SMEs operate in various sectors including metalworking, automotive components, and food processing. These enterprises face challenges accessing finance, skilled workforce, and international markets.

- Business support centres: Vojvodina ICT Cluster, Regional Development Agency:

The Vojvodina ICT Cluster provides specialized support services to technology companies and startups in the region. It offers mentoring, networking opportunities, and access to investment resources. The cluster organizes industry events, training programs, and matchmaking activities. It represents members' interests in policy dialogue and promotes regional ICT capabilities internationally. The cluster also facilitates collaborative projects and knowledge exchange among members.

The Regional Development Agency of Vojvodina offers comprehensive business support services to enterprises across various sectors. It provides information, consulting, and training services particularly focused on EU integration processes. The agency assists companies in accessing financing opportunities and developing project proposals. It maintains business databases and investment promotion materials. The organization also implements regional development programs and manages business infrastructure facilities.

- Funding institutions: European Investment Bank, Serbian Development Fund:

The European Investment Bank provides long-term financing for infrastructure projects, SME support, and climate action initiatives in Vojvodina. It offers favourable lending terms and technical assistance for project preparation and implementation. The bank prioritizes projects supporting EU policy objectives such as regional development and environmental sustainability. It collaborates with local financial institutions to enhance access to finance for businesses and public entities. The EIB also provides advisory services for investment project development.

The Serbian Development Fund offers various financial products including credit lines, guarantees, and grants to support business development. It focuses particularly on SME financing, entrepreneurship support, and regional development initiatives. The fund implements government programs aimed at job creation, innovation, and export promotion. It provides technical assistance and business advisory services alongside financial support. The institution plays a crucial role in implementing national economic development policies.

3.2.3 Stakeholders' cooperation patterns

- Strong collaboration between regional and local authorities:

The cooperation between Vojvodina's provincial government and local municipalities is institutionalized through regular coordination mechanisms and working groups. This collaboration is formalized through the Association of Cities and Municipalities, which serves as a platform for policy dialogue and joint initiative development. The provincial government provides methodological support and capacity-building programs to help municipalities implement regional development strategies effectively. Joint committees oversee the implementation of cross-jurisdictional projects, particularly in infrastructure and public service delivery. This vertical coordination ensures alignment between provincial priorities and local development needs,

maximizing resource efficiency. The cooperation extends to joint funding applications for EU projects and coordinated approaches to investment attraction. Regular consultation processes ensure that municipal perspectives are incorporated into provincial policy-making. This structured collaboration has been particularly effective in managing EU pre-accession funds and implementing regional development programs.

- Public-private partnerships in innovation and infrastructure:

Public-private partnerships in Vojvodina have evolved into sophisticated cooperation models addressing both infrastructure development and innovation ecosystem building. The regional government has established clear legal frameworks and institutional mechanisms to facilitate PPP projects, particularly in transportation and energy infrastructure. Innovation partnerships focus on technology transfer, with research institutions and universities collaborating closely with private companies on applied research projects. The province maintains a dedicated PPP unit that provides technical assistance and standardised documentation for partnership development. Several successful examples include the development of industrial parks, technology incubators, and renewable energy projects implemented through PPP arrangements. These partnerships typically involve risk-sharing mechanisms and long-term cooperation agreements ensuring sustainability. The private sector contributes technical expertise and management efficiency while public partners provide regulatory support and public interest oversight. Regular stakeholder forums facilitate matchmaking between public needs and private sector capabilities. Monitoring and evaluation mechanisms ensure that PPP projects deliver expected public benefits and value for money.

- Cross-border cooperation with Hungary, Romania, and Croatia:

Vojvodina actively participates in multiple Euroregional structures including the Danube-Kris-Mures-Tisza Euroregion and the Carpathian Euroregion, facilitating systematic cross-border cooperation. These frameworks enable joint project development in transportation infrastructure, environmental protection, and economic development through EU funding instruments like INTERREG. The province maintains regular bilateral consultations with neighbouring regions through joint working groups and cross-border committees. Cooperation with Hungary focuses on transportation connectivity, joint water management, and cultural exchange programs given the significant Hungarian minority in Vojvodina. Collaboration with Romania emphasizes Danube-related initiatives, border infrastructure development, and agricultural research cooperation. Partnership with Croatia concentrates on tourism development, emergency response coordination, and joint business initiatives. Cross-border cooperation has been instrumental in addressing common challenges such as flood protection, transportation bottlenecks, and labour market imbalances. These partnerships have strengthened particularly through Serbia's EU integration process, which provides additional frameworks and funding opportunities for cross-border initiatives. The cooperation has proven valuable in promoting regional stability and economic integration while preserving cultural diversity and addressing minority issues.

3.2.4 Other relevant players

- Chamber of Commerce and Industry of Serbia:

The Chamber of Commerce and Industry of Serbia (CCIS) is operating as an independent business association with mandatory membership for all business entities in Serbia. Its Regional Chamber in Vojvodina plays a crucial role in representing business interests and providing specialized services to local enterprises. The chamber actively participates in policy dialogue, proposing measures to improve business environment and competitiveness. It provides comprehensive services including business information, certification, legal assistance, and export promotion support. The organization facilitates business networking through sectoral associations, matchmaking events, and business missions. It maintains international connections through bilateral business councils and international chamber networks. The chamber also implements projects supporting SME development, innovation, and internationalization, often co-financed by international donors. Its research department produces valuable analyses and economic forecasts informing business decisions and policy making.

- Vojvodina Investment Promotion Fund:

The Vojvodina Investment Promotion Fund (VIP Fund) operates as a specialized financial institution focused on enhancing the province's investment attractiveness and supporting economic development. It offers various financial products including favourable loans, guarantees, and equity investments for projects with significant development impact. The fund prioritizes investments in strategic sectors identified in Vojvodina's development documents, particularly manufacturing, ICT, and agriculture processing. It provides technical assistance and advisory services to investors throughout the investment cycle, from project preparation to implementation. The institution collaborates closely with the Regional Development Agency and local governments to identify investment opportunities and address barriers. The fund manages special programs supporting green investments, energy efficiency, and circular economy projects. It also participates in co-financing arrangements with commercial banks and international financial institutions to leverage additional resources.

- NGOs and cultural organizations supporting regional development:

Non-governmental organizations in Vojvodina contribute significantly to regional development through their work in environmental protection, social inclusion, and cultural development. Environmental NGOs monitor implementation of sustainability policies and promote ecological standards in economic development. Cultural organizations preserve and promote the region's multicultural heritage while fostering creative industries and cultural tourism. Organizations like the Vojvodina Civic Centre facilitate citizen participation in development processes and promote active citizenship. Professional associations contribute to human resource development through training programs, knowledge sharing, and professional standards development. These organizations often serve as implementing partners for EU-funded projects, particularly in areas of social innovation and community development. They maintain extensive international networks and facilitate exchange of best practices in regional development. Their activities complement government efforts by addressing specific community needs and promoting sustainable development principles.

3.3 Regional Policy

3.3.1 Funding for FUAs

- IPA III funds (EU pre-accession assistance):

The Instrument for Pre-Accession Assistance III (IPA III) represents a fundamental EU funding mechanism designed to support Serbia's EU accession process, including the development of functional urban areas. Within its framework, support is provided for cross-border cooperation projects linked to the Danube Region Strategy, as well as for initiatives targeting urban sustainability and transport development. The Autonomous Province of Vojvodina actively participates in priority projects, particularly in the fields of environmental protection, transport, and social infrastructure development. The application processes are coordinated by the Serbian European Integration Office (SEIO), in close cooperation with provincial and local governments. Successful projects make a substantial contribution to the region's European integration and to strengthening socio-economic cohesion.

- Vojvodina Regional Operational Programme:

The Vojvodina Regional Operational Programme (ROP) constitutes the most important financial framework for the implementation of the province's own development strategies. Its resources derive from the provincial budget, national funding, and EU co-financing, in alignment with the priorities of the Smart Specialisation Strategy (S3). The ROP supports the development of urban mobility, the digital transition, energy efficiency, and the growth of innovative enterprises within functional urban areas. Its implementation is coordinated by the Regional Development Agency, with the active participation of local governments and economic stakeholders. The ROP plays a pivotal role in enhancing the region's competitiveness and sustainability.

- National grants for innovation and SMEs:

The Serbian government has launched several national grant programmes aimed at supporting innovation and small and medium-sized enterprises (SMEs), which are equally accessible to businesses in Vojvodina. The Innovation Fund provides support for technological development, research and development projects, and the digital transition, with particular emphasis on manufacturing, healthcare, and agrotechnology. SME grant schemes are designed to enhance competitiveness, stimulate export-oriented investments, and foster employment through preferential credit arrangements and non-repayable subsidies. Calls for applications are issued by the Ministry of Economic Development and the Serbian Development Fund through regional offices. These programmes place strong emphasis on fostering the green and digital transitions, as well as on facilitating entry into international markets.

- EIB and EBRD loans:

The European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) provide substantial long-term financing for infrastructure and environmental projects in Vojvodina. The EIB offers preferential lending schemes in the fields of sustainable transport, environmental protection, and energy efficiency, while the EBRD focuses primarily on private sector development and the promotion of market-oriented reforms. Both institutions also

provide technical assistance for the preparation and implementation of projects, in cooperation with national and local financial institutions. Borrowers include provincial governments, large enterprises, SMEs, and infrastructure operators. The financing conditions are highly competitive, with low interest rates and long maturities, which make them particularly attractive for large-scale investments.

3.3.2 Smart specialization fit

Vojvodina's S3 priorities:

- Sustainable agriculture and food processing:

Vojvodina's agricultural potential and its competences in sustainable food processing are highly aligned with the Smart Specialisation Strategy. The province demonstrates its greatest strengths in food security, precision agriculture, and value-chain innovation. The BioSense Institute possesses internationally recognised research and development capacities, particularly in agri-technology and digital solutions. The regional food-processing industry, alongside traditional production, is increasingly oriented towards organic production and circular economy models. The strategy places particular emphasis on strengthening local value chains and enabling entry into international markets.

- Information and communication technologies:

The province's strengths in information and communication technologies significantly contribute to enhancing regional competitiveness and advancing the digital transition. Novi Sad, as a regional IT hub, hosts numerous tech start-ups as well as regional offices of multinational corporations. The Vojvodina ICT Cluster actively fosters inter-company collaboration, research and development, and the advancement of digital skills. Regional universities provide ICT and engineering programmes that ensure a steady supply of qualified human capital. The strategy places strong emphasis on the introduction of Industry 4.0 solutions and the digitalisation of traditional sectors.

- Advanced manufacturing and materials:

Competences in advanced manufacturing and materials are of critical importance for the long-term sustainability of the region's industry-based economy. Vojvodina's role in the automotive supply chain, coupled with its expertise in metal processing and plastics technologies, provides a significant competitive advantage. Regional research and development capacities are increasingly oriented towards lightweight materials, composites, and smart manufacturing technologies. The strategy reinforces industrial cooperation and mechanisms for technology transfer. These developments aim to preserve and modernise the value-creating capacity of traditional industrial sectors.

- Energy efficiency and renewable energy:

Strengths in energy efficiency and renewable energy are fundamental for the province's green transition and energy security. The regional potential for wind and solar energy is considerable, particularly in the Banat and Bačka areas. Local enterprises are increasingly active in solar panel production, biomass processing, and energy-saving projects. The strategy promotes the establishment of smart grids and the development of energy storage technologies. Regional cooperation initiatives facilitate the integration of renewable energy sources into the local economic structure.

3.3.3 RTDI funding available

- Ministry of Education, Science and Technological Development grants:

The Ministry of Education, Science and Technological Development of the Republic of Serbia administers the nation's primary competitive grant schemes for research, technological development, and innovation (RTDI). These grants are allocated through a rigorous peer-review process that evaluates scientific excellence, innovation potential, and socioeconomic impact. The funding programs specifically support basic and applied research projects, experimental development, and the commercialization of research results. Particular emphasis is placed on projects that align with national smart specialization priorities and demonstrate strong industry-academia collaboration. The Ministry's grants serve as crucial seed funding that enables researchers to develop prototypes and validate concepts before seeking larger international investments.

- Horizon Europe partnerships:

As an associated country, Serbian research institutions and businesses enjoy full participation rights in Horizon Europe, the European Union's flagship research and innovation program. Vojvodina's entities actively participate in collaborative projects across various clusters, particularly in digital industries, climate science, and agri-food systems. The region's researchers frequently coordinate and partner in Marie Skłodowska-Curie Actions, European Innovation Council Pathfinder challenges, and Widening participation instruments. Strategic focus is placed on developing competitive proposals that address European Green Deal objectives and digital transformation priorities. Horizon Europe partnerships significantly enhance the internationalization of Vojvodina's research ecosystem and provide access to pan-European knowledge networks.

- Vojvodina Innovation Fund:

The Vojvodina Innovation Fund operates as the region's dedicated financial instrument for bridging the gap between research and market implementation. It offers tailored funding mechanisms including proof-of-concept grants, technology maturation loans, and equity investments in spin-off companies. The Fund prioritizes projects that demonstrate strong commercialization potential and align with Vojvodina's smart specialization strategy. Its investment criteria emphasize technological novelty, market applicability, and the creation of high-value jobs within the region. Additionally, the Fund provides specialized technical assistance in intellectual property

management, business planning, and investor readiness preparation to maximize the success rate of funded innovations.

3.3.4 Classification of FUAs RTDI elements

- Legal framework: Law on Innovation Activity:

The Law on Innovation Activity provides the foundational regulatory basis for research, technological development, and innovation (RTDI) governance within Vojvodina's Functional Urban Areas. This legislation establishes clear definitions of innovation entities, funding mechanisms, and intellectual property rights protection, creating a predictable environment for research-intensive investments. The law mandates the establishment of technology transfer offices and innovation funds at both regional and local levels, ensuring institutional support for innovation ecosystems. It aligns with the European Union's Acquis Communautaire on research and innovation, particularly regarding state aid rules and cross-border research cooperation. The implementation of this legal framework is monitored by the Ministry of Scientific and Technological Development through annual innovation audits and impact assessments.

- Policies: Smart Specialization Strategy:

Vojvodina's Smart Specialization Strategy (S3) serves as the primary policy instrument for directing RTDI investments toward priority areas with the greatest potential for regional competitive advantage. The strategy was developed through an entrepreneurial discovery process involving quadruple helix stakeholders, ensuring alignment between market needs and research capabilities. It identifies specific technological domains and innovation niches where Vojvodina can achieve global excellence, focusing on sustainable agriculture, advanced manufacturing, and digital technologies. The policy framework includes measurable targets for research commercialization, patent applications, and innovation-driven startups, with regular monitoring through a dedicated indicator system. The strategy also establishes mechanisms for international cooperation in science and technology, particularly within the Danube Region innovation ecosystem.

- Methodologies: EU-compliant project cycle management:

The adoption of EU-compliant project cycle management methodologies ensures that RTDI initiatives in Vojvodina's FUAs meet international standards of excellence and accountability. This approach encompasses rigorous ex-ante impact assessments, logical framework analysis, and results-based monitoring and evaluation systems throughout the project lifecycle. The methodology emphasizes the principle of additionality, ensuring that public RTDI investments generate outcomes that would not occur through market mechanisms alone. It incorporates gender mainstreaming, environmental sustainability, and open science principles as cross-cutting methodological requirements. Capacity-building programs train regional and local administrators in these methodologies, particularly focusing on Horizon Europe participation and IPA III fund management.

- Objectives: Enhancing regional competitiveness and innovation:

The primary objectives focus on transforming Vojvodina's FUAs into innovation hotspots that drive regional economic transformation and global competitiveness. Specific targets include increasing gross domestic expenditure on R&D to 3% of regional GDP and doubling private sector investment in innovation activities by 2030. The objectives emphasize creating world-class innovation infrastructure, including technology parks, living labs, and digital innovation hubs that serve multiple urban centres. A key focus lies on developing human capital through doctoral training programs, researcher mobility schemes, and industry-academia collaboration initiatives. The ultimate objective involves positioning Vojvodina as a recognized innovation leader in Central and Eastern Europe, particularly in agri-tech, advanced materials, and sustainable energy technologies.

3.4 The current situation of the Functional Urban Areas

3.4.1 Support mechanisms

- Policy makers: Provincial Secretariat for Economy:

The Provincial Secretariat for Economy serves as the primary policy-making body responsible for designing and implementing economic development strategies within Vojvodina's Functional Urban Areas. It develops regulatory frameworks and incentive programs specifically tailored to urban economic development needs and challenges. The Secretariat coordinates inter-departmental working groups to ensure policy coherence across various sectors affecting urban development, including transportation, energy, and spatial planning. It maintains continuous dialogue with municipal authorities and economic stakeholders to identify emerging urban development priorities and constraints. The Secretariat also represents Vojvodina's urban development interests in national policy discussions and international cooperation forums.

- Funding institutions: Serbian Development Fund, EU funds:

The Serbian Development Fund provides tailored financial products including subsidized loans, credit guarantees, and direct grants to support urban development projects and business activities within Functional Urban Areas. EU funding mechanisms, particularly through IPA III and Horizon Europe programs, offer substantial resources for urban sustainability, innovation, and infrastructure modernization projects. These institutions employ specialized urban development criteria in their funding decisions, prioritizing projects that demonstrate integrated urban development approaches and multi-stakeholder partnerships. They provide technical assistance to urban authorities in project preparation and implementation, enhancing local capacity for effective fund utilization. The combination of national and EU funding creates a comprehensive financial ecosystem supporting various stages of urban development from planning to implementation.

- Business support: Vojvodina ICT Cluster, Regional Development Agency:

The Vojvodina ICT Cluster delivers specialized business support services to technology companies and digital startups operating within urban areas, focusing on networking, knowledge exchange, and market access facilitation. The Regional Development Agency provides

comprehensive urban development support including strategic planning assistance, investment promotion, and project management services to municipal authorities and local businesses. Both organizations offer capacity-building programs specifically designed to address urban development challenges and opportunities. They facilitate public-private dialogue and partnership formation for integrated urban development projects. Their services include market intelligence, business mentoring, and access to national and international business networks and supply chains.

- Research centres: BioSense Institute, University of Novi Sad:

BioSense Institute conducts cutting-edge research in agri-tech and digital technologies, providing scientific support and technological solutions for urban development challenges, particularly in sustainable food systems and environmental monitoring. The University of Novi Sad contributes through its multidisciplinary research capabilities in engineering, social sciences, and environmental studies, addressing complex urban development issues. Both institutions offer expert advisory services to urban authorities and businesses, facilitating evidence-based policy making and technological innovation adoption. They provide specialized laboratory facilities and testing environments for developing and validating urban technologies and solutions. Their educational programs develop human capital with specialized skills relevant to urban development and management.

- Technology parks: Novi Sad Science Technology Park:

Novi Sad Science Technology Park serves as a crucial innovation infrastructure component, providing physical space, facilities, and support services for technology-based businesses and startups in urban areas. It offers business incubation and acceleration programs specifically tailored to urban technology challenges and market opportunities. The Technology Park facilitates technology transfer and commercialization from research institutions to market applications, with particular focus on urban solutions. It organizes networking events, knowledge-sharing sessions, and matchmaking activities connecting urban innovators with investors and customers. The Park also develops specialized programs addressing smart city technologies, sustainable urban development, and digital transformation of urban services and infrastructure.

3.4.2 Stakeholders involved

Public authorities, private companies, universities, and research institutes collaborate on innovation projects.

Strong emphasis on digitalization and smart city initiatives in Novi Sad.

3.5 The challenges the Functional Urban Areas face

3.5.1 FUAs need to work in a sound working climate

- Economic diversification needed beyond agriculture and traditional industries:

Vojvodina's Functional Urban Areas exhibit persistent over-reliance on traditional agricultural processing and basic manufacturing sectors, creating vulnerability to market fluctuations and technological disruption. This limited economic diversification hinders resilience during economic crises and restricts opportunities for high-value employment creation and talent retention. The transition toward knowledge-intensive industries remains hampered by insufficient investment in research commercialization and innovation infrastructure. Structural transformation is further constrained by misalignment between educational outputs and emerging economic sector requirements. Addressing this challenge requires coordinated policy interventions targeting entrepreneurial ecosystem development and strategic foreign direct investment attraction.

- Administrative bottlenecks in project implementation:

Complex multi-level governance structures frequently create coordination challenges between provincial, municipal, and national authorities, resulting in delayed project implementation and suboptimal resource allocation. Cumbersome permitting procedures and regulatory inconsistencies across jurisdictions present significant barriers to timely infrastructure development and business expansion. Administrative capacity limitations at local government level often impede efficient absorption of available EU funds and implementation of complex urban development projects. These institutional constraints are particularly evident in cross-sectoral initiatives requiring integrated approaches across multiple administrative domains. Streamlining governance mechanisms and enhancing administrative coordination remains crucial for improving implementation efficiency.

- Need for stronger cross-border cooperation:

Despite geographical proximity, Functional Urban Areas in Vojvodina exhibit underdeveloped institutional connections and economic integration with neighbouring regions in Hungary, Croatia, and Romania. Existing Euroregional frameworks often lack operational capacity and sufficient resources to implement substantive cooperation programs across border areas. Regulatory disparities and administrative barriers continue to hinder labour mobility, service provision, and business expansion across national boundaries. The potential for developing complementary economic specializations and shared infrastructure projects remains substantially underexploited. Enhanced cross-border cooperation requires strengthened institutional mechanisms, harmonized regulations, and dedicated funding instruments specifically designed for border region development.

3.5.2 Managing Risk and Innovation

- Funding gaps for innovation and infrastructure projects:

Vojvodina's innovation ecosystem faces significant financial constraints, particularly in the critical "valley of death" phase between research proof-of-concept and commercial viability. Public funding mechanisms remain fragmented and insufficient to meet the substantial capital requirements for scaling innovative technologies and modernizing urban infrastructure. Private risk capital remains underdeveloped, with limited venture capital presence and cautious

investment approaches from local financial institutions. The mismatch between project risk profiles and available financial instruments discourages investment in transformative but higher-risk innovation initiatives. These funding constraints disproportionately affect SMEs and research spin-offs that lack the collateral and track record required by traditional financing institutions.

- Brain drain of skilled workforce to Western Europe:

Vojvodina experiences substantial human capital depletion through the emigration of highly educated professionals, particularly in STEM fields and healthcare sectors. Pull factors include significantly higher wages, advanced research facilities, and better career development opportunities in EU15 countries, while push factors encompass limited local professional opportunities and relatively lower research investment. This skills erosion undermines the region's innovation capacity and reduces the critical mass necessary for knowledge-intensive cluster development. The phenomenon particularly affects recent graduates and early-career researchers, creating demographic imbalances in the professional workforce. Addressing this challenge requires comprehensive strategies combining competitive employment conditions, improved research infrastructure, and enhanced quality of life indicators.

- Technological adaptation challenges:

Local enterprises, particularly SMEs in traditional sectors, demonstrate limited absorptive capacity for adopting advanced technologies and implementing Industry 4.0 solutions. Technological adaptation is constrained by high implementation costs, lack of specialized technical expertise, and insufficient digital infrastructure in peripheral urban areas. Many businesses lack strategic awareness of technological opportunities and face organizational resistance to digital transformation processes. The pace of technological change frequently exceeds the adaptive capabilities of traditional industries and public institutions. These challenges are compounded by limited access to technology transfer mechanisms and inadequate support services for technological modernization and digital skill development.

3.5.3 Technology watch requirements

- Need for better IP scanning and brokerage event participation:

Vojvodina's innovation ecosystem lacks systematic intellectual property scanning mechanisms to identify emerging technologies and potential infringement risks across key sectors. The absence of dedicated technology watch units within research institutions and industry associations results in missed opportunities for early identification of disruptive technologies and strategic partnerships. Limited participation in international brokerage events and technology transfer forums reduces access to cutting-edge developments and potential collaborative opportunities. This deficiency in technology intelligence gathering undermines strategic research planning and reduces competitive positioning in global value chains. Establishing structured IP monitoring systems and enhancing event participation would significantly improve technology foresight capabilities and innovation strategy development.

- Limited resources for technology monitoring:

Financial constraints prevent organizations from acquiring advanced technology monitoring tools and subscribing to specialized patent databases and market intelligence services. Human resource limitations restrict the capacity to conduct comprehensive technology landscape analyses and continuous competitive intelligence gathering. The absence of dedicated technology watch professionals within most organizations leads to fragmented and ad-hoc monitoring activities rather than systematic oversight. Infrastructure deficiencies, particularly in digital connectivity and analytical tools, further constrain effective technology surveillance and analysis capabilities. These resource limitations collectively impair the region's ability to anticipate technological trends and adapt innovation strategies accordingly.

3.5.4 Identifying and hiring smart people

- Skills mismatch in emerging industries:

Vojvodina's educational output demonstrates significant misalignment with the rapidly evolving skill requirements of emerging technology sectors and knowledge-intensive industries. Traditional curricula in higher education institutions often lag behind industry needs, particularly in advanced digital competencies, interdisciplinary problem-solving, and innovation management. This disconnect creates substantial recruitment challenges for employers seeking specialized expertise in fields such as artificial intelligence, renewable energy technologies, and advanced materials science. The vocational training system similarly struggles to adapt to new technological paradigms, resulting in insufficient mid-career reskilling opportunities. Addressing this mismatch requires enhanced industry-academia collaboration, curriculum modernization, and work-integrated learning approaches that better anticipate future skill requirements.

- Talent retention challenges:

The region faces persistent difficulties in retaining high-potential graduates and experienced professionals, particularly in technology and research-intensive sectors that face intense international competition for talent. Compensation disparities compared to Western European markets remain substantial, while career advancement opportunities within local organizations often appear limited compared to international alternatives. Inadequate research infrastructure and limited access to cutting-edge technologies further reduce the attractiveness of local career paths for top-tier talent. The absence of critical mass in specialized fields creates professional isolation concerns that drive talent migration to larger innovation hubs. Retention strategies must address both economic factors and professional development opportunities while creating compelling local innovation ecosystems that can compete globally for talent.

3.5.5 Benchmarking practices

- Limited systematic benchmarking against industry peers:

Vojvodina's Functional Urban Areas lack structured mechanisms for continuous comparative analysis against peer regions and industry leaders, resulting in suboptimal performance

measurement and improvement targeting. Most benchmarking activities occur on an ad-hoc basis rather than through institutionalized processes integrated into strategic planning cycles. The absence of standardized performance indicators and data collection protocols hinders meaningful cross-regional comparisons and trend analysis. Organizations frequently focus on narrow operational metrics rather than comprehensive performance assessment across multiple dimensions of urban functionality. This limited benchmarking approach restricts the identification of performance gaps and best practices that could drive substantial improvements in urban development outcomes.

- Need for holistic good practice models:

Current urban development approaches often address sectoral challenges in isolation, lacking integrated frameworks that simultaneously consider economic, social, environmental, and governance dimensions. The absence of comprehensive urban development models prevents the adoption of synergistic approaches that could maximize co-benefits across different policy domains. Most municipalities struggle with implementing cross-sectoral innovation policies that require coordinated action across multiple administrative departments and stakeholder groups. There is insufficient application of circular economy principles and regenerative urban design approaches that could enhance sustainability outcomes. Developing holistic models would enable more effective resource allocation and policy integration across the complex ecosystem of urban development challenges and opportunities.

- Insufficient learning from leader FUAs:

Vojvodina's urban authorities demonstrate limited systematic learning from frontrunner Functional Urban Areas within the Danube Region and broader European context, despite the availability of numerous successful case studies and transferable solutions. Study visits and knowledge exchange activities often remain superficial, focusing on general observations rather than deep structural analysis of success factors and implementation mechanisms. There is inadequate adaptation of proven solutions to local contexts, frequently resulting in either direct replication without customization or complete dismissal of transferable approaches. The region lacks dedicated mechanisms for systematic documentation and dissemination of lessons learned from both successful and unsuccessful urban innovation experiments. Enhancing organizational learning capabilities would significantly accelerate urban development by avoiding repeated mistakes and leveraging proven solutions.

3.6 Opportunities and obstacles

3.6.1 Opportunities - Megatrends

- Environmental challenges driving green innovation:

Climate change adaptation requirements and EU environmental directives create substantial opportunities for developing and implementing innovative green technologies across Vojvodina's urban areas. The region's strong agricultural base and manufacturing capabilities provide fertile ground for circular economy innovations, particularly in waste valorisation, water management,

and sustainable materials. Increasing frequency of extreme weather events generates demand for climate-resilient infrastructure and early warning systems that could be developed and tested locally. Regulatory pressures and market demands for environmental compliance drive innovation in monitoring technologies, pollution control, and eco-industrial park development. These environmental challenges position Vojvodina to become a testbed for Danube Region-specific green solutions that could be scaled across Central and Eastern Europe.

- Urbanization creating demand for smart city solutions:

Accelerating urban population growth generates unprecedented demand for integrated smart city solutions that optimize resource use, enhance service delivery, and improve quality of life in Vojvodina's Functional Urban Areas. Digital transformation of urban infrastructure presents opportunities for developing and implementing IoT-based systems for traffic management, energy distribution, and public service optimization. The concentration of population and economic activity in urban centres creates ideal conditions for testing and scaling innovative urban mobility solutions, shared economy models, and district energy systems. Urban density provides economic viability for investments in advanced telecommunications infrastructure and digital service platforms. These urbanization patterns enable Vojvodina's cities to serve as living laboratories for smart city innovations applicable across medium-sized European cities.

- Energy transition opportunities:

EU energy security concerns and climate mitigation targets create unprecedented opportunities for developing renewable energy projects, energy efficiency solutions, and smart grid technologies across Vojvodina's urban areas. The region's favourable conditions for solar and wind energy generation present opportunities for utility-scale renewable projects and distributed energy resource integration. Building renovation requirements under EU directives generate demand for energy efficiency technologies, retrofitting services, and sustainable construction materials that local enterprises could provide. The transition toward electrification and hydrogen economies creates opportunities for developing specialized components, charging infrastructure, and energy management systems. These energy transition opportunities enable Vojvodina to position itself as a leader in sustainable energy solutions for Central and Eastern European markets.

- Ageing society requiring new service models:

Demographic aging creates compelling market opportunities for developing innovative healthcare technologies, assistive living solutions, and age-friendly urban services tailored to senior citizens' needs. The increasing proportion of elderly residents drives demand for digital health monitoring systems, home automation technologies, and accessible transportation solutions that maintain independence and quality of life. Changing dependency ratios create market opportunities for robotics-assisted care, telemedicine services, and community-based support systems that address workforce shortages in elder care. The silver economy represents a growing market segment for customized products and services that Vojvodina's businesses could target through innovative approaches. This demographic shift also creates opportunities for repositioning the region as a destination for active retirement and gerontological innovation. Energy transition opportunities

- Changing lifestyle patterns creating new markets:

Evolution toward knowledge-based work and digital consumption creates opportunities for developing new service models, collaborative spaces, and experience-based offerings that cater to changing urban lifestyle preferences. The growth of remote work enables secondary cities like Novi Sad to attract talent and develop specialized service sectors that were previously concentrated in capital cities. Increasing health and wellness awareness drives demand for sustainable food products, fitness technologies, and preventive healthcare services that leverage local capabilities. The experience economy creates opportunities for cultural and recreational services that showcase Vojvodina's multicultural heritage and natural assets. These lifestyle changes enable the development of niche markets and specialized services that could become regional export strengths.

3.6.2 Opportunities - Future concepts

- Automated transport systems:

Vojvodina's Functional Urban Areas present viable test environments for implementing automated transportation solutions due to their moderate scale and existing digital infrastructure foundations. The region's strong ICT sector and engineering capabilities provide the necessary technological base for developing control systems, sensor networks, and AI-driven management platforms for automated mobility. Pilot projects could focus on automated public transit corridors and logistics hubs that demonstrate operational efficiency and safety improvements. These developments would position the region as an innovation leader in Central European urban mobility solutions while addressing growing transportation demands. Strategic implementation could significantly reduce congestion, improve traffic safety, and enhance transportation accessibility across urban and peripheral areas.

- Autonomous vehicles development:

The region's automotive supply chain capabilities and technical universities create favourable conditions for developing and testing autonomous vehicle technologies, particularly in controlled environments and specific use cases. Collaboration between existing automotive manufacturers, technology companies, and research institutions could accelerate development of perception systems, decision-making algorithms, and connectivity solutions tailored to local conditions. Autonomous vehicle development offers opportunities for specialized component manufacturing, software development, and validation services that could become export-oriented activities. This technological transition could transform last-mile logistics, public transportation, and personal mobility patterns while creating high-value employment in advanced engineering fields.

- Shared mobility solutions:

Urban density patterns and changing mobility preferences create ideal conditions for implementing integrated shared mobility services that reduce private vehicle dependency and optimize transportation asset utilization. Development of mobility-as-a-service (MaaS) platforms could integrate various transportation modes into seamless user experiences while generating valuable

urban mobility data. Shared electric scooters, bike-sharing systems, and carpooling services address first/last mile connectivity challenges while reducing congestion and environmental impacts. These solutions particularly benefit younger urban populations and support tourism development through convenient access to urban attractions. Successful implementation could establish new business models and operational approaches transferable to other medium-sized European cities.

- Electrification of transport:

Vojvodina's energy infrastructure and manufacturing capabilities provide foundations for developing comprehensive electric mobility ecosystems, including vehicle production, charging infrastructure, and energy management systems. The transition to electric vehicles creates opportunities for retooling existing automotive suppliers and developing new specialized components for electric powertrains and battery systems. Strategic deployment of charging infrastructure, particularly along transportation corridors and in urban centres, supports broader adoption while creating business opportunities for energy providers and service operators. Electrification enables integration with renewable energy sources and smart grid technologies, enhancing overall energy system sustainability. This transition also reduces urban air pollution and noise levels while decreasing dependence on imported fossil fuels.

- Intermodal transport integration:

The region's position as a transportation crossroads creates unique opportunities for developing advanced intermodal solutions that seamlessly connect road, rail, water, and air transportation modes. Modern intermodal terminals could optimize freight distribution and passenger transfers while reducing transportation costs and environmental impacts through mode shifting. Digital integration platforms enabling real-time connectivity between different transportation systems would significantly improve logistics efficiency and user experience. These developments particularly benefit from Vojvodina's central European location and existing infrastructure networks. Successful intermodal integration enhances regional competitiveness for logistics investments and improves accessibility for both businesses and residents.

- Smart transport technologies:

Implementation of IoT sensors, AI analytics, and connected infrastructure enables development of intelligent transportation systems that optimize traffic flow, enhance safety, and improve operational efficiency. Smart traffic management systems can dynamically respond to congestion patterns, emergency situations, and special events while reducing travel times and environmental impacts. Advanced parking management solutions using real-time data reduce search traffic and improve urban space utilization while generating new revenue streams. These technologies create opportunities for local software development, system integration, and data analytics services that could be exported to other regions. The resulting data assets also provide valuable insights for urban planning and transportation policy development.

- High-speed rail development:

Strategic investments in high-speed rail connections could fundamentally transform Vojvodina's accessibility and regional integration, particularly along the Budapest-Belgrade corridor and potential extensions to other European networks. High-speed rail development would significantly reduce travel times to major economic centres while alleviating road congestion and reducing carbon emissions from transportation. This infrastructure creates opportunities for urban regeneration around station areas and stimulates economic development along the transportation corridor through improved accessibility. The project would require and consequently stimulate advances in railway engineering, construction technologies, and operational management systems. Successful implementation would position Vojvodina as a central node in European high-speed rail networks, enhancing its attractiveness for investment and talent acquisition.

3.6.3 Obstacles

- Lack of financial sources:

Vojvodina's Functional Urban Areas face significant constraints in accessing adequate funding for comprehensive urban development, particularly for long-term infrastructure projects and innovation initiatives. Traditional financial institutions often perceive urban development projects as high-risk investments, resulting in limited private sector participation and conservative lending practices. The absence of specialized financial instruments tailored to urban development timelines and risk profiles further restricts access to necessary capital. Public funding remains insufficient to address the substantial investment requirements for modernizing urban infrastructure and supporting innovation ecosystems. This financial scarcity particularly affects projects requiring patient capital with extended return timelines, such as sustainable infrastructure and research commercialization.

- Gaps in FUAs financing:

Existing financing mechanisms demonstrate significant discontinuities between different development stages, particularly in the transition from pilot projects to full-scale implementation and from research to market application. Municipalities struggle with accessing funding for project preparation and feasibility studies, creating barriers to developing bankable urban development projects. There is insufficient bridge financing available to maintain project momentum between different funding phases and programming periods. The complexity of accessing EU funds creates particular challenges for smaller municipalities with limited administrative capacity. These financing gaps result in partially implemented initiatives and reduced overall effectiveness of urban development strategies.

- Missing qualified personnel:

Urban authorities and development organizations face critical shortages of professionals with specialized expertise in smart city technologies, sustainable urban planning, and innovative financing mechanisms. The brain drain of technical talent to Western European countries and better-paying private sector positions creates persistent capacity challenges in public institutions. There is insufficient critical mass of experts in emerging fields such as data analytics, urban

resilience planning, and circular economy implementation. Limited opportunities for professional development and knowledge exchange further exacerbate skills obsolescence among existing technical staff. These personnel shortages significantly constrain the design and implementation of sophisticated urban development strategies.

- Difficult collaboration with public authorities:

Complex regulatory frameworks and bureaucratic procedures frequently hinder effective collaboration between different levels of government and between public authorities and private partners. Jurisdictional ambiguities and overlapping responsibilities between provincial, municipal, and national authorities create coordination challenges and decision-making delays. Risk-averse organizational cultures and rigid procurement systems often prevent innovative approaches and experimental projects that could address urban challenges more effectively. Insufficient mechanisms for stakeholder engagement and co-creation limit the incorporation of diverse perspectives into urban development planning. These collaboration difficulties reduce the efficiency and innovation potential of urban development initiatives.

- Non-collaboration between universities/research centres and FUAs:

Despite geographical proximity, significant disconnects persist between academic institutions and urban authorities in addressing practical urban development challenges through applied research and innovation. Research agendas often prioritize theoretical publications over practical problem-solving, reducing the relevance of academic work to immediate urban needs. Intellectual property regulations and technology transfer mechanisms remain underdeveloped, creating barriers to knowledge exchange and collaborative innovation. Limited institutional frameworks for sustained partnership result in ad-hoc cooperation rather than strategic long-term collaboration. These collaboration gaps prevent the effective translation of research into practical urban solutions and miss opportunities for evidence-based urban policy development.

3.6.4 How are the FUAs innovation and/or products financed

3.6.4.1 European Union Funding sources

- IPA III funds:

The IPA III programme represents the primary financial mechanism supporting Serbia's EU integration process, allocating substantial resources for institutional capacity building and socio-economic development within Functional Urban Areas. These funds specifically target the alignment of Serbian policies with the EU Acquis Communautaire while addressing regional development disparities through integrated territorial approaches. Vojvodina's urban authorities utilize IPA funding for developing strategic documentation, enhancing administrative capabilities, and implementing infrastructure projects that support EU convergence. The programme emphasizes cross-border cooperation initiatives, particularly with EU member states Hungary and Croatia, fostering regional integration and knowledge transfer. Successful implementation requires strict adherence to EU procurement rules, financial management standards, and monitoring procedures that gradually prepare institutions for future structural fund management.

- Horizon Europe:

As an associated country, Serbian research institutions and businesses participate fully in Horizon Europe, the EU's flagship research and innovation programme worth €95.5 billion for 2021-2027. This framework programme provides crucial funding for excellent science, industrial leadership, and societal challenges, with particular relevance for urban innovation ecosystems. Vojvodina's entities increasingly participate in collaborative projects across various clusters, especially those addressing climate-neutral cities, digital transformation, and health innovations. The programme's Widening component specifically enhances participation opportunities through instruments like Teaming, Twinning, and ERA Chairs that strengthen research and innovation capacity. Horizon Europe partnerships significantly enhance the internationalization of Vojvodina's research landscape while providing access to cutting-edge knowledge and technologies.

- European Regional Development Fund:

Although Serbia currently accesses ERDF indirectly through IPA components, future full access as an EU member state will provide transformative funding opportunities for urban development and innovation. The ERDF will support investments in research and innovation, SME competitiveness, and low-carbon economy transitions within Vojvodina's Functional Urban Areas. The fund particularly emphasizes smart specialization strategies, digital transformation, and sustainable urban development through integrated territorial approaches. Future programming will likely prioritize the transition toward climate-neutral cities, circular economy implementation, and enhanced urban mobility solutions. Preparation for ERDF management includes developing necessary administrative structures, strategic planning documents, and project pipeline development in alignment with EU cohesion policy requirements.

3.6.4.2 Sectoral Operational Programmes

- Vojvodina Regional Operational Programme:

The Vojvodina Regional Operational Programme serves as the principal programming document for implementing the region's development priorities through coordinated investment interventions. This programme specifically channels resources toward smart specialization areas identified in the regional development strategy, including sustainable agriculture, advanced manufacturing, and information technologies. It employs a place-based approach that recognizes the distinct developmental needs and opportunities across Vojvodina's diverse urban and rural landscapes. The programme mechanism enables integrated implementation of complementary infrastructure, innovation, and human capital development projects through multi-sectoral coordination. Management follows rigorous EU-compliant procedures including ex-ante conditionalities, performance frameworks, and evaluation mechanisms that ensure transparency and effectiveness in public investment delivery.

- National Innovation Programme:

Serbia's National Innovation Programme operates as a comprehensive framework instrument coordinating various innovation support measures across multiple governmental levels and

implementing institutions. This programme establishes strategic funding priorities aligned with the Smart Specialization Strategy while addressing critical innovation ecosystem gaps through targeted interventions. It combines financial instruments including grants, equity investments, and technical assistance to support technology development, research commercialization, and innovative entrepreneurship. The programme specifically enhances collaboration between research institutions and private sector entities through coordinated funding calls and partnership requirements. Implementation involves multiple executing agencies including the Innovation Fund, development agencies, and ministerial departments working in coordinated fashion to achieve synergistic impacts across the innovation value chain.

3.6.4.3 EU Framework Programme for RDI

- Horizon Europe partnerships:

Horizon Europe establishes the principal framework for Vojvodina's research and innovation entities to engage in pan-European collaborative projects, providing access to cutting-edge knowledge networks and substantial funding opportunities. Serbian participation enables full integration into European Research Area activities across all programme pillars, from excellent science to innovation ecosystems, with particular strength in agricultural technologies and digital transformation. The programme's collaborative nature necessitates formation of multinational consortia, fostering strategic partnerships between Vojvodina's research institutions, enterprises, and leading European organizations. Specific instruments like the Widening measures and European Innovation Council pathways offer tailored support for enhancing regional research excellence and innovation capacity. These partnerships significantly accelerate technology transfer, research commercialization, and integration into European value chains while adhering to strict excellence criteria and impact measurement frameworks.

- ESPON research programmes:

The European Spatial Planning Observation Network (ESPON) programme provides crucial evidence-based research and policy analysis on territorial development trends, particularly relevant for Vojvodina's Functional Urban Areas within broader European contexts. ESPON enables comparative analysis of regional competitiveness, territorial cohesion, and urbanization patterns through standardized methodologies and indicators applicable across European regions. The programme facilitates knowledge exchange and policy learning among practitioners and researchers addressing similar urban and regional development challenges across different national contexts. ESPON research outputs directly inform Vojvodina's spatial planning decisions, regional policy formulations, and cross-border cooperation strategies with neighbouring EU regions. Participation strengthens evidence-based policy making capabilities through access to territorial data, analytical tools, and European-wide benchmarking exercises that contextualize regional development within continental trends.

3.6.4.4 National programmes funding

- Ministry of Education, Science and Technological Development grants:

The Ministry of Education, Science and Technological Development administers Serbia's primary competitive grant schemes for scientific research and technological development through rigorously peer-reviewed funding mechanisms. These programmes support fundamental research projects, applied technological development, and innovation activities across all scientific disciplines, with particular emphasis on national smart specialization priorities. Funding instruments include project grants for research teams, infrastructure development support, and mobility programmes that enhance scientific collaboration and knowledge exchange. The Ministry's grant allocation process employs international review standards and excellence criteria while encouraging interdisciplinary approaches and stakeholder engagement. These programmes crucially supplement institutional funding and enable researchers to pursue innovative ideas with potential for scientific breakthrough and practical application.

- Serbian Development Fund support:

The Serbian Development Fund operates as the national development financial institution providing tailored financing solutions for business development, innovation commercialization, and entrepreneurial growth throughout Serbia. Its support mechanisms include favorable credit lines for equipment modernization, working capital financing, and export-oriented investments, particularly targeting small and medium enterprises. The Fund implements special programmes for technological innovation, including co-financing for prototype development, patent applications, and market entry of innovative products and services. It additionally provides guarantee schemes that enhance private sector access to commercial financing while sharing investment risks. Through its regional offices and partner networks, the Fund delivers advisory services alongside financial products, strengthening business capabilities and investment readiness among Vojvodina's enterprises.

3.6.4.5 Private funding

- **Corporate investments:**

Corporate investment represents a significant source of private funding for innovation and product development within Vojvodina's Functional Urban Areas, particularly through strategic partnerships between established enterprises and innovative startups. Major corporations including NIS, FCA Serbia, and Siemens allocate substantial resources to research and development activities, technology acquisition, and production modernization within their local operations. These investments often focus on developing market-specific solutions, enhancing operational efficiency, and adopting emerging technologies that maintain competitive advantage. Corporate venture capital initiatives enable larger enterprises to invest in promising startups and technologies that align with their strategic interests while fostering innovation ecosystem development. Such investments typically combine financial support with knowledge transfer, market access, and mentorship opportunities that significantly enhance startup growth potential.

- **Venture capital:**

Venture capital funding remains an emerging but growing component of Vojvodina's innovation finance landscape, providing essential risk capital for high-growth potential startups and scale-up companies. Specialized venture funds increasingly target technology startups in sectors such as ag-tech, fintech, and enterprise software that demonstrate potential for regional and international expansion. Venture investments typically involve equity participation combined with active mentorship, strategic guidance, and network access that support portfolio companies through critical growth phases. The venture capital ecosystem benefits from increasing interest from international funds and developing local investment expertise through successful exit experiences. This funding mechanism addresses the critical "valley of death" phase between initial concept development and revenue generation that traditional financing often fails to support adequately.

- **Business angels:**

Business angel investments constitute a vital early-stage funding source for Vojvodina's startups and innovative SMEs, providing both capital and valuable mentorship during the most vulnerable development phases. Angel investors typically comprise successful entrepreneurs, executives, and professionals who contribute not only financial resources but also industry expertise, business networks, and strategic guidance. The business angel community increasingly organizes through formal networks and angel groups that enable syndicated investments, due diligence sharing, and portfolio diversification. Angel funding often serves as crucial bridge financing between personal savings/friends-and-family rounds and institutional venture capital investments. This investment category demonstrates growing sophistication through standardized term sheets, structured due diligence processes, and active post-investment involvement that significantly enhances startup survival and growth prospects.

3.6.4.6 Own capitals

- **Self-financing by companies:**

Self-financing represents the most fundamental source of capital for Vojvodina's businesses, comprising internally generated resources that provide maximum operational autonomy and financial flexibility. Companies primarily utilize retained earnings, depreciation reserves, and working capital optimization to fund innovation activities, equipment upgrades, and market expansion initiatives without external dependencies. This approach enables rapid decision-making and implementation of innovative projects that might not align with external investors' risk-return expectations or funding timelines. Particularly for family businesses and traditionally structured enterprises, self-financing maintains ownership control and avoids dilution while supporting organic growth strategies. The availability and strategic allocation of self-generated funds significantly influence companies' innovation capacity and ability to respond to market opportunities without external financing constraints.

- **Reinvested profits:**

Profit reinvestment serves as a crucial mechanism for sustainable business growth and technological modernization, allowing Vojvodina's enterprises to compound their competitive

advantages through continuous improvement and expansion. Companies strategically allocate portions of their annual profits to research and development activities, productivity enhancements, and market development initiatives that ensure long-term competitiveness. This approach demonstrates management's commitment to innovation and organizational learning while signalling financial stability and growth potential to external stakeholders. Reinvestment patterns vary significantly across sectors, with technology-intensive companies typically allocating higher percentages of profits to innovation activities compared to traditional industries. The consistent reinvestment of profits creates virtuous cycles of improvement, capability development, and value creation that form the foundation of sustainable competitive advantage in increasingly knowledge-intensive markets.

3.6.4.7 Banking credit institutions

- **Commercial bank loans:**

Commercial banks provide essential debt financing for Vojvodina's businesses through various credit products including working capital loans, investment loans, and trade finance facilities that support daily operations and expansion initiatives. These institutions typically employ conservative lending practices requiring substantial collateral, proven cash flow generation, and comprehensive business documentation, particularly for innovative projects with higher risk profiles. Loan terms and interest rates reflect perceived risk levels, with smaller enterprises and innovative startups often facing less favourable conditions compared to established corporations. Banks increasingly develop specialized products for specific sectors and purposes, including technology adoption loans and green investment facilities, though risk aversion remains prevalent. The banking sector's financing approach prioritizes capital preservation and predictable returns, creating limitations for highly innovative but unproven business concepts and early-stage ventures.

- **EIB financing:**

The European Investment Bank provides long-term, favourable financing for strategic projects in Vojvodina that align with EU policy objectives, particularly in infrastructure modernization, climate action, and SME support. EIB financing features extended maturity periods, below-market interest rates, and flexible grace periods that address the specific cash flow patterns of large-scale investment projects. The bank employs rigorous technical and environmental appraisal methodologies while requiring adherence to EU standards in procurement, environmental protection, and social safeguards. EIB funds typically flow through local financial institutions as credit lines or directly to large projects, with technical assistance components enhancing implementation capacity. This financing source significantly complements national resources while promoting policy convergence with EU standards and practices across various development sectors.

- **EBRD support:**

The European Bank for Reconstruction and Development delivers targeted financing and technical assistance that promotes private sector development and market economy transition in

Vojvodina through various innovative instruments. EBRD financing combines loans, equity investments, and guarantees with comprehensive policy dialogue and technical cooperation that address both financial and structural business environment challenges. The bank specializes in supporting private enterprises, commercial infrastructure, and financial institutions while promoting environmental sustainability, economic inclusion, and digital transformation. EBRD's additionality principle ensures its investments deliver impacts beyond what market sources alone could achieve, particularly in pioneering new business models and technologies. The bank's extensive international experience and network facilitate knowledge transfer and best practice adoption while crowding in private investors through demonstrated success and risk-sharing mechanisms.

3.6.4.8 Business Angels

- **Angel investor networks:**

Formalized angel investor networks have emerged as structured mechanisms for pooling capital, expertise, and due diligence capabilities among high-net-worth individuals seeking investment opportunities in Vojvodina's startup ecosystem. These networks typically operate through regular pitch events, standardized investment processes, and syndication arrangements that enable larger investment rounds and risk diversification. Organizations such as the Serbian Business Angels Network (SBAN) provide institutional frameworks for investor education, deal flow generation, and post-investment portfolio management. Angel networks enhance investment efficiency through collective due diligence, shared term sheets, and coordinated mentorship support for portfolio companies. The professionalization of angel investing through these networks significantly improves startup access to early-stage capital while reducing informational asymmetries and transaction costs for both investors and entrepreneurs.

- **Startup funding:**

Business angel investments primarily target early-stage startups demonstrating innovative technologies, scalable business models, and strong growth potential within Vojvodina's priority sectors. Funding typically ranges from €25,000 to €250,000 per startup, covering critical development phases between concept validation and revenue generation where traditional financing remains inaccessible. Angel investors provide not only capital but also strategic mentorship, industry connections, and operational guidance that significantly enhance startup survival and growth prospects. Investment decisions emphasize entrepreneurial team capabilities, market opportunity size, and technological defensibility rather than historical financial performance. This funding category addresses the most acute financing gap in the innovation lifecycle, enabling promising startups to achieve milestones that attract subsequent venture capital investment and market traction.

3.6.4.9 Venture capital

- **VC funds focusing on technology:**

Specialized venture capital funds targeting technology sectors have emerged as crucial financial intermediaries in Vojvodina's innovation ecosystem, providing growth capital to high-potential startups with scalable business models. These funds typically invest in series A and B financing rounds, deploying €500,000 to €5 million per company to accelerate market expansion, product development, and team growth. Technology-focused VCs employ rigorous due diligence processes evaluating technological novelty, market size, competitive positioning, and entrepreneurial team capabilities before making investment decisions. They actively manage portfolio companies through board representation, strategic guidance, and network introductions that enhance growth trajectories and investment outcomes. Successful funds demonstrate sector specialization in areas like ag-tech, enterprise software, and advanced materials where Vojvodina shows particular innovation strengths, leveraging local expertise while pursuing regional market opportunities.

- **Corporate venture capital:**

Specialized venture capital funds targeting technology sectors have emerged as crucial financial intermediaries in Vojvodina's innovation ecosystem, providing growth capital to high-potential startups with scalable business models. These funds typically invest in series A and B financing rounds, deploying €500,000 to €5 million per company to accelerate market expansion, product development, and team growth. Technology-focused VCs employ rigorous due diligence processes evaluating technological novelty, market size, competitive positioning, and entrepreneurial team capabilities before making investment decisions. They actively manage portfolio companies through board representation, strategic guidance, and network introductions that enhance growth trajectories and investment outcomes. Successful funds demonstrate sector specialization in areas like ag-tech, enterprise software, and advanced materials where Vojvodina shows particular innovation strengths, leveraging local expertise while pursuing regional market opportunities.

3.6.4.10 Others

- **Crowdfunding platforms:**

Digital crowdfunding platforms have emerged as alternative financing mechanisms that enable Vojvodina's innovators and entrepreneurs to access capital directly from distributed audiences through reward-based, donation-based, or equity-based models. These platforms particularly benefit creative projects, social enterprises, and consumer product innovations that demonstrate strong narrative appeal and community engagement potential. Local platforms and international services like Kickstarter provide accessible funding channels that bypass traditional financial intermediaries, though transaction volumes remain modest compared to conventional financing sources. Crowdfunding serves not only as capital acquisition tool but also as market validation mechanism, community building platform, and marketing channel for innovative concepts. Successful campaigns typically combine compelling storytelling, attractive reward structures, and strategic communication that resonates with both local and global supporter communities.

- **Public-private partnerships:**

Public-private partnerships (PPPs) represent sophisticated collaborative frameworks that leverage private sector efficiency and innovation capacity for delivering public infrastructure and services within Vojvodina's Functional Urban Areas. These arrangements typically involve long-term contracts where private partners assume significant design, construction, financing, and operational responsibilities for public assets like transportation systems, energy infrastructure, or digital networks. PPPs enable public authorities to implement capital-intensive projects without immediate budgetary constraints while transferring certain project risks to private partners better equipped to manage them. Successful PPP implementations require robust legal frameworks, transparent procurement processes, and balanced risk-sharing arrangements that protect public interests while ensuring private sector viability. These partnerships increasingly focus on sustainable infrastructure, smart city solutions, and innovation facilities that address urban development challenges through combined public and private capabilities.

3.7 Functional Urban Areas - SWOT ANALYSIS - SERBIA

Strengths

- Strategic location in the Danube Region
- Strong agricultural and industrial base
- Multicultural and multilingual workforce
- Growing ICT and innovation ecosystem
- EU integration process attracting investments

Weaknesses

- Dependency on traditional sectors
- Administrative inefficiencies
- Infrastructure gaps
- Brain drain of skilled workforce
- Limited R&D investment

Opportunities

- EU pre-accession funds availability
- Digitalization and smart city trends
- Cross-border cooperation projects
- Green transition investments

- Growing ICT and AgTech sectors

Threats

- Political instability in the region
- Economic volatility
- Global market competition
- Climate change impacts
- Bureaucratic hurdles

Results

The comprehensive baseline study conducted across Vojvodina's Functional Urban Areas reveals a region positioned at a critical developmental crossroads, possessing substantial inherent strengths yet facing significant systemic challenges that constrain its full potential within the Danube Region context. The analysis demonstrates Vojvodina's robust foundation in traditional economic sectors, particularly agricultural production, and food processing, where the region maintains competitive advantages through fertile land resources, established supply chains, and processing capabilities. Simultaneously, the study identifies emerging strengths in advanced manufacturing, information technologies, and renewable energy sectors, where strategic investments and human capital development have begun creating promising innovation ecosystems, particularly around urban centres like Novi Sad.

The assessment nevertheless uncovers persistent structural challenges that require urgent addressing. Critical funding gaps exist throughout the innovation lifecycle, particularly affecting the transition from research to commercialization and the scaling of innovative small and medium enterprises. Administrative bottlenecks manifest through complex multi-level governance coordination challenges, regulatory inconsistencies, and limited municipal capacities that collectively impede efficient project implementation and resource allocation. The region's human capital development faces the dual challenge of brain drain to Western European markets and skills mismatches between educational outputs and emerging industry requirements, particularly in technology-intensive sectors.

Furthermore, the study identifies underdeveloped collaboration mechanisms between key stakeholders, including fragmented university-industry partnerships, limited cross-border cooperation despite geographical proximity, and insufficient knowledge transfer between research institutions and practical urban development applications. These challenges collectively constrain Vojvodina's ability to maximize its strategic positioning within European value chains and fully leverage its Danube Region connectivity advantages.

The results emphasize that addressing these constraints requires integrated policy interventions combining improved governance mechanisms, enhanced financing instruments, strategic human

capital development, and strengthened innovation ecosystems. The findings provide a evidence-based foundation for developing targeted strategies that can transform Vojvodina into a more competitive, innovative, and cohesive region within the broader Danube macro-regional context.

Conclusions

The comprehensive analysis of Vojvodina's Functional Urban Areas leads to several definitive conclusions regarding their developmental trajectory and strategic positioning within the broader Danube Region context. The assessment confirms that Vojvodina's urban ecosystems possess unique comparative advantages that position them favourably for accelerated growth and regional leadership, provided appropriate strategic interventions are implemented systematically.

- Strategic Positioning and Opportunities

Vojvodina's FUAs demonstrate particularly strong potential for leveraging European integration processes as catalysts for transformational development. The region's geographic centrality within the Danube Basin, combined with its existing infrastructure networks and multicultural heritage, creates exceptional conditions for serving as a bridge between Central and Southeastern European markets. The ongoing EU accession process provides not only structural funding opportunities but also crucial policy alignment mechanisms that enhance institutional capacities and governance standards. Digital transformation emerges as another critical opportunity domain, where Vojvodina's established ICT sector, educational institutions, and growing startup ecosystem can drive broader economic modernization and innovation diffusion across traditional industries.

- Critical Intervention Areas

The analysis identifies three fundamental investment priorities that will determine the region's developmental success. Infrastructure investments require particular focus on modernizing transportation networks, enhancing digital connectivity, and developing sustainable energy systems that collectively form the backbone of competitive urban economies. Innovation ecosystem development must address the entire value chain from research to commercialization, with special attention to bridging funding gaps, enhancing university-industry collaboration, and creating physical innovation infrastructure. Governance improvements necessitate streamlining administrative processes, enhancing multi-level coordination, and developing new public-private partnership models that can deliver projects more efficiently and effectively.

- Implementation Imperatives

Successful realization of Vojvodina's potential will require integrated approaches that connect these priority areas rather than treating them in isolation. Infrastructure investments must be planned with innovation ecosystem needs in mind, while governance reforms should facilitate both infrastructure development and innovation enhancement. The region's cross-border cooperation advantages should be systematically leveraged through joint planning, resource pooling, and shared service delivery with neighbouring regions in Hungary, Croatia, and Romania. Particular

attention must be paid to developing human capital through educational reforms, talent retention strategies, and lifelong learning systems that can support knowledge-intensive development.

- Sustainable Development Considerations

All development initiatives must incorporate sustainability principles addressing environmental protection, social inclusion, and economic resilience. The transition to circular economy models, climate adaptation measures, and inclusive growth strategies will be essential for ensuring long-term viability and quality of life in Vojvodina's urban areas. The region's agricultural heritage and natural assets provide strong foundations for developing sustainable food systems and green economic activities that can differentiate its offering within European markets.

In conclusion, while Vojvodina's FUAs face significant challenges, their fundamental assets and strategic positioning provide strong foundations for transformative development. The region's future success will depend on its ability to implement coordinated interventions that enhance connectivity, innovation, and governance while leveraging its European integration prospects and cross-border cooperation opportunities.

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MOLDOVA


3.1 Database of each country

3.1.1 General geographical information (country geographical location, population, administrative organization: counties/towns/villages, centralized or decentralized governance)

The Republic of Moldova is a landlocked country situated in Eastern Europe, between Romania to the west and Ukraine to the north, east, and south. Geographically, the country lies at

approximately 47° north latitude and 29° east longitude, covering a total area of 33,846 square kilometres. The landscape is largely composed of hilly plains, and the country experiences a moderate continental climate with distinct seasonal variations .

Moldova's population is currently estimated at around 2.5–2.6 million people (2024), a figure that reflects significant out-migration over recent decades . Within this national context, Chișinău stands out as the largest urban centre and the capital city. The municipality itself has a registered population of about 662,000 inhabitants (2024 estimate) . However, the wider metropolitan or functional urban area is considerably larger, with estimates ranging between 800,000 and 1,000,000 inhabitants, depending on the method of delineation .

Administratively, Moldova is organized as a unitary state. It is divided into 32 districts (raioane), three municipalities with special status (Chișinău, Bălți, and Bender/Tighina), one autonomous territorial unit (Gagauzia, officially UTA Găgăuzia), and the territorial unit on the left bank of the Dniester (Transnistria), which is not currently under the control of the central government . At the local level, the country comprises approximately 54 towns and more than 800 communes and villages .

Chișinău Municipality itself has a complex administrative structure. In addition to the city proper, it incorporates six subordinate towns—Durlești, Sângera, Codru, Cricova, Vatra, and Vadul lui Vodă—and twelve communes, each of which consists of several villages . This administrative configuration makes the municipality not only the political and economic centre of the country but also the core of its largest functional urban area.

From a governance perspective, Moldova is a unitary state that has formally adopted a decentralized framework. The Law on Local Public Administration (2006, subsequently amended), along with Moldova's ratification of the European Charter of Local Self-Government in 1997, defines the principles of local self-governance . According to these provisions, mayors and local councils are directly elected and hold responsibilities over local budgets, utilities, and urban planning. Despite this legal framework, governance in Moldova remains highly centralized in practice. Local public administrations are heavily dependent on transfers from the central government, and national authorities retain substantial oversight in key sectors such as education, healthcare, and infrastructure development.

3.1.2 FUAs **legislative** framework applicable in the country

Moldova's legislative framework for FUAs is built on internationally recognized principles of decentralization and local autonomy but remains challenged by overlapping competencies, limited fiscal and legal autonomy of local governments, and incomplete implementation of urban planning tools. The government strategy supports sustainable, polycentric urban development with Chisinau as the key growth pole, in line with EU integration objectives.

Constitutional Foundation

Moldova is a unitary and indivisible state, as declared in Article 1 of the Constitution. It recognizes local public administration as a key element of the governance system.

Articles 109-113 explicitly regulate local governance, defining local public administration and structure:

Article 109 guarantees local autonomy and decentralization.

Article 110 defines territorial units: villages, towns, districts, and the Autonomous Territorial Unit (ATU) of Gagauzia.

Article 14 and Law No. 136/2016 recognize Chișinău as the capital with a special legal status.

Primary Laws and Frameworks

The Law on Local Public Administration (No. 136/2016) is the main statute regulating local authorities' functions, organization, finances, and property rights, guaranteeing local autonomy aligned with the European Charter of Local Self-Government.

Other important laws include:

- Law on Regional Development (2006) sets out regional growth policies.
- Law on Local Public Finances regulates financial decentralization.
- Law on Local Elected Officials regulates electoral processes.
- Law on Administrative and Territorial Organisation outlines administrative boundaries.

European Charter of Local Self-Government

Moldova ratified the European Charter of Local Self-Government in 1997, committing legally to principles of:

- Local autonomy in exercising responsibilities.
- Adequate financial resources to match local competencies.
- Protection of boundaries and local rights.
- However, the Additional Protocol on the right to participate in local affairs (ETS No. 207) remains unsigned.

Governance Structure and Challenges

The governance system operates on two levels: central administration and local public administration, with the exception of Gagauzia, which enjoys autonomous regional status. Moldova's local government is highly fragmented, comprising approximately 900 local authorities, many of which are small and financially weak. Municipalities, towns, and villages generally hold similar responsibilities, but disparities in administrative capacity and financial strength are significant.

Despite decentralization laws, there is a growing tendency towards recentralization that restrains the full realization of local governance powers. Challenges include weak financial autonomy, as local governments depend heavily on state transfers; limited authority over human resource management, property, and local tax policies; excessive and sometimes arbitrary oversight by central government bodies; and political interference that affects the stability of local elected officials, including through recall referenda and legal challenges.

Special Regime for the Capital City: Chișinău

Chișinău enjoys a special legal and administrative status codified under Law No. 136/2016. The municipality comprises the city proper divided into five administrative sectors—Centru, Buiucani, Râșcani, Botanica, and Ciocana—along with 34 suburban localities. The city is governed by an elected mayor and a local council. Governance issues have plagued Chișinău, with frequent political contention evident through delayed mayoral elections and interim administration arrangements, impacting governance stability.

Urban Planning and Territorial Development Legislation

Urban planning in Moldova is guided primarily by the Law on Urban Planning and Territory Arrangement Bases (1996), which sets out principles for regional and urban spatial planning. National strategies increasingly emphasize sustainable urban development, polycentric growth, and alignment with European Union standards. To organize space effectively, authorities develop General Urban Plans and Zonal Urban Plans; however, financing and implementation obstacles continue to undermine their effectiveness and reach. One notable gap in the urban planning and territorial development directory documents is the lack of a National Spatial Planning Plan that would allow for a more streamlined approach on territorial planning.

Decentralization and Regional Development Strategy

The National Strategy for Decentralization (2012-2018) aimed at transferring competencies and enhancing local government capacity but experienced limited success in full implementation. The Regional Development Law promotes balanced territorial development through the concept of growth poles, positioning Chișinău as Moldova's dominant urban center, complemented by smaller surrounding towns in a polycentric framework. Reforms targeting enhancement in local revenue generation have yet to fully materialize, and local governments frequently shoulder responsibilities without matching fiscal resources.

Local Government and Citizen Participation

Legislative frameworks include provisions for citizen participation, transparency, and local democracy aligned with Council of Europe norms. However, public participation in urban planning and governance is weak due to insufficient information availability and cultural barriers.

3.1.3 FUAs **guidelines** applicable in the country

3.1.4 FUAs **methodologies** applicable in the country

Moldova has not yet formalized a specific national methodology for identifying and monitoring Functional Urban Areas. However, the approach includes:

Use of administrative territorial divisions combined with functional criteria such as commuting flows, economic interactions, and service access patterns.

Implementation of GIS-based urban planning instruments, including digital General Urban Plans (GUP) and Zonal Urban Plans (ZUP) for Chisinau, digitized with UNDP support, enabling advanced spatial analyses and integrated city management.

Application of international best practices from OECD, UNECE, and EU frameworks, such as the Pressure-State-Response (PSR) model employed in the EBRD Green City Action Plan for Chisinau focusing on environment, transport, energy, and land use.

Urban development strategies embrace polycentric principles, aiming to strengthen Chisinau's role as a growth pole while fostering balanced development of secondary urban centers.

Consultative and participative processes involve municipal departments, enterprises, and the public to ensure alignment of strategies with local needs and EU requirements.

3.1.5 Major investor companies, other players in the FUAs-related sector, in the field of industry, services, research, research departments within the companies)

The leading financial and strategic partner in Chisinau's urban development is the European Bank for Reconstruction and Development (EBRD), which has committed over €2.75 billion to Moldova overall, including about €68 million for urban sustainability projects in Chisinau.

Other prominent investors and players:

- Multiple international donors and development agencies (UNDP, USAID, GIZ, SIDA, EU) actively support urban infrastructure, governance reforms, and economic development.
- Moldova's Free Economic Zones (7 FEZs) and 2 industrial parks attract foreign and domestic companies focusing on machinery, light industry, food processing, and ICT services.
- Private sector presence is significant in manufacturing, IT, telecommunications, and services sectors.
- Research and development activities are concentrated in universities, research institutes, and limited corporate R&D centers, with growing attention to innovation and digital technologies within the urban functional area.

3.1.6 Statistics about FUAs activity, results, employment etc. in investor sectors etc.

Here is a detailed analysis of the statistics on Functional Urban Areas (FUAs) activity, economic results, and employment in investor sectors with a focus on Chisinau, Moldova:

Economic Role of Chisinau

Chisinau is the dominant economic center of Moldova, generating nearly half of the country's *Gross Domestic Product (GDP)*. The capital's economic weight significantly overshadows other regions, underscoring Chisinau's role as a functional urban area that concentrates economic output, services, and population. Moldova's total GDP in recent years is around 13-14 billion euros nominally, with Chisinau's contribution approximately 8.6 billion euros, reflecting its economic primacy.

Employment Structure

Employment in Moldova is predominantly in the *private sector, accounting for over 69%* of the employed population working outside public administration or agriculture. Within the broader economy:

- *Industry,* including manufacturing and construction, composes about *14.7% of total employment*. Manufacturing within Free Economic Zones (FEZs) in and around Chisinau is a key employment driver.

- The *Information and Communication Technology (ICT) sector* notably contributes around 7% of Moldova's GDP and employs a growing share of the workforce, reflecting Chisinau's specialization in digital and knowledge-based industries.
- Other significant sectors in Chisinau's labor market include *finance, trade, and public administration,* which benefit from the city's status as the political and economic capital.

Free Economic Zones and Industrial Employment

Moldova operates several Free Economic Zones (FEZs), including areas such as the Chisinau FEZ, which provide fiscal and customs incentives to attract foreign investment and boost exports. FEZs play a critical role in:

- *Driving manufacturing output,* particularly in machinery, electronics, and light industry.
- Generating *industrial employment*, albeit the absolute numbers are still relatively modest compared to employment in traditional sectors.
- Enhancing Moldova's export capacity by linking domestic production to international value chains.

Urbanization and Migration

Due to the concentration of economic opportunities and services in Chisinau, the city experiences *significant rural-to-urban migration*, contributing to steady urban growth. This migration raises important challenges for urban infrastructure, housing, transportation systems, and social services which must expand to accommodate the increasing population.

Economic Outlook and Challenges

Economic growth forecasts for Moldova present a mixed picture with modest expected GDP growth rates of around 1.3% in 2025 and similar moderate projections through 2028. Challenges influencing this outlook include:

- Geopolitical tensions and regional instability.
- Volatility in export markets and energy prices.
- Fiscal constraints and infrastructure deficits.

Despite these challenges, sectors anchored in Chisinau — particularly ICT, finance, and manufacturing in FEZs — are expected to continue as engines of Moldova's economic recovery and development.

Summary Table: Key Economic Data for Chisinau and Moldova

Indicator	Data / Estimate
Chisinau GDP Contribution	~50% of national GDP
Moldova GDP (2024 nominal)	~€13.8 billion
Chisinau GDP (2024 nominal)	~€8.6 billion
Private Sector Employment	>69% of total employment
Industry Employment Share	~14.7%

ICT GDP Contribution	~7% of Moldova's GDP
Moldova GDP Growth Forecast 2025	~1.3% increase
Free Economic Zones	Critical for exports & jobs

3.1.7 Any specific specialization of the FUAs (eg IT & Digital Technologies, automotive, aerospace etc.)

Chisinau's Functional Urban Area demonstrates specific sectoral specializations that underpin its economic and innovative prominence in Moldova, structured mainly around free economic zones, service industries, and digital urban governance.

Machinery Manufacturing and Light Industry in Free Economic Zones

Chisinau houses key Free Economic Zones (FEZs) such as the "Expo-Business-Chisinau" FEZ and the "Tracom" Industrial Park. These platforms offer preferential customs and tax regimes attracting both domestic and foreign investors. Their primary activities focus on machinery manufacturing, industrial production, processing, construction materials, electronics including automotive wiring harnesses, beverages, textiles, and other light industries. For example, the Tracom Industrial Park contains modern technical and production infrastructure supporting around 71 registered residents with over 2,000 jobs created, representing significant industrial activity and investment reaching hundreds of millions of Moldovan Lei.

Service Sector: ICT, Finance, Business Services, and Public Administration

Chisinau is the hub for Moldova's service economy with significant employment in ICT (Information and Communication Technology), which contributes substantially to GDP growth and employment. The city also hosts leading finance institutions, business service providers, and public administration bodies, making it Moldova's main center for knowledge-intensive and administrative activities.

Smart City Initiatives: Sustainable Transport and Mobility

Chisinau is actively developing smart city initiatives emphasizing sustainable urban transport and mobility strategies. These include integrated public transport planning, adoption of green technologies for reducing pollution, and deploying digital solutions to enhance urban infrastructure management. These efforts aim to mitigate urban challenges such as traffic congestion and air quality deterioration.

Integration of Digital Technologies in Urban Management

Digitalization is increasingly used in urban management, including digitized general and zonal urban planning supported by GIS technologies, smart infrastructure monitoring, and data-driven governance. This helps Chisinau improve spatial planning, optimize resource use, and increase citizen engagement in governance.

Economic and Innovation Center

Chisinau positions itself as Moldova's economic and technological innovation center, though compared to EU urban areas, it maintains a relatively modest research intensity and high-tech industry presence. The city relies on its strategic location, investment incentives within FEZs, and ongoing modernization efforts to enhance its competitiveness and growth trajectory.

3.2 The stakeholders

3.2.1 Governance structure (public authorities, private/public companies, clusters)

The governance of Chisinau's FUAs involves multiple public authorities, private enterprises, and cluster organizations working in coordination. The municipality of Chișinău manages urban planning, infrastructure, utility services, and transport through dedicated technical departments. Governance is supported by a formal institutional setup including a Working Group and Steering Committee to manage city projects such as the Green City Action Plan. These bodies include heads of municipal departments and enterprises, the acting mayor, council secretary, and sectoral heads. Governance structures promote participatory processes through consultations involving key stakeholders to align with legal frameworks and citizens' expectations.

3.2.2 Main stakeholders involved in the Functional Urban Areas: public authorities, ministries, municipalities, national/regional boards, clusters, relevant companies from industry-related sectors, major manufacturers in FUAs-related sectors, automotive, aerospace, IT, universities, research centres, specialized authorities in innovative industry sectors, public services companies, ports, airports, SMEs, business support centres, expert think-tanks, funding institutions, innovation poles etc.

Key stakeholders in Chisinau's Functional Urban Areas span diverse sectors:

Public Authorities:

- National ministries overseeing urban development, economic development, transport, and environment.
- Chisinau municipal administration and related local government institutions.
- Specialized authorities for housing, utilities, and environmental regulation.

Municipal and Regional Boards: Responsible for regional planning, spatial development, and coordination.

Clusters and Industry Sectors:

- Moldova hosts about 20 cluster organizations in sectors like construction, agri-food, energy, mobility, ICT, and tourism.
- Clusters foster innovation, SME competitiveness, and regional cooperation.
- Clusters are active in elevating sectors critical to urban economic resilience and inclusion.

Industry and Companies:

- Major manufacturing firms, especially within Free Economic Zones (FEZs) focusing on machinery, electronics, light industry.
- ICT companies and business process outsourcing (BPO) firms in the services sector.
- SMEs supported via business support centres and innovation poles.

Universities and Research Centres:

- Academic and research institutions contribute to urban innovation and workforce development.
- Collaboration with clusters and municipalities for applied research and skills enhancement.

Public Services Companies:

- Utilities, transport providers, and waste management companies operating at the city and regional level.

Transport Infrastructure:

- Although Chisinau does not operate ports or airports within the core urban area, airports nearby contribute to connectivity.
- Transport infrastructure planning includes cooperation between municipal and national bodies.
- Civil Society and Think-Tanks:
- Local and international NGOs, expert groups, and think tanks actively participate in governance dialogue and project monitoring.
- The civil society sector plays an important role in transparency, public engagement, and sustainability initiatives.

Funding Institutions:

- International development banks such as EBRD, CEB, EIB and World Bank.
- European Union programs supporting urban development, infrastructure, and innovation.

3.2.3 Stakeholders' cooperation patterns in FUAs within the country but also with FUAs from other countries

Cooperation among stakeholders in Chisinau's FUAs is characterized by multi-level governance arrangements involving:

- Joint working groups between municipal departments, sector agencies, and private sector clusters.
- Regular consultations underpinning strategic urban projects with technical and political participation.
- Cross-sector partnerships to implement EU-funded initiatives on sustainability, mobility, and digitalization.

- Engagement with civil society organizations fostering participatory urban governance.

International cooperation is also evident with FUAs in other countries:

- Moldova participates in regional networks with neighbouring countries (Romania, Ukraine, EU member states).
- Cross-border collaboration on environment, transport, and economic integration programs.
- Events like the “Clusters Meet Regions” conference promote inter-regional value chains and knowledge exchange.

3.2.4 Other relevant players in the country’s FUAs

Additional actors influencing Chisinau’s FUAs include:

- Development Partners: UN agencies, GIZ, USAID, SIDA, and other bilateral/multilateral donors supporting technical assistance and capacity building.
- Business Associations: Entities such as the Foreign Investors Association (FIA) facilitate private sector dialogue and investment promotion.
- Civil Society Networks: Over 550 civil society organizations active in Chisinau and Moldova, fostering social inclusion and service delivery.
- Media and Communication Platforms: Disseminate information supporting governance transparency and civic engagement.
- Innovation Poles: Emerging clusters of technology and startups helping to modernize the urban economy.
- Educational Institutions: Vocational and technical schools that supply qualified labor and foster entrepreneurship.

3.3 National Policy on FUAs in each country

3.3.1 Funding for Functional Urban Areas by National Programmes / other funding programmes / support schemes

The Republic of Moldova benefits from multiple funding streams aimed at supporting the development of Functional Urban Areas, including Chisinau. At the national level, funding is channeled through various mechanisms such as the **National Regional and Local Development Fund (FNDRL)**, which provides financial support for integrated urban development projects. The FNDRL operates in synergy with international partners like the **Solidarity Fund PL in Moldova**, financed by the Polish government, which co-finances interventions related to economic, social, and civic revitalization as well as small-scale infrastructure upgrades in urban areas.
Moreover, Moldova has recently gained access to the **European URBACT IV Programme (2021-2027)**, which supplies over €86.7 million in grants for joint sustainable urban development projects, including priorities such as urban mobility, energy transition, land-use efficiency, and institutional capacity building for local authorities. Moldova is expected to receive targeted funding within URBACT, enabling strategic investment in FUAs' resilience and growth.
These funding programmes are complemented by initiatives from multilateral donors such as the European Bank for Reconstruction and Development (EBRD) and the World Bank, which provide

loans, grants, and technical assistance for urban enhancement projects in Chisinau and other urban centers.

3.3.2 Smart specialization fit with regards to Functional Urban Areas (strategy documents)

Moldova has adopted a **Smart Specialization Strategy**, developed with EU support, focusing on maximizing resources for innovation and research where the country has competitive advantages. This strategy identifies four priority sectors:

- Agriculture and Food Processing
- Information and Communication Technology (ICT)
- Energy
- Biomedicine and Biopharmaceuticals

This strategic framework aligns well with the economic profile and development potential of Chisinau and its Functional Urban Area, especially regarding the ICT sector's growth and the city's role as an administrative and innovation hub. The Smart Specialization Strategy is integrated into the Government's broader Action Plan and aims to catalyze Moldova's transition toward a knowledge-based, digitalized, and sustainable economy by 2030.

3.3.3 Classify, categorize, and record all relevant Functional Urban Areas RTDI related to legal framework, policies, strategies, methodologies, objectives, visions, practices, at national level

At the national level, Moldova's policies and legal frameworks related to FUAs incorporate:

- The Law on Regional Development (2006), which defines functional development regions aligning with territorial planning and socioeconomic development goals.
- The establishment of National Coordination Councils and Regional Development Agencies responsible for planning, implementing, and coordinating regional and urban development projects.
- RTDI (Research, Technological Development, and Innovation) activities are prioritized within the national innovation system, especially focused on sectors highlighted in the Smart Specialization Strategy.
- Operational plans and methodologies for FUAs include spatial planning documents such as General Urban Plans (GUP) and Zonal Urban Plans (ZUP), fostering data-driven governance.
- Strategic visions reinforce Chisinau's role as a growth pole within a polycentric urban network, aiming for balanced development of secondary towns and rural areas.

3.4 The current situation of the Functional Urban Areas

3.4.1 Functional Urban Areas support mechanisms:

- Policy makers in Functional Urban Areas related sectors
- National authorities in Functional Urban Areas related sectors
- Funding institutions related to Functional Urban Areas support schemes
- Business support/consulting boards, offices for specific Functional Urban Areas

Policy Makers in Functional Urban Areas Related Sectors

At the policy-making level, key national and local entities steer urban development-related sectors. The **Ministry of Infrastructure and Regional Development** is a pivotal actor, formulating policies and launching programmes that encourage sustainable urban growth, economic development, and infrastructure improvements across FUAs including Chisinau. Local government, represented by the **Chisinau Municipal Council and Mayor's Office**, operationalizes these policies through urban planning, public services management, and infrastructural projects, often engaging in participatory governance approaches.

National Authorities in Functional Urban Areas

Beyond the ministry, several national authorities contribute to FUA-related sectors, such as the **Ministry of Economy and Digitalization**, the **Ministry of Environment**, and regulatory bodies overseeing utilities, transport, housing, and spatial planning. Regional Development Agencies facilitate coordination and capacity building across various territorial units, supporting both metropolitan and smaller urban centers in integrated development.

Funding Institutions Related to Functional Urban Areas Support Schemes

Funding for FUAs is delivered through both national and international channels. Nationally, the **National Regional and Local Development Fund** allocates resources to urban revitalization, infrastructure modernization, and community social projects. Moldova also benefits from substantial EU funding mechanisms, including the **URBACT IV Program (2021-2027)**, which allocates over €86 million for urban sustainability projects emphasizing mobility, energy efficiency, land use, and governance capacity. These are complemented by investments and technical support from multilateral institutions such as the European Bank for Reconstruction and Development (EBRD), World Bank, and United Nations Development Programme (UNDP).

Business Support/Consulting Boards and Offices for Specific Functional Urban Areas

Chisinau hosts various business support infrastructures that foster entrepreneurship, innovation, and business development within the FUA.

- Multifunctional Centres for Business Environment provide "one-stop shop" services for legal registration, licensing, cadastral works, and enterprise support, facilitating easy business operations and administrative procedures.
- Several business consulting firms, incubators, and innovation hubs operate in sectors like ICT, manufacturing, and services. These entities offer capacity building, technical assistance, and networking opportunities.

- Sector-specific cluster organizations in Moldova, active in construction, information technology, agri-food, and renewable energy, help strengthen cooperation among enterprises and public bodies, driving innovation and competitiveness in FUAs.

3.4.2 FUNDA QUESTIONNAIRE of FUA in MOLDOVA

SEE ANNEX

3.5 The challenges the Functional Urban Areas face to develop

3.5.1 FUAs need to work in a sound working climate to improve the business performance assured by the FUAs

Chisinau's Functional Urban Area (FUA), like many in Moldova, is situated within a challenging economic and institutional context that can hinder optimal business performance. The local business climate is affected by structural constraints such as limited access to finance, administrative burdens, and a pervasive informal economy that decreases the competitiveness of formal enterprises. These issues are exacerbated by overlapping competencies between various local administrations, creating uncertainties and inefficiencies in governance.

Furthermore, the urban infrastructure struggles to keep pace with rapid population growth and economic activity, limiting the capacity to attract and sustain new businesses. Access to quality utilities, transport, and digital connectivity is essential to foster a conducive environment for business performance, yet investments remain insufficient. Efforts to improve transparency, reduce bureaucratic delays, and promote a predictable regulatory framework are ongoing prerequisites to enhancing the overall working climate within the FUAs.

3.5.2 Managing Risk and Innovation: the Challenge for Functional Urban Areas

Chisinau's Functional Urban Area (FUA), like many in Moldova, is situated within a challenging economic and institutional context that can hinder optimal business performance. The local business climate is affected by structural constraints such as limited access to finance, administrative burdens, and a pervasive informal economy that decreases the competitiveness of formal enterprises. These issues are exacerbated by overlapping competencies between various local administrations, creating uncertainties and inefficiencies in governance.

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3.5.3 Benchmarking against leader FUAs, to adopt best practice for specific functions of the FUAs

Moldova's FUAs, including Chisinau, benefit from benchmarking initiatives designed to assess their performance against leading functional urban areas in Europe. Benchmarking covers diverse urban functions from governance and sustainability to inclusivity and socio-economic outcomes. Such comparative assessment helps identify performance gaps and learning opportunities.

For example, Chisinau's participation in EU URBACT and EBRD Green City projects provides frameworks to evaluate urban mobility, energy efficiency, and governance relative to European counterparts. These benchmarking exercises guide the adaptation of best practices tailored to local contexts, such as enhancing public transport integration, improving data transparency, or adopting circular economy principles.

However, challenges remain in accessing comprehensive, consistent data for effective benchmarking, and there is a need to institutionalize these practices within planning cycles. Strengthened capacities at municipal and regional levels to interpret and implement benchmarking findings are critical for sustained policy improvements and functional urban development.

3.6 Opportunities and obstacles of Functional Urban Areas

3.6.1 Opportunities for Functional Urban Areas - Megatrends: environmental challenges, urbanization & megacities, ageing society, energy demand and sources, changing lifestyle etc.

Chisinau's Functional Urban Area faces significant opportunities driven by global and regional megatrends. The accelerating **urbanization** of Moldova, particularly migration into Chisinau, is transforming the city into a major economic and social hub. This urban concentration creates potential for economic diversification, innovation, and improved service delivery.
Environmental challenges such as **climate change, air pollution, and resource management** are increasingly prioritized, prompting adoption of sustainable urban development and green infrastructure projects supported by international partners. This opens avenues for funding and technical assistance geared towards energy efficiency, climate resilience, and smart city technologies.
The **ageing population** presents both social challenges and opportunities in healthcare, housing, and community services, driving innovation in social policy and infrastructure adaptation.
Shifting **energy demand and source transitions** in Moldova towards renewables offer FUAs the chance to modernize energy systems, reduce emissions, and create green jobs.
Changing **lifestyles and technological penetration** also promote the rise of digital services, flexible working arrangements, and demand for better mobility solutions—all benefiting urban economies and quality of life in Chisinau.

3.6.2 Obstacles for Functional Urban Areas (ex. lack of financial sources, gaps in Functional Urban Areas financing, missing qualified personnel, difficult collaboration with the public authorities, weak collaboration between universities/ research centres and Functional Urban Areas

Despite these opportunities, FUAs in Moldova confront numerous obstacles:

- Lack of Financial Resources: Local governments and FUAs suffer from constrained budgets, limited access to stable funding, and dependence on volatile transfers from

the central government. This restricts investments in critical infrastructure and service improvements.

- Gaps in FUAs Financing: There is an absence of integrated, targeted financing schemes specifically addressing the unique functional area challenges, leading to fragmented investment and planning.
- Lack of Qualified Personnel: Human resource capacity at local government and administrative levels is insufficient, particularly in urban planning, innovation management, and technical disciplines critical for sustainable FUA development.
- Difficult Collaboration with Public Authorities: Coordination between various levels of government, municipalities, and agencies often suffers from unclear roles, overlapping responsibilities, and lack of effective communication, impeding strategic urban management.
- Weak Collaboration Between Universities/Research Centres and FUAs: While academic institutions exist, links with FUAs to transfer knowledge, foster innovation, and support urban challenges remain weak. This gap reduces the uptake of research and innovation for practical urban solutions.

3.7 Functional Urban Areas - SWOT ANALYSIS in MOLDOVA

Strengths

- Legal and institutional foundation: Moldova's Constitution (Articles 109-113) and Law No. 136/2016 on Local Public Administration provide a strong legal framework for decentralization, local autonomy, and urban governance aligned with the European Charter of Local Self-Government. The Law on Regional Development (2006) underpins territorial cohesion and balanced growth, positioning Chisinau as a growth pole within a polycentric urban network.
- Economic primacy and specialization: Chisinau dominates Moldova's economy, contributing about 50% of GDP, with strong sectors in machinery manufacturing, light industry (particularly within Free Economic Zones), ICT, finance, and public administration.
- Modern urban planning tools: Digitized General Urban Plans (GUP) and Zonal Urban Plans (ZUP) developed with UNDP support enable advanced spatial analysis, integrated city management, and participatory planning processes contributing to sustainable urban development.
- International cooperation and funding: Access to EU programmes like URBACT IV and substantial funding from development banks (EBRD, World Bank) and donor agencies provide financial support and technical assistance for urban sustainability, mobility, and innovation projects.
- Active stakeholder engagement: Multi-level governance structures and cooperation patterns among municipal authorities, clusters, private sector, civil society, and academia foster cross-sectoral dialogue and integrated urban strategies.

Weaknesses

- Fragmented governance and legal ambiguities: Suburban localities in Chisinau have autonomous councils not formally subordinated to the municipal council, creating

overlapping competences and policy fragmentation. Institutional capacity at the local level can be limited.

- Financial constraints: Limited local budget revenues, dependence on central government transfers, and absence of targeted integrated financing schemes for FUAs restrict infrastructure investments and service improvements.
- Insufficient human capital: Shortage of qualified personnel in urban planning, innovation management, and technical fields weakens development potential. Cooperation between universities/research centers and FUAs remains underdeveloped.
- Infrastructure and environmental challenges: Rapid urbanization stresses transport systems, housing, utilities, and air quality, with aging infrastructure and environmental risks requiring large-scale interventions.
- Data gaps and benchmarking capacity: Deficiencies in comprehensive data collection and analysis hinder effective benchmarking against leading FUAs for adoption of best practices.

Opportunities

- Megatrends alignment: Urbanization, ageing society, environmentally sustainable transitions, and digitalization present chances to modernize Chisinau's urban structures, service delivery, and economic base.
- Smart specialization: Moldova's Smart Specialization Strategy targeting ICT, energy, agriculture, and biomedicine fits well with Chisinau's economic profile, offering pathways to innovation-driven growth and regional competitiveness.
- EU integration and policy alignment: Accession-related reforms and access to EU structural funds can boost urban infrastructure, governance reforms, and socio-economic development in FUAs through harmonized legislation and standards.
- Enhanced participatory governance: Growing civil society and formalized stakeholder cooperation enable inclusive planning and innovation in managing common urban resources.
- International partnerships: Collaboration with neighbouring countries and participation in European urban networks support knowledge transfer, capacity building, and joint problem-solving.

Threats

- Governance instability and political interference: Local governance faces risks from political interference, delayed elections, and inconsistent policy continuity, especially in Chisinau.
- Economic vulnerabilities: Reliance on limited export sectors, regional economic fluctuations, and underdeveloped private sector reduce resilience of FUAs.
- Environmental and disaster risks: Aging, poorly maintained infrastructure combined with climate change effects pose significant threats to urban safety and sustainability.
- Demographic decline outside core city: Migration patterns increase disparities between Chisinau and smaller towns/rural areas, leading to uneven development and social challenges.
- Funding uncertainties: Dependence on external donor funding and EU programmes without stable domestic funding mechanisms could hinder long-term urban development efforts.

Results

Chisinau's Functional Urban Area has demonstrated substantial progress in institutional capacity building, spatial planning, and sectoral integration. Digitization of the General Urban Plan (GUP) and Zonal Urban Plans (ZUP) allows for advanced spatial data analysis improving city management and planning practices. Projects like the Green City Action Plan have mobilized multiple stakeholders around sustainable urban mobility, energy efficiency, and environmental resilience. The city remains the primary economic hub, contributing nearly 50% of Moldova's GDP and evidencing specialization in key sectors such as manufacturing, ICT, and services centered around its Free Economic Zones. However, persistent challenges include limited financing, infrastructure deficits, governance fragmentation, and environmental pressures due to rapid urbanization and population growth.

Conclusions

Chisinau's FUAs possess significant potential grounded in a robust legal framework (including Law No. 136/2016, Law on Regional Development 2006), a growing innovation ecosystem, and active international cooperation strengthening governance and urban planning. To unlock this potential fully, enhanced coordination among suburban and municipal authorities, sustainable financing mechanisms, and capacity development are imperative. Embracing smart specialization in areas aligned with national strategies, coupled with continued adoption of EU best practices and benchmarking, will bolster resilience and competitiveness. Addressing infrastructural and environmental challenges while fostering inclusive participatory governance will be vital to ensuring long-term, sustainable development for Chisinau's FUAs.

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Prešov Region
SLOVAKIA


3.1 Database of SLOVAKIA

3.1.1. General geographical information (country geographical location, population, administrative organization: counties/towns/villages, centralized or decentralized governance)

The Slovak Republic (commonly called Slovakia) is a landlocked Central European country. Its territory covers **49,035 km²**, stretching from the **Carpathians Mountain ranges in the north** to the fertile plains along the **Danube River in the south**. Slovakia shares borders with five countries: the Czech Republic to the northwest, Poland to the north, Ukraine to the east, Hungary to the south, and Austria to the southwest. This strategic location makes Slovakia a natural crossroads for transport corridors between Western and Eastern Europe, as well as Northern and Southern Europe.

The **population** is estimated at around **5.5 million inhabitants in 2025** (5 449 270 based on population census in 2021). Despite its relatively small population, Slovakia is highly urbanized, with significant shares of people concentrated in large **functional urban areas (FUAs)** such as

Bratislava (metropolitan - largest), **Košice** (metropolitan - second largest), **Žilina**, **Nitra**, **Trnava**, **Prešov**, **Trenčín** and **Banská Bystrica** (all of them are regional seats).

Slovakia is a **unitary parliamentary republic**. It is divided into **8 self-governing regions (kraje)** - mentioned in the previous paragraph. These are further subdivided into **79 districts (okresy)** and approximately **2,890 municipalities**. Each municipality has an elected mayor and council, while each region has its own elected governor and assembly. This multilevel system creates a dense web of governance that intersects with national policies. The central government retains responsibility for national legislation, fiscal policy, transport networks, higher education, and major investment incentives, while the regions and municipalities manage regional education (primary and secondary schools), healthcare facilities, social services, local roads, and land-use planning.

The **Prešov FUA** serves as the core urban and economic centre of northeastern Slovakia. It encompasses **Prešov city and surrounding municipalities** with strong commuting links, including Veľký Šariš, Haniska, Nižná Šebastová, Fintice, and others. Its total population is estimated at **170,000–180,000** inhabitants, reflecting both city residents and the workforce in neighboring towns and villages who regularly travel to Prešov for **employment**, **education**, or **services**. The borders of the Prešov FUA extend beyond the Prešov district, especially into the districts of Sabinov, Vranov nad Topľou, and partially Košice, creating a **polycentric northeastern urban area**, with Košice as the dominant municipality in the broader regional urban system.

3.1.2 FUAs **legislative** framework applicable in the country

Slovakia does not have a dedicated **"Functional Urban Areas Law"**. Instead, FUAs are recognized through their **statistical and planning functions**, largely drawing upon the **OECD–Eurostat methodology** (Dijkstra et al. 2019) for defining functional urban areas. According to this approach, FUAs are delineated as urban cores (based on population density) combined with commuting zones (based on labour mobility patterns). National statistical and planning agencies rely on these definitions when analysing settlement systems and regional development strategies.

Relevant legislation that indirectly governs FUAs includes:

- The **Act on Regional Development Support** (No. 539/2008 Coll.)
- The **Act on Construction** (No. 25/2025 Coll.)
- The **Act on Municipal Establishment** (No. 369/1990 Coll.)
- The **Act on Self-Governing Regions** (No. 302/2001 Coll.)
- The **Act on Spatial Planning** (No. 200/2022 Coll.)
- Various sectoral laws covering environmental protection, transport networks, and investment incentives.

These legal frameworks create the **conditions under which FUAs operate**: they guide municipal and regional planning, shape the allocation of European Structural and Investment Funds (ESIF), and determine responsibilities among central and subnational governments.

3.1.3 FUAs **guidelines** applicable in the country

Guidelines for FUAs in Slovakia arise mainly from **national planning documents** and **EU cohesion programming cycles**. The most important include:

- The **Slovak Partnership Agreement with the EU (2021–2027)**
- **Programme Slovakia 2021–2027**
- The **Integrated Territorial Investments (ITIs)** mechanism
- The **Research and Innovation Strategy for Smart Specialisation of the Slovak Republic (RIS3 SK, 2021–2027)**

3.1.4 FUAs **methodologies** applicable in the country

The most widely used methodology is the OECD/**Eurostat FUA classification**. According to this, Slovakia contains two metropolitan FUA (Bratislava and Košice) and several medium and small FUAs (Žilina, Trnava, Nitra, **Prešov**, Banská Bystrica, Trenčín, and others).

Beyond statistical delineation, **Smart Specialisation methodologies** could be utilized in Slovakia´s FUAs. These include the **entrepreneurial discovery process (EDP)**, in which local businesses, universities, and municipalities jointly identify promising fields of innovation. In practice, this means that Bratislava FUA might emphasize **digital services and finance**, Košice FUA might concentrate on **IT outsourcing and R&D in materials and aerospace**, while Žilina and Trnava would highlight **automotive and mechanical engineering**.

3.1.5 Major investor companies, other players in the FUAs-related sector, in the field of industry, services, research, research departments within the companies)

For the **Prešov Region**, the major companies and other key players contributing to the FUA's economy include:

Plzeňský Prazdroj Slovensko – Leading producer of beverages, primarily beer, contributing to the region's food and beverage industry and supporting local supply chains.

Milk-Agro – Dairy production company, specializing in milk, cheese, and other dairy products, providing employment and linking agricultural production with regional processing industries.

- **Lear Corporation Seating Slovakia** – Automotive supplier focusing on **car seat production**; part of the broader automotive supply chain serving European manufacturers, integrating the region into the automotive sector.
- **University of Prešov** – Regional academic and research centre providing applied research in **logistics, environmental technologies, business services, and social sciences**; supports innovation in both private and public sector projects and contributes skilled graduates to the local labor market.
- **ZVL Auto s.r.o.** – Automotive components manufacturer producing parts for European car makers, reinforcing the region's position within Slovakia's automotive supply network.
- **Spinea Prešov a.s.** – Specialized in **development and production of high-precision gears and actuators**, used in robotics, industrial automation, and machinery; represents a niche in **precision engineering** and technology-driven manufacturing.
- **MKW s.r.o.** – Manufacturer of **sanitary products**, including bathroom fixtures and **accessories, supplying both domestic and international markets.**

3.1.6 Statistics about FUAs activity, results, employment etc. in investor sectors etc.

According to the Statistical Office of the Slovak Republic shows lack **Prešov Region** of employment opportunities, due to which residents often moved to other regions or abroad for work. The **unemployment rate**, i.e., the share of unemployed people among economically active residents, has long been the highest among Slovak regions and reached **10.8% in 2023**. **Economically active residents**, meaning those employed or unemployed over the age of 15, accounted for nearly **50% of the population**. The **economic activity rate**, i.e., the ratio of economically active people to the population over 15 years old, was **61.3%**. The **employment rate** (the proportion of working people aged 20 to 64 to the total population in the same age group) was **72.2%**. The **average nominal monthly wage** reached **€1,342**, falling short of the national average by **€286**, the largest gap among all regions.

In terms of economic performance measured by **gross domestic product (GDP) creation**, the **Prešov Region** ranks among the less productive regions of Slovakia. The region's GDP, i.e., the value of all goods and services produced in the region during **2023**, amounted to **€11,431 million** at current prices, representing **9.3% of the national total**. On a per capita basis, GDP reached **€14,108** at current prices, falling short of the national average by **37.4%**.

Regarding the **education** in Prešov Region, **21%** of inhabitants have university education and **25,58%** of the population has higher secondary education. Number of live birth children was higher than number of deaths by 546, moreover, more people came to live in FUA in comparison to those who left. Overall population increase reached the number of 706.

3.1.7 Any specific specialization of the FUAs (eg IT & Digital Technologies, automotive, aerospace etc.)

Compared to other Slovak FUAs, **Prešov FUA does not have a single dominant high-tech or industrial specialization** like Bratislava (ICT/business), Košice (IT/software), or Žilina (automotive). Its economic profile is more **diversified, service-oriented** and constructed mainly by small to medium enterprises (See 3.1.5 and 3.2.2).

3.2 The stakeholders

3.2.1 Governance structure (public authorities, private/public companies, clusters)

Slovakia's governance architecture for Functional Urban Areas (FUAs) sits inside a unitary—but partly decentralised—state. Policy design and major funding allocation are driven by **central ministries** while operational delivery and local services are concentrated at **regional** and **municipal** levels. Regions coordinate regional development strategies and some transport/education responsibilities; municipalities manage land use, local transport, social services and business support at city level.

On the private side, FUAs are shaped by large foreign-owned OEMs (mainly automotive) and major multinational IT and logistics firms, alongside domestic SMEs. Formal cluster bodies, such as regional automotive supplier groupings and IT clusters (e.g., the Košice IT community / "IT Valley" network) act as intermediaries between industry, academia and government; technology parks and incubators (often attached to universities) facilitate spin-outs and shared facilities. Public–private partnerships (PPPs) are used selectively for infrastructure and investment projects but remain less standardized than in many Western European metropolitan areas. The

Research & Innovation Authority (VAIA), the Slovak Research & Development Agency (APVV) and the national investment promotion agency (SARIO) are institutional hubs linking policy, finance and business support functions.

Public Authorities:

Municipal Government – City of Prešov

The city has an elected mayor and city council responsible for local administration, urban planning, infrastructure, social services, and education (primary and secondary schools).

Key urban planning and service delivery decisions affecting the FUA's commuting and surrounding municipalities are coordinated at the city level.

Prešov District Authority (Okres Prešov)

Manages administrative functions at the district level, including civil registration, regional development oversight, and coordination of services among municipalities.

Supports the implementation of regional and national policies within the district.

Prešov Self-Governing Region (Kraj Prešov)

Headed by an elected governor and regional assembly, responsible for secondary education, regional healthcare, transport infrastructure, land-use planning, and coordination of EU-funded programs.

Plays a strategic role in regional economic development, including support for industrial parks, innovation initiatives, and business support services.

National Agencies

Various central government bodies oversee legislation, fiscal policies, investment incentives, environmental protection, and transport networks that impact Prešov FUA, eg. Ministry of Transport, Ministry of Investments, Regional Development and Informatization, Ministry of Environment, Association of Towns and Municipalities of Slovakia, Slovak Railways, etc.

Private and Public Companies:

The economic landscape of Prešov FUA is shaped by a combination of **light manufacturing, food and beverage production, automotive supply, precision engineering, and research-oriented companies**:

- **Spinea Prešov a.s.** – precision gears and actuators, serving robotics and automation sectors.
- **Lear Corporation Seating Slovakia** – automotive components (car seats).
- **ZVL Auto s.r.o.** – automotive parts production.
- **Plzeňský Prazdroj Slovensko** – beverage production (beer).
- **Milk-Agro** – dairy production.
- **MKW s.r.o.** – sanitary products.
- **University of Prešov** – research and innovation in logistics, environmental technologies, business services, and applied sciences.
- **Slovenské elektrárne** a.s. - Electricity production
- **Západoslovenská energetika (ZSE)** - Electricity Distribution and Retail

- **Slovenská železnica (Železnice Slovenskej republiky)** - Rail Transport

3.2.2 Main stakeholders involved in the Functional Urban Areas: public authorities, ministries, municipalities, national/regional boards, clusters, relevant companies from industry-related sectors, major manufacturers in FUAs-related sectors, automotive, aerospace, IT, universities, research centres, specialized authorities in innovative industry sectors, public services companies, ports, airports, SMEs, business support centres, expert think-tanks, funding institutions, innovation poles etc.

Public Authorities

- **Government Office of the Slovak Republic** – central government; coordinates cross-ministry agendas; **Scope**: national; **Official website**: vlada.gov.sk

Ministries

- **Ministry of Transport of the SR** – transport policy, TEN-T, urban mobility & rail/road/aviation; **Scope**: national; **Official website**: mindop.sk
- **Ministry of Investment, Regional Development and Informatization of the SR (MIRRI)** – EU funds, regional development, digitalization; **Scope**: national; **Official website**: mirri.gov.sk
- **Ministry of Environment of the SR** – climate, air quality, permitting; **Scope**: national; **Official website**: minzp.sk
- **Ministry of Economy of the SR** – industrial policy, investments, innovation; **Scope**: national; **Official website**: economy.gov.sk

Municipalities

- **City of Prešov Municipality** – urban planning, public services, transport, local economy; **Scope**: local; **FUAs**: Prešov; **Official website**: presov.sk

National & Regional Boards

- **Prešov Self-Governing Region (PSK)** – regional development, education, healthcare, infrastructure; **Scope**: regional; **FUAs**: Prešov; **Official website**: po-kraj.sk

Clusters

- **Slovak Automotive Industry Association (ZAP SR)** – automotive sector support, includes Prešov-based firms; **Scope**: national; **Official website**: zapsr.sk

Relevant Companies (Industry)

- **Lear Corporation Seating Slovakia** – automotive (car seats);
  Scope: international, national presence; **FUAs**: Prešov; **Official website**: lear.com
- **Spinea Prešov, a.s.** – precision gears for robotics/automation;
  Scope: international exports, national impact; **FUAs**: Prešov; **Official website**: spinea.com
- **Milk-Agro** – food and dairy production, retail chain;
  Scope: national; **FUAs**: Prešov; **Official website**: milkagro.sk

Major Manufacturers

- **ZVL Auto s.r.o.** – automotive bearings;
  Scope: international, national supplier; **FUAs**: Prešov; **Official website**: zvlauto.sk
- **Plzeňský Prazdroj Slovensko** – beverage production (beer, soft drinks);
  Scope: national, international (member of Asahi Group); **FUAs**: Prešov (regional production & distribution), all Slovakia; **Official website**: prazdroj.sk

Universities

- **University of Prešov –** public university; education and research in social sciences, theology, health, sports, management; FUA: Prešov

Research Centres

- **Slovak Academy of Sciences (SAV)** – national research institutes; FUAs: all major cities

Public Service Companies

- **ŽSR – Železnice Slovenskej republiky** – rail infrastructure; FUAs: national
  Official website: zsr.sk
- **ZSSK – Železničná spoločnosť Slovensko** – passenger rail operator; FUAs: national
  Official website: zssk.sk
- **SPP – Slovenský plynárenský priemysel** – gas distribution; FUAs: national
  Official website: spp.sk
- **Slovenské elektrárne** – energy generation; **FUAs**: national; **Official website**: seas.sk

Investment & Trade Promotion

- **SARIO – Slovak Investment and Trade Development Agency** – FDI & supplier development; **FUAs**: national; **Official website**: sario.sk

Funding Institutions

- **Slovak Investment Holding (SIH)** – infrastructure & SME finance; **Scope**: national; **Official website**: sih.sk
- **APVV – Slovak Research & Development Agency** – R&D grant agency; **Scope**: national; **Official website**: apvv.sk

Financial & Statistical Authorities

- **National Bank of Slovakia (NBS)** – financial stability, investments; FUAs: national
  Official website: nbs.sk
- **Statistical Office of the SR** – data on population, labour, GDP; FUAs: national
  Official website: statistics.sk

3.2.3 Stakeholders' cooperation patterns in FUAs within the country but also with FUAs from other countries

Within Slovakia (National & Interregional Cooperation)

- **Prešov Self-Governing Region (PSK)**
  - Cooperates with other self-governing regions (notably Košice, Žilina, and Banská Bystrica) on integrated territorial investments (ITI) and EU-funded regional development projects.
  - Works with the Ministry of Investment, Regional Development and Informatization (MIRRI) on EU funds allocation.
- **City of Prešov & Surrounding Municipalities (Veľký Šariš, Fintice, Haniska)**
  - Inter-municipal cooperation on waste management, public transport, and joint infrastructure planning.
  - Part of polycentric urban cooperation with **Košice FUA**, forming the **Košice–Prešov metropolitan area**, especially in transport and labour mobility.
- **University of Prešov (PU)**
  - Collaborates with Slovak universities (Košice TU, UPJŠ, Žilina University) on ICT, logistics, and social sciences research.

- **Industrial Stakeholders (Lear, Spinea, ZVL Auto)**
    - Supply chain and subcontracting ties with national automotive hubs (Žilina, Trnava, Nitra). Cooperation with Slovak Automotive Industry Association (ZAP SR).
- **Clusters & Agencies**
    - **Košice IT Valley Cluster** – joint IT projects with Prešov partners.
    - **SIEA, SARIO, SOPK Prešov** – SME support, investment promotion, innovation transfer across Slovakia.

International Cooperation (Cross-border & EU Networks)

- **Cross-Border with Poland (Podkarpackie Voivodeship, Rzeszów FUA)**
    - Cooperation through the **Interreg Poland–Slovakia Programme** (transport corridors, tourism, cultural exchange).
    - Joint environmental and infrastructure projects, e.g., cross-border cycling routes, border road upgrades.
- **Cross-Border with Ukraine (Zakarpattia region, Uzhhorod FUA)**
    - Projects on border management, energy efficiency, and humanitarian cooperation.
    - Limited but growing academic and cultural cooperation with Uzhhorod National University.
- **Cross-Border with Hungary (Borsod-Abaúj-Zemplén, Miskolc FUA)**
    - Partnerships in logistics, trade, and energy projects.
    - Participation in **Carpathian Euroregion** (regional development, innovation networks).
- **European Networks**
    - Prešov municipality and PSK participate in **Eurocities projects** via Slovak national representation.
    - **University of Prešov** takes part in Erasmus+ and Horizon Europe research projects (international student and researcher mobility, joint applied science projects).
    - Industrial firms (Lear, Spinea, ZVL Auto) are integrated in **European automotive and robotics value chains**, exporting to Germany, France, Czechia.

3.3 National Policy on FUAs in SLOVAKIA

3.3.1 Funding for Functional Urban Areas by National Programmes / other funding programmes / support schemes

Functional Urban Areas (FUAs) in Slovakia are not officially recognized as legal or administrative units, so they cannot directly apply for funding. Grants and programmes must be accessed by municipalities or self-governing regions, either individually or through voluntary cooperation. This arrangement affects how investments are planned and implemented, particularly for projects requiring cross-boundary coordination.

The **Operational Programme Slovakia 2021–2027**, co-financed by EU cohesion funds and the national budget, is the main channel for urban development financing, covering sustainable mobility, energy efficiency, digitalisation, social inclusion, and economic

competitiveness. Since FUAs cannot be applicants, municipalities or regions must submit proposals, often requiring inter-municipal agreements. Smaller municipalities may face difficulties participating, leading to uneven coverage.

National sectoral schemes and revolving loan facilities also require applications from recognized legal entities, not FUAs. Technical assistance grants help with project preparation and capacity building, supporting inter-municipal cooperation where possible.

International programmes, including **OECD**, **World Bank**, and **EEA/Norway Grants**, have promoted integrated planning and pilot projects in areas like urban greening, climate adaptation, and social regeneration. However, they too operate through municipal or regional bodies, emphasizing the limitation of the current institutional setup.

Overall, the lack of formal FUA status creates fragmentation in funding and governance. Strengthening inter-municipal cooperation, scaling technical assistance, and considering eventual recognition of FUAs could improve coordination, project implementation, and the territorial impact of national and EU funding.

3.3.2 Smart specialisation fit with regards to Functional Urban Areas (strategy documents)

- **Stratégia inteligentnej špecializácie Slovenska (RIS3 SK 2021–2027)**
  Smart Specialisation domains (mobility, digitalisation, Industry 4.0, green technologies) are concentrated in urban cores and require cooperation with surrounding municipalities. FUAs provide the spatial logic for implementation, though not formally mentioned.

- **Program Slovensko 2021–2027 (Operačný program Slovensko)**
  EU Cohesion Policy programme for Slovakia. Contains *Integrated Territorial Investments (ITI)* and *Sustainable Urban Development measures*, implemented by cities but covering wider commuting and functional areas.

- **Integrovaná územná stratégia Prešovského samosprávneho kraja 2021 - 2027**
  The Integrated Territorial Strategy (IÚS) of the Prešov Self-Governing Region forms part of the comprehensive Program of Economic and Social Development of the Prešov Region (PHRSR PSK) 2021–2030, and at the same time, it is a specific document for integrated territorial development, which in the programming period 2021–2027 is supported by EU funds.

3.3.3 Classify, categorize, and record all relevant Functional Urban Areas RTDI related to legal framework, policies, strategies, methodologies, objectives, visions, practices, at national level

Legal Framework

- **Koncept územného rozvoja Slovenska (KURS 2001, aktualizácia 2011)**
  National spatial development perspective. Defines *metropolitan areas, agglomerations, development corridors*. Provides analytical basis closest to an FUA concept, although FUAs are not legally codified.
- **Stavebný zákon (Zákon č. 50/1976 Zb.) + reforma územného plánovania (2024)**
  Core planning act; the 2024 reform introduced regional planning authorities and

centralized planning portals. This creates tools for addressing cross-municipal (FUA-like) planning, though FUAs remain unofficial.

Policies

- **Architektonická politika Slovenska (APS, 2023–)**
  National urban/architectural policy. Promotes sustainable cities, integrated spatial development, and inter-municipal cooperation. Directly relevant to FUA dynamics, especially metropolitan coordination.

Strategies

- **Stratégia inteligentnej špecializácie Slovenska (RIS3 SK 2021–2027)**
  Smart Specialisation domains (mobility, digitalisation, Industry 4.0, green technologies) are concentrated in urban cores and require cooperation with surrounding municipalities. FUAs provide the spatial logic for implementation, though not formally mentioned.
- **Program Slovensko 2021–2027 (Operačný program Slovensko)**
  EU Cohesion Policy programme for Slovakia. Contains *Integrated Territorial Investments (ITI)* and *Sustainable Urban Development measures*, implemented by cities but covering wider commuting and functional areas.

Methodologies & Practices

- **Podnikateľský objavný proces (EDP) v RIS3**
  Stakeholder engagement methodology under RIS3. In practice, many identified clusters (e.g. Bratislava mobility, Košice ICT, Žilina automotive) correspond to FUA-level ecosystems.

- **Integrované územné stratégie miest (ITI/IDS)**
  Municipal-led integrated strategies required for EU funding, promoting cross-municipal projects in transport, environment, and innovation. They operationalize FUA-like cooperation despite lacking legal status.

3.4 The current situation of the Functional Urban Areas

3.4.1 Functional Urban Areas support mechanisms:

- Policy makers in Functional Urban Areas related sectors
- National authorities in Functional Urban Areas related sectors
- Funding institutions related to Functional Urban Areas support schemes
- Business support/consulting boards, offices for specific Functional Urban Areas

The Ministry of Investment, Regional Development and Informatization (MIRRI SR) is the key national policy maker in Functional Urban Areas related sectors. This ministry plays a crucial role in coordinating and implementing national policies, including the allocation of EU funds for projects aimed at enhancing the competitiveness and quality of life in urban areas. Other relevant bodies include **the Ministry of Foreign and European Affairs** and **the Ministry of Environment**. The country's strategic direction is guided by documents like the Slovakia 2030 –

Vision and National Sustainable Development Strategy, which aims to integrate sectoral and regional policies.

For the **Prešov FUA**, policy implementation is carried out at the regional and municipal levels. The **Prešov Self-Governing Region** (Prešovský samosprávny kraj) and the **City of Prešov** government are the primary local policy makers. They are responsible for creating local development programs that align with national strategies and address the specific needs of the FUA. Collaboration between these entities is crucial for effective planning and project execution, however, the collaboration is sporadic.

FUAs are supported through a layered institutional mix. Policy design is centred in **ministries** (Investments/Regional Development, Economy, Transport) and **VAIA**, which oversee R&I and strategic funding. Managing authorities for **Programme Slovakia** handle calls for urban, transport and RDI investments; **APVV** and **VAIA** fund competitive R&D and commercialization activities. Infrastructure lending and large project co-financing often involve the European Investment Bank, the European Commission's technical assistance, and national development instruments. **At the local level**, **city administrations** and **regional offices** implement ITIs and community projects; innovation intermediaries (tech parks, incubators) provide translation services between research and market. Overall, the system is functional but **uneven**: major FUAs such as Bratislava and Košice have denser support ecosystems, while smaller FUAs depend more on sporadic national programmes and project funding.

While there are national frameworks, business support for specific FUAs like Prešov is often provided by a mix of public and private entities. National business support is available through institutions like the **Slovak Business Agency**, which offers assistance to small and medium-sized enterprises (SMEs) and startups. Regionally, the **Prešov Self-Governing Region** and the **City of Prešov** have their own business development agencies and programs.

Ministry of Investment, Regional Development and Informatization	Email: kontakt@mirri.gov.sk Number: +421 2/2092 8888 Website: https://mirri.gov.sk/en/
Ministry of Economy	Email: minister@economy.gov.sk Number: +421 2/ 4854 1111 Website: https://www.mhsr.sk/en
Ministry of Transport	Email: obcan@mindop.sk Number: 02 / 59 49 43 36 Website: https://www.mindop.sk/en
Ministry of Foreign and European Affairs	Email: info@mzv.sk Number: +421 2/5978 1111 Website: https://www.mzv.sk/en/web/en
Ministry of Environment	Email: info@enviro.gov.sk Number: 02/5956 2306 Website: https://www.minzp.sk/en/about-us/
Prešov Self-Governing Region	Email: predseda@psk.sk Number: +421 51 / 70 81 111 Website: https://psk.sk/en/presov-self-

	governing-region
City of Prešov	Email: mesto.radnica@presov.sk Number: +421 51/3100 154 Website: https://www.presov.sk/
VAIA (Research and Innovation Authority)	Email: vaia@vlada.gov.sk Number: +421 2/209 25 737 Website: https://vaia.gov.sk/en/
APVV (Slovak Research and Development Agency)	Email: agentura@apvv.sk Number: +421 2 572 04 501 Website: https://www.apvv.sk/?lang=en

3.4.2 FUNDA QUESTIONNAIRE for FUA in SLOVAKIA

See ANNEX

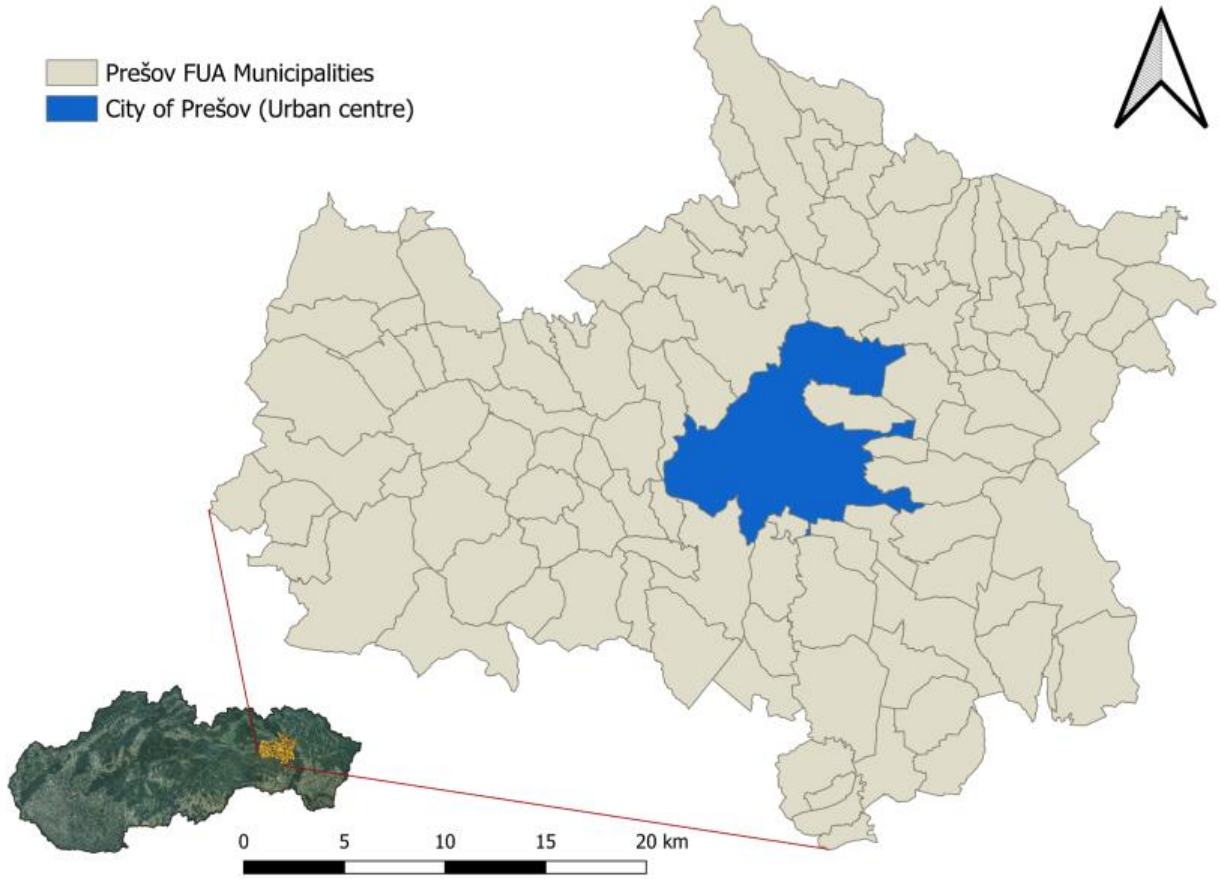

Figure 1. Prešov Functional Urban Area

3.5 The challenges the Functional Urban Areas face to develop

3.5.1 FUAs need to work in a sound working climate to improve the business performance assured by the FUAs

The **Prešov FUA** offers a relatively favourable environment for starting a business. Compared to other Slovak cities, the administrative hurdles for business registration are considered lower. This is bolstered by a network of local support institutions, including the Regional Advisory and Information Centre (RPIC) Prešov and the local Chamber of Commerce and Industry, which provide crucial guidance and resources for entrepreneurs and small to medium-sized enterprises (SMEs).

Furthermore, there is a clear commitment from local and regional authorities to improve the economic landscape. Significant investment in infrastructure, most notably the D1 motorway bypass, is a major step towards enhancing connectivity and logistical efficiency, which is vital for trade and manufacturing sectors. This long-term strategic investment signals a positive outlook for the region's future business potential.

Despite local efforts, the Prešov FUA's working climate is fundamentally undermined by broader regional issues. The most pressing challenge is a **pronounced skills mismatch**. While the region has a higher-than-average unemployment rate, businesses consistently report a shortage of qualified labour, particularly in high-value fields like IT and engineering. This "brain drain" of skilled workers to Bratislava or other EU countries starves local businesses of the talent needed to innovate and grow.

Secondly, the region has historically struggled to attract significant **Foreign Direct Investment (FDI)**. Unlike the western parts of Slovakia, which have benefited from major international investments, the Prešov region has a lower concentration of high-productivity, export-oriented firms. This results in a less dynamic job market and lower overall economic output, creating a difficult environment for businesses to thrive.

3.5.2 Managing Risk and Innovation: the Challenge for Functional Urban Areas

The Prešov Functional Urban Area (FUA) faces a significant challenge in balancing risk management with innovation, a crucial dynamic as it transitions from a traditional industrial base to a knowledge-based economy. This transformation presents both opportunities for growth and risks of failure.

A primary risk for the Prešov FUA is **economic vulnerability**. Unlike western Slovakia, the region has struggled to attract significant foreign investment, leading to lower wages and a higher risk of unemployment. This stagnation fuels the **out-migration of skilled, young people**, a brain drain that depletes the talent pool and hinders future innovation. Another major risk is **fragmented governance**. The lack of a unified administrative body makes it difficult to execute coherent urban and regional development strategies, leading to inefficiencies and the potential for public projects to stall.

Despite these risks, the FUA is proactively building an **innovation ecosystem**. A key opportunity lies in strengthening the link between the **University of Prešov (PU)** and local businesses. By supporting applied research and university spin-offs, the FUA can convert academic knowledge into economic value. The city is also embracing **smart city initiatives**, such as creating a "digital twin" to improve urban planning and service delivery. This effort positions Prešov as a forward-thinking hub, potentially attracting new businesses and talent.

However, these innovation efforts are not without risk. They require substantial investment and a skilled workforce, and a failure to manage these factors could result in significant financial losses. The core challenge for the Prešov FUA is to integrate risk management directly into its innovation strategy. This means moving beyond a risk-averse mindset to one that takes calculated risks. By fostering **public-private partnerships**, the FUA can share the financial burdens and leverage private sector expertise, enabling it to pursue ambitious projects more safely. Ultimately, Prešov's success hinges on a governance model that is both proactive and pragmatic, capable of taking calculated risks to drive sustainable growth while safeguarding against the vulnerabilities inherent in its ongoing transformation.

3.5.3 Benchmarking against leader FUAs, to adopt best practice for specific functions of the FUAs

Functional Urban Areas (FUAs) have become the key scale for understanding and managing modern urban development. They capture how people actually live, work, and move, going beyond administrative boundaries. **Benchmarking FUAs** against European leaders is crucial for identifying gaps, adopting tested practices, and accelerating transformation. For Slovakia, and especially for the **Prešov FUA**, benchmarking provides a pathway to improve governance, sustainability, and competitiveness in line with EU priorities.

Prešov is Slovakia's third-largest city, but unlike Bratislava or Košice, it operates with limited resources and weaker institutional capacity. Its hinterland is characterised by smaller municipalities, commuting ties, and industrial transition. This profile makes it more comparable to **medium-to-small FUAs** in Central and Northern Europe—such as **Oulu (Finland), Maribor (Slovenia), Plzeň (Czech Republic), or Debrecen (Hungary)**—than to large metropolitan centres. That does not mean that they should not learn from metropolitan FUAs.

Benchmarking Prešov against medium FUAs

1. Governance and cooperation

- *Prešov today*: Municipalities cooperate sporadically, mostly through EU-funded projects. No stable governance platform exists.
- *Peer practice*: Maribor and Plzeň have built functional metropolitan partnerships that coordinate transport and spatial planning despite fragmented administrations.
- *Lesson*: Prešov can create a light "FUA council" to coordinate priorities and prepare joint EU funding bids.

2. Mobility

- *Prešov today*: Public transport is available but fragmented; high reliance on cars persists in suburban zones.
- *Peer practice*: Oulu integrates regional bus and cycling networks, with strong digital ticketing and winter cycling infrastructure. Plzeň runs a unified transport company across the FUA.
- *Lesson*: Prešov should expand its SUMP to FUA scale, integrate ticketing across modes, and develop cycling corridors linking the city core to surrounding municipalities.

3. Energy and heating

- *Prešov today*: District heating exists, usually utilizing biomass as a heating source
- *Peer practice*: Reykjavík and other Iceland's municipalities have for years utilized geothermal energy for district heating
- *Lesson*: Prešov can utilize the same approach as surrounding mountain ranges create conditions for implementation of geothermal heating sites

4. Digitalisation and research links

- *Prešov today*: Cooperation with universities is underused, and municipal data is fragmented.
- *Peer practice*: Oulu leverages its university for ICT innovation and smart city pilots. Plzeň has a strong innovation ecosystem linked to its technical university.
- *Lesson*: Prešov can build a small FUA "innovation platform" with its universities, focusing on energy efficiency, mobility data, and digital health.

3.6 Opportunities and obstacles of Functional Urban Areas

3.6.1 Opportunities for Functional Urban Areas - Megatrends: environmental challenges, urbanization & megacities, ageing society, energy demand and sources, changing lifestyle etc.

Prešov Functional Urban Area (FUA) faces several development challenges but also significant opportunities shaped by current megatrends. One of the most pressing issues is **environmental sustainability and air quality**, strongly affected by road congestion and heavy transit flows. The completion of the D1 bypass together with investments in **public transport electrification, bicycle networks, and park-and-ride systems** could substantially reduce emissions and improve mobility within the city. At the same time, strengthening **urban greenery along the Torysa River** and implementing **modern flood prevention and stormwater management systems** would enhance climate resilience and the overall quality of urban life.

As a **regional education and service hub**, Prešov plays an important role for surrounding municipalities, providing access to schools, healthcare, and administrative services. This position offers the opportunity to reinforce its role as a **secondary urban core complementing Košice** within a polycentric urban system. A growing demand for **housing and real estate** creates favorable conditions for **urban renewal projects, brownfield redevelopment, and smart housing solutions**, which could make the city more attractive to both residents and investors.

Demographic change is another significant trend, as the district shows an **increasing share of seniors** and continued outmigration of younger people to Košice or abroad. This opens opportunities in the **silver economy**—notably the expansion of **social care services, telemedicine, senior-friendly housing, and employment in the care sector**—which could both address local needs and create new jobs.

Finally, the FUA is **heavily commuter-oriented**, with strong daily flows from towns such as Vranov nad Topľou, Sabinov, and Veľký Šariš. This pattern highlights the need for a more efficient and integrated transport system. Improving **bus–rail connections**, expanding **cycling routes**, and leveraging the D1 highway together with railway modernization projects could transform Prešov into a more accessible and attractive **logistics and mobility hub** within Eastern Slovakia.

3.6.2 Obstacles for Functional Urban Areas (ex. lack of financial sources, gaps in Functional Urban Areas financing, missing qualified personnel, difficult collaboration with the public authorities, weak collaboration between universities/ research centres and Functional Urban Areas

The Prešov Functional Urban Area (FUA) faces a set of interconnected structural, institutional, and market obstacles that limit its development potential. One of the primary challenges is **limited financing** for mid-sized, FUA-level projects. While EU and national programmes often prioritize larger regional initiatives, smaller municipalities within the FUA struggle to co-finance investments, leaving strategic, such as brownfield redevelopment and social infrastructure projects, largely unrealized.

Skills shortages and brain drain further constrain the local economy. Younger, highly skilled residents frequently migrate to Košice, Bratislava, or abroad, while the district's ageing population increases demand for care services. Local businesses, particularly in technology, engineering, and knowledge-intensive sectors, struggle to fill positions, which reduces investment attractiveness and limits innovation capacity.

Governance and administrative barriers exacerbate these challenges. The multi-level system of municipalities, district authorities, and the regional self-government often produces fragmented decision-making and slow implementation. Smaller municipalities frequently lack capacity to prepare complex EU project proposals or coordinate cross-municipal initiatives, while lengthy permitting procedures and inconsistent planning documents delay investments further.

Although the University of Prešov generates skilled graduates and applied research, **university–industry collaboration remains limited**, particularly among local SMEs with low R&D capacity. This weak linkage reduces knowledge commercialization, innovation absorption, and the FUA's ability to move up value chains in sectors such as precision engineering, green technologies, or digital services.

Infrastructure and mobility gaps are another obstacle. Traffic congestion, especially around the incomplete D1 bypass, coupled with outdated rail networks, reduces intra-FUA mobility and logistics efficiency. Uneven digital infrastructure in peripheral areas also restricts remote work, e-services, and digital upskilling opportunities.

The **labour market and socio-economic vulnerabilities** of the FUA further compound the situation. High unemployment and lower wages compared to the national average limit domestic demand and constrain business growth, while a concentration of low-skill jobs and long-term unemployment restricts the pool of workers available for retraining in emerging sectors.

While **links with Košice offer opportunities**, **the city's economic dominance can draw talent and investment away from Prešov**. Coordination on shared infrastructure and labour markets is underdeveloped. Cross-border collaboration with Poland, Hungary, and Ukraine is constrained by administrative differences and limited targeted funding.

3.7 Functional Urban Areas - SWOT ANALYSIS in SLOVAKIA

Strengths

- **Regional hub**: Prešov serves as an education, healthcare, and administrative center for surrounding municipalities, providing critical services and attracting daily commuters.
- **Industrial base**: Presence of companies like Lear Corporation, Spinea Prešov, ZVL Auto, and Milk-Agro ensures diversified economic activities in automotive, precision engineering, and food production.
- **Human capital and research**: University of Prešov provides skilled graduates and applied research capacity, supporting innovation and workforce development.
- **Connectivity**: Strategic location near D1 highway and rail connections to Košice enhances mobility and logistics potential.
- **Cultural and tourism assets**: Historic city centre, nearby castles, and natural attractions support urban and eco-tourism opportunities.

Weaknesses

- **Limited FUA-scale financing**: Smaller municipalities struggle to co-finance projects, limiting implementation of transport, housing, and infrastructure initiatives.
- **Skills shortage and brain drain**: Young, skilled workers often migrate to Košice or abroad, while an ageing population increases care demands.
- **Weak university–industry linkages**: Collaboration between local firms and University of Prešov is limited, reducing commercialization of innovation.
- **Infrastructure gaps**: Incomplete D1 bypass, outdated rail lines, and uneven digital infrastructure constrain mobility, logistics, and digital services.
- **Fragmented governance**: Multi-level administrative system slows decision-making and complicates cross-municipal project coordination.

- **Lower economic diversification**: dependence on public services, fewer large private sector employers compared to Bratislava or Košice.
- **Weak international visibility** of local firms and university research compared to Košice.

Opportunities

- **Green transition and sustainability**: Electrification of public transport, cycling infrastructure, urban greenery, and stormwater management can improve environmental quality.
- **Urban renewal and housing**: Growing demand for real estate offers chances for brownfield redevelopment, smart housing, and urban regeneration projects.
- **Silver economy and health services**: Expansion of social care, telemedicine, and senior-friendly infrastructure addresses demographic trends and creates jobs.
- **Polycentric urban development**: Strengthening Prešov as a secondary core city complementary to Košice can attract investment and talent, benefitting from a dual-labour pool.
- **Digitalization and service industries**: Start-ups, creative industries, and shared services can be promoted leveraging local graduates and digital infrastructure.
- **Tourism and cultural heritage**: Urban and weekend tourism, combined with proximity to natural and cultural attractions, can diversify the economy.
- **Cross-border cooperation with Poland** (Rzeszów FUA) and Hungary (Miskolc FUA) for logistics, research and cultural projects.

Threats

- **High unemployment and wage gaps**: Lower wages and limited local demand reduce investment attractiveness and economic growth.
- **Demographic Decline and Outmigration of skilled workforce**: Shrinking working-age population, persistent brain drain limits innovation capacity and human capital availability.
- **Limited SME investment capacity**: Small firms' constrained budgets impede adoption of advanced or green technologies.
- **Dependence on Košice**: Economic dominance of Košice may draw talent, investment, and opportunities away from Prešov.
- **Coordination challenges with cross-border regions**: Administrative and regulatory differences with Poland, Hungary, and Ukraine can slow joint initiatives.
- **Environmental risks**: Urban congestion, air pollution, and climate-related hazards (flooding, stormwater management) threaten liveability and development.

Results

The assessment of Functional Urban Areas (FUAs) in Slovakia, with Prešov as a case study, reveals the growing significance of these territories as engines of regional development and as spatial units that better reflect real socio-economic interactions than traditional administrative boundaries. FUAs concentrate employment, education, and services, and in the case of Prešov, this manifests through its role as a hub for public administration, healthcare, education, and emerging IT and engineering services. The Prešov FUA has a diversified base of stakeholders, including universities, innovative SMEs, large manufacturers, municipal and regional authorities, and business support organizations, all of which contribute to shaping local and regional development. The city also benefits from its geographic position along the Košice–Prešov corridor and from cross-border linkages with Poland, Hungary, and Ukraine. EU and national programmes have been instrumental in funding infrastructure, innovation, and social projects, enabling the FUA to align with European cohesion and smart specialization objectives. Nevertheless, structural weaknesses persist: employment opportunities and wage levels remain below the national average, infrastructure investments are lagging, and governance is fragmented, with no permanent metropolitan coordination body. Furthermore, demographic decline, outmigration of young people, and dependence on EU funding limit resilience. Compared to more advanced FUAs such as Bratislava or Košice, Prešov's position is less competitive, yet it holds untapped potential in education-driven innovation, regional service provision, and sustainable urban development.

Conclusions

The Prešov FUA demonstrates both the opportunities and limitations of Slovakia's medium-sized urban areas. To fully realise its potential, greater emphasis must be placed on strengthening metropolitan governance, ensuring effective coordination between Prešov, neighbouring municipalities, and the regional authority. Deepening university–industry collaboration and fostering innovation ecosystems can improve knowledge transfer, while targeted investment in transport links, digital infrastructure, and green transition projects will address critical structural gaps. Prešov should position itself not as a competitor but as a complementary hub to Košice, leveraging shared labour pools and cross-border cooperation with Poland and Hungary to attract new investment. EU and national funding will remain essential, but long-term sustainability requires mobilising local financial resources and enhancing institutional capacity. By tackling governance fragmentation, addressing demographic decline, and integrating into broader European urban networks, the Prešov FUA can shift from a peripheral, underperforming region to a resilient and innovative functional urban centre.

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