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Regional School of Public Administration

BUILDING TOGETHER GOVERNANCE FOR THE FUTURE

Co-funded by the European Union

EMERGING TECH FOR SMARTER PUBLIC ADMINISTRATIONS IN THE WESTERN BALKANS

Contents

Abbreviations

AIIA — Algorithmic Impact Assessment
AI — Artificial Intelligence
AIS — Agency of Information Society (Kosovo*)
AI RMF — (if referenced elsewhere) AI Risk Management Framework (NIST)
C4IR — Centre for the Fourth Industrial Revolution (Serbia)
CBCG — Central Bank of Montenegro
CERT — Computer Emergency Response Team
CMA — Capital Market Authority (Montenegro)
DPIA — Data Protection Impact Assessment
DMA — Digital Markets Act (EU)
DSA — Digital Services Act (EU)
eID — Electronic Identification
eIDAS — Electronic Identification, Authentication and Trust Services (EU regulation)
EDIH/EDIHs — European Digital Innovation Hub(s)
EU — European Union
EU AI Act — European Union Artificial Intelligence Act
EU acquis — Acquis communautaire (the body of EU law and obligations)
FITD — Fund for Innovation and Technology Development (North Macedonia)
GPAI — Global Partnership on Artificial Intelligence
GDPR — General Data Protection Regulation (EU)
GPU — Graphics Processing Unit
HPC — High-Performance Computing
HR — Human Resources (context: government HR platforms/processes)
ICT — Information and Communications Technology
IoT — Internet of Things
LoRaWAN — Long Range Wide Area Network
NAIS — National Agency for Information Society (Albania)
NATO — North Atlantic Treaty Organization
NIS2 — Second EU Directive on Security of Network and Information Systems
NIST — National Institute of Standards and Technology (US)
OECD — Organisation for Economic Co-operation and Development
PPP — Public–Private Partnership
PSD2 — Payment Services Directive 2 (EU)
RAG — Retrieval-Augmented Generation (a method for "retrieval-grounded" AI)
RCC — Regional Cooperation Council
ReSPA — Regional School of Public Administration
SBI — Serbian Blockchain Initiative
SOP/SOPs — Standard Operating Procedure(s)
TTS-MK — Text-to-Speech, Macedonian
UAE — United Arab Emirates
UENC — Unique Electronic Number for Citizens (North Macedonia)
UK — United Kingdom
UNDP — United Nations Development Programme
UNESCO — United Nations Educational, Scientific and Cultural Organization
UX — User Experience
WB — Western Balkans

Introduction

The accelerating adoption of artificial intelligence (AI) and other emerging technologies across the Western Balkans presents both remarkable opportunities and pressing governance challenges. Public administrations in Albania, Bosnia and Herzegovina, Kosovo[1*], Montenegro, North Macedonia, and Serbia are experimenting with AI to improve service delivery, from citizen-facing digital assistants to predictive analytics in taxation and healthcare. Yet, the absence of harmonized governance structures, uneven infrastructure, and skills gaps hinders the translation of pilots into sustained impact.

This study is timely because it addresses a dual imperative: aligning with the European Union's digital and AI frameworks while ensuring that national administrations in the region build the trust, transparency, and resilience necessary for the responsible use of AI. With the EU AI Act on the horizon, Western Balkan governments must prepare not only for compliance but also for seizing the developmental dividends of digital innovation.

Summary

A Region in Motion

The Western Balkans are stepping confidently into the digital future. Governments across Albania, Bosnia and Herzegovina, Kosovo*, Montenegro, North Macedonia, and Serbia are experimenting with artificial intelligence (AI), blockchain, Internet of Things (IoT), and smart city solutions to modernize administration and make governance more efficient, transparent, and closer to the citizen.

Although starting points vary, all six countries share a clear trajectory: alignment with European Union (EU) frameworks, particularly the EU AI Act, coupled with experimentation that is already enhancing services. This is a region not waiting to catch up, but actively shaping its digital destiny.

Administration Snapshots

Albania – Bold Pioneer

Albania stands out as one of the most ambitious reformers. Its e-Albania portal now delivers more than 1,250 digital services to millions of citizens, helping cut red tape and improve accessibility. The launch of "Diella," an AI-powered assistant promoted to oversee procurement, has made global headlines and symbolizes Albania's willingness to push boundaries in digital governance, while procurement oversight remaining under human supervision and supported by mandatory human-in-the-loop safeguards and algorithmic audit trails.

The government is preparing an AI Strategy aligned with the EU AI Act, while simultaneously using AI in EU legal alignment and piloting AI it in customstaxation, translation, and further on in customs, education and healthcare diagnostics. Partnerships with Microsoft and the World Bank bolster Albania's credibility as a regional innovator. Smart city pilots are also underway in 20 municipalities, testing how IoT and AI can improve urban living.

"Albania is proving that bold digital experiments can become global milestones."

1 * *This designation is without prejudice to positions on status and is in line with UNSCR 1244 and ICJ Advisory opinion on the Kosovo Declaration of Independence.*

Bosnia and Herzegovina – Civil Service Optimist

Bosnia and Herzegovina remains at an early stage, hampered by fragmented governance structures, but the civil service is proving highly receptive to innovation. AI training is now part of the official curriculum for civil servants, and surveys show staff view AI as supportive rather than threatening. Municipalities are already experimenting: pilot projects include chatbots for administrative assistance, air quality monitoring systems, and CO_2 emission tracking, often supported by universities and NGOs.

Although there is no national AI strategy and regulatory sandboxes are absent, Bosnia has introduced AI ethical standards into public administration reform plans, and GDPR-inspired personal data protections provide a baseline for safeguards. The administration's opportunities lie in scaling local successes into national frameworks, building on its greatest asset: the optimism and readiness of its civil servants.

"Bosnia's biggest strength is the openness of its civil servants to embrace innovation."

Kosovo– Strong Foundations Builder*

Kosovo* has been steadily investing in the architecture of a digital state. The eKosova portal, launched in 2021, already offers around 300 services. Its upgrade, eKosova 2.0, will add AI-powered case management and life-event services, making interactions more proactive and personalized.

Kosovo* also has a national interoperability platform linking about 50 systems, an upcoming eID and digital wallet, and a government cloud strategy underway. New departments for Data Governance and Innovation within the Agency of Information Society highlight a serious commitment to institutionalizing innovation. An AI Strategy is in preparation, alongside EU AI Act transposition, while early pilots in tax analytics, recruitment, and legislative drafting show how technology can support complex governance tasks.

"Kosovo is laying a digital foundation strong enough to build the state of the future."*

Montenegro – Digital Experimenter

Montenegro combines strong connectivity with a willingness to try bold ideas. With nearly universal 4G, 75% 5G coverage, and over 80% of households online, citizens are well-placed to benefit from new services. The government has launched an Open Data Portal (data.gov.me), making machine-readable datasets available to support future AI applications.

Municipal pilots such as "Superslužbenik" in Podgorica test AI-driven administrative support, while public–private initiatives are exploring AI in healthcare and document processing. Montenegro is preparing its first National AI Strategy (targeted for 2025), building on a UNDP AI Landscape Assessment conducted in 2024. It is also testing fintech innovation through regulatory sandboxes and expanding its blockchain vision. Policymakers are positioning Montenegro as a testbed for digital experimentation, where lessons learned can quickly scale across the region.

"Montenegro shows the power of experimenting — trying, testing, and adapting quickly."

North Macedonia – Inclusive Innovator

North Macedonia has pioneered innovations that combine local identity with digital inclusion. The VezilkaLLM, a Macedonian-language AI model developed by the University Ss Cyril and Methodius, represents a major step toward digital sovereignty and accessibility for low-resource languages. This compact but powerful tool ensures public services are available in the national language, while keeping sensitive data locally governed.

Other pilots include AI-assisted emergency number 112 services, tools supporting visually impaired citizens, and AI-powered participatory urban planning workshops where citizens co-designed greener city spaces. Municipalities are also exploring AI digital twins for climate adaptation and energy transition. With a Ministry of Digital Transformation established in 2024 and 5G rollout underway, North Macedonia is investing in infrastructure to scale these pilots.

"North Macedonia is proving that inclusion and identity can drive digital leadership."

Serbia – Regional Frontrunner

Serbia has taken the most ambitious leap. Its €50 million AI Factory, equipped with a 25 PetaFlop supercomputer, ranks among Europe's most powerful and places Serbia firmly on the global AI map. The administration is also chairing the Global Partnership on AI (2024–2027), underscoring its global influence.

Domestically, Serbia is investing in national data centers, expanding smart city projects in Belgrade, Novi Sad, Niš, and Kragujevac, and strengthening blockchain regulation. The ICT sector already generates $3.9 billion in exports annually. Ethical AI guidelines have been published, and a dedicated AI law is in preparation. For policymakers, Serbia illustrates how strategic investment, combined with international engagement, can translate into genuine leadership in digital transformation.

"Serbia is showing how smart investment can turn ambition into global leadership."

Why This Matters for the Region

The Western Balkans are not passive participants in Europe's digital transformation. Each administration is investing, testing, and building systems that are already reshaping governance. The EU AI Act provides a unifying benchmark, while regional cooperation through ReSPA, RCC, and EU integration platforms allows for shared learning and collective progress.

For regulators and policymakers, the lesson is clear: emerging technologies are no longer future possibilities. They are present realities already driving efficiency, accountability, and citizen engagement. With coordinated leadership, investment in human capital, and stronger governance frameworks, the region can transform pilots into systemic reforms and demonstrate to Europe how smaller states can lead responsibly in the digital age.

"The Western Balkans are on the move, building digital futures that are bold, inclusive, and ready for Europe."

Albania Snapshot: Emerging Technologies

Albania – Key Emerging Tech Achievements

Category	Details
Infrastructure & Innovation	Albania is one of the boldest digital reformers in the Western Balkans. Its e-Albania portal serves as the backbone of e-governance, offering over 1,250 digital services to more than 3.3 million users, covering everything from driving licenses to pension claims. Broadband goals: 1 Gbps for urban households and 100 Mbps for rural homes by 2025, supported by 5G trials since 2019. In response to the 2022 cyberattacks, Albania established a state of the art, modern Governmental Security Operational Centre to monitor and protect all the government systems and infrastructure, and also strongly empowered the National Agency for Cybersecurity to protect critical and important infrastructures.. Albania's Open Data Portal has been developed and enhanced in line with global best practices, improving accessibility and data transparency. while the Government Gateway is currently being upgraded with the latest technologies to enable more efficient inter-agency data exchange.. First, it will support upgrades to the hardware and network equipment in the AKSHI data center hosting e-Albania and GG, alongside the upgrading of primary and secondary business continuity sites supporting cloud migration and integration of existing AKSHI ICT data center infrastructure. Second, it will support the strengthening of interoperability and the GG through two sub-activities: (i) the modernization and adoption of a new GG software solution architecture to facilitate improved inter-operability and digital service delivery; and (ii) supporting the addition of new back-end government systems connected to the GG to strengthen inter-operability and further improve data exchange focusing on priority service delivery "use-cases" (that is, data exchange service interfaces between public sector backend systems for the purpose of delivering a service). Major international partnerships with Microsoft, OpenAI, and the World Bank support AI infrastructure and technical capacity.
Policy & Governance	Albania is finalizing its first National AI Strategy (2025), aligned with the EU AI Act. In 2024, the Council of Ministers adopted AI methodology and technical standards requiring transparency, accountability, and human oversight in high-risk domains like procurement. Law on Electronic Governance created a comprehensive framework for digital services, legally recognized blockchain, and mandated AI integration. Personal Data Protection Law requires Data Protection Impact Assessments (DPIAs) before deploying AI with personal data. Institutional leadership rests with the National Agency for Information Society (NAIS), which coordinates electronic services across government and is impacted by the EU Artificial Intelligence Act.
Use Cases in Public Services	Albania is pioneering with Diella, the AI-powered virtual assistant launched in 2023, which has already processed 2M+ citizen queries. In September 2025, Prime Minister Edi Rama promoted Diella to "AI Minister," making Albania one of the first countries worldwide to assign procurement oversight to an AI system. AI is being piloted in tax analytics, with Microsoft-supported real-time dashboards detecting anomalies in invoices and declarations to combat tax evasion. For EU integration, this system features an advanced AI-powered module designed to simplify and expedite the legislative transposition process. Authorized users can select relevant EU acquis, organized by chapters, and initiate the transposition of specific legal acts. The module supports collaborative workflows, allowing multiple contributors to work simultaneously on the same legal act. Upon starting the process, the system generates an AI-powered translation of the selected acquis, utilizing cutting-edge natural language processing technology. Users can refine and adjust this initial translation to ensure it is accurate and contextually precise. Extensive testing has shown that the AI module achieves an accuracy rate of over 96%, significantly reducing the need for manual translation. After finalizing the translation, the system automatically produces concordance tables, a crucial component in the legislative transposition process. The rollout of this module is structured into two phases: Phase 1: Deployment across ministries and agencies, focusing on optimizing translation workflows and automating concordance table generation. Phase 2: Integration of AI-driven legal analysis to compare EU acquis with existing Albanian legislation. This feature will identify overlaps, gaps, and contradictions, enabling systematic amendments or repeal of conflicting provisions. Developed by Microsoft under a government partnership, the module is built on the ChatGPT 4.0 architecture. It operates within a secure and isolated environment, ensuring compliance with data protection standards while safeguarding sensitive legal documents. The model and the data are hosted and processed in the EU. Using data from Legal Gap Analysis tables, the module categorizes EU acquis by chapter, simplifying selection for employees involved in the integration process. It also enables real-time retrieval of CELEX documents through unique reference numbers, ensuring users have access to the latest legal texts for translation. The module acts as an intelligent assistant throughout the transposition workflow, providing context-aware suggestions, actionable insights, and continuous support. By incorporating AI into the decision-making process, it enhances operational efficiency, reduces errors, and accelerates legislative alignment efforts. This system represents a major technological leap in harmonizing national legislation with EU standards, offering a streamlined, precise, and efficient approach to the transposition process

Preconditions for emerging technologies

Digital infrastructure: by 2025, Albania aimed to provide 100 percent of urban households with broadband speeds of 1 Gbps and rural homes with at least 100 Mbps. Investments in 5G, launched in 2019 with ongoing telecom trials, are aimed at supporting nationwide high-speed connectivity. The government has expanded digital service delivery through the e-Albania portal. Since its launch in 2013, the portal has become the backbone of Albania's e-governance system, offering more than 1,250 services to over 3.3 million registered users, reducing bureaucratic inefficiencies, and expanding citizen access.

Cybersecurity has become a pressing priority, particularly after a wave of sophisticated cyberattacks in 2022 exposed vulnerabilities in national systems. In response, Albania established a state of the art, modern Governmental Security Operational Centre to monitor and protect all the government systems and infrastructure, and also strongly empowered the National Agency for Cybersecurity to protect critical

and important infrastructures to strengthen resilience against digital threats. This institutional reform underscores the recognition that secure systems are essential for introducing AI-enabled public services. The Government has partnered with global actors, including Microsoft, OpenAI, and the World Bank, to accelerate its AI and digital infrastructure agenda.

Data: The new Open Data Portal has been designed to provide citizens, journalists, researchers, and entrepreneurs with an easier and clearer way to find and use the open data produced by public institutions. The new portal has been significantly improved in many aspects and is built according to the standards used in the European Union's open data portal.. The Government Gateway, which underpins inter-agency data sharing, is undergoing a major upgrade to enhance its functionalities. Together, these platforms form the backbone of AI and data-driven governance, enabling more integrated, responsive, and transparent public service delivery.[2]

Artificial intelligence

Policy and governance: Albania has made substantial progress in shaping its AI policy landscape. A National AI Strategy is currently undergoing its final stage of public consultations, involving stakeholders from government, academia, and the private sector to ensure the roadmap is comprehensive and inclusive. In parallel, the Council of Ministers adopted a methodology and technical standards for AI in 2024, marking a notable step forward in formalizing AI governance practices. The national approach emphasizes transparency, human oversight, and accountability, particularly in high-risk use cases such as procurement. These standards draw on international best practices from bodies such as the EU, OECD, NATO, and NIST.

Still, challenges remain. Institutional resistance to change, budget constraints, a shortage of technical talent in the public sector, and ensuring inclusive access (for people with limited digital or technical capacity) are all cited as obstacles. Albania's leadership considers stakeholder engagement, clear vision, workforce development, and ethical frameworks to be critical for scaling AI adoption sustainably.

Albania's Law No. 43/2023, as amended on Electronic Governance creates a broad framework for digital public services, data processing, and electronic document management. It introduces a legal definition of blockchain as distributed ledger technology, and provisions for integrating AI into service delivery. The law anchors its vision in a robust digital infrastructure, comprising the e-Albania portal, government data centers, interoperability platforms, and secure electronic document systems, while assigning the National Agency for Information Society (NAIS) responsibility for coordinating electronic services.[3]

AI applications involving personal data fall under the Personal Data Protection Law, which requires data controllers to conduct a data protection impact assessment before processing.[4]

The lack of transparency standards about how algorithmic decision-making will function in practice creates uncertainty and risks of misuse. Although the government approved a program in late 2023 to review cybersecurity, internet access, and AI standards, no draft acts have been produced or made public, leaving a significant gap between the law's ambitions and its operational reality.[5]

Use cases in public service delivery:

- **AI minister**: AI is playing an increasingly central role in reshaping service delivery. A key driver of this transformation has been the introduction of AI-powered tools. The government's virtual assistant, Diella, launched in 2023 (whose name means "sun" in Albanian), has already handled over one million citizen queries, streamlining access to services ranging from driver's licenses to pension applications. It issues official documents with e-stamps to reduce bureaucratic delays. Originally designed to provide quick responses and reduce reliance on manual help desks, Diella has since evolved into two distinct models: one focused on citizen services and another functioning as a "digital minister" to oversee public procurement. In September 2025, Prime Minister Edi Rama announced that Diella had been promoted to "minister", making Albania one of the first countries in the world to appoint an AI-generated cabinet member. Diella's new mandate is to oversee all public procurement, a sector long plagued by corruption and organized crime. This unprecedented role is subject to significant scrutiny, given its potential impact on algorithmic transparency and accountability.

2 https://www.worldbank.org/en/results/2025/07/03/transforming-institutions-for-inclusive-services-and-human-development-in-albania

3 https://www.ijpl.eu/navigating-the-algorithmic-shift-and-the-legal-implications-of-artificial-intelligence-in-albanias-public-administration/

4 https://www.sharefoundation.info/wp-content/uploads/SHARE_DSA-DMA-AIA-STUDY.pdf

5 https://www.ijpl.eu/navigating-the-algorithmic-shift-and-the-legal-implications-of-artificial-intelligence-in-albanias-public-administration/

- The government is piloting **real-time analytics of electronic invoices and customs declarations** in cooperation with Microsoft, providing officials with dashboards for revenue and taxation oversight. This is intended to detect anomalies and combat tax evasion and financial crime.
- **AI tools are also being leveraged for EU integration**, particularly for legal translation and harmonization of Albanian laws with European legislation (4000 EU acts). These projects, fine-tuned with specialized legal glossaries, have achieved translation accuracies above 96% and around 70% accuracy in detecting inconsistencies.
- **Police also use drones** to monitor traffic and support raids, improving efficiency and safety. Collectively, these examples show AI's growing role in enhancing transparency, efficiency, and alignment with EU requirements.[6]
- With EU funding, Albania plans to develop an **AI-powered radiology system by 2027** to assist doctors in early disease detection and personalized treatment.[7]

Blockchain

Albania has adopted one of the more advanced regulatory regimes for blockchain and cryptocurrencies in the region, through legislation enacted in 2020. Although the local market remains nascent, the clarity and structure offered by the regulation have positioned the country as an early regional adopter of distributed-ledger-technology (DLT) based financial markets.

The cornerstone is Law No. 66/2020, formally titled *"On Financial Markets Based on Distributed Ledger Technology"*, which entered into force on 1 September 2020. This law governs all DLT-based financial market activities conducted within or originating from Albania. Key elements of the law include:

- Classification of digital assets by their function (for example, payment tokens, security tokens, asset tokens) to clarify their regulatory treatment.
- A licensing framework for entities participating in the DLT ecosystem — including exchanges, digital token agents and custodial services.
- Assignment of supervisory responsibility to the Albanian Financial Supervisory Authority (AFSA/FSA) and the National Agency for Information Society (AKSHI) for oversight of licensed activities.
- Incorporation of anti-money-laundering and counter-terrorist-financing (AML/CFT) requirements applicable to virtual-asset service providers.[8]

Regulatory sandboxes

Albania currently has no regulatory sandboxes.[9]

Internet of things/smart cities

In February 2025, Albania partnered with UAE-based Presight to roll out a nationwide AI-powered smart city initiative across 20 cities. The project will modernize infrastructure, improve traffic and emergency management, and enhance public services through an AI-driven management platform and command-and-control center. It positions Albania as a regional leader in applying AI to public administration, supporting its broader digital transformation agenda.[10]

6 https://www.kdz.eu/system/files/downloads/2025-04/AI%20at%20local%20level.pdf

7 https://www.kdz.eu/system/files/downloads/2025-04/AI%20at%20local%20level.pdf

8 https://www.fatf-gafi.org/content/dam/fatf-gafi/fsrb-fur/Moneyval-FUR-Albania-2021.pdf.coredownload.pdf; https://seelegal.org/wp-content/uploads/2021/10/Legal-and-regulatory-framework-in-Albania-regarding-financial-markets-based-on-DLT.pdf

9 https://www.suerf.org/publications/suerf-policy-notes-and-briefs/digital-transformation-of-the-albanian-banking-system-the-results-of-the-albanian-banking-sector-digitalization-survey-2024/

10 https://gulfindustryonline.com/ArticleTA/431211

Opportunities

- Albania sees major opportunities in expanding its AI-driven virtual assistant into a fully transactional platform that can automate entire processes such as business registration, permit applications, and social benefit claims. Achieving end-to-end automation would make Albania a regional leader in digital service delivery and enable knowledge sharing with neighboring countries.
- Another strategic opportunity lies in developing AI models for low-resource languages such as Albanian, which would strengthen localization, improve accuracy, and ensure technological sovereignty.
- Investments in high-performance computing infrastructure would further reduce dependence on external cloud providers, while advanced, specialized training for existing experts would ensure that Albania remains at the cutting edge of AI governance and deployment.

Challenges

- The small number of AI experts in the Government creates a clear bottleneck, and progress will depend on retaining and upskilling this talent pool.
- The reliance on public cloud infrastructure poses sovereignty and security risks until domestic HPC facilities and sovereignty controls are implemented on current public cloud infrastructure are operational..
- On the governance side, while the human-in-the-loop approach has been strong, the deployment of AI in procurement oversight represents a sensitive shift and will need rigorous safeguards.
- Finally, the absence of regulatory sandboxes and blockchain pilots reduces Albania's space for experimentation and innovation compared to regional peers. Addressing these watch-outs will be critical to maintaining momentum in the administration's digital transformation journey.[11]

11 https://balkaninsight.com/2025/09/16/albanias-headline-grabbing-ai-minister-is-a-risky-innovation/

Bosnia and Herzegovina Snapshot: Emerging Technologies

Bosnia and Herzegovina – Key Emerging Tech Achievements

Category	Details
Infrastructure & Innovation	Bosnia and Herzegovina (BiH) is early-stage in digital transformation but has begun laying critical infrastructure. Government has invested in scattered data centers and plans to develop shared service centers and potentially a government cloud, which would reduce costs and improve cybersecurity. Universities and NGOs contribute to innovation through localized pilots in AI and IoT, such as environmental monitoring projects. These foundations provide building blocks for more structured national digital reforms.
Policy & Governance	Although BiH does not yet have a national AI strategy, AI ethical standards are included in revised public administration action plans. AI is recognized as a priority in the Federation of BiH Development Strategy 2021–2027. Training and workshops have been launched to prepare civil servants for AI adoption. The Law on Protection of Personal Data (GDPR-inspired) regulates automated decision-making, requiring human oversight. In Republika Srpska, the Information Security Law mandates AI-related incident reporting to the National CERT. These frameworks, while fragmented, provide an important baseline for future structured adoption of AI.
Use Cases in Public Services	Bosnia and Herzegovina is piloting AI at the municipal and institutional level. Examples include chatbots for administrative assistance, air quality and CO_2 monitoring systems, and energy efficiency IoT applications. Civil service optimism is notable: surveys by the Agency for Human Resources and Civil Service show that public servants largely view AI as supportive rather than threatening. AI training has been incorporated into the official civil service curriculum, signaling readiness for scaled adoption once governance frameworks mature. Universities and NGOs are actively involved, making BiH a hub for experimental but promising pilots in local government services.

Preconditions for emerging technologies

Bosnia and Herzegovina (BiH) faces foundational gaps in digital transformation, particularly at the strategic and institutional level. The administration lacks a dedicated national digital transformation strategy, information society strategy, or AI roadmap, leaving only fragmented activities defined within broader action plans. One such activity is the planned introduction of AI ethical standards in public administration, intended to align with international and EU-recognized principles. The policy environment is further complicated by Bosnia's multi-level governance structure, which makes coordination between the federal, entity, and local levels difficult. Digital identity, interoperability, and data-sharing frameworks remain underdeveloped, and these are widely recognized as prerequisites for structured adoption of AI. Data quality and standardization are major pain points: registries exist across multiple institutions, often with overlapping or inconsistent fields, making large-scale integration very difficult. While government data centers have received some investment, infrastructure remains fragmented. Plans are in place to establish shared service centers and potentially utilize government cloud solutions, which would reduce costs, enhance cybersecurity, and support smaller institutions that currently struggle to maintain their own IT infrastructures. However, institutional capacity is thin. Responsibilities for digital governance are dispersed across ministries, without a single operational agency to drive implementation. This diffusion of responsibility means that while strategic frameworks may exist on paper, execution is often inconsistent.

Artificial intelligence

Policy and regulations: AI policy in BiH remains in its embryonic stage. The administration has no national AI strategy, although a small number of activities, particularly the introduction of ethical standards, are embedded in revised action plans. These standards are envisioned as a formalized part of the public administration, complemented by trainings and workshops for civil servants. Broader legal alignment is limited to GDPR-inspired data protection regulations, but there is no AI-specific legislation. Efforts to draft broader governance frameworks that include AI are still at the discussion stage, with little clarity on timelines.

BiH currently lacks laws specifically regulating AI. Relevant safeguards come through personal data protection. The Law on Protection of Personal Data addresses cases where decisions about individuals rely solely on automated processing, setting conditions for such processing and requiring some degree of human intervention, in line with GDPR principles. In Republika Srpska, the Information Security Law obliges reporting of incidents affecting the public interest to the National CERT, which also covers those involving AI technologies.[12]

The sole explicit reference to AI in current legislation is found in the 2021–2027 Development Strategy adopted by the Parliament of the Federation of Bosnia and Herzegovina. As AI technologies advance, sustained efforts will be required to adapt legal and policy frameworks to keep pace with new challenges and opportunities.[13]

Use cases: Practical adoption of AI has been limited, fragmented, and often experimental. Small-scale pilots, such as the use of chatbots for administrative assistance, exist, but there is no broad or systematic deployment. Research by the Agency for Human Resources and Civil Service recently assessed both the potential of AI in public administration and the perceptions of civil servants. Results were surprisingly optimistic: public servants largely view AI as supportive rather than threatening, and training programs have begun to appear in the official curriculum for civil service education. This suggests a cultural readiness to adopt AI once institutional and policy frameworks catch up. Overall, however, AI remains more of a political talking point than an operational reality, with leaders frequently citing it as a "next big evolution" without concrete implementation plans.

Blockchain

Blockchain has not been prioritized in any national strategy or action plan, and there are no major government-led blockchain initiatives. At most, stakeholders reported a handful of proof-of-concept projects, often at the institutional or academic level. These efforts remain exploratory and disconnected from broader public administration reforms.

Regulatory Sandboxes

No regulatory sandboxes exist in Bosnia and Herzegovina. The absence of such mechanisms limits opportunities for safe experimentation with AI, blockchain, or fintech solutions, and prevents regulators from building hands-on capacity for managing emerging technologies.

Internet of Things / smart cities

IoT and sensor-based projects primarily exist at the local level, particularly in areas related to environmental monitoring and green initiatives. Municipalities and NGOs have experimented with solutions for air pollution monitoring, CO_2 emission tracking, and energy efficiency in public infrastructure. Some universities and research labs have also developed hardware and open-source software to monitor pollution and share data, sometimes incorporating AI for analysis. However, these promising initiatives rarely scale beyond local pilots due to lack of state-level coordination, funding, and institutional support. As a result, IoT and smart city applications remain fragmented, with different standards and technologies deployed across municipalities.

12 https://www.sharefoundation.info/wp-content/uploads/SHARE_DSA-DMA-AIA-STUDY.pdf

13 https://www.kdz.eu/system/files/downloads/2025-04/AI%20at%20local%20level.pdf

Opportunities

Despite the systemic challenges, Bosnia and Herzegovina has clear opportunities. The most immediate lies in human capital, as demonstrated by the positive attitudes of civil servants towards AI and the introduction of AI training into the official curriculum. This readiness creates a foundation for more ambitious capacity-building programs, particularly if combined with regional knowledge-sharing. Another opportunity is in scaling successful local initiatives, such as pollution monitoring or academic projects, by integrating them into national frameworks, thus avoiding duplication and fragmentation. Regionally, BiH stands to benefit from participating in cross-border projects, learning from successful pilots in neighboring countries, and aligning its future strategies with EU policy frameworks.

Challenges

- The lack of coherent strategies, legal frameworks, and central institutional capacity hampers structured adoption of emerging technologies.
- Data decentralization and poor interoperability make large-scale AI deployment difficult, while fragmented IT infrastructures across ministries strain budgets and cybersecurity readiness. Political fragmentation further complicates coordination, as responsibilities are dispersed and often contested. Without a clear lead agency, promising initiatives often stall.
- For BiH, the immediate priority will be establishing strong governance and institutional mechanisms to coordinate fragmented efforts, align them with EU standards, and build upon the optimism and readiness of its civil service.

Kosovo Snapshot: Emerging Technologies*

Kosovo* – Key Emerging Tech Achievements

Category	Details
Infrastructure & Innovation	Kosovo* is steadily building the foundations of a digital state. The eKosova portal (2021) provides ~300 services, and eKosova 2.0 (in procurement) will add AI-driven case management, personalized services, and proactive life-event modules. The national interoperability platform, operational since 2018, links ~50 government systems and is being upgraded to a next-generation framework. A national eID system with electronic signatures, seals, and a digital wallet is set for launch, enabling secure access to services. The backend infrastructure is shifting to the cloud, as the government has signed contracts for a cloud strategy and upgraded its data network. The Agency of Information Society (AIS) has created Data Governance and Innovation departments to institutionalize AI and data-driven innovation. Integrated Service Centers are being piloted to ensure digital services are also accessible face-to-face for citizens who need assistance.
Policy & Governance	Kosovo*'s e-Government Strategy (2023) sets AI as one of six strategic objectives, with a National AI Strategy planned. It is preparing to transpose the EU AI Act, embedding safeguards early. Governance guardrails include restricting AI to retrieval-grounded generation (RAG) over trusted government data and requiring human-in-the-loop oversight for high-impact decisions affecting rights or entitlements. The Digital Agenda 2030 aims for 80% adoption of AI and big data technologies by companies. A National Cyber Security Strategy (2023–2027) includes provisions for AI in strengthening resilience. These efforts show Kosovo*'s ambition to pair AI deployment with governance structures from the outset.
Use Cases in Public Services	Kosovo* is prioritising AI-enabled citizen services. eKosova 2.0 will feature an AI chatbot that functions not only as a Q&A bot but also as a transaction and routing engine across agencies, with proactive life-event pilots (e.g., childbirth case management, launched in March 2025). Other pilots include AI-based tax compliance analytics, AI-assisted recruitment, and AI for legislative drafting and EU acquis alignment. Procurement is also introducing cross-government platforms to unify HR, finance, and project reporting. These initiatives, although early-stage, demonstrate Kosovo*'s commitment to integrating AI into core government workflows. Regionally, Kosovo* participates actively in the Western Balkans Digital Summit, RCC programmes, and EU/UK initiatives, creating strong opportunities for cross-border data and digital identity interoperability.

Preconditions for emerging technologies

Digital infrastructure: The Government is modernizing core rails while keeping service delivery momentum. A national interoperability platform (operational since 2018) already connects ~50 government systems; work has started on a next-generation national interoperability framework and platform, with external consultancy support to frame the upgrade. The e-government portal (eKosova) launched in 2021 and now hosts ~300 services; a major "eKosova 2.0" procurement is underway to add case management, smart applications, and stronger performance, security, and UX. Identity and trust services are also maturing: a national eID platform (electronic identification, signatures/seals, and a digital wallet) is slated for launch within weeks. On the backend, the state is shifting to cloud: contracts were just signed for a government cloud strategy and for upgrading the government data network. To ensure no one is left behind, an Integrated Service Centre model will provide the same digital services face-to-face with assisted support. Finally, a whole-of-government platform is being procured to link planning, execution, and reporting across finance, HR, projects, and assets—creating a shared-services backbone that should reduce duplication and improve cybersecurity.

Data & trust services. Recognizing that "data fuels AI," the government is establishing an enterprise architecture with data as its first pillar. A centralized metadata management platform is onboarding an initial set of ten key registries to catalogue what data exists, improve standards, and prepare for privacy-preserving reuse (including open data for external value creation). Institutional capacity is being expanded inside the Agency of Information Society (AIS) with new Data Governance and Innovation departments, while a digital capacity-building framework will upskill the entire public administration. Trust safeguards are being built in by design (see AI section): retrieval-grounded AI on vetted sources, human-in-the-loop for high-impact decisions, and data-minimization to balance personalization with privacy.

Artificial intelligence

Policy and regulation: In Kosovo*, there are currently no laws or regulations governing the use of AI systems.[14] The Digital Agenda of Kosovo* 2030[15] outlines plans for the administration to become a digital economy. This includes specific goals to increase the adoption of AI and big data technologies among companies to 80% by 2030. AI is currently pursued in an agile, use-case–led manner under the 2023 e-Government Strategy (one of six strategic objectives focuses on innovation). A dedicated AI Strategy is planned to commence this year. Governance guardrails are being scoped in parallel with deployments: solutions must ground outputs in trusted government data (RAG[16] over approved corpora), and human oversight is required where rights and entitlements are affected. The administration is also preparing to transpose the EU AI Act, likely beginning next year. Kosovo*'s National Cyber Security Strategy for 2023–2027 incorporates AI to help strengthen the resilience of digital infrastructure against cyber threats.[17] **Use cases:** Near-term focus is on eKosova 2.0, which will introduce an AI-enabled chatbot designed not as simple Q&A but as a routing and transaction engine across agencies, plus personalization for proactive services as the state scales its life-event model (a childbirth pilot launched in March). Early AI trials also include recruitment workflows, legislative drafting/transposition to accelerate alignment with EU acquis, and tax administration risk analytics to refine compliance oversight. Because several initiatives are just entering procurement or pilot phase, measurable impact data are not yet available.

Blockchain

No blockchain initiatives were highlighted in the government's current digital transformation work. This remains an open space for experimentation once data, identity, and interoperability foundations are fully in place.

Regulatory sandboxes

No formal sandboxes are yet in place. As AI and other frontier tools transition from pilots to production, a cross-agency sandbox (involving data protection and sector regulators) could provide a controlled environment for testing high-impact services, sharpening supervisory capacity, and codifying practical guidance.

Internet of Things / smart cities

The life-event, identity, and interoperability pillars suggest a path toward integrated, sensor-infused services in the future (e.g., proactive eligibility, targeted inspections). However, the current emphasis is on getting identity, data governance, and cross-system connectivity right before scaling into broader smart-city use cases.

14 https://www.sharefoundation.info/wp-content/uploads/SHARE_DSA-DMA-AIA-STUDY.pdf

15 https://me.rks-gov.net/en/blog/public-consultations-held-on-the-kosovo-digital-agenda-2030/

16 RAG, or Retrieval-Augmented Generation, is an AI technique that enhances the capabilities of Large Language Models (LLMs) by providing them with external, up-to-date information from a knowledge base, like a set of documents or databases, before they generate a response. See: https://aws.amazon.com/what-is/retrieval-augmented-generation/.

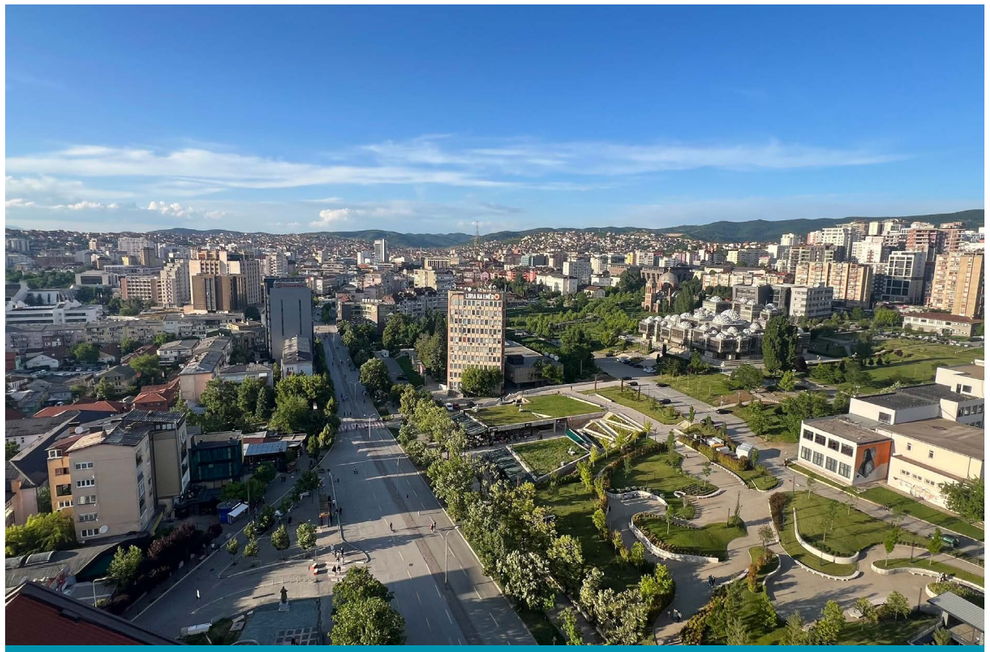
17 https://mpb.rks-gov.net/Uploads/Documents/Pdf/EN/2700/e-Government%20Strategy%20Kosovo%202023-2027.pdf

Opportunities

The Government can convert solid platform investments into user-visible gains by: (1) pushing eKosova 2.0 beyond information into personalized, proactive transactions across life events; (2) operationalizing the metadata platform to standardize, catalogue, and responsibly open high-value datasets; (3) using RAG-based AI to safely accelerate EU acquis transposition and complex casework; (4) scaling risk-based analytics in revenue and compliance; and (5) leveraging capacity-building via ReSPA, as well as UNESCO's public-sector AI competencies' framework and the ITU Digital Academy to rapidly upskill both specialists and frontline officials. Regionally, the administration is active under RCC, the Western Balkans Digital Summit, and EU/UK programmes; all good vehicles for knowledge-sharing, wallet/eID interoperability, and eventually cross-border data collaboration once national governance layers mature.

Challenges

The biggest execution risks sit in data quality and stewardship, which can stall AI and personalization if metadata, semantics, and sharing agreements lag behind service ambitions. Privacy trade-offs will intensify as personalization deepens; establishing clear thresholds, data minimization routines, and DPIA-style checks is essential. As AI touches rights and entitlements, human-in-the-loop must be enforced and auditable. On infrastructure, cloud transition, and network upgrades must be paired with disciplined cybersecurity and vendor management to avoid lock-in and exposure. Finally, without a formal AI Strategy and a lightweight sandbox regime, pilots may outpace policy, leaving agencies uncertain about compliance and risk management, especially as EU AI Act transposition begins.



Montenegro Snapshot: Emerging Technologies

Montenegro – Key Emerging Tech Achievements

Category	Details
Infrastructure & Innovation	Montenegro is branding itself as a digital experimenter, leveraging strong connectivity and bold pilots. The administration already has near-universal 4G coverage, ~75% 5G coverage, and over 80% of households connected to the internet, making citizens well-placed to benefit from AI-driven services. In 2024, the government launched the Open Data Portal (data.gov.me), offering machine-readable public datasets to support future AI applications. Public–private pilots are testing AI in healthcare, permitting, and document processing, while start-up and research ecosystems explore AI in parallel with government reforms. Efforts to improve backend systems include investments in IT upgrades, cloud services, and secure data-sharing platforms, though government-owned national data centers are absent. Municipalities with stronger resources (notably Podgorica) are leading innovation, while smaller ones lag due to limited IT capacity.
Policy & Governance	Montenegro is preparing its first National AI Strategy, scheduled for adoption in late 2025, which will outline priorities for responsible AI use. Current AI regulation relies on the Constitution and the Personal Data Protection Act, with partial alignment to GDPR. A UNDP Artificial Intelligence Landscape Assessment (2024) mapped Montenegro's opportunities and risks, providing a baseline for policy. Broader gaps remain in IP, liability, contracts, and consumer protection law, but policymakers are keen to position Montenegro as a regional testbed for AI and blockchain regulation. Regulatory sandboxes have been created by the Capital Market Authority (CMA) and the Central Bank of Montenegro (CBCG), enabling fintech and blockchain experimentation. A €2B blockchain initiative, supported by Agile Dynamics, aims to develop a sovereign-friendly framework for digital trade, digital ID, and tokenized markets.
Use Cases in Public Services	Montenegro has several notable pilots and early deployments. In Podgorica, the Superslužbenik ("Super Officer") pilot offers AI-powered municipal assistance, designed to eventually process citizen requests end-to-end in natural language. National eGovernment portals deploy chatbots and machine learning tools for administrative workflows like permits and registrations. Public–private partnerships in healthcare combine state institutions, private firms, and innovation fund support to explore AI-assisted diagnostics. The Open Data Portal enables the publication of machine-readable government data, laying groundwork for future AI applications. Municipal "life-event" workflows, such as bicycle permit systems, are being tested to reduce the burdens of document collection for citizens. Regulatory sandboxes support innovative fintech solutions, offering controlled environments for banks and startups. Montenegro's blockchain program also envisions applications in cross-border trade, digital identity systems, and tokenized capital markets, making it one of the most ambitious blockchain agendas in the region.

Preconditions for emerging technologies

Digital Infrastructure: Nearly universal 4G coverage and the ongoing rollout of 5G, which already reaches about three-quarters of the population, provide opportunities for faster, more reliable digital services. With over 80 percent of households connected to the internet and high mobile penetration, the population is well-positioned to take advantage of AI-driven services. Government attention to upgrading IT systems, cloud storage, and secure data-sharing platforms also signals readiness to modernize public administration. Public-private partnerships provide additional opportunities to mobilize investment, extend infrastructure to underserved regions, and enhance resilience through advanced data centers and scalable cloud solutions. There are no government-owned data centers.[18]

Despite these advancements, Montenegro's baseline for digital transformation remains uneven, especially outside the capital and larger municipalities. Core e-services have progressed only where individual leaders and better-resourced local teams have pushed reforms; elsewhere, small municipalities often operate with minimal IT staff and fragmented processes that still require paper printouts, stamps, and duplicate data entry. This creates "double work" for civil servants and might discourage digital and AI adoption. National data-center and cybersecurity ambitions exist, but financing, governance clarity, and operationalization lag, and there is no consistent, whole-of-government approach to shared platforms or enterprise architecture that would raise the floor for all municipalities.

Data & trust services. Data is the principal bottleneck. Key registries are inconsistent, duplicated or contradictory across institutions (e.g., different "official" numbers for the same indicator), and terminology is not harmonized—undermining interoperability and any future algorithmic decisions. GDPR alignment is incomplete and longstanding reforms to the personal data protection framework remain unfinished, leaving privacy and lawful processing on shaky ground. Data literacy is low across much of public administration, with many staff unfamiliar with even basic tools; without clear ownership, stewardship and standard operating procedures for collection, quality control and exchange, the system cannot reliably feed AI or advanced analytics.

Artificial Intelligence

Policy and governance: As of late 2025, Montenegro has no dedicated AI legislation; AI is governed by existing laws such as the Constitution and the Personal Data Protection Act, though these frameworks are limited.

Major gaps remain in areas like intellectual property, liability, contracts, labor, and consumer protection. The current data protection regime is not fully harmonized with the GDPR, creating risks related to how AI handles personal data. Copyright law is also outdated for AI: it lacks provisions for text and data mining for commercial purposes and does not recognize AI-generated works, leaving a significant gap in supporting AI innovation and safeguarding rights.[19]

A national AI strategy is being prepared, with adoption targeted for year-end; a government/working group process exists, but meaningful participation from social services and other frontline domains appears to be limited. There are no currently adopted standards for AI transparency, accountability or impact assessment in the public sector. According to the 2024 UNDP Artificial Intelligence Landscape Assessment (AILA), there is minimal institutional support for transparency, safety, inclusivity, or public accountability.[20]

Mechanisms to challenge algorithmic decisions, perform AI ethics audits, or ensure gender-sensitive and inclusive AI development are underdeveloped. According to key informant interviews, there is no active plan to transpose the EU AI Act; stakeholders expect discussion to follow (or be reflected in) the strategy. Civil society highlights the risk of repeating past digital-reform patterns: drafts revised late, weak consultation, and unclear mandates for implementing bodies; now with higher stakes given AI's rights impacts.

18 https://www.datacenterdynamics.com/en/news/montenegro-to-get-data-center-as-part-of-hungary-infrastructure-deal/

19 https://www.ibanet.org/medias/anlbs-ai-working-group-report-june-2024-19-montenegro.pdf; see also: https://www.sharefoundation.info/wp-content/uploads/SHARE_DSA-DMA-AIA-STUDY.pdf

20 https://www.undp.org/sites/g/files/zskgke326/files/2025-05/eng_undp-aila_montenegro.pdf

Use cases in public service delivery:

Public-sector AI deployments are nascent. A UNDP-supported readiness assessment has mapped opportunities and risks, while isolated public–private pilots are emerging (e.g., a health-sector project combining a public institution, a private company, and innovation-fund support). AI is also applied in public administration through chatbots and automated response systems on eGovernment portals, while machine learning–based document processing tools are used for registrations, permits, and other administrative services. Start-up and research ecosystems are active around AI, but these advances operate in parallel to government, without national guardrails for sensitive data access, model governance, or procurement. The absence of common process redesign means any "AI layer" would amplify existing inconsistencies ("garbage in, garbage out"), particularly in benefits or eligibility determinations.

The Government recently introduced the Open Data Portal, data.gov.me, which makes public sector data freely available in machine-readable formats. Although the portal itself does not deploy AI directly, it lays the groundwork by providing a crucial data infrastructure that can support future AI applications in public administration.[21]

- In Podgorica, authorities have introduced an AI-powered service known as *Superslužbenik* (Super Officer) (asistent.epodgorica.me). This pilot initiative is designed to assist citizens by providing information and responding to queries related to municipal operations. The long-term vision is to create a service that is fully knowledgeable about administrative procedures, enabling residents to describe their needs in natural language. Superslužbenik would then manage the submission process, collect the required information and documentation, and forward the request to the relevant municipal department for further action.

Blockchain

Montenegro is launching a bold national initiative to build a €2 billion blockchain-driven digital economy, positioning itself as a regional hub for innovation and regulation in Southeast Europe. Supported by Agile Dynamics, the effort aims to align policy, infrastructure, and business incentives to create an open, sovereign-friendly, and interoperable blockchain framework that serves both the public and private sectors. Planned applications include cross-border trade, digital identity systems, decentralized finance, and tokenized capital markets to expand access to funding.[22]

Regulatory sandboxes

Montenegro has established regulatory sandboxes through the Capital Market Authority (CMA) and the Central Bank of Montenegro (CBCG) to foster financial innovation. The CMA's sandbox[23] operates under the framework defined by the "Rules on the Regulatory Framework for Financial Innovations," allowing participants to test new financial products under supervision. The CBCG's FinTech Hub serves as a similar innovation center, offering consultations and support for technological advancements in banking and payment services.[24]

Internet of Things / smart cities

Local governments show uneven but promising activity, with some municipalities simplifying internal procedures, improving interoperability, and piloting "life-event"-style services (e.g., bike permit/workflows) that reduce document collection from citizens. These developments lay the groundwork for future IoT deployments by clarifying responsibilities, streamlining steps, and standardizing data flows. Replication will require tailored guidance by municipality size and capacity, not copy-paste blueprints.

21 https://balkaninsight.com/2025/05/29/amid-concern-over-ai-abuse-in-montenegro-lawmakers-play-catch-up.

22 https://www.consultancy.eu/news/12014/montenegro-and-agile-dynamics-explore-how-to-unlock-2-billion-blockchain-economy

23 https://www.scmn.me/images/ENG/Regulation/CapitalMarket/1265-2-19e-2.pdf

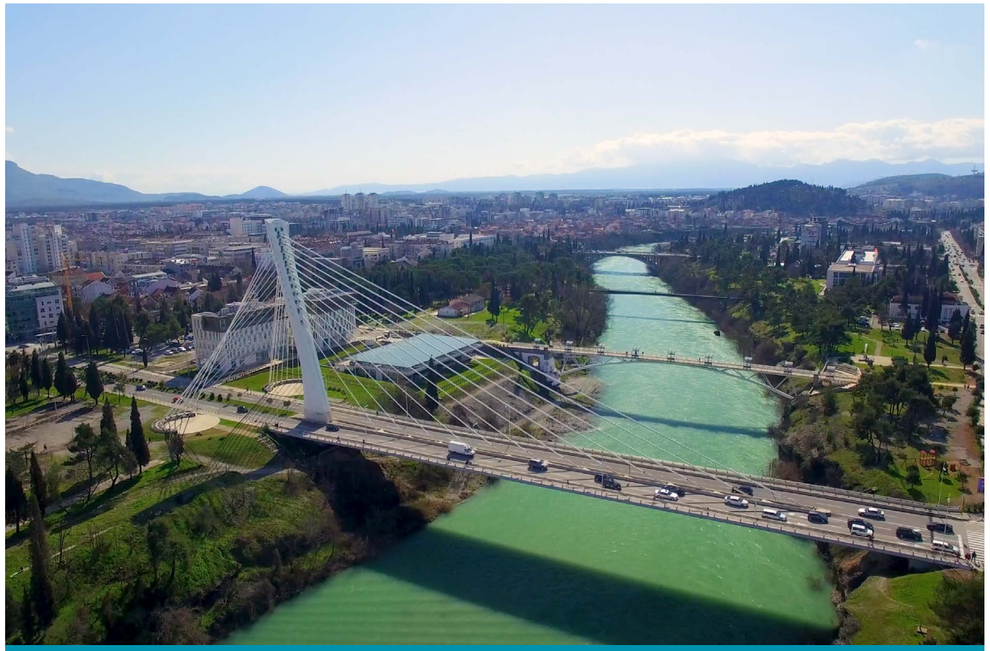
24 https://www.cbcg.me/en/public-relations/news/press-releases/the-cbcg-fintech-hub-regulatory-innovation-centre-established.

Opportunities

- **Get the foundations right:** use the AI strategy to codify data governance (owners, stewards, schemas, quality rules), minimum interoperability baselines, and privacy-by-design—before scaling algorithms into entitlements or enforcement.
- **Municipal first-movers:** document and scale practical municipal playbooks (process maps, checklists, SOPs, role assignments) where reforms already work; pair with targeted grants and shared services so smaller municipalities are not left behind.
- **Capacity building that sticks:** prioritize data literacy for frontline officials, plus role-specific AI competencies (procurement, DPIAs/AIIAs, human-in-the-loop design). Use UNESCO's competency frameworks and similar curricula to socialize rights and risk-based thinking.
- **Public–private partnerships with safeguards:** continue PPP pilots in clearly bounded domains (e.g., health analytics), but require data-access protocols, evaluation plans, redress mechanisms, and external oversight.
- **Regional leverage:** formalize knowledge exchange on "what failed/what worked" (e.g., Serbia's social-cards lesson), align baseline data standards, and pursue joint asks with vendors where the Western Balkans' combined scale improves negotiating power.

Challenges

- **Data quality & interoperability:** without authoritative registries, harmonized semantics, and routine reconciliation, AI will reproduce errors at scale and harm the most vulnerable.
- **Governance gaps:** unclear mandates, late-stage drafting changes, and limited inclusion of frontline domains create accountability vacuums.
- **Rights risk:** deploying eligibility or risk models without transparency, impact assessments, and appeal mechanisms invites discriminatory outcomes and erodes trust.
- **Capacity & financing:** tiny municipal teams and tight budgets demand shared platforms, phased roll-outs, and realistic targets (including modest digital-literacy goals).
- **Premature transposition:** attempts to "rush" complex frameworks (DSA/DMA/AI Act) without institutional readiness will produce paper compliance and operational fragility.



North Macedonia Snapshot: Emerging Technologies

North Macedonia – Key Emerging Tech Achievements

Category	Details
Infrastructure & Innovation	North Macedonia is positioning itself as an inclusive innovator, combining digital identity with local-language AI. In 2024, it launched the Ministry of Digital Transformation, tasked with building national policy, strengthening cybersecurity, and advancing AI adoption. The administration has nearly 100% 5G coverage and 68% of households connected to high-capacity broadband, placing it among the regional leaders in connectivity. Its signature innovation is the development of VezilkaLLM, a 4-billion parameter Macedonian-language AI model, designed by the Faculty of Computer Science and Engineering in Skopje. Unlike generic multilingual tools, it is optimized for a low-resource language, ensuring sovereignty and inclusion. Infrastructure still lacks high-performance computing and advanced data centers, but government digitization efforts continue with interoperability frameworks and a Unique Electronic Number for Citizens (UENC) supporting eID and trust services.
Policy & Governance	A Draft National AI Strategy, prepared by the Fund for Innovation and Technology Development (FITD), is aligned with EU AI Act principles and OECD/UNESCO standards. While not yet adopted, it lays the foundation for responsible and ethical AI use. The Law on Personal Data Protection, harmonized with GDPR, establishes strong safeguards, recognizing biometric data as a special category and mandating open data publication. North Macedonia has also created an interoperability and data exchange framework across legal, semantic, and technical levels, designed to unify government platforms. However, AI-specific legislation is still pending. The government is also leveraging the Digital Europe Programme and European Digital Innovation Hubs (EDIHs) for resources and capacity.
Use Cases in Public Services	North Macedonia is experimenting with AI in ways that blend technology and inclusion. The VezilkaLLM is enabling e-government services in Macedonian, reducing reliance on foreign systems and keeping data locally governed. The 112 emergency system uses AI to transcribe, translate, and triage calls in real-time, improving response times and accessibility. The TTS-MK speech synthesizer, originally developed for the National Union of the Blind, supports visually impaired citizens in accessing services. In urban planning, the UNDP Accelerator Lab with Urbanist AI piloted participatory design workshops where citizens co-created greener city spaces using AI image generation. Municipalities in Skopje, Tetovo, and Bitola are also piloting digital twins for climate adaptation, energy transition, and mobility management. SkopjePulse, an IoT-enabled crowdsourcing platform, provides real-time air pollution data through the MojVozduh mobile app, empowering citizen engagement. Together, these pilots reflect North Macedonia's drive to link AI with accessibility, local identity, and sustainable development.

Preconditions for emerging technologies

North Macedonia is in the early stages of adopting AI in its public sector, with efforts hampered by lagging infrastructure and regulatory frameworks. However, recent governmental and institutional initiatives demonstrate a strong commitment to AI-driven public service modernization, with the establishment of a new Ministry of Digital Transformation in 2024 aimed at accelerating this process. This ministry is responsible for designing national policies, building digital infrastructure, strengthening cybersecurity, and promoting e-governance to create a more efficient and interconnected public administration.

Digital infrastructure: Almost 100 percent of the population has access to 5G coverage, and 68 percent of households are connected to high-capacity fixed networks, placing the administration ~30th globally for mobile broadband speeds. Despite this, North Macedonia lacks the digital infrastructure necessary for advanced AI research and deployment. Critical gaps include supercomputers, modern data centers, and systems capable of processing big data. Equally concerning is the shortage of qualified staff within the public sector to design, manage, and regulate AI systems. Together, these infrastructure and human capacity deficits severely limit the administration's readiness to adopt AI solutions at scale in public service delivery.[25] The central government continues to digitize services; however, various digital readiness assessments indicate that hybrid/cloud growth will benefit from clear data classification and robust security controls to facilitate broader adoption across government agencies. [26]

Data and trust services: The administration has introduced an EU-modeled interoperability and data exchange framework, covering legal, organizational, semantic, and technical dimensions, which is gradually being adopted across the administration. However, to fully realize its potential, more agencies must connect their systems and replace outdated legacy software that limits seamless data flows. A second critical pillar is the rollout of a National Digital Identity Service, aligned with eIDAS standards, supported by the Unique Electronic Number for Citizens (UENC).[27]

Artificial intelligence

Policy and regulation: Public stakeholders view AI as a lever for enhancing service quality, while also flagging risks (such as bias, privacy concerns, and job displacement) and emphasizing the need for safeguards and accountability. A working group, initiated by the Fund for Innovation and Technology Development (FITD), was established in 2021 to create North Macedonia's first national AI strategy. The draft strategy aims to align with EU standards and establish a framework for the development of ethical and responsible AI; however, it has not yet been adopted. North Macedonia has no laws directly regulating AI. On the data governance front, the administration has introduced a GDPR-aligned Law on Personal Data Protection[28] alongside mandates for open data publication, creating a legal foundation for transparency and accountability. Relevant provisions of the Law on Personal Data Protection explicitly recognize biometric data as a "special category of personal data," making it applicable in cases such as post-remote biometric identification within AI systems.[29] However, uptake and consistent application of these frameworks vary significantly across institutions, with uneven awareness and capacity limiting their full impact. North Macedonia scored 18.14/100 on the Global Index on Responsible AI, among the lowest in Europe, indicating weak frameworks, limited governance capacity, and minimal human rights safeguards in AI use.[30] The legal framework also lacks resolution on intellectual property for AI-generated works and the use of datasets for AI learning.[31]

Use cases in public service delivery: AI interest spans public services, telecom optimization, and finance; however, government agencies and private sector stakeholders require assistance with data governance, privacy-by-design, risk/impact assessment, and monitoring and evaluation (M&E) to scale responsibly.

- The UNDP Accelerator Lab in North Macedonia, working with Urbanist AI, has introduced an innovative approach to public consultations in urban planning by integrating an AI-powered image generation tool. In a one-day workshop in Skopje, participants from government, civil society, academia, and the wider community collaboratively used the tool to design visual proposals for transforming public spaces, with a focus on mitigating micro-heat island effects. This participatory process not only empowered citizens to directly shape ideas for greener, cooler urban environments but also generated a diverse set of creative options for three specific locations in the city. By combining technology with inclusive engagement, the initiative demonstrates how AI can enhance transparency, creativity, and public trust in decision-making around urban development.[32]
- VezilkaLLM, a 4B parameter Macedonian language model developed by the Faculty of Computer Science and Engineering in Skopje, represents a major step toward digital inclusion and sovereignty by bringing cutting-edge AI capabilities to a low-resource language. Unlike generic multilingual systems, it is trained specifically for Macedonian, enabling fluent, accurate handling of grammar, vocabulary, and long-form text while remaining compact and efficient enough for deployment on modest infrastructure. For public administration, this is significant: it enables more inclusive and accessible e-government services in the national language, strengthens citizen engagement, reduces reliance on foreign platforms, and ensures sensitive data remains locally governed. Beyond service delivery, the model fosters domestic AI expertise, opening pathways for innovation in legal, educational, and healthcare applications, and positioning Macedonia as a regional leader in AI tailored for low-resource contexts.[33]
- One of the few areas where AI has been piloted in the public sector is the 112-emergency number system, which uses AI to support real-time call analysis, transcription, and translation. However, full implementation remains limited due to insufficient funding, lack of a comprehensive legal and technical framework, and unresolved privacy concerns. Projects of this kind, which handle sensitive personal data, require systematic privacy and data protection impact assessments, a practice not yet established in North Macedonia.[34]
- Assistance for citizens with disabilities: As early as 2012, projects like the TTS-MK speech synthesizer were developed for the National Union of the Blind, demonstrating an early commitment to using AI to improve public services for vulnerable populations.
- Municipalities are exploring AI for citizen services (chatbots, digital assistants), urban planning, mobility, and administrative automation, but face challenges in implementation, such as lack of local datasets, limited AI literacy, and the absence of municipal-level AI guidelines. Municipalities are also exploring AI-driven digital twins for urban planning, energy transition, and climate adaptation.[35]

Blockchain

At the municipal level, interest in blockchain exists for urban planning and healthcare pilots, but projects remain nascent.[36]

Regulatory sandboxes

The National Bank has created an "innovation gateway" to engage with fintech developers. It is also expanding coordination with other national regulators, partly to prepare for EU membership and Payment Services Directive 2 (PSD2) compliance.[37]

Internet of Things/smart cities

The deployment of 5G networks is key to supporting large-scale IoT applications. North Macedonia has made significant progress, and its digital development goals include covering all towns with an uninterrupted 5G signal by the end of 2027.

- In Skopje, a crowdsourcing platform called SkopjePulse was developed to monitor environmental data and address the city's air pollution problem. The IoT platform uses a LoRaWAN sensor network to provide citizens with real-time data on pollution levels via the MojVozduh mobile app.[38]
- Smart city pilots in larger municipalities (Skopje, Bitola, Tetovo) include mobility management, e-services portals, and energy efficiency.[39]

25 The performance audit by the State Audit Office (Државен Завод за Ревизија – ESA/DZR) of North Macedonia, titled "Opportunities for the Use of Artificial Intelligence in the Public Sector.", which covers the period 2018–2023 and was published in 2025. It provides an in-depth review of state and donor-supported AI projects, their outcomes, and the structural barriers preventing AI adoption in the public sector. Available at: https://dzr.mk/sites/default/files/2025-08/KRI_RUS_Vestacka_intelegencija_FINAL.pdf

26 https://www.undp.org/sites/g/files/zskgke326/files/2024-01/dra_mk_06.pdf; https://ec.europa.eu/assets/rtd/eis/2025/ec_rtd_eis-country-profile-mk.pdf

27 https://www.undp.org/sites/g/files/zskgke326/files/2024-01/dra_mk_06.pdf

28 https://www.dlapiperdataprotection.com/index.html?t=law&c=MK

29 https://www.sharefoundation.info/wp-content/uploads/SHARE_DSA-DMA-AIA-STUDY.pdf

30 https://www.global-index.ai/

31 https://www.kdz.eu/system/files/downloads/2025-04/AI%20at%20local%20level.pdf

32 https://www.undp.org/acceleratorlabs/blog/demystifying-ai-monolith-sustainable-development-part-1

33 https://huggingface.co/finki-ukim/VezilkaLLM

34 https://dzr.mk/sites/default/files/2025-08/KRI_RUS_Vestacka_intelegencija_FINAL.pdf

35 https://www.kdz.eu/system/files/downloads/2025-04/AI%20at%20local%20level.pdf

36 https://www.kdz.eu/system/files/downloads/2025-04/AI%20at%20local%20level.pdf

37 https://www.nbrm.mk/porta-za-inovacii-en.nspx

38 https://www.itu.int/hub/2020/02/how-skopje-north-macedonia-is-using-innovative-tech-to-clean-up-air-pollution

39 https://www.kdz.eu/system/files/downloads/2025-04/AI%20at%20local%20level.pdf

Opportunities

- Early pilots have shown promise in case triage, document intake, and multilingual digital assistants that can expand citizen access. These pilots could be paired with algorithmic and data protection impact assessments, along with strong monitoring and evaluation mechanisms to ensure accountability.
- Accelerating interoperability onboarding across ministries, improving data quality, and adopting privacy-preserving analytics can unlock more effective use of information in social protection, health, and tax/customs services. This requires not only technical standards but also institutional incentives to connect legacy systems and safeguard citizen trust. Parallel investments in secure cloud and DevOps practices, anchored in a clear data classification policy, would support hybrid deployments that balance resilience and security.
- A national digital skills program with advanced tracks in machine learning and data science would cultivate the talent pool needed to sustain AI adoption. Targeted access schemes, such as providing devices and connectivity for older citizens (60+) and rural communities, could ensure that digital transformation is not exclusionary. Dedicated pathways for women in technology would also expand diversity in the sector.
- Leveraging the Digital Europe Programme and European Digital Innovation Hubs (EDIHs) could provide the financial and technical resources to scale pilots into mature services. Municipal innovation hubs, supported by EU funding, could serve as testbeds where local authorities trial AI-enabled solutions before nationwide rollout.

Challenges

- Affordability of devices and persistent digital skills gaps continue to limit the broad adoption of AI. Uneven local capacity further slows the pace of implementation.
- While awareness of AI ethics and impact assessments is growing, their use across ministries remains inconsistent. Embedding these practices more systematically will be essential for responsible AI deployment.
- North Macedonia also lacks a national AI strategy, legal framework, and coordinating institution, leaving public bodies without clear guidance or accountability mechanisms. Privacy safeguards and impact assessments are sporadic, and oversight bodies face resource constraints.
- Finally, some prominent AI initiatives have struggled with sustainability. The ADA digital assistant, launched in 2023, became non-functional within two years due to lapses in maintenance, while the open data portal has been inactive since early 2025. These cases underscore the importance of long-term planning and continuity in government-backed AI projects.[40]

40 https://dzr.mk/sites/default/files/2025-08/KRI_RUS_Vestacka_intelegencija_FINAL.pdf

Serbia Snapshot: Emerging Technologies

Serbia – Key Emerging Tech Achievements

Category	Details
Infrastructure & Innovation	Serbia has positioned itself as a regional frontrunner in AI infrastructure. In 2025, it launched a €50M AI Factory equipped with a 25 PetaFlop BullSequana XH3000 supercomputer, 300 GPUs, and 2.5 petabytes of storage, integrated with generative AI models from Mistral AI. This facility, part of the *Leap into the Future – Serbia 2027* program, provides academia, government, and businesses with cutting-edge resources. Earlier investments include the National Data Center in Kragujevac (Nvidia-powered) and the AI Research Institute (established 2021), the first in Southeastern Europe. In 2022, Serbia opened the Centre for the Fourth Industrial Revolution (C4IR Serbia) in partnership with the World Economic Forum, focusing on AI and biotech in healthcare. The ICT sector employs ~110,000 people, generates $3.9B annually in exports, and has grown over 26% per year for a decade, making it the administration's largest net exporter. Mobile networks cover >90% of the population, though fixed broadband penetration is only 18%. A 5G spectrum auction is planned for late 2025.
Policy & Governance	Serbia adopted its first Strategy for AI Development (2020–2025) framing AI as a driver of economic growth, education, and digitalization. A new AI Strategy is under preparation, expected to strengthen regulatory and ethical frameworks. In 2023, it issued Ethical AI Guidelines promoting transparency, fairness, dignity, harm prevention, and human oversight — but compliance is voluntary. A draft AI Law is being developed to create binding rules, while a Draft Law on Information Security (2023) aims to align with EU's NIS2 directive, expand the role of CERT, and protect critical infrastructure. Serbia chairs the Global Partnership on AI (2024–2027) and is hosting GPAI summits in Belgrade, signaling global ambition. Current cloud regulations require government data to remain in domestic data centers, limiting use of international providers.
Use Cases in Public Services	Serbia is piloting AI across key sectors. In healthcare, applications are expanding in diagnostics and planning. In energy, the Electric Power Industry of Serbia uses AI for electricity demand forecasting, cutting prediction times and errors. The Tax Administration is preparing AI collaborations with the University of Novi Sad to detect income tax evasion risks. Serbia also leads in Smart Cities, with Belgrade, Novi Sad, Niš, and Kragujevac deploying projects in lighting, mobility, and city cloud/data integration. On blockchain, the Serbian Blockchain Initiative (2018) and the Law on Digital Assets (2020) created a robust regulatory framework, supporting licensed crypto exchanges and boosting confidence in digital finance. Serbia also hosts a thriving gaming industry linked to blockchain applications.

Preconditions for emerging technologies

Digital transformation and emerging technologies are at the core of Serbia's economic strategy. The Government has committed more than $70 million to AI and related research, while also elevating its international profile by chairing the Global Partnership on AI (GPAI) from 2024 to 2027 and hosting annual GPAI summits in Belgrade. These moves underscore Serbia's ambition to shape global AI governance while accelerating domestic innovation.

Digital infrastructure: Mobile networks are widely available, with 3G and 4G coverage reaching over 90 percent of the population, providing a solid foundation for digital services. However, fixed broadband penetration remains limited at just 18 percent, reflecting persistent challenges in expanding high-capacity infrastructure to households and businesses. Looking ahead, the administration plans to hold its 5G spectrum auction in the fourth quarter of 2025.[41]

Digital and AI skills: the ICT sector is now the administration's largest net exporter, generating $3.9 billion in exports in 2023 and sustaining annual growth of over 26 percent for a decade. Employing around 110,000 people, the sector spans software development, data services, gaming, customer support, and advanced research. This economic strength provides a foundation for scaling AI and digital services across both public and private domains.

41 https://datahub.itu.int/data/?i=20631&e=SRB; see also: https://www.trade.gov/country-commercial-guides/serbia-digital-economy

AI institutions and data centers: In 2021, it established the first AI Research Institute in Southeastern Europe. This was followed by the launch of the National Data Center in Kragujevac, equipped with a powerful Nvidia supercomputer accessible to public and private users, with a second machine planned by 2025. The establishment of the Centre for the Fourth Industrial Revolution (C4IR Serbia) in 2022, in partnership with the World Economic Forum, further reinforced this momentum by focusing on AI and biotechnology applications in healthcare. The most ambitious step came in April 2025 with the announcement of a €50 million partnership with Eviden (Atos Group) to build a National AI Factory. Developed under the "Leap into the Future – Serbia 2027" program and led by the Office for IT and eGovernment, the initiative will establish a Centre of Excellence featuring a BullSequana XH3000 supercomputer capable of 25 PetaFlops, 300 GPUs, and 2.5 Petabytes of storage. Integrated with generative AI models from Mistral AI, the facility will offer academia, businesses, and government institutions cutting-edge resources, tools, and expertise. With applications across healthcare, energy, transportation, and public administration, the AI Factory is set to expand national AI capacity and strengthen Serbia's digital autonomy, cementing its position as a frontrunner in AI development in Southeast Europe.[42]

Artificial Intelligence

Policy and regulation: The Strategy for AI Development 2020–2025 framed AI as a driver of economic growth, education, and digitalization. A new AI Strategy 2024–2030 is under adoption, expected to expand regulatory, ethical, and institutional frameworks. Serbia's AI governance is based on soft law. The 2023 Ethical Guidelines, an output of the AI Strategy 2020–2025, set principles of explainability, dignity, fairness, and harm prevention, along with conditions for responsible AI (supervision, safety, data protection, transparency, equality, and accountability). Compliance is voluntary, assessed through recommendations and a questionnaire. The Guidelines take a risk-based approach, flagging high-risk AI systems but not banning any. Personal data rules follow GDPR-style protections, with mandatory impact assessments. No binding rules exist yet for general-purpose AI or biometric ID. Institutions include the AI Institute (research-focused, no regulatory powers). A working group is drafting a dedicated law for AI. Currently, no sanctions or mandatory conformity assessments are in place—oversight remains voluntary.[43]

Cybersecurity and data governance remain central enablers of AI. In 2023, Serbia introduced a Draft Law on Information Security, designed to align national frameworks with the EU's NIS2 Directive.[44] The law envisions the creation of an Office for Information Security, an expanded role for the national CERT, and new obligations for critical infrastructure operators in energy, finance, healthcare, ICT, and utilities. A series of high-profile cyberattacks on state entities, including the Electric Power of Serbia and the Public Land Registry, exposed vulnerabilities and reinforced the urgency of reform.

Cloud regulation is another key issue. Current laws require that all government data be stored in domestic data centers, restricting the use of global cloud providers. Oracle has adapted by localizing services through a private data center within Kragujevac's state-owned facility. However, regulatory reforms, particularly in data classification, will be crucial to enabling the adoption of hybrid and cross-border clouds that support advanced digital services.

Use cases in public service delivery:

- Healthcare applications are growing, supported by C4IR.
- Electric Power Industry of Serbia - This public enterprise is employing AI to enhance its electricity demand forecasting. By integrating machine learning analytics, the company has improved its ability to predict electricity consumption, reducing both prediction time and error margins.[45]
- Tax Administration - A collaboration with the University of Novi Sad is in preparation to utilize AI for risk detection of personal income tax evasion.[46]

42 https://www.techmonitor.ai/ai-and-automation/eviden-deal-establish-serbias-national-ai-factory/

43 https://www.sharefoundation.info/wp-content/uploads/SHARE_DSA-DMA-AIA-STUDY.pdf; https://www.schoenherr.eu/content/ai-regulation-and-development-in-serbia

44 https://zuniclaw.com/en/new-law-on-information-security/

45 https://www.kdz.eu/system/files/downloads/2025-04/AI%20at%20local%20level.pdf

46 https://www.kdz.eu/system/files/downloads/2025-04/AI%20at%20local%20level.pdf

Blockchain

The Serbian Blockchain Initiative (SBI), established in 2018, has played a central role in advancing domestic expertise, pushing for regulatory clarity, and elevating Serbia's profile on the global blockchain stage. Government interest is growing in exploring blockchain applications in sectors such as healthcare and urban planning, pointing to opportunities for public sector innovation. Serbia adopted a comprehensive Law on Digital Assets in 2020, creating a formal regulatory framework for the domestic operation of licensed crypto exchanges. This legal foundation has strengthened investor confidence and positioned Serbia as a regional leader in digital finance. The administration has also developed a thriving gaming industry, with more than 70 companies and over 1,500 employees. Serbia's gaming sector is home to major players such as Nordeus, acquired by U.S. giant Take-Two Interactive 3Lateral, and blockchain-linked gaming ventures like GameCredits.[47]***Blockchain***

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Regulatory sandboxes

Serbia has established two regulatory sandbox frameworks to foster innovation. The FinTech sandbox allows novel payment technologies to operate under supervisory oversight within a controlled market environment, without requiring full regulatory registration.

The MedTech sandbox enables the expedited importation of unregistered medical devices for research and development purposes, provided the startup is listed in the National Innovation Registry.[49]

Internet of Things/smart cities

Serbia is advancing a range of Smart City initiatives in Belgrade, Novi Sad, Niš, and Kragujevac, including smart lighting, urban mobility systems, public Wi-Fi, and city cloud/data center infrastructure. Part of this has been the deployment of "Safe City" programs in cooperation with Huawei, starting around 2017, which integrate video surveillance, traffic monitoring, license-plate recognition, and increasingly facial recognition across public spaces. In Kragujevac, for example, public transport data is being integrated into digital systems and city cloud features are being adopted.[50]

47 https://www.trade.gov/country-commercial-guides/serbia-digital-economy

48 https://www.trade.gov/country-commercial-guides/serbia-digital-economy

49 https://innovations.serbiacreates.rs/

50 https://www.trade.gov/country-commercial-guides/serbia-digital-economy

Opportunities

- **Cutting-edge AI infrastructure:** The launch of the €50M AI Factory with a supercomputer and integration of generative AI models creates a powerful platform for research, innovation, and public sector applications in healthcare, energy, taxation, and urban planning.
- **Policy leadership & international visibility:** By chairing the GPAI and hosting annual GPAI summits, Serbia strengthens its influence in global AI governance.
- **Public service applications:** AI pilots in healthcare (diagnostics and planning), electricity demand forecasting, and tax administration risk detection highlight scalable use cases that can increase efficiency, reduce costs, and improve citizen services.
- **Blockchain:** Early adoption of the Law on Digital Assets (2020) positions Serbia as a regional leader in blockchain regulation, opening opportunities for blockchain-based public sector innovation in healthcare, urban planning, and digital finance.
- **Smart cities & IoT:** Ongoing projects in Belgrade, Novi Sad, Niš, and Kragujevac, including smart lighting, mobility systems, and city cloud platforms, provide a testbed for AI- and IoT-powered solutions in sustainable urban management.
- **ICT sector strength:** With 110,000 employees and $3.9B in exports, Serbia's ICT sector provides a strong talent base and private-sector drive to accelerate AI adoption in both domestic and international markets.

Challenges

- **Regulatory gaps: C**urrent AI governance relies on soft law (non-binding Ethical Guidelines), with no mandatory conformity assessments or sanctions yet in place. The draft AI Law remains under preparation, leaving oversight fragmented.
- **Data governance & cloud restrictions:** Mandatory localization of government data in domestic data centers limits the use of global cloud services. Without reforms in data classification and cross-border data flows, adoption of advanced cloud-enabled digital services could stall.
- **Ethical & privacy concerns:** Deployment of Safe City (including video surveillance and facial recognition) raises risks of privacy violations and potential misuse, challenging Serbia's compliance with EU standards and human rights obligations.
- **Skills mismatch:** While the ICT sector is thriving, AI-specific skills (e.g., data science, ethics, and cybersecurity) are unevenly distributed. Public administration may struggle to retain qualified talent, slowing institutional uptake of AI solutions.

Future Trends

Future Trends in AI Governance for Public Administrations

Trend	Description	Implications for Western Balkans Public Administrations
Generative AI	Large models producing text, images, and code to automate citizen services, translation, and legal harmonization.	Can boost efficiency (e.g., document processing, citizen queries), but requires safeguards against bias, misinformation, and over-reliance on automated outputs.
Agentic AI	Autonomous systems capable of planning and executing multi-step tasks with minimal human input.	Potential to transform workflows in procurement, auditing, and crisis management. Raises urgent governance needs for accountability, liability, and human-in-the-loop oversight.
AI Infrastructure	Investments in HPC, national data centers, and cross-border data platforms to support AI development and deployment.	Essential for digital sovereignty and reducing reliance on foreign providers. Regional collaboration could accelerate progress, but requires harmonized data classification and cybersecurity standards.

Conclusion

The Western Balkans present a mosaic of progress and gaps in adopting emerging technologies. Albania is testing the boundaries of AI governance by appointing an AI-powered assistant as a "minister" for procurement, but this bold step risks outpacing safeguards and transparency mechanisms. Bosnia and Herzegovina has yet to move beyond fragmented pilots, although the optimism of its civil service provides a platform for growth once strategies are consolidated. Kosovo* has laid solid foundations with interoperability and digital ID and is well-positioned to embed safeguards early as it drafts its first AI strategy and transposes the EU AI Act. Montenegro is investing heavily in blockchain and smart city initiatives, but the lack of GDPR alignment, inconsistent registries, and limited institutional capacity undermine scalability. North Macedonia has produced innovations such as the VezilkaLLM language model and AI-enabled emergency response systems; however, failures in sustaining projects like the ADA assistant and open data portal reveal weaknesses in execution and governance. Serbia has emerged as a regional leader, investing in a €50 million AI Factory, supercomputing capacity, and international AI governance leadership, yet its reliance on soft-law guidelines, privacy concerns from Safe City surveillance, and failures such as the Social Card welfare system show that infrastructure and ambition must be matched by rigorous oversight.

Taken together, these experiences underscore the region's dual imperative: to align with the EU AI Act and broader European digital frameworks while simultaneously addressing the administration-specific governance, data, and institutional weaknesses. Without clear accountability, strong impact assessments, and inclusive governance, pilot projects risk becoming isolated experiments rather than systemic reforms. To ensure emerging technologies enhance public administration rather than erode trust, the region must prioritize coordinated strategies, harmonized data and privacy frameworks, investment in human capital, and mechanisms for accountability. Regional collaboration offers the opportunity to share lessons, pool resources, and engage collectively with technology vendors, ensuring that innovation translates into sustainable and trustworthy public services.

Annex I: Public Sector KII Questionnaire

Methodological Note

Artificial Intelligence (AI) is transforming how governments deliver services, regulate sectors, and engage with citizens. However, the ability of public administrations to adopt AI responsibly varies greatly. This questionnaire is designed to assess the AI readiness of government agencies across six critical dimensions: Vision and Governance, Digital Infrastructure, Data Ecosystem, Talent and Skills, Innovation and Industry Development, and Ethics, Safety, and Public Trust.

By using Key Informant Interviews (KIIs) with structured but conversational questions, the tool collects concrete evidence on policies, budgets, institutional practices, and implementation realities in AI. The findings provide a baseline for national AI governance, guide capacity-building, and ensure alignment between digital transformation goals and responsible AI adoption.

General Instructions

- Use plain, conversational language.
- Explain technical terms when asking.
- Use probing questions like "Can you give an example?", "How often does this happen?", or "Is this implemented or just on paper?"
- Write down quotes verbatim when meaningful.
- Confirm whether policies are operational or in development.

Dimension 1: Vision and Governance

This dimension evaluates whether the public sector has a clear, coherent direction for AI, supported by formal strategies, effective leadership, and robust coordination mechanisms. It assesses the existence and quality of implementation plans, budgeting, monitoring, and alignment with wider government priorities. Evidence typically includes written policies, mandates for coordinating bodies, meeting records, budget lines, and performance indicators.

1.1 National AI Strategy

- Is there a formal AI strategy at national or sectoral level?
- Has your organization been involved in implementing or aligning with this strategy?
- Is the strategy written and accessible, or only expressed as general intentions?

1.2 Designated AI Coordination Body

- Is there a formal group, task force, or committee overseeing AI at national or sectoral level?
- If yes, who leads it, and how frequently does it meet?

1.3 Inter-organization Coordination

- Does your organization coordinate with other ministries or agencies on AI-related matters?
- Are there mechanisms such as joint working groups, memoranda of understanding, or shared projects?

1.4 Implementation Frameworks & Financing

- Does your administration have a workplan or roadmap for AI-related implementation?
- Is there a dedicated budget or allocation of resources?
- Are there monitoring systems or performance indicators in place?

1.5 Alignment with Broader Development Goals

- How does your administration align AI activities with broader development strategies or sectoral plans?
- Are AI projects integrated into wider government planning?

1.6 Stakeholder Engagement

- Do you consult with universities, private sector, or civil society organizations when designing or implementing AI projects?
- How frequent and inclusive are these consultations?
- Has stakeholder input influenced actual policies?

1.7 International Partnerships

- Has your administration collaborated with international organizations or donors on AI-related topics?
- Were these one-off engagements or sustained collaborations?

1.8 Foresight and Horizon Scanning

- Does your administration engage in foresight, technology scanning, or trend analysis for AI?
- Are studies, reports, or strategic planning tools used?

1.9 AI in Sectoral Strategies

- Is AI referenced or integrated into strategies for areas such as health, agriculture, or public services?
- Can you give examples of AI applications or pilots in your sector?

1.10 Procurement of AI Tools

- Does your organization have a dedicated budget for acquiring or developing AI solutions?
- Does procurement focus on open-source tools, proprietary systems, or a mix?
- How are risks such as vendor lock-in, cost, and transparency managed?
- Are procurement guidelines in place to ensure interoperability and alignment with public needs?

1.11 Cybersecurity and AI

- Does your organization use AI for cybersecurity purposes such as automated monitoring or predictive analysis?
- How are risks specific to AI systems (e.g., adversarial attacks, data integrity) addressed?
- Are policies in place to ensure secure procurement, deployment, and monitoring of AI-enabled systems?
- Do you collaborate with national or international partners on AI-driven cyber resilience?

Dimension 2: Digital Infrastructure

This dimension examines the foundational technologies that enable AI-powered public services, including connectivity, computing capacity, cloud readiness, power reliability, and adherence to technical standards. It also considers emerging infrastructure (e.g., IoT and edge computing) and the role of public–private collaboration. Evidence may include infrastructure inventories, service-level metrics, cloud usage policies, resilience/continuity plans, and standardization documents.

2.1 Connectivity

- What is your assessment of mobile broadband availability in rural and urban areas?
- Are there connectivity gaps that affect service delivery?**2.2 Broadband Quality & Affordability**
- Do you have data on broadband speed, reliability, or affordability?
- How does poor connectivity affect your organization's work?

2.3 Cloud Services

- Do public institutions in your sector use cloud services?
- What challenges exist in adopting cloud solutions (e.g., cost, security, regulation)?

2.4 Data Centers & Compute

- Are there data centers or computing facilities that support AI capacity?
- Does your organisation use or require advanced computing such as high-performance clusters or GPUs?

2.5 Energy Reliability

- Do electricity outages or instability affect your organisation's digital operations?
- Are backup systems in place?

2.6 Emerging Infrastructure (IoT, Edge)

- Is your organisation deploying Internet of Things or edge computing solutions?
- Are these pilot initiatives or fully operational?

2.7 Infrastructure Standards

- Are there standards or policies guiding interoperability, security, and infrastructure use?

2.8 Public-Private Partnerships

- Does your organisation partner with the private sector to expand or strengthen digital infrastructure?
- What roles do these partnerships play?

2.9 International Compute Access

- Does your organisation access international computing platforms?
- Are there restrictions that affect this access?

2.10 Public Investment in AI Infrastructure

- Are there government-funded projects such as computing clusters or smart platforms supporting AI?
- Has your organisation benefited from such investments?

Dimension 3: Data Ecosystem

This dimension assesses how data is generated, governed, protected, shared, and made usable for AI. It covers open data practices, interoperability, data protection and oversight, data classification, cross-border data flows, anonymization, and stewardship/accountability. Evidence can include data inventories, sharing protocols, protection policies, oversight interactions, and audit or compliance reports.

3.1 Open Data

- Does your organisation publish datasets that could support AI?
- Are they in machine-readable formats?

3.2 Interoperability & Standardization

- Are data standards in place across government?
- Do your systems link with other agencies' systems?

3.3 Data Protection

- Is there a legal or policy framework for data protection?
- Has your organisation implemented internal data protection policies or assigned responsible officers?

3.4 Oversight Authorities

- Does your organisation interact with a data protection or oversight authority?
- Are you required to report breaches or submit compliance documentation?

3.5 Data Classification & Sharing

- Is data classified into categories such as public or confidential?
- Are there protocols for sharing data with other agencies or partners?

3.6 Platform Integration

- Are your services integrated with other government platforms?
- Are data flows manual or digital?

3.7 Cross-border Data Flow

- Does your organisation work with service providers that store data abroad?
- Are there policies guiding data storage location?

3.8 Anonymization

- Does your organisation produce or use anonymized datasets?
- Are there protocols for ensuring safe anonymization?

3.9 Accountability

- Who is responsible for data management in your organisation?
- Are there audits or compliance reviews?

3.10 Public–Private Data Partnerships

- Has your organisation collaborated with external partners to use or share data?
- Were safeguards in place to protect citizen data?

Dimension 4: Talent and Skills

This dimension evaluates the availability and development of human capabilities required for responsible AI in government. It considers in-house expertise, structured training for civil servants, partnerships with research and training institutions, and longer-term pipeline mechanisms such as fellowships or vocational programs. Evidence often includes staffing profiles, training curricula, participation records, partnership agreements, and skills gap analyses.

4.1 Skills in Government

- Does your organisation have staff with AI, data science, or digital expertise?
- How many specialists are employed?

4.2 Partnerships with Research Institutions

- Has your organisation collaborated with universities or research institutions on AI?
- Are there joint research programs, internships, or exchanges?

4.3 Training for Civil Servants

- Are staff offered training in AI, data, or digital governance?
- Are these regular programs or ad hoc workshops?

4.4 Fellowships & Scholarships

- Does your organisation fund or facilitate fellowships or scholarships in AI fields?
- Who is eligible for these opportunities?

4.5 Technical and Vocational Training

- Are there partnerships with vocational or training centers for AI and digital upskilling?

Dimension 5: Innovation and Industry Development

This dimension explores how the public sector stimulates and adopts innovation relevant to AI: through engagement with startups, innovation funding, testbeds, regulatory sandboxes, technology transfer, PPPs, and talent attraction schemes. It focuses on moving from pilots to sustainable, scaled solutions. Evidence may include program guidelines, procurement records, sandbox/testbed documentation, partnership contracts, and post-pilot evaluation reports.

5.1 Startups

- Does your organisation work with AI startups?
- Have you funded, piloted, or purchased their solutions?

5.2 Innovation Programs

- Are there government-led grants, challenges, or incentive schemes for AI projects?
- Does your organisation operate testbeds for experimentation?

5.3 Regulatory Sandboxes

- Are there sandbox programs in your sector?
- Have companies tested AI solutions through them?

5.4 Technology Transfer

- Does your organisation support moving research into public or private sector applications?
- Are there partnerships to scale technologies into services?

5.5 Public-Private Partnerships (PPPs)

- Has your organisation entered into PPPs for AI projects?
- What lessons were learned from these collaborations?

5.6 Talent Attraction Schemes

- Has your organisation implemented schemes to attract AI professionals from abroad?
- What challenges or successes have you observed in such initiatives?

Dimension 6: Ethics, Safety, and Public Trust

This dimension examines whether AI in the public sector is guided by clear ethical principles, transparent processes, and effective safeguards. It looks at governance structures (e.g., ethics review), algorithmic transparency and accountability, redress mechanisms, public communication and literacy, civil society participation, global engagement, and legal liability frameworks. Evidence includes ethical guidelines, review minutes, impact assessments, citizen-facing notices, complaints data, consultation records, and legal instruments.

6.1 Ethical Guidelines

- Does your organisation follow or promote ethical guidelines for AI?
- Were these developed internally or adapted from international models?

6.2 Ethics Boards

- Does your organisation have a body reviewing AI or data-driven projects for ethical compliance?

6.3 Transparency & Accountability

- Are citizens informed about how automated systems affect them?
- Are there internal policies for algorithmic accountability?

6.4 Redress Mechanisms

- Can citizens appeal or challenge automated decisions?
- Are such mechanisms used in practice?

6.5 Public Awareness & Trust

- Has your organisation conducted outreach, education, or surveys on AI?
- What is the general level of trust in AI-driven systems?

6.6 Civil Society Participation

- Are civil society organizations involved in AI policymaking or oversight?
- Has their input shaped policy?

6.7 Global Engagement

- Has your organisation participated in international AI governance initiatives?
- Are there formal partnerships with international organizations?

6.8 Legal Accountability

- Are there laws or regulations defining liability if AI causes harm?
- Has your organisation faced legal or reputational challenges linked to AI?

6.9 Media Literacy Campaigns

- Has your organisation run campaigns to raise awareness about AI or digital safety?
- Were they accessible to diverse communities and languages?

Closing Guidance

- End by asking: *"Is there anything else important about AI in your organisation that we haven't asked?"*
- Prioritize concrete evidence: names of policies, institutions, budgets.
- Score immediately after each section with justification.
- Allocate 60–75 minutes per interview, but probe deeper where answers are superficial.

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