DIGITAL DEVELOPMENT PROFILE

UNDP Kosovo

JOINT SDG FUND

UNITED NATIONS KOSOVO TEAM

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[1]References to Kosovo shall be understood to be in the context of Security Council Resolution 1244 (1999)

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List of Abbreviations

4G	Fourth generation of cellular network technology
5G	Fifth generation of cellular network technology
AgTech	Agricultural Technology
AI	Artificial Intelligence
ARKEP	Autoriteti Rregullator i Komunikimeve Elektronike dhe Postare
ATIK	The Alliance of Tech Parks and Incubators of Kosovo
BHIS	Basic Health Information System
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (Federal Ministry for Economic Cooperation and Development, Germany)
CEPT	Conference of Postal and Telecommunications Administrations
CIR	Critical Infrastructure Resilience
COVID-19	Coronavirus disease 2019
CTO	Chief Technology Officer
DEP	Digital Europe Programme
DS4A	Digital Skills for All
DTC	Digital Transformation Center
EBRD	European Bank for Reconstruction and Development
EDIH	European Digital Innovation Hubs
eduroam	Education Roaming
EHRs	Electronic Health Records
eID	Electronic ID system
ELVs	End-of-Life Vehicles
EPR	Extended Producer Responsibility
EU	European Union
EYE	Enhancing Youth Employment
FAO	The Food and Agriculture Organization of the United Nations
FTTH	Fiber-To-The-Home
GDP	Gross Domestic Product
GEANT	European Academic Network
GIC	Gracanica Innovation Centre
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GPON	Gigabit Passive Optical Network
HIS	Hospital Information Systems
ICK	Innovation Centre Kosovo
ICT	Information and Communication Technology
IOM	International Organization for Migration
IoT	Internet-of-Things
IPAK	Kosovo Institute for Public Administration
IPR	Intellectual Property Rights
IT	Information Technology
ITP	Innovation and Training Park
ITU	International Telecommunication Union
KAS	Kosovo Agency of Statistics
KCGF	Kosovo Credit Guarantee Fund
KfW	German Development Bank
KODE	Kosovo Digital Economy
KOSTT	Kosovo's Transmission System Operator
KREN	Kosovo's Research and Education Network
LTE	Long-Term Evolution (Telecommunications)
MAFRD	Ministry of Agriculture, Forestry and Rural Development
MIET	Ministry of Industry, Entrepreneurship, and Trade of Kosovo

MSMEs	Micro, Small, and Medium-sized Enterprises
NDS	Development Strategy 2030
NGOs	Non-Governmental Organisations
NSMS	Spectrum Monitoring System
OECD	Organisation for Economic Co-operation and Development
PPP	Public Private Partnership
PROs	Produce Responsibility Organizations
PTK	Post and Telecom of Kosovo
R&D	Research and Development
RAEPC	Regulatory Authority of Electronic and Postal Communications
RCC	Regional Cooperation Council
RIT	The Rochester Institute of Technology Kosovo
ROI	Return on Investment
RRA	Regional Roaming Agreement
S3	Smart Specialization Strategy
SDGs	Sustainable Development Goals
SIDA	Swedish International Development Cooperation Agency
SMEs	Small and Medium Size Enterprises
STEM	Science, Technology, Engineering, and Mathematics
STIKK	Kosovo Association of Information and Communication Technology
TiK	Telekom Kosovo
TRA	Telecommunication Regulatory Authority
TSOs	Transmission System Operators
TV	Television
UN	United Nations
UNICEF	United Nations International Children's Emergency Fund
UNDP	United Nations Development Programme
UNFPA	United Nations Fund for Population Activities
UNV	United Nations Volunteers
UN-HABITAT	United Nations Human Settlements Programme
UN-WOMEN	United Nations Entity for Gender Equality and the Empowerment of Women
USAID	United States Agency for International Development
VET	Vocational Education and Training
WCAG	Web Content Accessibility Guidelines
WEEE	Waste Electrical and Electronic Equipment
WHO	World Health Organization
YIET	Youth for Inclusion, Equality, and Trust
YOU	Youth Online and Upward

1. Introduction

1.1 Background and Context

Digital transformation journey of Kosovo is shaped by its aspiration to foster economic growth, improve public services, and align its digital ecosystem with European Union (EU) standards. As part of the Western Balkans Digital Agenda[1], Kosovo is integrating policies that support regional digital convergence, ensuring that its digital infrastructure, regulatory frameworks, and governance structures are in line with the EU Digital Decade 2030[2] goals. Digital transformation in Kosovo is not only a matter of regulatory alignment or modernization, it is increasingly recognized as a key enabler for sustainable development and a cross-cutting accelerator of the Sustainable Development Goals (SDGs). Digital technologies are instrumental in reducing inequalities, increasing public sector efficiency, improving educational and health outcomes, and fostering inclusive economic growth. As such, digital initiatives aim to improve both governance and service delivery, while addressing structural development challenges across urban and rural communities. This development-oriented focus was reinforced in the Prime Minister's 2023 SDG Commitment[3a], which included a dedicated pledge to advance digital transformation. The commitment outlined targets such as expanding broadband access to 100% of inhabited areas, increasing the share of public services delivered online through platforms like e-Kosova, and enhancing digital literacy among marginalized groups. These goals are directly linked to SDG 5 (Gender Equality), SDG 9 (Industry, Innovation and Infrastructure), SDG 4 (Quality Education), and SDG 16 (Peace, Justice and Strong Institutions), and reflect Kosovo's growing emphasis on leveraging digitalization to create a more inclusive, accountable, and resilient society.

Over the past decade, Kosovo has made significant progress in expanding broadband coverage, increasing internet penetration, and integrating Information and Communication Technology (ICT) across key economic sectors. These advancements have laid the groundwork for a more connected and digitally enabled society. However, challenges such as regional disparities in connectivity, limited digital literacy, cybersecurity vulnerabilities, and regulatory gaps continue to hinder the full realization of its digital potential. In response to these challenges and as part of its broader digital transformation agenda, Kosovo launched the e-Kosova platform - an official digital portal designed to provide people, businesses, and public administration employees with access to a wide array of electronic public services. e-Kosova enables users to obtain services online, thereby reducing the need for in-person visits to central institutions offices and improving the efficiency and accessibility of service delivery. Crucially, the platform is integrated with the Interoperability Platform, allowing for seamless data exchange among institutions and fostering more coordinated and responsive governance. At the EU level, digital transformation has been a top priority under the European Commission's Digital Compass 2030, which emphasizes the need for secure, high-speed internet access, digital skills development, public service digitization, and a strong innovation ecosystem. In response, the Western Balkans Digital Agenda, launched in 2018, aims to integrate the region into the European digital single market, foster interoperability between the Western Balkans and EU institutions, and accelerate 5G deployment, cybersecurity cooperation, and ICT-driven economic development. Kosovo's digital transition is closely tied to these objectives, leveraging EU-supported programs such as the EU4Digital[3] initiative to improve broadband access, promote e-governance, and strengthen the digital economy.

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[1] European Commission. (2018) Press release IP/18/4242. European Commission. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_18_4242 [Accessed 23 January 2025]
[2] European Commission. (2021) 2030 Digital Compass: The European way for the Digital Decade. European Commission. Available at: https://digital-strategy.ec.europa.eu/en/policies/digital-compass [Accessed 23 January 2025]
[3a]. SDG Summit 2023 –Commitments to Transform Our World: Kosovo Commitments. [online] United Nations. [Accessed 13 Apr. 2025]
[3] Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). (2024) EU Digital: An accelerated digital transition for the Western Balkans. GIZ. Available at: https://www.giz.de/en/downloads/giz2024-en-eu-digital-an-acclerated-digital-transition-for-the-western-balkans.pdf [Accessed 23 January 2025]

The COVID-19 pandemic further emphasized the importance of digital transformation as a key pillar of economic resilience and social adaptability. As in many EU countries, Kosovo rapidly expanded remote working, digital education, and e-commerce, accelerating the adoption of cloud-based services, e-government platforms, and digital financial technologies. The pandemic also exposed critical gaps in digital literacy, rural connectivity, and data security, necessitating targeted interventions to ensure sustainable digital inclusion. Recognizing these challenges, the European Commission extended substantial digital investment and technical assistance to Western Balkan economies, supporting infrastructure modernization and cybersecurity enhancements.

Kosovo’s digital development is intrinsically linked to its socio-economic growth, playing a crucial role in job creation, public sector efficiency, education, and regional competitiveness. Kosovo’s continued efforts to align with the European Digital Strategy and the EU's Cybersecurity Framework are vital for building a secure, interoperable, and innovation-driven digital ecosystem. Strategic investments in 5G networks, fiber-optic expansion, and data governance reforms are paving the way for Kosovo to strengthen its role as a regional leader in digital transformation.

The digital divide remains a pressing challenge, with rural populations, low-income households, people with disabilities, the elderly and women disproportionately affected by gaps in digital access and skills. Data highlights persistent inequalities in digital literacy, particularly among rural women and marginalized communities, limiting their ability to engage in ICT-driven employment, online education, and e-commerce opportunities. While urban regions have achieved near-universal connectivity, rural schools, healthcare facilities, and businesses continue to face barriers in accessing high-speed broadband and digital tools.

Kosovo’s Digital Agenda 2030[4] builds upon the Electronic Communication Sector Policy – Digital Agenda for Kosovo (DAK) 2013-2020, which laid the foundation for broadband expansion and e-government services. While the previous agenda achieved substantial progress in internet penetration, key challenges remain, including limited adoption of e-health services, digital financial inclusion gaps, and cybersecurity vulnerabilities. The Digital Agenda 2030 sets out a more comprehensive framework to transform Kosovo into a digitally advanced society, focusing on expanding high-speed broadband and 5G coverage to both urban and rural areas, enhancing SME digitalization and access to digital financial services, improving the interoperability of e-government services, boosting cybersecurity resilience and data protection policies, and strengthening digital skills development, particularly for women, youth, and underserved communities.

Furthermore, the Digital Agenda 2030 aligns Kosovo with key EU digital policies, ensuring that its digital transformation remains in sync with broader European strategies. This includes the EU Digital Compass, which aims to provide next-generation digital services, digital skills development, and innovation ecosystems for all European citizens and businesses. The agenda also aligns with the EU Green Deal[5], which promotes energy-efficient ICT infrastructure and sustainable digital technologies, the EU Cybersecurity Strategy[6], which strengthens Kosovo’s and regional cyber resilience, and the EU Gigabit Society Strategy[7], which targets universal gigabit connectivity by 2030. Through these strategic alignments, Kosovo is positioning itself as a forward-thinking digital economy, fostering innovation, economic growth, and inclusive digital participation.

[4] Ministry of Economy (2023) Digital Agenda of Kosovo 2030: Strategic orientation for digital transformation of Kosovo. Available at: LINK , accessed on 23 Jan 2025

[5] European Commission. (2019) The European Green Deal. European Commission. Available at: https://ec.europa.eu/clima/eu-action/european-green-deal_en [Accessed 23 January 2025]

[6] European Commission. (2020) The EU's Cybersecurity Strategy for the Digital Decade. European Commission. Available at: https://digital-strategy.ec.europa.eu/en/library/eus-cybersecurity-strategy-digital-decade [Accessed 23 January 2025]

[7] European Commission. (2018) Connectivity for a European Gigabit Society: Brochure. European Commission. Available at: https://digital-strategy.ec.europa.eu/en/library/connectivity-european-gigabit-society-brochure [Accessed 23 January 2025]

[9a]European Commission. (2023). 2023 Communication on a new Growth Plan for the Western Balkans. [online] Directorate-General for Neighbourhood and Enlargement Negotiations. Available at: https://neighbourhood-enlargement.ec.europa.eu/2023-communication-new-growth-plan-western-balkans_en [Accessed 13 Apr. 2025]

1.2 Objective of the Report

In 2024, Kosovo became a key partner in the European Union's Growth Plan for the Western Balkans[9a], a strategic initiative aimed at fostering socio-economic convergence with the EU by accelerating reforms and targeted investments across six priority areas, one of which is digital transformation. The plan provides for a total of €6 billion in financial support to the region, comprising €2 billion in grants and €4 billion in concessional loans. Rather than fixed central level allocations, the funding will be distributed according to a methodology set out in Regulation (EU) 2024/1449, which determines indicative envelopes for each beneficiary based on population size and GDP per capita relative to the regional average. This approach ensures an equitable and needs-based allocation of funds that reflects both demographic scale and economic development levels. Although Kosovo's exact share is not explicitly stated, preliminary estimates based on the allocation methodology suggest that it could receive approximately 10–12% of the total facility, amounting to €600–720 million over the multi-year period, depending on final reform performance and absorption capacity.

The Growth Plan offers a vital opportunity to operationalize the Digital Agenda 2030, addressing persistent gaps in broadband coverage, digital inclusion, and service delivery. However, while the financial resources are substantial, the successful realization of these digital transformation targets hinges on several factors. These include the effective absorption and coordination of external funds, robust institutional capacity, and the timely implementation of enabling policies, particularly in areas such as interoperability, cybersecurity, and data protection. If properly harnessed, the Growth Plan could significantly accelerate Kosovo's progress toward becoming a digitally empowered and inclusive society. However, while funding presents a critical opportunity, the realism of reaching these targets will depend heavily on effective governance, interinstitutional coordination, and the capacity to absorb and implement investments efficiently and inclusively. Furthermore, achieving all the targets set out in the Digital Agenda 2030 within the designated timeframe will require sustained political will, cross-sectoral collaboration, and agile execution.

The Digital Development Profile for Kosovo aims to provide a structured and comparative analysis of its progress in digital transformation. Building upon the framework established by the International Telecommunication Union (ITU) and other United Nations (UN) organizations, the report seeks to evaluate Kosovo's capacity for leveraging ICT for sustainable development.

The primary objectives of this report are:

- To assess the digital infrastructure, connectivity, and access to ICT.
- To analyze the readiness and inclusiveness of the digital ecosystem, including human capital, innovation ecosystems, and institutional (central and local) initiatives.
- To provide a basis for informed decision-making by policymakers, development partners, and private sector stakeholders.
- To support the alignment of digital strategies with international best practices and European Union (EU) standards.

This report will serve as a reference document for engaging stakeholders in dialogue on digital development and identifying actionable strategies for fostering a more inclusive and innovation-driven digital economy.

1.3 Methodology

The methodology for preparing the Digital Development Profile adopts a multidimensional approach that encompasses quantitative and qualitative analyses. It comprehensively integrates international best practices, regional comparisons, and local context to assess Kosovo's digital transformation landscape.

Key Components of Methodology

1. **Five-Building-Blocks Framework**

   The analysis is structured around the five-building-blocks framework, which examines digital transformation through the following dimensions:

   - **Meaningful Connectivity:** Evaluating the availability, affordability, and quality of digital infrastructure, including internet access, mobile networks, and emerging technologies like 5G.
   - **People-Centric Transformation:** Assessing the digital skills, inclusion efforts, and measures to bridge the digital divide among vulnerable populations such as women, youth, and persons with disabilities.
   - **Government-Centric Transformation:** Reviewing institutional (central or local) initiatives, policies, and e-governance platforms to improve public service delivery and administrative efficiency.
   - **Sector-Centric Transformation:** Exploring the impact of digitalization in critical sectors like agriculture, health, and Small and Medium-sized Enterprises (SMEs).
   - **Innovation Ecosystem:** Analyzing the development of digital startups, innovation hubs, and the ecosystem fostering entrepreneurship and technological advancement.

2. **Data Collection and Analysis**

   The report incorporates both **quantitative** and **qualitative** data sources:

   - **Quantitative Data**
     - ICT indicators from the International Telecommunication Union (ITU), World Bank, and the Kosovo Agency of Statistics (KAS)
     - Metrics such as internet penetration, broadband access, and digital skill levels.
   - **Qualitative Data**
     - Case studies and reports on successful digital initiatives in Kosovo.
     - Analysis of institutional (central or local) strategies, regulatory frameworks, and policy documents.
     - Perspectives from stakeholders across public, private, and civil society sectors.

In addition to international and Kosovo-specific data from institutions such as the International Telecommunication Union (ITU), the World Bank, and KAS, this report draws extensively on the UNDP Kosovo's Digital Household Survey (DHS) 2022. The DHS offers highly localized, context-specific insights that are essential for understanding household-level access to and use of digital technologies. Unlike broader international data, the DHS provides disaggregated data by age, gender, income, and geography, allowing for a more nuanced analysis of digital inclusion and the socio-economic dimensions of digital transformation. Its findings on connectivity, device ownership, usage patterns, and perceived barriers, particularly among vulnerable populations, serve as a critical complement to comparative benchmarking exercises. Furthermore, as the DHS was developed in collaboration with local stakeholders, its alignment with domestic priorities enhances its policy relevance and practical utility. This makes the DHS not only a valuable data source but also a strategic tool for designing inclusive, targeted, and evidence-based digital development interventions.

3. **Comparative Benchmarking**

   Kosovo's performance is benchmarked against regional peers, including other Western Balkan economies and select European Union member states. This comparative analysis identifies gaps and highlights opportunities to enhance its digital capabilities and align with regional best practices.

4. **Stakeholder Engagement (planned workshop and conference)**

   The report is informed by consultations with key stakeholders, including:

   - **Representatives:** Responsible for ICT, digital transformation, and related fields. Primarily engaged with public authorities and institutions in Kosovo and international organisations such as the United Nations International Children's Emergency Fund (UNICEF), Food and Agriculture Organization (FAO), United Nations Human Settlements Programme (UN-Habitat), International Organization for Migration (IOM), United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women), United Nations Fund for Population Activities (UNFPA), International Telecommunication Union (ITU) and United Nations Development Programme (UNDP).
   - **Private Sector:** Startups, SMEs, and multinational corporations operating in the ICT domain.
   - **Civil Society and Academia:** Non-Governmental Organizations (NGOs) and research institutions involved in digital inclusion, education, and innovation.
   - **Development Partners:** International organizations and donors supporting digital development initiatives. Stakeholder interviews and workshops provided insights into on-the-ground challenges, policy priorities, and potential areas for collaboration.

5. **Case Studies and Success Stories**

   Specific examples of successful initiatives are highlighted to illustrate best practices and lessons learned. These include:

   - Implementation of e-governance platforms such as eKosova.
   - Development of innovation hubs and support mechanisms for startups.
   - Efforts to bridge the digital divide through targeted inclusion programs.

6. **Policy and Strategy Analysis**

   The report evaluates policies and strategies, such as the DAK and other sectoral plans, against global standards and regional benchmarks. It assesses their alignment with the European Union's Digital Agenda and the UN's Sustainable Development Goals.

7. **Holistic Approach to Challenges and Opportunities**

   The methodology identifies barriers to digital transformation, such as regulatory gaps, digital skill shortages, and infrastructure limitations. Simultaneously, it highlights opportunities in areas like entrepreneurship, international partnerships, and sectoral digitalization.

8. **Sustainability Focus**

   The analysis integrates a focus on sustainability by considering:

   - Long-term implications of digital infrastructure development.
   - Environmental concerns such as e-waste management and energy-efficient technologies[8] [9].
   - Social sustainability through inclusive digital policies.

9. **Validation and Review**

   The findings are validated through:

   - Peer reviews by ICT experts and development partners.
   - Feedback from stakeholders to ensure the relevance and accuracy of the report's recommendations.

2.Kosovo Profile

2.1 Building Block 1: Meaningful Connectivity as a Foundation for Digital Transformation

Meaningful connectivity is the cornerstone of Kosovo's digital transformation, ensuring that individuals and businesses have reliable, affordable, and equitable access to digital technologies and services. It enables the broader adoption of digital tools, fosters innovation, and drives socioeconomic development. Its progress in enhancing connectivity reflects a commitment to bridging the digital divide and aligning with global best practices. However, significant challenges remain, particularly in underserved and rural areas.

Central and local institutions, in collaboration with private sector stakeholders and international development partners, have prioritized expanding broadband infrastructure, introducing next-generation networks, and increasing internet service affordability. While these initiatives have resulted in substantial improvements, gaps in infrastructure, digital inclusion, and cybersecurity highlight the need for continued investment and reform.

2.1.1 General Overview of Connectivity Indicators

Kosovo has made significant strides in connectivity over the past decade, achieving high internet penetration rates and improving access to digital services. Progress in connectivity demonstrates the potential for rapid digital transformation, but challenges such as affordability, infrastructure gaps, and the urban-rural divide remain significant hurdles. While considerable progress has been made in reducing costs and expanding access, affordability remains a concern for certain population groups. Rural communities, low-income households, and marginalized groups continue to face challenges in accessing and sustaining reliable digital connectivity due to cost barriers. Addressing these disparities through targeted subsidies, public-private initiatives, and inclusive pricing models will be essential for ensuring equitable digital inclusion. By addressing these challenges through targeted policies and investments, Kosovo can establish a strong foundation for digital innovation and inclusiveness. Key connectivity indicators illustrate the progress and challenges in the digital landscape:

[8] NGO Lens (2023) E-Waste Assessment Kosovo. [Accessed 23 January 2025]
[9] Ministry of Environment and Spatial Planning (2013) Strategy on Waste Management 2013-2022. [Accessed 23 January 2025]

1. Internet Penetration

International Monetary Fund (IMF) in its report on Kosovo[10] reported that as of March 2023, Kosovo had attained one of the highest levels of internet coverage in Europe, with every village having access to high-speed broadband offering speeds of up to 100 Mbps. This achievement aligns with the goals of the Kosovo Digital Economy (KODE) project, which is backed by a $20.7 million initiative from the World Bank. By 2022, 99.8% of households had internet access, while all enterprises were equipped with broadband connectivity, 27% of which utilized fiber-optic technology. This placed Kosovo among the most connected entities in the region. Furthermore, at least 3G network coverage reached 99.5% of the population, with 4G and 5G networks covering 94% and 65% of the territory, respectively.

UNDP's Digital Development Compass, with a perfect score of 5 for Kosovo's Connectivity (Stage 5: Transformational)[11], indicates that it has successfully removed critical barriers such as affordability, accessibility, and inclusivity. This high score signifies that policies and pricing structures are inclusive, enabling widespread access to the Internet and digital services for most of the population. This progress reflects broader improvements in affordability at domestic level, with increased competition and infrastructure investments driving down costs. However, while affordability is less of a systemic barrier than in the past, disparities persist for specific demographics, particularly in rural and economically disadvantaged areas. Ensuring continued reductions in cost and equitable access remains a priority for the digital development.

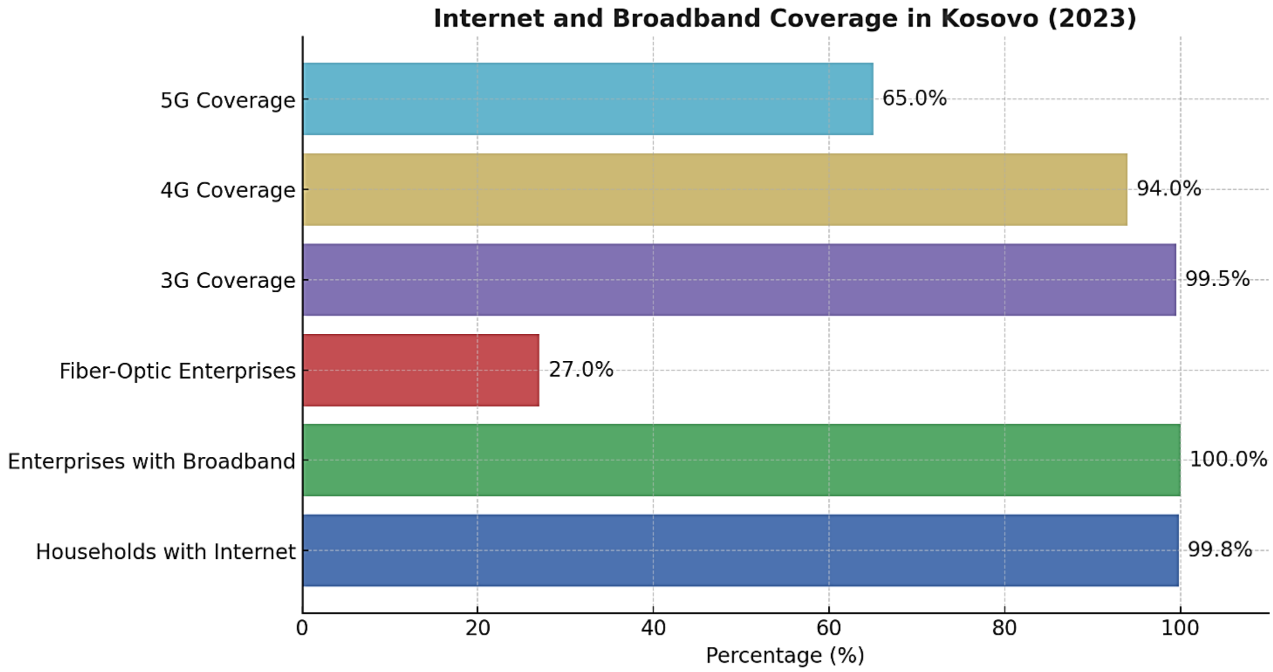

Figure 1: Internet and Broadband Coverage in Kosovo (2023)

[10] International Monetary Fund (IMF) (2024): Selected Issues. IMF Report No. 24/365, December. Washington, D.C.: International Monetary Fund
[11] UNDP Digital Development Compass, Kosovo, accessed on 23 Jan 2025

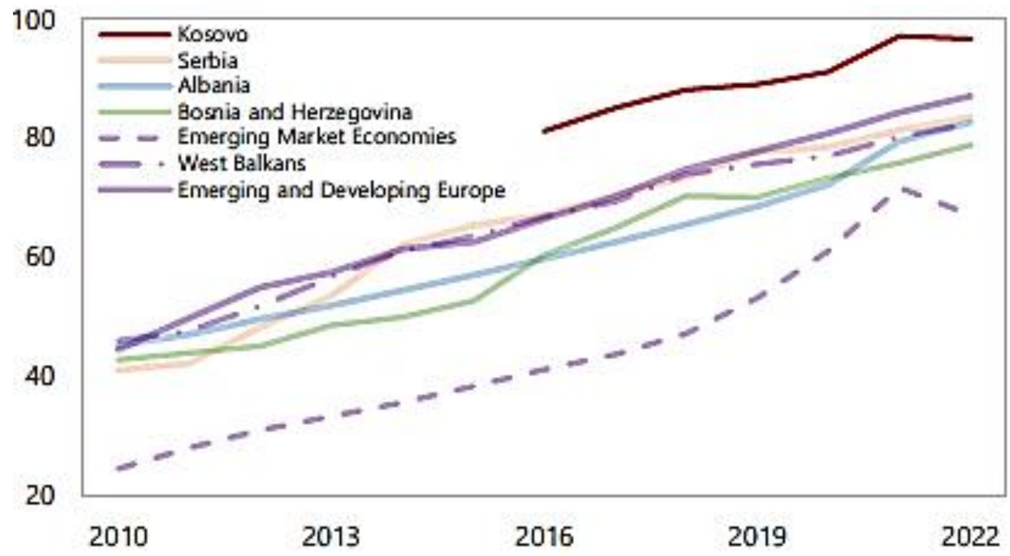

Figure 2: Comparative Representation of Internet Users (Percent of Population) in Kosovo and Neighboring Economies[12]

UNDP's Digital Household Survey (DHS)[13] conducted in Apr 2022, provides insightful data on connectivity technology, highlighting a high level of access to basic services. The survey found that an overwhelming majority, 99.66% of households, are connected to the electricity grid, while 99.72% have access to television. Internet access is also widely available, with 99.55% of households connected. Among the types of internet connections, wireless (Wi-Fi) is the most common at 97.77%, followed by LTE/3G/4G at 48.74%, and cable internet at 44.25%. Furthermore, the survey reported that in terms of digital devices, 85.19% of households have a computer equipped with a webcam. Regarding education it was reported that 57.40% of families have children attending school, but access to computers at school remains varied. About 31.47% of children have access to computers at school, whereas 17.64% have them but do not use them, and 13.82% are unaware of their availability. Unfortunately, 28.00% of students do not have access to computers at school at all. Additionally, only 38.22% of schools are connected to the internet, highlighting a potential area for improvement in educational infrastructure. The DHS found that public access to the internet remains relatively low, with only 29.24% of people having access to free public wireless internet. However, workplace internet connectivity is significantly higher, with 85.76% of individuals having access to the internet at work.

[12] n12, page 43
[13] UNDP Kosovo's Digital Household Survey, https://www.undp.org/kosovo/digital Apr 2022, Microsoft Power BI, Page 1, accessed on 23 Jan 2025

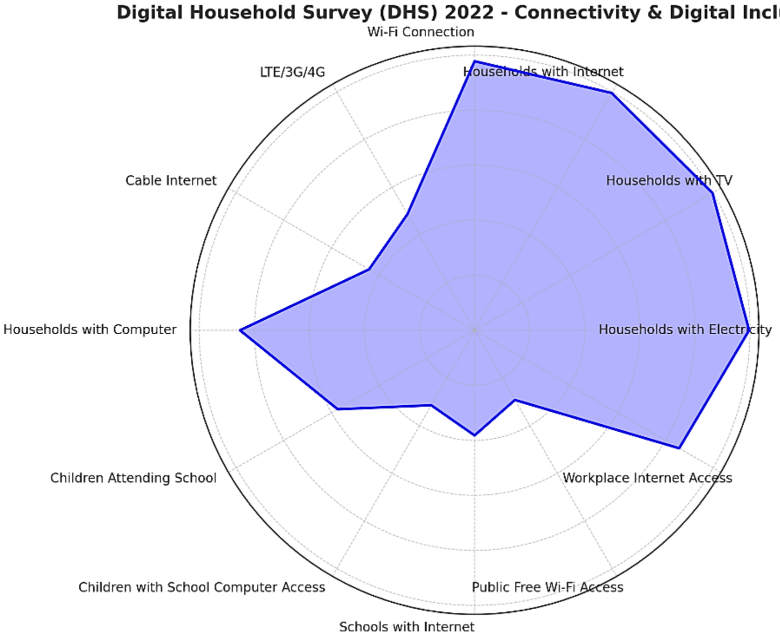

Figure 3: Connectivity and Digital Inclusion

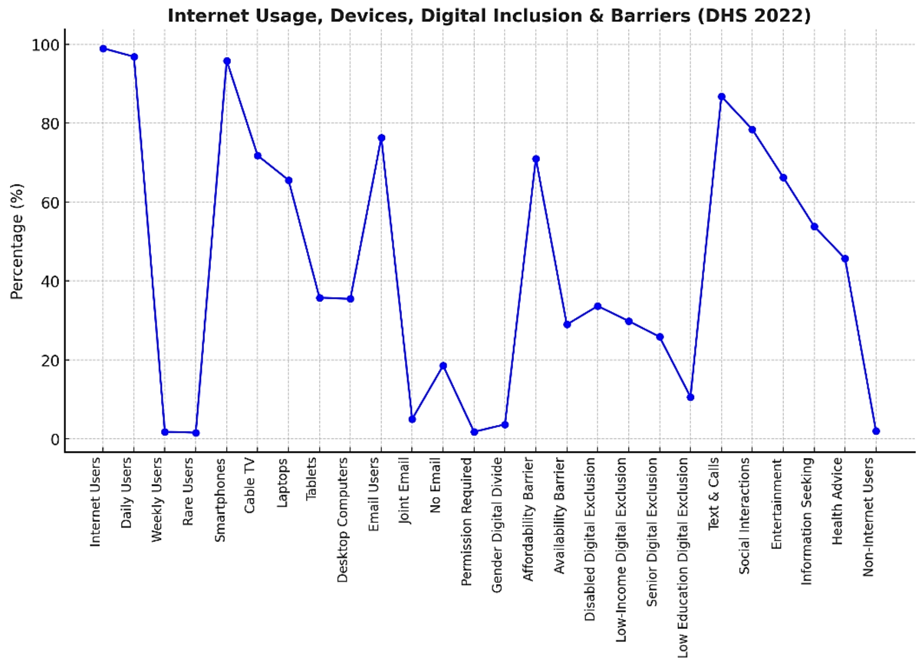

Figure 4: Internet Usage, Devices, Digital Inclusion & Barriers

A significant 98.97% of respondents report using the internet, with 96.86% using it every day, 1.79% once or twice a week, and 1.56% rarely[14]. In terms of devices used to connect to the internet at home, smartphones are the most common at 95.86%, followed by digital (cable) TV at 71.81%, laptops at 65.57%, tablets at 35.78%, and desktop computers at 35.47%. Additionally, 76.32% of individuals have an email address, while 5.02% have one but it is a joint email address with a family member, and 18.56% do not have an email address at all. Regarding digital inclusion, only 1.77% of respondents require permission to use any devices, suggesting a high degree of digital autonomy. However, 3.65% acknowledge a gender disparity in access to digital

[14] UNDP Kosovo's Digital Household Survey, https://www.undp.org/kosovo/digital Apr 2022, Microsoft Power BI, Page 3, accessed on 23 Jan 2025

technologies between men/boys and women/girls. Affordability is identified as the biggest obstacle to digital participation, with 71.04% citing it as a barrier, followed by availability issues at 28.96%. Vulnerable groups facing digital exclusion include individuals with disabilities (33.66%), low-income households (29.85%), seniors aged 60 and above (25.86%), and people with low education levels (10.62%). The primary purposes for internet usage include communication through text and calls (86.78%), social interactions (78.42%), entertainment (66.28%), information seeking (53.88%), and accessing medical or health advice (45.66%). Online shopping, financial services, education, job searching, and working remotely are also common uses, though in smaller percentages. Interestingly, 1.96% of respondents do not use the internet at all.

2. Broadband Access

The Organisation for Economic Co-operation and Development (OECD), in its competitiveness outlook report for Western Balkans reported that the KODE project, funded by the World Bank, has played a crucial role in improving connectivity, having connected over 60 mobile network towers (5G or 5G-ready) via fiber by 2021 and ensuring that all rural settlements had broadband access by March 2023, achieving 100% coverage[15]. Additionally, the project linked Kosovo's Research and Education Network (KREN) with the European Academic Network (GEANT), facilitating Eduroam access for students and staff across educational institutions. It also provided subsidized high-speed Internet to schools, with digital infrastructure installed in 100 schools by early 2024 and an additional 110 schools planned for expansion.

The OECD's competitiveness outlook report further reported that the mobile broadband penetration in Kosovo has grown significantly, reaching 95.4% through 3G and 4G technologies by the third quarter of 2023. However, despite progress in mobile connectivity, challenges persist in the fixed broadband sector. Fixed broadband penetration has stagnated at 21-22% over the past three years, positioning Kosovo among the lowest in the Western Balkans and trailing the EU average of 38.7% and the OECD average of 34.9% as of 2022.

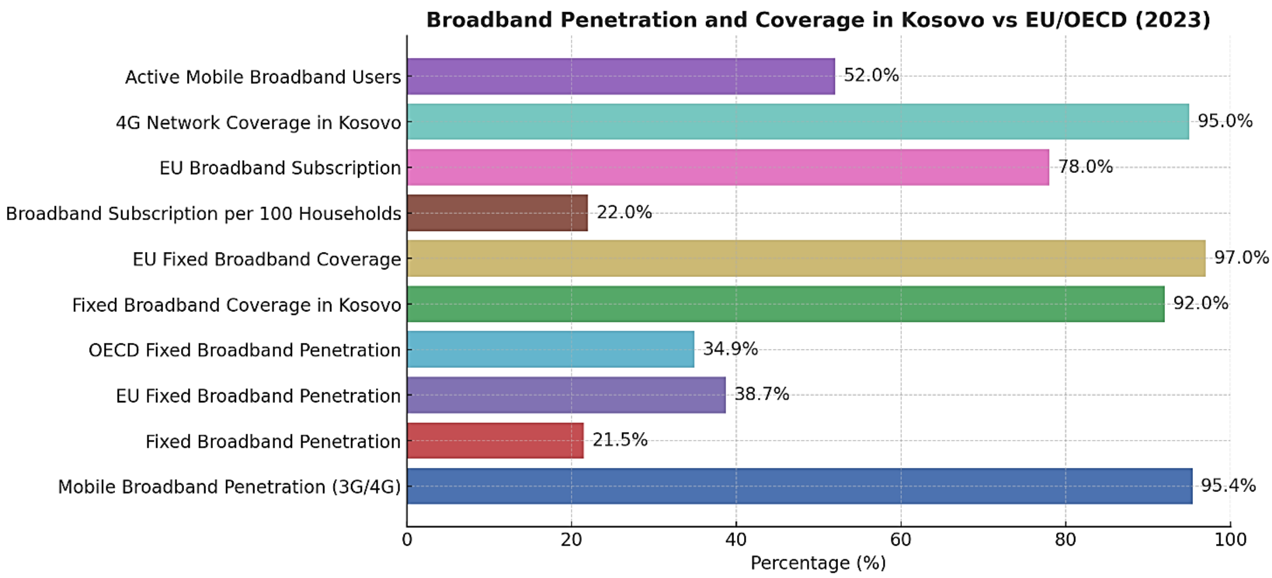

Figure 5: Broadband Penetration and Coverage in Kosovo vs EU/OECD

[15] Organisation for Economic Co-operation and Development (OECD) (2024) Western Balkans Competitiveness Outlook 2024: Kosovo. Competitiveness and Private Sector Development. Paris: OECD Publishing. Available at: https://doi.org/10.1787/ff74ae0e-en [Accessed 23 January 2025]

Kosovo's fixed broadband coverage stands at 92%, below the EU average of 97%. Broadband subscription per 100 households is only 22%, significantly lower than the EU average of 78%[16]. Mobile broadband penetration is high, with 95% of the population covered by 4G networks. However, only 52% actively use mobile broadband services due to affordability issues.

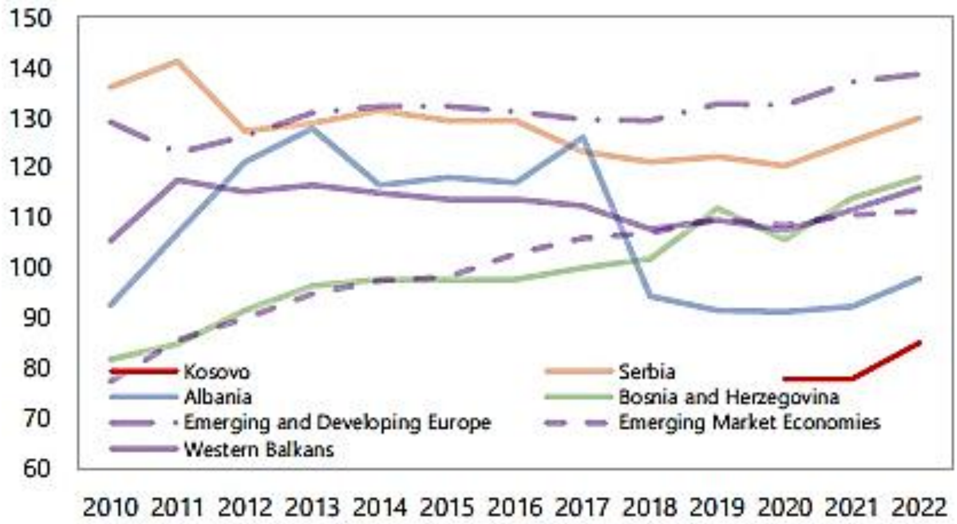

Figure 6: Comparative Representation of Mobile Broadband Subscription (Per 100 Habitant) in Kosovo and Neighboring Economies[17]

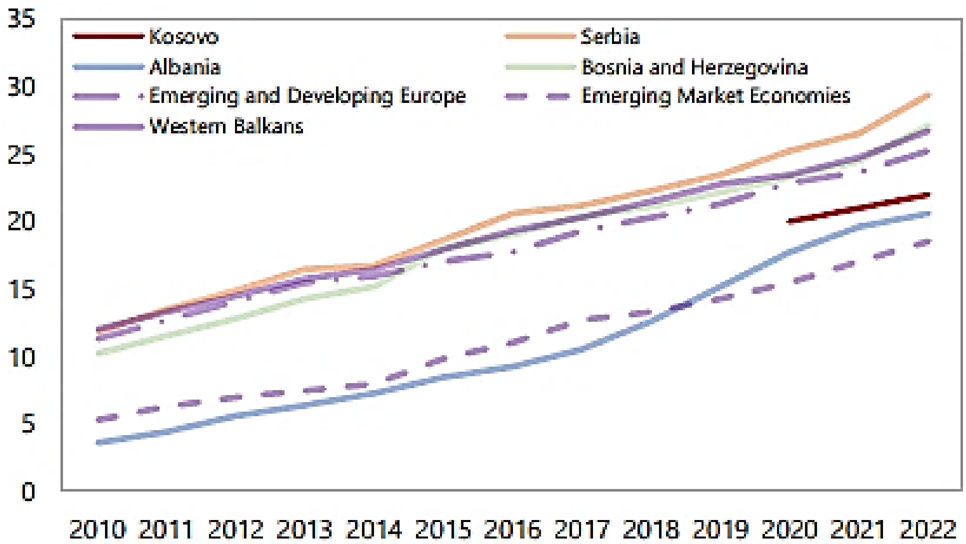

Figure 7: Comparative Representation of Fixed Broadband Subscription (Per 100 Habitant) in Kosovo and Neighboring Economies[18]

The broader regional categories—Emerging and Developing Europe and Emerging Market Economies—show significantly higher download speeds, with Emerging and Developing Europe reaching close to 120 Mbps by 2024, highlighting the gap Kosovo and its neighboring countries face in broadband infrastructure development[19]. Despite improvements, the fixed broadband speeds remain below regional averages, reflecting the challenges mentioned in broadband penetration and infrastructure development. From January 2017 to January 2024, mobile

[16] Regional Cooperation Council (RCC) (2022) Western Balkans Digital Economy Society Index (WB DESI) 2022 Report. Bosnia and Herzegovina: Regional Cooperation Council.
[17] n 12, page 43
[18] n 12, page 43
[19] n 12

download speeds have steadily increased across the Western Balkans[20]. Kosovo shows consistent improvement but remains below the regional averages for most of the period. In the early years, Kosovo's speeds were relatively low compared to Serbia and Albania, but significant progress is evident from around 2021 onwards, with noticeable fluctuations.

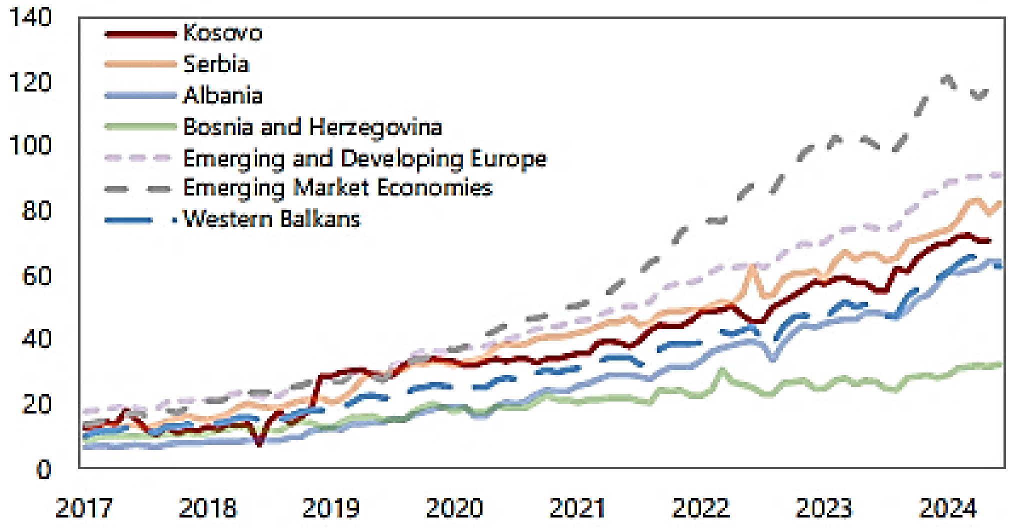

Figure 8: Comparative Representation of Fixed Broadband Download Speed (Mbps) in Kosovo and Neighboring Economies[21]

Figure 9: Comparative Representation of Mobile Internet Download Speed (Mbps) in Kosovo and Neighboring Economies[22]

3. Affordability of Connectivity

The cost of internet services in Kosovo has decreased steadily over the years, with mobile data becoming more affordable relative to fixed broadband. Despite this, internet affordability remains a challenge for low-income households, particularly in rural areas. Affordability is a critical factor influencing digital inclusion across Kosovo. It ranks high in mobile broadband affordability, with

[20] ibid
[21] n 12, page 43
[22] n 12, page 43

89% of the population considering it affordable. However, affordability for fixed broadband remains an issue for rural and low-income households[23].

UNDP's Digital Household Survey reported nearly all households possess digital devices, with 99.72% owning a digital television and 98.79% owning a smartphone[24]. Laptop ownership is at 68.62%, while desktops, tablets, and gaming devices are owned by a smaller proportion of households (37.34%, 37.24%, and 26.23%, respectively)]. When asked about affordability, 51.52% of respondents consider digital TVs affordable, while smartphones are perceived as affordable by 54.6%. However, gaming consoles and desktop computers are deemed less affordable, with only 21.18% and 27% agreeing on affordability, respectively.

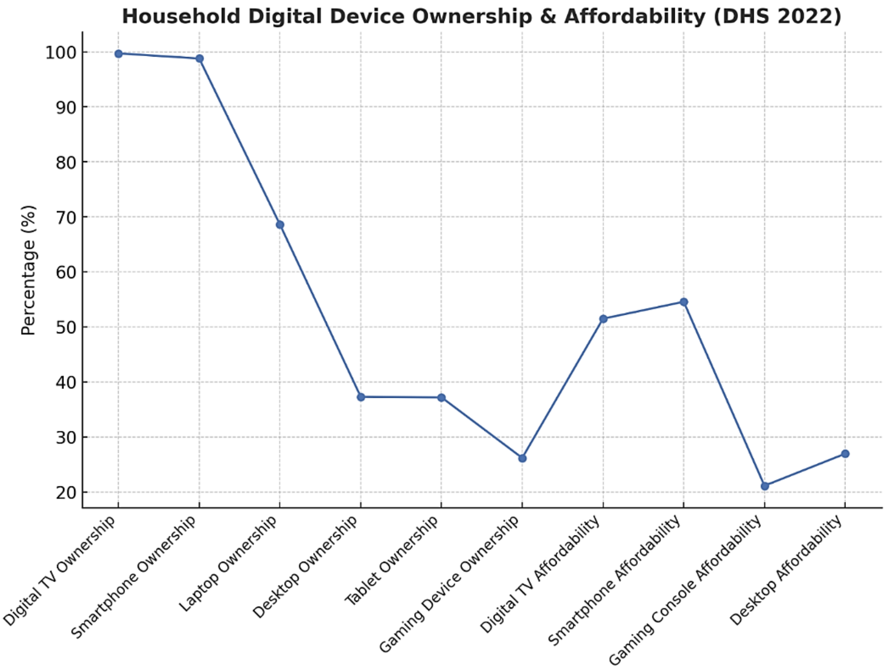

Figure 10: Household Digital Device Ownership & Affordability

4. Digital Divide

In 2019, the highest internet usage was recorded among individuals aged 35-44, accounting for 20.5%[25]. However, this figure declined by 1% in 2020. In contrast, internet usage among those aged 65 and older saw an increase from 9.2% to 10.1%, reflecting a 0.9% rise. Additionally, internet usage among women grew from 38.7% in 2019 to 40.2% in 2020, while for men, it increased by 1.6%, reaching 57.4%.

[23] n 17
[24] UNDP Kosovo's Digital Household Survey, https://www.undp.org/kosovo/digital Apr 2022, Microsoft Power BI, Page 2, accessed on 23 Jan 2025
[25] Increasing Civic Engagement in the Digital Agenda (ICEDA) (2021) Kosovo Digital Agenda Observatory: Kosovo Report and Roadmap for Digital Agenda Advancement . June.

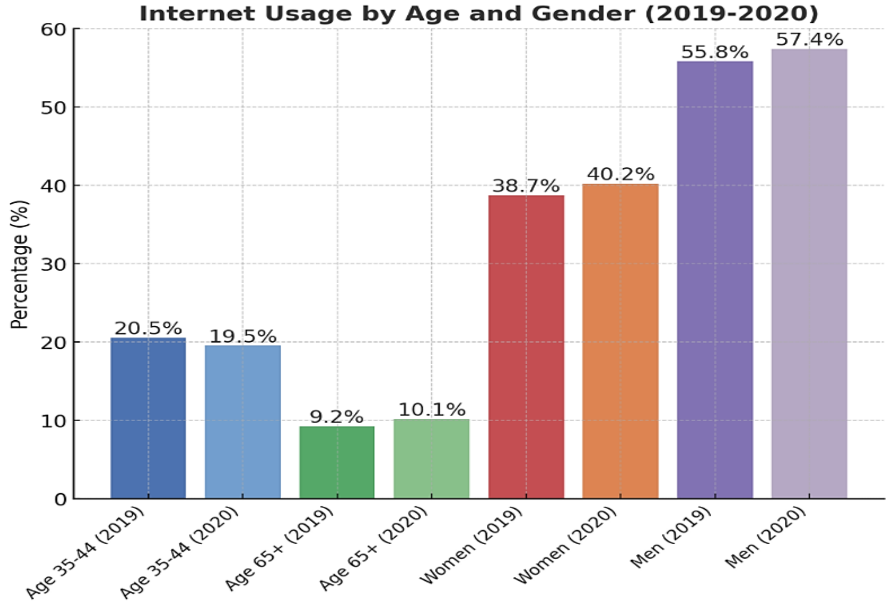

Figure 11: Internet Usage by Age and Gender

The analysis of digital household survey data for men in urban areas reveals a high level of internet usage, with 99.23% of respondents indicating that they use the internet[26]. Among them, 97.58% report using the Internet daily, highlighting its integral role in their daily routines. The digital household survey data for men in rural areas indicates that 98.23% of respondents use the internet, with the majority (96.75%) accessing it daily. The survey found that email usage is also widespread among men in urban areas, with 85% having an email address. However, a small percentage (1.54%) report needing permission to use digital devices, indicating minimal restrictions on digital access. Email adoption is reported to be relatively high, with 78.07% of respondents having an email address; only 0.82% of men in rural areas report needing permission to use digital devices, indicating a high level of autonomy in device usage. Meanwhile, 3.75% of urban as well as rural men acknowledge a gender-based disparity in digital access, reflecting ongoing issues in equitable access to technology.

Urban male respondents expressed that affordability (e.g., insufficient income to pay for data or inability to afford digital devices) at 67.20& remains the major barrier women and girls face in digital access and participation. At the same time, availability (e.g., barriers to broadband access) at 32.8% is another obstacle for women and girls in accessing digital technologies. Like the urban men, rural men respondents expressed that affordability is the major barrier, and the second barrier is availability at 73.74% and 26.26%, respectively, for women and girls in accessing digital technologies and participating in digital life. The UNDP's DHS reported that in urban areas, individuals with disabilities are perceived as the most vulnerable group (35.10%), followed by low-income households (32.22%) and seniors aged 60+ (22.67%). In rural areas, individuals with disabilities (35.81%) are considered the most at risk, followed by low-income households (27.96%) and seniors aged 60+ (24.57%).

[26] n 16

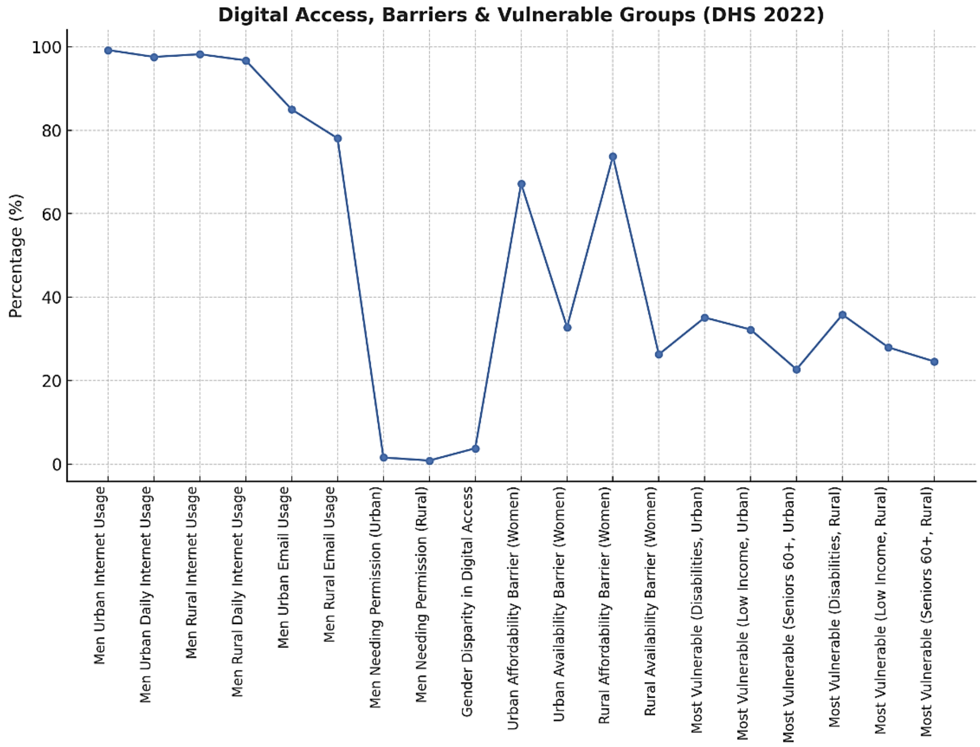

Figure 12: Digital Access, Barriers and Vulnerable Groups: Men Respondents

The digital household survey data for women in urban areas indicates a high level of internet usage, with 99.75% of respondents reporting that they use the internet. Among them, 96.45% access the internet daily, demonstrating its strong integration into their daily lives. The digital household survey data for women in rural areas shows that 98.89% of respondents use the internet, with the majority (95.98%) accessing it daily. The digital household survey found that in urban areas, email adoption is relatively high, with 76.08% of women having an email address. A small percentage (2.03%) of women report needing permission to use digital devices, reflecting some level of restriction in digital autonomy. Additionally, 3.04% of respondents acknowledge a gender gap in access to digital technology between men and women. Email adoption among women in rural areas stands at 67.88%, which is lower compared to their urban counterparts. A notable 2.77% of respondents report needing permission to use digital devices, reflecting some dependency or restrictions in accessing technology. Additionally, 3.99% of respondents acknowledge a gender gap in digital access between men and women, which highlights existing inequalities in technology use.

When examining barriers to digital access for women and girls in urban areas, the DHS reported that affordability is the most significant challenge, cited by 73.16% of respondents, while availability issues account for 26.84%. The perception of digital exclusion highlights that low-income households (33.71%), individuals with disabilities (31.27%), and seniors aged 60+ (26.71%) are among the most vulnerable groups. In rural areas, the key barriers faced by women and girls in accessing digital technologies are primarily affordability (69.03% reporting affordability issues such as insufficient income to pay for data, or cannot afford a device), followed by availability issues (30.97% reporting availability issues such as barriers to broadband access), demonstrating that financial limitations remain the most significant challenge in rural areas. Individuals with disabilities (32.02%) are perceived to be the most vulnerable, followed by seniors aged 60+ (29.39%) and low-income households (26.61%), emphasizing the need for targeted interventions to bridge the digital divide in these communities.

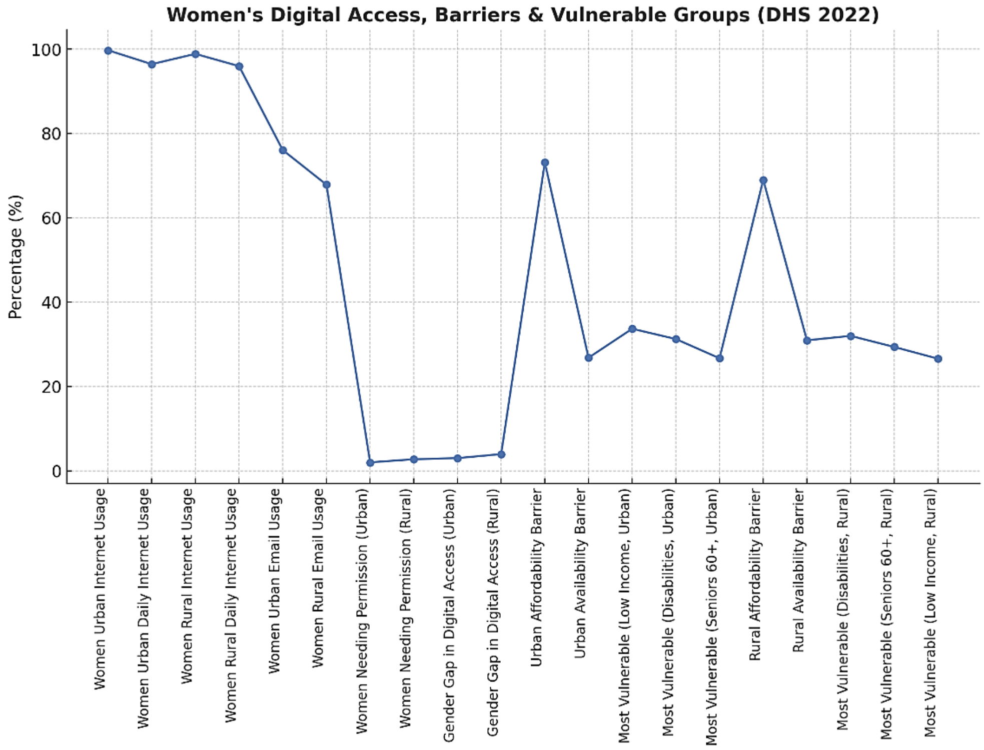

Figure 13: Women's Digital Access, Barriers and Vulnerable Groups: Women Respondents

5. ICT Usage and Adoption

UNDP's Digital Household Survey reported that the primary purposes of internet usage among men in urban areas include communication (87.12%), social interactions (77.98%), and entertainment (70.87%). Information seeking, medical advice, and online shopping also feature prominently, while activities such as job searching and supporting personal businesses have lower engagement. In rural men, in terms of internet usage, the most common activities include communication (85.15%), social interactions (76.98%), and entertainment (64.51%). Other significant uses include information seeking, online shopping, and accessing medical and educational resources. However, activities related to employment, such as job searching and remote work, are utilized less frequently.

Women in urban areas primarily use the internet for communication (87.97%), social interactions (79.62%), and entertainment (70.25%). Other common uses include information seeking, online shopping, and accessing medical and educational resources. Women in rural areas use the internet primarily for communication (87.26%), social interactions (79.29%), and entertainment (61.57%). Other notable purposes include information seeking, online shopping, and education. However, participation in activities such as working online, job searching, and business support remains relatively low.

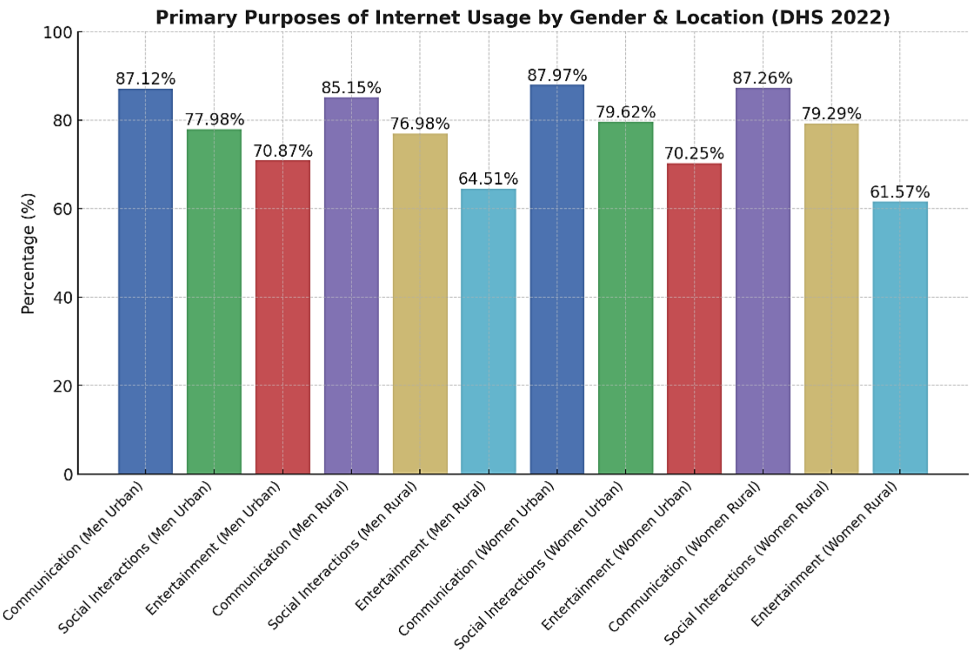

Figure 14: Primary Purposes of Internet Usage by Gender & Location

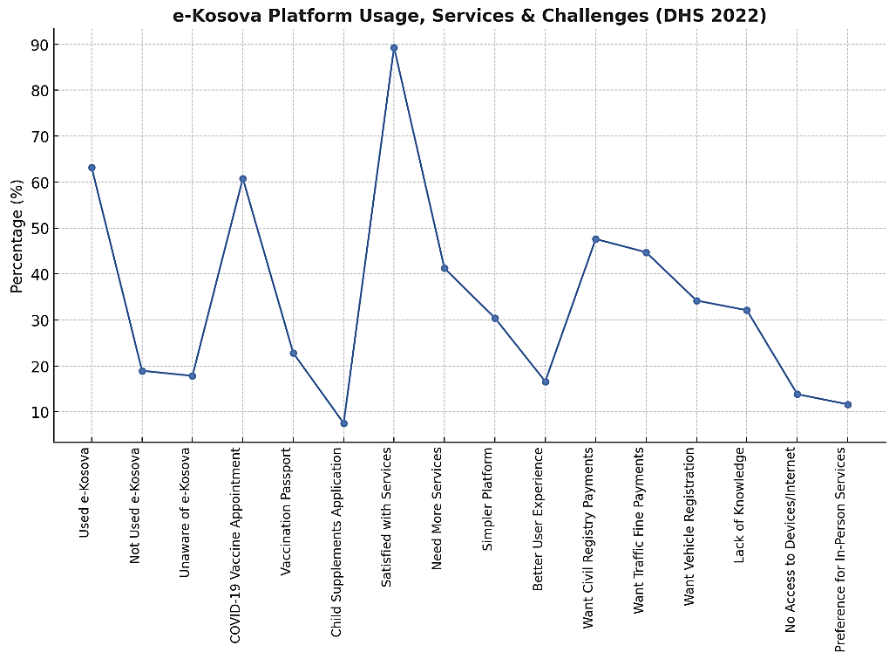

Figure 15: e-Kosova Platform Usage, Services and Challenges

The analysis of the e-Kosova platform usage data reveals that a majority of respondents (63.23%) have used the platform, while 18.94% have not, and 17.83% are unaware of it[27]. This indicates a relatively high adoption rate but suggests a need for further awareness campaigns. Among the most commonly used services on the platform, setting an appointment for COVID-19 vaccination stands out as the most utilized service (60.8%), followed by the electronic vaccination passport (22.81%) and applying for child supplements (7.53%). This highlights that health-related services are the primary drivers of platform engagement. Regarding user experience, a significant 89.32% of respondents reported being satisfied with the services provided, indicating a positive perception of the platform's effectiveness. However, there may still be areas for improvement, as some users

[27] UNDP Kosovo's Digital Household Survey, https://www.undp.org/kosovo/digital Apr 2022, Microsoft Power BI, Page 12, accessed on 23 Jan 2025

have experienced technical issues or difficulties finding specific services. When asked about additional services they would like to see on the platform, respondents highlighted payment for civil registry services such as birth and marriage certificates (47.62%), traffic fines (44.74%), and vehicle registration (34.22%) as top priorities. This suggests a demand for expanding the platform's offerings to include essential administrative services. In terms of potential improvements, the majority of users (41.25%) indicated a need for adding more services, followed by making the platform simpler to use (30.43%) and improving the overall user experience (16.61%). Barriers to the use of online public services in the past include a lack of knowledge about how to use the platform (32.12%), lack of access to devices or the internet (13.84%), and a preference for in-person services (11.63%). These insights suggest that digital literacy and accessibility remain key challenges to address.

It is pertinent to note that the data above is based on the UNDP’s Survey, as explained above. The input received from the central authorities of Kosovo states that electronic payments through eKosova were launched in December 2021, and since then, traffic fines can be paid directly from eKosova. The electronic civil registry certificates were launched in eKosova in June 2022, and since then, they have been provided online for free (hence, there is no need for electronic payment for these documents).

The analysis of digital wellbeing data reveals that a majority of respondents (65.67%) perceive the internet's impact on them as positive, while 27.02% view it neutrally, and only 3.32% consider it negative[28]. This indicates a generally favorable perception of the internet's influence on their lives. In terms of online safety, 64.67% of respondents feel somewhat safe, and 20.93% feel very safe, while a smaller portion (11.85%) feel somewhat unsafe, suggesting that while most users have confidence in their online security, a significant minority still have concerns. When asked about the biggest threats they face online, fraud or scams emerged as the top concern (53.49%), followed by bullying or harassment (52.93%) and unwanted sexual approaches (34.33%). Concerns about unauthorized use of personal images and exposure to sexual content were also noted by about 30.79% and 31.34% of respondents, respectively, highlighting prevalent online safety challenges. Regarding motivation to embrace new technology solutions, a significant 56.26% are motivated, while 35.55% are somewhat motivated, and only 8.19% are not interested. This indicates a strong willingness to adopt technological advancements. Respondents also expressed a desire to improve their digital skills (40.09% strongly agree), and many consider digital skills essential in today’s world (30.68% strongly agree). Experience with online threats reveals that 39.87% of respondents have not faced any negative incidents online, but 36.21% have encountered disinformation, followed by hacking (19.27%), bullying or harassment (17.61%), and unwanted sexual approaches (16.17%).

[28] UNDP Kosovo's Digital Household Survey, https://www.undp.org/kosovo/digital Apr 2022, Microsoft Power BI, Page 8, accessed on 23 Jan 2025

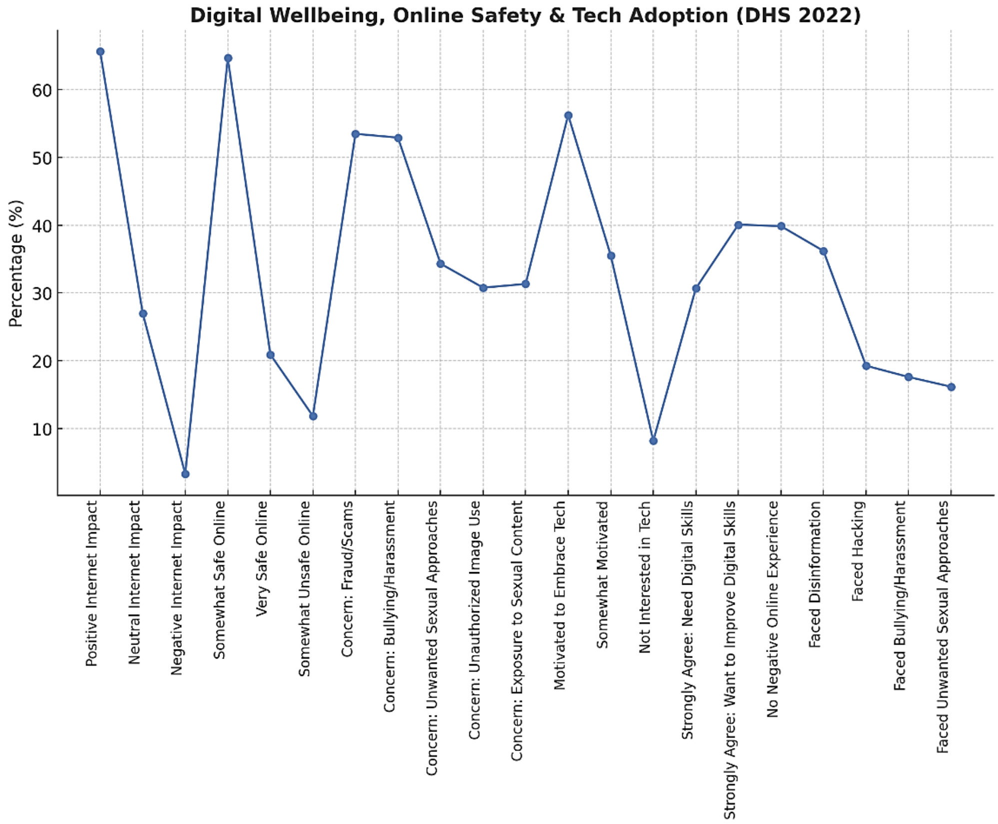

Figure 16: Digital Wellbeing, Online Safety & Technology Adoption

2.1.2 Market Environment

The telecommunications sector is served by the Post and Telecommunication of Kosovo (PTK) and Ipko[29]. PTK, a Socially Owned Enterprise, offers a range of telecommunication services, including fixed-line and mobile phone services and internet services. Fixed telephony currently consists of 57,332 landline connections. Additionally, there are 328 public payphones installed in various public locations and post offices. Five authorized operators provide fixed-line services: Telekom Kosovo (TiK), IPKO, Kujtesa.Net, Fiber Link, and Cones. Telekom Kosovo holds an 80.5% market share. TiK and Ipko, a subsidiary of Slovenia Telecom, provide mobile network services. Two licensed virtual operators, Z-mobile and D3mobile, also offer UMTS and LTE services. The ICT sector has over 1,018,324 users, while Ipko serves 592,876 users, with both providers collectively covering approximately 90% of the market. Internet services are provided by more than 54 authorized Internet Service Providers (ISPs), four of which have direct connections to the international network.

2.1.3 Meaningful Connectivity in the Regional Context

Kosovo's position within the Western Balkans places it in a unique context for regional connectivity initiatives and collaboration. While it has made notable strides in expanding digital access and infrastructure, its connectivity landscape reflects shared challenges and opportunities compared to its regional peers.

Regional connectivity projects, such as the Western Balkans Digital Agenda[30], aim to improve broadband penetration and harmonize standards across the region. Kosovo participates actively in

[29] Kosovo Investment and Enterprise Support Agency (KIESA), 2025. Telecommunication. [online] Available at: LINK [Accessed 23 January 2025].
[30] European Commission, 2018. Digital Agenda for the Western Balkans: EU sets out new flagship initiatives and support. [online] Available at: https://ec.europa.eu/commission/presscorner/detail/es/ip_18_4242 [Accessed 23 January 2025].

these initiatives, focusing on: (i) Developing last-mile infrastructure to bridge urban-rural divides; and (ii) Supporting cross-boundary digital infrastructure projects.

The Regional Roaming Agreement (RRA) was signed by Western Balkan economies on 4 April, 2019, during the second Western Balkans Digital Summit in Belgrade[31]. Facilitated by the Regional Cooperation Council (RCC) and the European Commission, the agreement aimed to reduce and eventually eliminate roaming charges within the region. As a result, from 1 July, 2021, people of the Western Balkans no longer incur additional charges while roaming within the region, aligning with the "Roam Like at Home" model. Building upon this regional success, 38 telecommunication operators from the EU and the Western Balkans agreed in December 2022 to lower data roaming prices between these areas[32]. This agreement, effective from October 1, 2023, makes data roaming more affordable for individuals and businesses traveling between the EU and the Western Balkans.

The Balkans Digital Highway is an initiative aimed at enhancing high-speed broadband access across the Western Balkans by leveraging existing infrastructure, particularly the fiber-optic networks of Transmission System Operators (TSOs)[33]. This approach seeks to improve digital connectivity both within and throughout the Western Balkans. In Kosovo, KOSTT, the domestic TSO, has expressed strong support for the Balkans Digital Highway initiative[34]. The organization is committed to collaborating on regional infrastructure sharing to enhance digital connectivity. Furthermore, the Ministry of Economy has positioned the Kosovo as a regional leader in the digital highway project, aiming to improve infrastructure and provide better opportunities for the youth[35]. The project is considered one of the most attractive, focusing on facilitating easier access to digital services.

2.1.4 Connectivity Policies and Regulations

Policy efforts to ensure universal access have been effective, as evidenced by its Access Enablers score of 5[36]. Regulatory frameworks have focused on affordability and inclusivity, ensuring even marginalized communities benefit from digital connectivity. This strong foundation provides a platform for future initiatives like 5G deployment and rural broadband expansion, critical for fostering economic and social development.

1. **Digital Agenda for Kosovo (DAK):** The DAK 2030[37] is a comprehensive strategy that outlines policies and priorities in the context of ongoing digital transformation. This cross-sectoral strategy aims to align digital development with innovative technologies and global digital trends. It takes into account the strategic objectives of the development strategy, the IT strategy, and other socio-economic policy documents of Kosovo. Additionally, it aligns with the latest strategies and recommendations of the European Union, such as the Digital Compass 2030, the Green Deal, and Shaping Europe's Digital Future.

[31] Regional Cooperation Council (RCC), n.d. Stay Charged, Roam Free – Western Balkans Roaming Free Agreement. [online] Available at: https://www.rcc.int/campaigns/10/stay-charged-roam-free [Accessed 23 January 2025]
[32] European Commission, 2023. Decrease in data roaming fees between Western Balkans and EU. [online] Available at: https://neighbourhood-enlargement.ec.europa.eu/news/decrease-data-roaming-fees-between-western-balkans-and-eu-2023-10-02_en [Accessed 23 January 2025]
[33] Western Balkans Investment Framework (WBIF), n.d. Balkans Digital Highway Project. [online] Available at: https://wbif.eu/project/PRJ-MULTI-DII-006 [Accessed 23 January 2025]
[34] Telegrafi, n.d. KOSTT supports the development of the initiative for joint sharing of the Balkan digital infrastructure. [online] Available at: https://telegrafi.com/en/kostt-mbeshtet-zhvillimin-e-iniciatives-per-ndarjen-e-perbashket-te-infrastruktures-digjitale-ballkanike [Accessed 23 January 2025]
[35] Ministry of Economy, n.d. Lluka: Kosovo, a regional leader of the digital highway project. [online] Available at: LINK [Accessed 23 January 2025]
[36] n 13
[37] Public Consultation on the Kosovo Digital Agenda 2030. [online] Available at: LINK [Accessed 23 January 2025]

2. **Kosovo Broadband Plan:** The Kosovo Digital Economy (KODE)[38] Project serves as the cornerstone of broadband strategy, aiming to enhance access to high-speed internet across the territory, particularly in underserved rural areas. Launched in 2018 with support from the World Bank, the project has successfully connected numerous villages, schools, and healthcare institutions to high-speed broadband infrastructure. By March 2023, Kosovo achieved full broadband internet coverage in all inhabited areas, placing it among the leading economies in Europe in terms of internet accessibility.
3. **Kosovo Development Strategy (DS):** The Development Strategy 2030[39] is the principal strategic document outlining the vision for sustainable development over the next decade. It addresses key challenges and sets priorities across various sectors, including economic growth, social welfare, education, environmental sustainability, and governance. The strategy aims to align Kosovo's policies with international standards and the Sustainable Development Goals (SDGs), providing a framework for long-term strategic and budgetary planning.
4. **Regulatory Authority of Electronic and Postal Communications (RAEPC):** The Regulatory Authority of Electronic and Postal Communications (ARKEP)[40], is a regulatory body overseeing electronic communications and postal services. Established under the Law on Electronic Communications, ARKEP is responsible for implementing policies and strategies in these sectors, as defined by the Ministry.
5. **e-Government Strategy of Kosovo 2023-2027:** The e-government Strategy 2023-2027[41] aims to accelerate digital transformation by enhancing public administration efficiency and civic engagement. It focuses on six strategic objectives: digital service optimization, data-driven decision-making, cybersecurity enhancement, interoperability, digital literacy, and inclusive service delivery. The strategy aligns with Kosovo's Digital Agenda 2030 and follows principles such as "once-only," personalization, and proactive service delivery. It emphasizes collaboration, innovation, and regulatory alignment with EU standards.
6. **Kosovo's Spectrum Policy:** The spectrum policy is primarily guided by the Frequency Allocation Plan, which outlines the allocation and utilization of the radio-frequency spectrum within Kosovo[42]. This plan aligns with international standards set by organizations such as the International Telecommunication Union (ITU) and the European Conference of Postal and Telecommunications Administrations (CEPT). The plan was developed by the Telecommunication Regulatory Authority (TRA) and submitted to the Kosovo Assembly for approval in April 2011.

   In recent developments, the Regulatory Authority for Post and Electronic Communications (ARKEP) has allocated frequencies suitable for 5G operations to operators such as IPKO and Telecom Kosovo[43]. The input received from the central authorities of Kosovo states that the allocation for 5G spectrum was carried out in 2023. It's worth mentioning that by the end of 2024, Kosovo Telecom achieved 5G coverage in 65% of Kosovo's territory. To monitor and manage the spectrum effectively, Kosovo has implemented its Spectrum

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[38] World Bank, 2023. Every Village in Kosovo Now Connected to High-Speed Broadband Internet, With World Bank Support. [online] Available at: https://www.worldbank.org/en/news/press-release/2023/03/21/-every-village-in-kosovo-now-connected-to-high-speed-broadband-internet-with-world-bank-support [Accessed 23 January 2025]
[39] Development Strategy and Plan 2030. [online] Available at: LINK [Accessed 23 January 2025].
[40] Regulatory Authority of Electronic and Postal Communications (RAEPC), n.d. Official Website. [online] Available at: LINK [Accessed 23 January 2025]
[41] "Ministry of Internal Affairs", 2023. e-government Strategy 2023-2027. [online] Available at: https://mpb.rks-gov.net/Uploads/Documents/Pdf/EN/2700/e-Government%20Strategy%20Kosovo%202023-2027.pdf [Accessed 23 January 2025]
[42] International Telecommunication Union (ITU), n.d. Broadband Mapping and QoS Aspects: Kosovo Experience. [online] Available at: https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2019/Mapping%20Warsaw/Kreshnik.pdf [Accessed 23 January 2025]
[43] Spectrum Tracker, n.d. Kosovo allocates frequencies for 5G operations. [online] Available at: https://www.spectrum-tracker.com/news/8 [Accessed 23 January 2025]

Monitoring System (NSMS)[44]. This system enables the identification of interference sources and ensures compliance with international obligations, thereby supporting Kosovo's digital infrastructure and cybersecurity.

2.1.5 Increasing Infrastructure Reliability Through Cybersecurity

UNDP's Digital Household Survey reported that more than half (56.69%) of respondents expressed having no security concern in relation to making online purchases or banking, 27.43% expressed somewhat concern, 7.02% said they should be concerned but are not, 6.70% reported being very concerned, and 2.17% were a little concerned[45]. This reflects the critical importance of cybersecurity in fostering trust and growing trust in digital financial services. The Cyber Security Strategy 2023-2027[46] outlines a comprehensive plan to enhance its cybersecurity posture. The strategy emphasizes strengthening legal and institutional frameworks, promoting cybersecurity awareness, fostering public-private partnerships, and building domestic and international cooperation. It also focuses on developing sustainable cybersecurity capacities for both public institutions and private sectors, as well as advancing investigative and military cybersecurity capabilities. The strategy aligns with the Digital Agenda 2030 and aims to create a secure and resilient online environment for all people, businesses, and public sector entities. Kosovo has developed a comprehensive legal framework to address cybersecurity, harmonizing its legislation with European Union standards. The cornerstone of this framework is Law No. 08/L-173 on Cyber Security, enacted in 2023, which establishes principles for cybersecurity, delineates the responsibilities of relevant authorities, and mandates the creation of a Cyber Security Agency[47]. This law partially transposes Directive (EU) 2013/40 on attacks against information systems. Additionally, the Law No. 03/L-166 on Prevention and Fight of the Cyber Crime, adopted in 2010, criminalizes various cyber offenses, including unauthorized access, data interference, and system interference[48]. The input received from Kosovo's central authorities states that, in 2023, amendments to the Penal Code and Penal Procedure Code were adopted in Parliament to include clauses from the Budapest Convention related to cybercrime. With the adoption of these amendments and the Cyber Security Law No. 08/L-173, the old Law No. 03/L-166 has been entirely abrogated.

Kosovo is taking significant steps to modernize its digital infrastructure and enhance cybersecurity by aligning its legislation with key EU standards. Kosovo plans to adapt its laws in accordance with the EU Gigabit Infrastructure Act[49] and implement measures to secure the rollout of 5G networks, following the guidelines set out in the EU 5G cybersecurity toolbox[50]. In parallel, Kosovo has introduced frameworks for Critical Vulnerability Disclosure (CVD)[51] and Crisis Management[52], as stipulated by the EU acquis, demonstrating its commitment to meet European regulatory requirements and improve its overall resilience in digital and crisis management sectors. Kosovo's electronic identification system is set to incorporate the European Union's European Blockchain Services Infrastructure Identification Wallet[53], allowing people to store their electronic IDs in an

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[44] Ministry of Economy, n.d. Inauguration of the Spectrum Monitoring System – A Project of Domestic Importance. [online] Available at: LINK [Accessed 23 January 2025]
[45] UNDP Kosovo's Digital Household Survey, https://www.undp.org/kosovo/digital , Apr 2022, Microsoft Power BI, Page 9, accessed on 23 Jan 2025
[46] Ministry of Internal Affairs, 2023. Cyber Security Strategy 2023-2027. [online] Available at: LINK [Accessed 26 January 2025]
[47] Kosovo Centre for Security Studies (QKSS), n.d. Kosovo's Take on Cybersecurity. [online] Available at: https://qkss.org/al/publikimet/kosovos-take-on-cybersecurity [Accessed 23 January 2025]
[48] Council of Europe, n.d. Kosovo – Cybercrime Legislation and Policies. [online] Available at: https://www.coe.int/en/web/octopus/-/kosovo- [Accessed 23 January 2025].
[49] European Parliamentary Research Service (EPRS). (2023) Gigabit Infrastructure Act: Reducing the cost of deploying gigabit networks. European Parliament. Available at: https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/749783/EPRS_BRI(2023)749783_EN.pdf [Accessed 23 January 2025]
[50] European Commission. (2020) EU Toolbox for 5G Security. European Commission. Available at: https://digital-strategy.ec.europa.eu/en/library/eu-toolbox-5g-security [Accessed 23 January 2025]
[51] n 5
[52] n 5
[53] n 5

EU-compliant digital wallet starting in autumn 2024. Supported by the Reform Agenda[54], this initiative aims to secure the cross-boundary functionality of the identity wallet by establishing a Balkan Identity Wallet, which will also facilitate access to the EU Digital Identity Wallet. To ensure readiness and coordinated participation in the Balkan Identity Wallet by 2027, Kosovo is proposing the creation of an official Working Group that will include all representatives from all the Western Balkans (WB)[55].

2.2 Building Block 2: People-Centric Digital Transformation

The Digital Transformation Portfolio of UNDP Kosovo aims to create significant system-wide impacts by focusing on several key objectives[56]. First, it strives to ensure that digital access is affordable, accessible, and reliable for everyone, promoting inclusiveness in the digital landscape. Second, the initiative seeks to accelerate the growth of an intelligent and environmentally sustainable economy by leveraging digital transformation as a driving force. Third, the portfolio is committed to enhancing user experiences and empowering communities by harnessing digital solutions, ultimately fostering greater engagement and participation in the digital ecosystem.

To achieve these goals, UNDP Kosovo has adopted a comprehensive approach centered around four main areas: Digital Enabler, Digital Trust, Digital Society, and Digital Economy. This strategy aligns with the UNDP Strategic Plan 2022–2025, emphasizing the need for holistic engagement at the policy level, an enabling legal environment, agile systems, and continuous experimentation and iteration. A notable initiative under this portfolio is the UNDP's Digital Household Survey, which revealed high technology access and internet penetration in Kosovo. However, it also highlighted a significant digital literacy divide, particularly in terms of using complex productivity tools and coding skills essential for the digital economy.

Although the available sources do not outline specific quantitative targets or timelines, the portfolio is notably grounded in a people-centric design. It prioritizes community engagement to better understand local needs, promotes inclusivity, and ensures that digital transformation efforts are responsive to the diverse realities across the population. This emphasis on inclusion and empowerment is critical in strengthening engagement and encouraging broader participation in the digital ecosystem. This approach is reflected in concrete initiatives such as the Digital Skills Programme, which delivered practical training in areas like web development and data engineering to bridge the digital skills gap and enhance employment opportunities. More than 400 young men and women benefited from this programme, gaining foundational and job-relevant digital competencies. Another significant initiative is providing assistive technology to visually impaired students at the University of Pristina. This equipment enables students to independently take notes, access learning materials, and conduct research, ensuring that digital inclusion extends to people with disabilities and fostering equal access to higher education.

Together, these interventions illustrate how the portfolio translates its people-centered principles into action, ensuring that the benefits of digital transformation are broadly shared and socially inclusive. These outcomes also offer a model for scaling digital inclusion initiatives across other institutions and vulnerable groups.

2.2.1 Digital Skills Development

Digital skills are a cornerstone of digital transformation. They enable individuals to fully participate in the digital economy, enhance employability, and improve productivity across sectors. In Kosovo,

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[54] n 5
[55] n 5
[56] United Nations Development Programme (UNDP), 2021. Accelerating Digital Transformation in Kosovo. [online] Available at: https://medium.com/@undp.innovation/accelerating-digital-transformation-in-kosovo-adb5b64e6eb0 [Accessed 23 January 2025]

the development of digital skills has been a priority, but gaps in training, accessibility, and inclusivity remain.

Digital transformation agenda recognizes that developing robust digital skills is fundamental for creating an inclusive and competitive digital society. In this context, initiatives such as the UNICEF Learning Passport[57], locally implemented as Shkollat.org,play a pivotal role. The Learning Passport platform provides a comprehensive digital repository, featuring over 14,000 video lessons across core subjects for Grades 1–9. By assigning unique digital identifiers to each student, the platform facilitates personalized learning experiences and enables educators to monitor progress efficiently. This tailored approach not only enhances digital literacy among students and teachers but also equips young learners with the essential ICT competencies required in a rapidly evolving job market. As a result, these efforts contribute directly to bridging the digital skills gap in both urban and rural areas, reinforcing the commitment to ensuring that every person can participate in the digital economy.

UNICEF highlights that while Shkollat.org has been instrumental in providing digital learning resources, its utilization remains limited. The study found that teachers and students initially embraced digital learning during the COVID-19 pandemic, becoming familiar with videoconferencing tools and online educational content. However, the adoption of structured digital learning platforms like Shkollat.org is still underutilized. Challenges such as gaps in internet connectivity and access to devices hinder students' engagement with digital learning both in and out of the classroom. While specific quantitative targets and timelines are not explicitly detailed, the portfolio is grounded in a people-centric design. It prioritizes community engagement to understand local needs better, promotes inclusivity, and ensures that digital transformation efforts are responsive to the diverse realities across the population. This emphasis on inclusion and empowerment is critical in strengthening engagement and encouraging broader participation in the digital ecosystem.

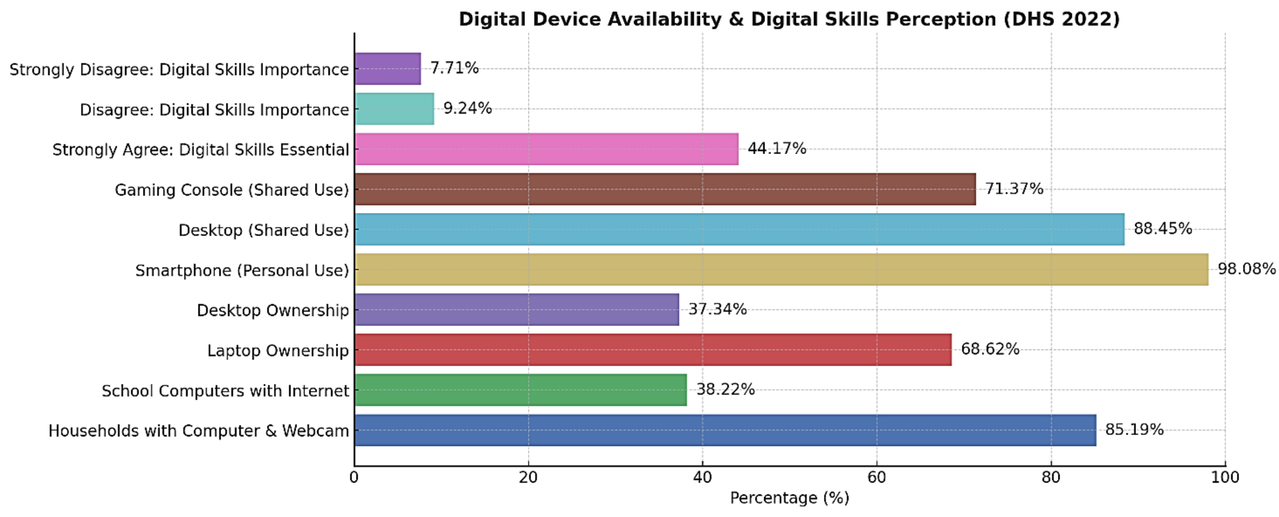

Figure 17: Digital Device Availability and Digital Skills Perception

UNDP's Digital Household Survey reported that 85.19% of households have at least one computer with a webcam, showing significant availability of digital tools for education and work[58]. However, improving access in the remaining households is essential to ensure inclusive digital participation. The survey reported that only 38.22% of school computers are connected to the internet, which indicates a gap in equipping educational institutions with adequate digital infrastructure for e-

[57] UNICEF. (2023) Transforming Education in Kosovo with the Learning Passport: The Case of Shkollat.org. UNICEF Innocenti – Global Office of Research and Foresight. Available at: https://www.unicef.org/innocenti/media/3531/file/UNICEF-Transforming-Education-Kosovo-Learning-Passport-EN-2023.pdf [Accessed 23 January 2025]
[58] n 15

learning. While most households own basic devices like smartphones and TVs, laptops and desktops are less common, with usage rates of 68.62% and 37.34%, respectively[59]. This may limit opportunities for advanced digital literacy skills development that typically requires more versatile devices. Smartphones are predominantly personal devices (98.08%), while desktops and gaming consoles are more likely to be shared, with shared usage at 88.45% and 71.37%, respectively. This suggests smartphones as the primary tool for individual digital engagement, but larger shared devices could contribute to family-wide digital literacy. While 44.17% strongly agree that improving digital skills is essential, a notable 9.24% disagree and 7.71% strongly disagree, indicating a gap in perceived importance of digital literacy among a subset of the population[60].

The Food and Agriculture Organization of the United Nations (FAO), in its report on gender profile of agriculture and rural livelihoods reported that only 38% of schools have internet-connected computers, which limits digital learning opportunities for students, particularly in rural schools where the connectivity rate is even lower (31%) compared to urban schools (48%)[61]. Furthermore, only 31% of students use computers at school. Around 41% of rural women report that their digital skills are not aligned with labor market demands, compared to 33% of rural men. A significant number of rural women (30%) and men (28%) report insufficient information about available digital services, which restricts their ability to use these technologies effectively.

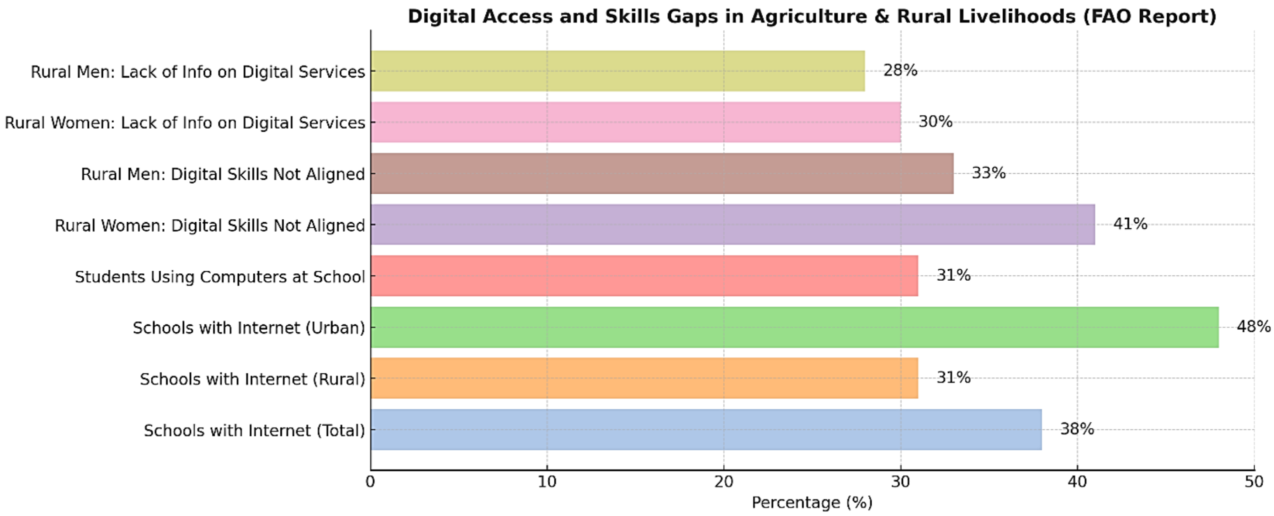

Figure 18: Digital Access and Skills Gaps in Agriculture & Rural Livelihoods

A 2023 European Survey revealed that over 50% of Kosovars require moderate-to-high digital skill development to meet labor market demands. Initiatives like the "Digital Skills for All" program have begun addressing this gap, training 180 young job seekers in data engineering, web development, and digital marketing[62]. Only 0.5% of public employees are IT specialists, far below the recommended 2–3% for effective digital governance[63]. The Kosovo Institute for Public Administration (IPAK) provides ICT training for public officials, covering areas like e-governance, IT security, and data protection[64]. Programs like the Youth Online and Upward (YOU) initiative aim to equip 4,000 youth with technical and soft skills, including web development, digital marketing, and graphic design. Launched by the United Nations Development Programme (UNDP) in partnership with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Digital Skills Programme supports 110 young jobseekers in developing marketable digital skills through

[59] n 26
[60] n 30
[61] FAO. 2024. Kosovo gender profile of agriculture and rural livelihoods. Budapest. https://doi.org/10.4060/cd1154en
[62] n 12
[63] n 43
[64] n 27

training bootcamps in Information and Communication Technology (ICT)[65]. The training covers areas such as programming, networking, design, and digital marketing.

Digital Skills for All (DS4A) implemented by RIT Kosovo in collaboration with UNDP and the Ministry of Local Government and Administration and financially supported by the Ministry of Foreign Affairs and International Cooperation of the Italian Republic, this initiative aims to equip up to 180 young women and men aged 18-29 with essential digital skills[66]. The program offers intensive training in key digital domains, including mobile application development, web development, data engineering, networking, digital marketing, and digital design. Gracanica Innovation Centre (GIC) supported by the Enhancing Youth Employment (EYE) project, GIC imparts vital 21st-century skills, such as creativity, communication, and the basics of robotics and computer programming, to youth in Kosovo[67]. The center has engaged trainers to instill ICT skills in the youth, aiming to identify, train, and certify 60 young individuals, and match many of them with jobs in the local business ecosystem.

2.2.2 Bridging the Gendered Digital Divide – Women and Girls in the ICT and STEM Sectors

Kosovo's digital inclusion initiatives are hindered by a lack of horizontal interministerial coordination and outdated legal frameworks. Accessibility for individuals with disabilities, such as adopting Web Content Accessibility Guidelines (WCAG 2.0) standards for public websites, has not been prioritized[68]. Efforts to enhance digital inclusion among marginalized groups, including Roma and Egyptian populations, remain limited. Comprehensive data collection and targeted programs are necessary to mitigate digital exclusion. Women represent 51.7% of internet users in Kosovo, but their participation in the ICT workforce remains minimal. Scholarships and STEM-specific campaigns aim to encourage more women to enter ICT fields[69]. Internet usage among women increased to 40.2% in 2020, narrowing the gender gap. However, efforts to include more women in digital transformation initiatives remain necessary[70].

Digital skills vary notably by gender across different age groups and education levels. In the 16-24 age bracket, young women outperform their male counterparts in basic and above-basic digital skills, holding a 5.7 percentage point advantage in 2019[71]. However, as individuals age, this trend reverses, with men eventually taking the lead—peaking at a 12.2 percentage point advantage among those aged 25-54. Moreover, digital competence is closely tied to educational attainment for both genders, with women generally excelling among those with higher education. Despite these trends, Kosovo continues to lag behind the EU-27 average and other regional counterparts in overall digital skills proficiency.

[65] United Nations Development Programme (n.d.) UNDP and GIZ launching Digital Skills Programme. Available at: https://www.undp.org/kosovo/press-releases/undp-and-giz-launching-digital-skills-programme (Accessed: 24 January 2025)
[66] RIT Kosovo (n.d.) Digital Skills for All (DS4A). Available at: https://www.rit.edu/kosovo/DS4A (Accessed: 24 January 2025).
[67] Helvetas Kosovo (n.d.) Digital skills for young people of the Serbian community in Kosovo. Available at: https://helvetas-ks.org/eye/en/digital-skills-for-young-people-of-the-serbian-community-in-kosovo (Accessed: 24 January 2025)
[68] OECD (2024), Western Balkans Competitiveness Outlook 2024: Regional Profile, Competitiveness and Private Sector Development, OECD Publishing, Paris, https://doi.org/10.1787/170b0e53-en
[69] n 12
[70] n 27
[71] The International Bank for Reconstruction and Development/The World Bank. (2024) Kosovo: Gender Assessment. Washington, D.C.: The World Bank. Available at: https://hdl.handle.net/10986/41898 [Accessed 23 January 2025]

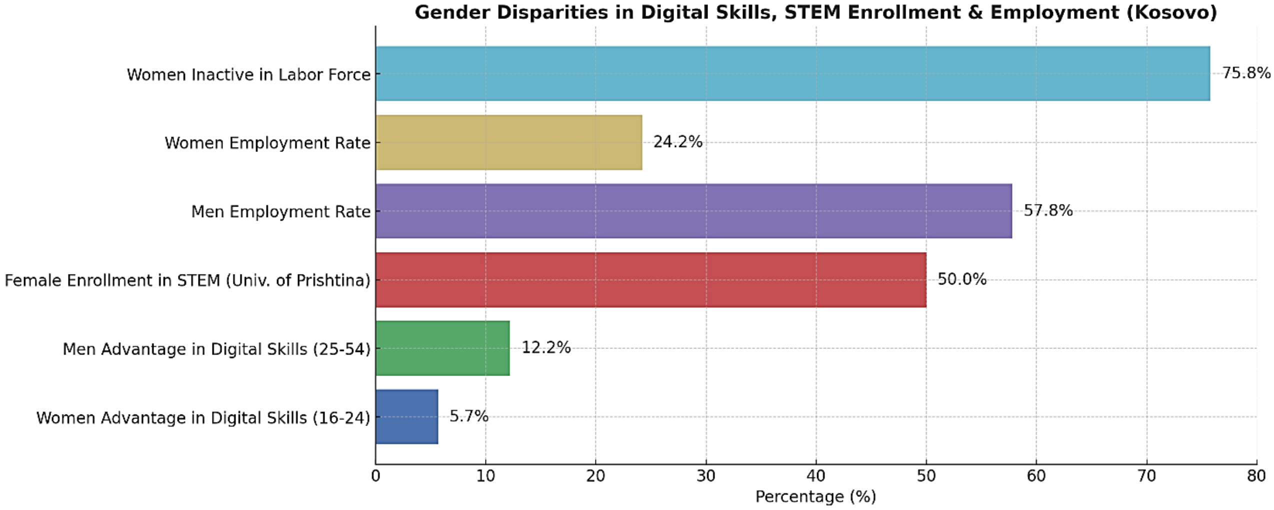

Figure 19: Gender Disparities in Digital Skills, STEM Enrollment and Employment

Female enrollment in STEM (Science, Technology, Engineering, and Mathematics) programs has seen notable improvements in recent years[72]. At the University of Pristina, women now constitute 50% of students in STEM fields, marking a significant shift in these traditionally male-dominated disciplines. However, challenges persist. Despite increased enrollment, women remain underrepresented in the labor market, particularly in STEM-related professions[73]. The KAS reports that while 57.8% of men are employed, only 24.2% of women hold employment. Furthermore, 75.8% of women are classified as inactive in the labor force. Although specific data on women's employment in STEM fields is limited, a 2021 report indicates a growing trend of women entering the ICT sector, though their numbers remain low.

Table 1: Individuals with Basic Digital Skills or Above (percentage, by sex, age group, and level of education) (2019)[74]

	Kosovo		EU-27	
	Men	Women	Men	Women
AGE-GROUPS				
16-24 years old	55.3	61	81	82
25-54 years old	32.6	20.4	63	62
55-74 years old	12.5	4.2	37	26
LEVEL OF EDUCATION				
Low formal education	12.6	6	35	27
Medium formal education	28.8	31.3	56	53
High formal education	66.6	69.1	86	82

[72] UN Women (2024) Breaking barriers: How STEM scholarships are empowering Kosovo's young women. Available at: https://eca.unwomen.org/en/stories/news/2024/08/breaking-barriers-how-stem-scholarships-are-empowering-kosovos-young-women (Accessed: 24 January 2025).
[73] UNICEF Kosovo Programme (n.d.) Advocacy brief: Girls' vision for the future in Kosovo. Available at: https://www.unicef.org/kosovoprogramme/stories/advocacy-brief-girls-vision-future-kosovo (Accessed: 24 January 2025)
[74] n 73

The Institute for Strategic Studies report highlights the gender divide by noting that women are underrepresented in AI-related fields, comprising only 18% of the tech workforce. It also states that 47% of women lack basic digital skills, compared to 29% of men[75]. Furthermore, the report points out that AI-driven systems may reinforce the existing gender biases due to biased training data and lack of diverse representation in algorithm development.

2.2.3 Digital Inclusion and ICT Accessibility for Persons with Disabilities

Despite near-universal internet access (98.6% of households in 2023), only 28% of individuals interact with public administration online. Cross-sectoral digital inclusion policies lack horizontal coordination[76]. UNDP's report highlights significant challenges in digital inclusion and ICT accessibility for people with disabilities [77]. According to the report, only 11.8% of people with disabilities have access to assistive technologies, limiting their ability to participate in the digital economy. Furthermore, 78% of respondents reported a lack of adequate digital skills training, which hinders their employment opportunities in the ICT sector. The report emphasizes the importance of implementing inclusive policies and expanding access to digital tools and training to bridge the existing digital divide for people with disabilities.

Accessibility in e-services is improving through digital platforms like e-Kosova, which aims to centralize public services and make them accessible to all people[78]. UNDP announced the establishment of a Resource Center for students with disabilities[79]. The center will be equipped with assistive technology provided by UNDP Kosovo to enhance educational experience and improve accessibility for students with disabilities. The initiative aims to promote inclusion, awareness, and understanding of students' diverse needs and abilities.

2.2.4 Building Trust and Confidence in the Use of ICTs for Children and Youth

Kosovo's E-Participation Index score of 3.32 reflects moderate public engagement in online platforms that facilitate public decision-making processes[80]. While this score suggests progress in digital inclusion for children and youth, further investments in e-participation tools and awareness programs are needed to empower younger generations to contribute meaningfully to governance and policy development.

UNICEF's Learning Passport initiative illustrates how thoughtfully designed digital education tools can enhance online safety and build digital residency[81]. By offering a secure platform with robust privacy measures and controlled access through individualized digital IDs, the Learning Passport reassures both students and parents that the digital space is safe for learning. In addition, the platform incorporates features that promote interactive and engaging learning experiences while ensuring compliance with best practices in child online protection. These measures include user-friendly interfaces, secure communication channels, and continuous monitoring for cyber threats. Moreover, integrating digital safety education within the platform helps raise awareness about responsible internet use, ultimately empowering children and youth to navigate the digital world

[75] Institute for Strategic Studies (2024) The effects of artificial intelligence on human rights. Available at: https://westernbalkansfund.org/wp-content/uploads/2024/12/ITS-The-Effects-of-Artificial-Intelligence-on-Human-Rights-Final-EN.pdf (Accessed: 24 January 2025).
[76] n 17
[77] United Nations Development Programme (2024) Labor market inclusion of persons with disabilities in Kosovo. Available at: https://www.undp.org/sites/g/files/zskgke326/files/migration/ks/Labor-Market-Inclusion-of-persons-with-disabilities.pdf (Accessed: 24 January 2025).
[78] n 27
[79] UNDP Kosovo (2024) Positive news coming from the University..., LinkedIn. Available at: https://www.linkedin.com/posts/undp-kosovo_positive-news-coming-from-the-university-activity-7138100637665234945-NTss/ (Accessed: 24 January 2025)
[80] n 13
[81] n 59

confidently and safely. Such initiatives are essential to overcoming challenges related to cyberbullying and data privacy, thereby ensuring that the next generation is not only digitally literate but also digitally secure.

UNDP's Digital Household Survey reported that 84.6% of respondents think education on online safety should be part of formal school education, 12.32% reported they do not know if it should be part of formal school education, and 3.08% of respondents answered negatively[82]. Unique challenges of cyberbullying include the vast number of bystanders (49.9%) and lack of parental awareness (43.83%)[83]. These factors complicate efforts to mitigate cyberbullying compared to traditional forms. When asked who the first person or authority is to reach out to help if they felt threatened online, the majority of respondents, 61.6%, reported they would approach the police[84]. 15.35% indicated they would not ask for help from anyone, and 14.17% felt comfortable reaching out to a friend. In comparison, minuscule 4.18% and 0.10% indicated they would reach out to parents or guardians and teachers, respectively. When asked where they would report a security breach or ask about online security, the majority (52.92%) indicated they would use the Kosovo Police website[85]. However, 24.45% said they "don't know," reflecting a lack of awareness about available online security resources.

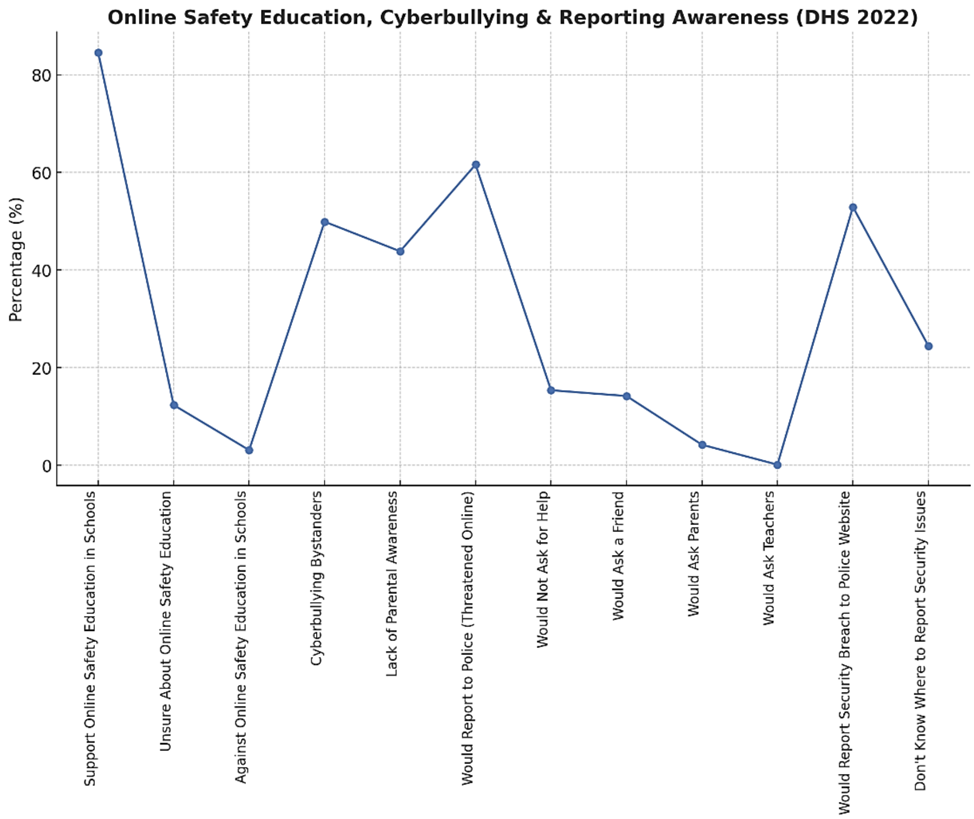

Figure 20: Online Safety Education, Cyberbullying and Reporting Awareness

The Youth for Inclusion, Equality, and Trust (YIET) project, implemented by UNDP Kosovo, aims to empower young people by enhancing their skills in media literacy, combating misinformation, and promoting constructive narratives[86]. The project has made significant strides in fostering inclusion and equality among youth. Notably, forty-three young women and men from diverse communities

[82] n 47
[83] UNDP Kosovo's Digital Household Survey, https://www.undp.org/kosovo/digital , Apr 2022, Microsoft Power BI, Page 15, accessed on 23 Jan 2025
[84] n 47
[85] n 85
[86] UNDP Kosovo (n.d.) Youth for Inclusion, Equality and Trust. Available at: https://www.undp.org/kosovo/projects/youth-inclusion-equality-and-trust (Accessed: 24 January 2025)

have acquired new skills and knowledge related to disinformation and misinformation. Additionally, ten young journalists and UN Volunteers (UNVs) have been trained and actively engaged in nine different media organizations, promoting positive messaging and countering hate speech through youth-led storytelling. The initiative has also increased awareness among sixty young participants, equipping them to be "Upstanders" against hate speech, bullying, misogyny, and violence. Furthermore, the project has supported five initiatives promoting constructive intergroup relations and gender equality while also involving sixty young individuals with disabilities (both intellectual and physical) in sports activities to strengthen inclusion, equality, and trust. An important milestone of the YIET project includes a collaborative effort between Kosovo and North Macedonia to exchange experiences and goals related to youth policy development. These efforts collectively contribute to building a more informed and inclusive youth community.

The ICT for Kosovo's Growth project, funded by the EU and implemented by WEglobal and Prishtina, aims to enhance Kosovo's ICT sector by providing modern training and fostering job creation[87]. The project has trained over 2,123 youth, with 1,711 certified trainees, and recorded a 61% male and 39% female participation rate. Training includes 300-hour courses in cybersecurity, web development, Java, Python, AI, and more. Additionally, it has facilitated several B2B matchmaking events and cross-regional collaborations.

2.3 Building Block 3: Government-Centric Digital Transformation

Government-centric digital transformation refers to the modernization of governance, administration, and public service delivery through the adoption of ICTs. For Kosovo, this transformation is essential for improving efficiency, transparency, and citizen engagement. By digitizing services, streamlining administrative processes, and fostering open governance, it aims to create a responsive and accountable public sector that meets the needs of its people.

2.3.1 E-government Policy

Kosovo's Leadership and Strategy score of 1.95 (Stage 1: Basic) indicates a reactive approach to digital governance, with isolated projects rather than a unified strategy[88]. This fragmentation limits the effectiveness and scalability of e-government initiatives. On the other hand, according to the World Bank's 2022 GovTech Maturity Index (GTMI)[90a], Kosovo advanced from Group C ("some focus" on GovTech) in 2020 to Group B ("significant focus") in 2022. This progression reflects improvements across four key areas: core systems, digital public service delivery, digital citizen engagement, and GovTech enablers. The GTMI serves as a comprehensive measure of digital transformation in the public sector, assisting practitioners in designing new digital transformation projects. The public administration, particularly in e-governance, reflects a combination of meaningful progress and ongoing structural challenges.

The SIGMA Public Administration Report 2024[90b] highlights advancements such as the launch of the eKosova portal and the anticipated activation of the domestic electronic identification (eID) system. These developments have led to higher levels of satisfaction among citizens and businesses when accessing public digital services compared to others in the Western Balkans.

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[87] European Forum of Technical and Vocational Education and Training (n.d.) ICT for Kosovo's Growth. Available at: https://efvet.org/ict-for-kosovos-growth/ (Accessed: 24 January 2025)
[88] n 13
[90a]World Bank. (2022) GovTech Maturity Index (GTMI) Data Dashboard. [online] Available at: https://www.worldbank.org/en/data/interactive/2022/10/21/govtech-maturity-index-gtmi-data-dashboard.print [Accessed 29 May 2025].
[90b]OECD (2025), Public Administration in Kosovo 2024: Assessment against the Principles of Public Administration, SIGMA Monitoring Reports, OECD Publishing, Paris, https://doi.org/10.1787/a53fce6b-en
[90c]European Commission. (2024) NIFO 2024 Supporting Document: Kosovo. Interoperable Europe. [online] Available at: https://interoperable-europe.ec.europa.eu/sites/default/files/inline-files/NIFO_2024%20Supporting%20Document_Kosovo_vFinal_rev.pdf [Accessed 29 May 2025].

Strategic frameworks like the Public Administration Reform Strategy (2022–2027) and the e-government Strategy (2023–2027) are in place, though implementation has been limited, with only 46% of planned activities achieved in 2023. Kosovo now ranks above the regional average in digital service delivery and public financial management. However, critical gaps remain in system interoperability, service performance monitoring, and public engagement. The legal foundation for digital governance is solid, but execution is constrained by limited domestic funding, fragmented coordination, and an underdeveloped culture of innovation in the civil service.

The 2024 Interoperable Europe factsheet[90c] outlines a range of ongoing reforms that are transforming the Kosovo's digital public administration. Central to these efforts is the implementation of the e-government Strategy 2023–2027, which prioritizes enhanced e-government coordination, cybersecurity, digital infrastructure, and the development of digital skills among civil servants. A key reform is the expansion of the eKosova portal, with continuous efforts to increase both the number and quality of online services available to individuals and businesses, including integrated services and digital payment options. Another major initiative is the development of a new Interoperability Framework (NIF), designed to facilitate seamless data exchange and ensure technical, semantic, and organizational interoperability across institutions. Furthermore, Kosovo is revamping its Open Data Portal by incorporating more datasets and adopting an open-data-by-design approach in system development. The creation of user-centric digital services is also underway, with a focus on structuring services around life events to improve accessibility and satisfaction. Finally, the central institutions are promoting digital skills development to build a more capable public workforce and bridge the digital divide, reinforcing the foundation for a modern, efficient, and transparent digital administration.

UNDP's Digital Household Survey reported that 35.61% of respondents rated the central institution's use of digital technology during the COVID-19 pandemic as "effective," and 11.26% as "very effective", while 10.29% found it "ineffective" and 6.38% "very ineffective"[89]. This indicates a mixed perception of how effectively the central institutions adapted to digital responses during the crisis. For municipal authorities, 36.28% of respondents rated digital technology use as "effective" and 12.58% as "very effective" while 9.93% found it "ineffective" and 7.38% as "very ineffective". These ratings highlight that local institutions were perceived as slightly better in digital adaptation than the central institutions. 69.17% of respondents have used the e-Kosova platform, while 12.85% are not aware of it[90]. This reflects a relatively high awareness and adoption of the platform, but there is still a need to reach the unaware population to ensure inclusivity. Usage patterns reveal that the platform is most commonly used for tasks like setting appointments for COVID-19 vaccinations and accessing electronic vaccination passports, showing its utility during the pandemic.

[89] UNDP Kosovo's Digital Household Survey, https://www.undp.org/kosovo/digital Apr 2022, Microsoft Power BI, Page 10, accessed on 23 Jan 2025
[90] n 29

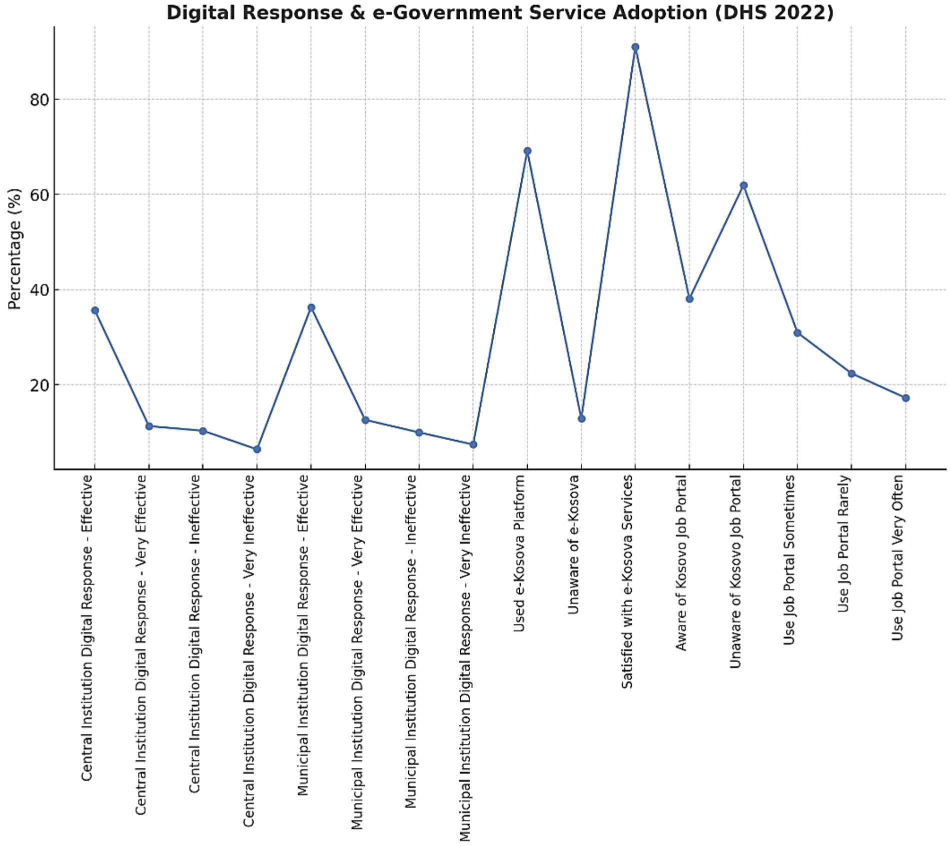

Figure 21: Digital Response and e-government Service Adoption

A significant 91.03% of users report satisfaction with the services provided through e-Kosova[91]. However, a small subset experienced issues such as unclear guidelines or difficulty finding services, highlighting areas for improvement. 38.07% of respondents are aware of the Kosovo Job Portal, while a significant 61.93% are not aware of its existence[92]. This highlights a key gap in outreach and promotion of e-government employment services. Among those aware, 30.92% report using the platform "sometimes," and 22.35% use it "rarely." Only 17.21% use it "very often," indicating low active engagement despite awareness.

UNDP DHS reported that 62.87% of respondents believe that digital technology will improve the services they receive from authorities or public institutions in the future, 63.96% believe that the technology will improve the way children are educated, 63.98% believe the technology will improve healthcare services, 63.38% think the way they work or study would improve, 59.54% believe the shopping experience will improve, and 54.56% believe the technology will improve the way they bank[93]. In contrast, 3.09% of the respondents think the technology will worsen the way they receive services from the authorities or public institutions, 11.2% think the way education is imparted to children will worsen, 3.59% indicated that the healthcare services would worsen due to technology, 4.02% indicated that the way they work and study would worsen because of the technology, 4.38% think their shopping experience will worsen, and 5.78% believe their banking experience will worsen because of technology. The responses on improvement versus worse experiences that the technology may cause in different sectors indicate a strong optimism toward the role of digitalization in enhancing public service delivery. 67.35% of respondents expressed comfort in submitting complaints or corruption allegations through online platforms, while 32.65%

[91] n 29
[92] UNDP Kosovo's Digital Household Survey, https://www.undp.org/kosovo/digital Apr 2022, Microsoft Power BI, Page 14, accessed on 23 Jan 2025
[93] n 85

indicated discomfort[94]. This suggests a high level of trust in digital systems for governance but highlights the need to address barriers for the remaining population.

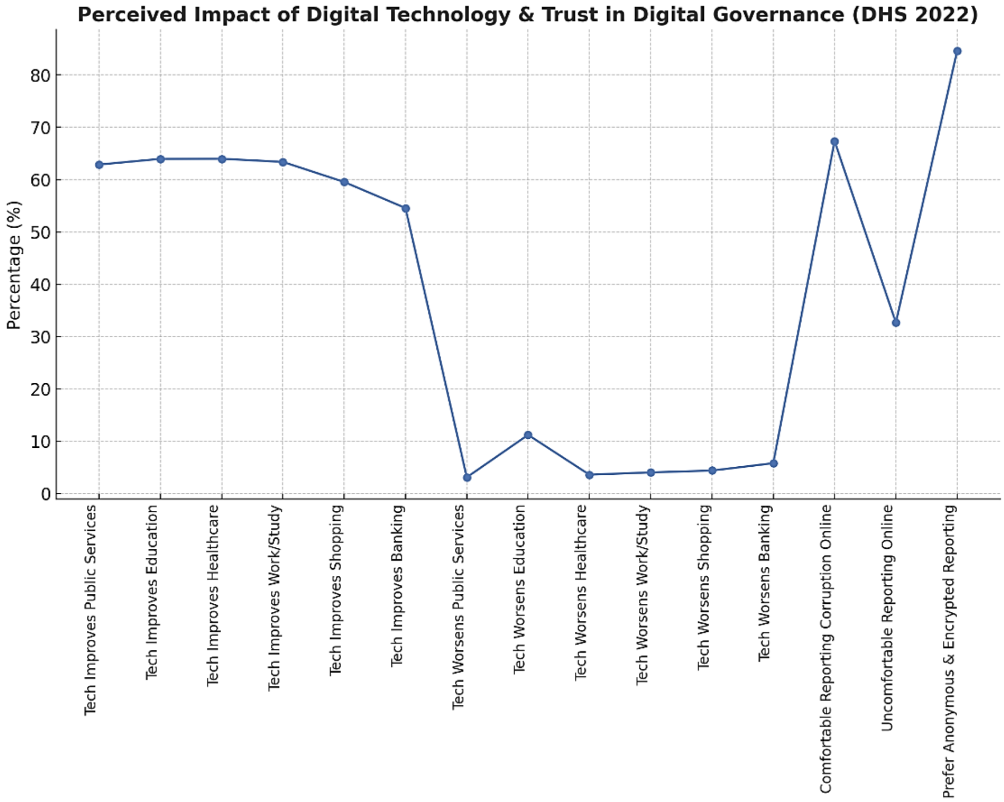

Figure 22: Perceived Impact of Digital Technology & Trust in Digital Governance

An overwhelming 84.63% of respondents stated they would feel more comfortable reporting corruption anonymously and through secured (encrypted) systems. This underscores the critical importance of confidentiality and robust security measures in fostering trust in digital governance. The platform "Raporto.rks-gov.net" allows individuals to report cases of corruption and misconduct within the public sector[95]. It offers the option for anonymous reporting, ensuring that individuals can submit information without revealing their identity. The platform provides a secure and confidential environment for whistleblowers to report irregularities, contributing to greater transparency and accountability in governance.

E-governance initiatives have led to the simplification of 152 services at both central and local levels, the discontinuation of 64 services in three municipalities, and the initiation of digitalisation for more than 30 additional services. Although progress has been made in developing the interoperability platform, its usage remains limited. Moreover, shortcomings in the legal framework regulating administrative procedures and digital service delivery, along with low-quality data in digital public registers, have contributed to only 10% of public services being accessible online[96]. A Digital Transformation Unit has been established to oversee these efforts. Only 28% of people interact with public administration online. Among these, the most common services accessed include tax payments (48%) and obtaining digital copies of personal identification (27%). By 2027,

[94] UNDP Kosovo's Digital Household Survey, https://www.undp.org/kosovo/digital Apr 2022, Microsoft Power BI, Page 16, accessed on 23 Jan 2025
[95] Raporto platform – Kosovo without corruption. Available at: LINK (Accessed: 24 January 2025)
[96] n 17
[98a]Jagxhiu, L. (2025). A significant step in Kosova's digital transformation! [LinkedIn post]. Retrieved April 13, 2025, from https://www.linkedin.com/posts/lulezon-jagxhiu-08669a4_kosova-ekosova-digitaltransformation-activity-7297715960017227776-KqU8

the authorities aim to make 65% of public services digital, addressing the current gap where only 10% of services are available online.

As of early 2025, notable progress has been made: the e-Kosova platform now offers over 220 online services[98a], surpassing the initial scope in terms of service volume. These include widely used services such as tax payments, civil status documentation, criminal record certificates, and applications for social assistance and vehicle registration. Despite this expansion, user engagement remains relatively limited, with only 28% of individuals interacting with public administration online. Among these users, the most commonly accessed services are tax payments (48%) and digital identification documents (27%). The scale-up of services demonstrates positive momentum. However, to meet the target within the remaining timeframe, Kosovo must accelerate implementation by improving backend interoperability, enhancing institutional capacity across line ministries and municipalities, increasing public awareness, and promoting digital inclusion, especially for rural and marginalized populations. Achieving the 2027 target remains feasible, but will depend on sustained political will, better coordination, and targeted investments in both systems and human capital.

As per the input provided by the UN-Habitat, UN-Habitat a full audit was conducted on spatial planning application, the GIS-based planning database mandated by law to manage spatial planning documents from central and local authorities. The audit revealed significant gaps in data accuracy, interoperability, and system use. It provided actionable recommendations to modernize the platform and strengthen municipal engagement. These are essential tools for advancing transparent, evidence-based planning and improving access to public information.

The Ministry of Health plans to implement a centralized e-health system by 2030, integrated with existing and newly developed systems, such as BHIS, EHR, HIS, and e-Prescriptions. These systems will ensure secure and seamless communication between various healthcare providers at all levels[97]. UNDP Kosovo has supported the Ministry in collecting data for their Basic Health Information System (across all medical centres (i.e. ambulances, etc.) by deploying teams in different regions with the purpose of understanding whether the system is functional, if there is the right infrastructure, internet connectivity, etc. The authorities are establishing an e-Health governing body, tasked with oversight of all e-health projects, ensuring interoperability, governance, and accountability. The Digital Agenda 2030 serves as the overarching framework for this initiative, aiming to use ICT to enhance governance, economic competitiveness, and social well-being.

As per the input provided by the International Organization for Migration (IOM), a United Nations-supported online Platform for Communities was launched in May 2024. This platform provides multilingual resources on available services and has already reached over 1,264 users. By addressing language barriers, it has significantly enhanced public access to information for all community members, offering content in both official and widely spoken languages. Furthermore, In line with broader digitalization efforts, IOM initiated the development and installation of a Biometric Identification System. This system is designed to streamline the registration and biometric enrolment processes for migrants, contributing to more efficient service delivery. In addition, IOM provided support to central authorities in the development of guidance for maintaining the Case Management Database. This database plays a crucial role in ensuring the effective management of return and reintegration processes for displaced people.

2.3.2 ICTs and the Education System

The integration of ICTs into Kosovo's education system is a cornerstone of the its digital transformation strategy. The UNICEF Learning Passport[98] initiative serves as a prime example of

[97] Ministry of Health (n.d.) Strategic plan for the development of the health information system 2024-2030. Available at: LINK (Accessed: 24 January 2025)
[98] n 59

this effort. Launched in collaboration with the Ministry of Education and key private partners, the Learning Passport has emerged as an innovative digital learning platform designed to ensure continuity and quality of education during disruptive periods such as the COVID-19 pandemic. The platform provides interactive features—including instant messaging and video conferencing—to facilitate effective communication between teachers and students. In addition, by offering a personalized learning experience through individual digital IDs, the system allows educators to tailor instruction to meet diverse student needs, thereby addressing disparities in digital access and learning outcomes. This initiative not only modernizes the educational landscape but also lays the groundwork for future digital education reforms by promoting blended learning environments, increasing teacher capacity in ICT, and fostering greater inclusivity and engagement among all students.

The Kosovo Education Strategic Plan (2022-2026)[99], includes ICT as a core focus; despite this, the student-to-computer ratio stands at 1:27.4, far below the OECD average[100]. The Kosovo Education Strategy 2022-2026 outlines a comprehensive plan to integrate digital and ICT technologies into the education system, aiming to modernize teaching and learning processes[101]. Furthermore, Kosovo's Education Strategy reported a student-to-computer ratio of 1:35. One of the primary goals is to equip 100% of schools with high-speed internet and digital learning devices by 2026, ensuring equal access to technology across urban and rural areas. The strategy also highlights the establishment of digital classrooms to foster interactive learning experiences and the introduction of e-learning platforms to facilitate blended learning approaches.

Teacher capacity-building is a key focus, with plans to provide ongoing ICT training to at least 80% of educators by 2025. These training programs will cover topics such as digital literacy, the use of educational technology, and cybersecurity. Moreover, efforts to introduce coding and robotics courses in pre-university education will be scaled up, with a target of having 50% of primary school students engaged in ICT-related subjects by 2026. To ensure digital inclusion, the authorities aims to provide free digital resources and textbooks through a centralized education portal, enabling students to access learning materials remotely. Special attention is given to students with disabilities, with a commitment to enhancing accessibility features such as assistive technologies and screen readers in educational software.

2.3.3 E-Waste Management

Efforts to digitize the public sector include e-waste management policies under the Digital Agenda 2030. However, a lack of centralized infrastructure for recycling and disposal hampers progress[102]. The e-government strategy indirectly addresses sustainability through the digitalization of services, minimizing the need for physical resources and associated waste[103].

Kosovo's approach to waste management, particularly concerning electronic waste (e-waste), is outlined in the Integrated Waste Management Strategy 2021–2030[104]. This strategy emphasizes the application of Extended Producer Responsibility (EPR) mechanisms to four specific waste streams: packaging, Waste Electrical and Electronic Equipment (WEEE), batteries, and End-of-Life Vehicles (ELVs). The strategy also sets targets to increase the percentage of municipal solid waste managed in controlled facilities, aiming for 60% by 2020, 80% by 2025, and 100% by 2028. Additionally, it plans to raise municipal solid waste collection coverage from 74% in 2018 to 80% in 2021, reaching 100% by 2028. However, Kosovo has not fully met these targets, and the implementation of EPR schemes, including those for e-waste, remains a work in progress. The

[99] Ministry of Education, Science, Technology and Innovation of Kosovo (2022) Education Strategy 2022-2026. Available at: LINK (Accessed: 24 January 2025)
[100] n 17
[101] n 101
[102] n 12
[103] n 43
[104] European Environment Agency (2021) Kosovo municipal waste factsheet 2021. (Accessed: 24 January 2025)

authorities continue to face challenges in aligning Kosovo's waste management practices with European Union standards.

As of 2025, Kosovo has made incremental progress in modernizing its waste management system, yet the treatment of electronic waste (e-waste) remains a critical challenge. The Integrated Waste Management Strategy 2021–2030 identified e-waste as a priority stream under the Extended Producer Responsibility (EPR) framework, alongside packaging, batteries, and end-of-life vehicles (ELVs). However, despite this policy commitment, Kosovo has not yet fully operationalized EPR schemes for Waste Electrical and Electronic Equipment (WEEE). The necessary sub-legal acts, enforcement mechanisms, and producer registration systems remain underdeveloped, limiting the effectiveness of e-waste collection and processing[106a]. Progress in broader municipal waste management has also fallen short of strategy benchmarks. The goal to process 80% of municipal solid waste in controlled facilities by 2025 has not been met; recent estimates suggest that only about 40% is currently handled through formal systems[106b]. Nevertheless, Kosovo has made measurable gains in collection coverage, which increased from 74% in 2018 to approximately 92% by 2024, indicating momentum toward the 100% coverage target by 2028[106b].

To bridge the gap in e-waste management, Kosovo will need to prioritize the development of dedicated take-back schemes, Producer Responsibility Organizations (PROs), and certified recycling facilities. Additionally, awareness campaigns, public collection points, and school-based education programs can help build a culture of responsible disposal. Strengthening institutional capacity and aligning domestic legislation with EU WEEE directives will be critical to achieving meaningful outcomes in e-waste treatment.

2.4 Building Block 4: Sector-Centric Digital Transformation

Sector-centric digital transformation refers to the integration of digital technologies within specific sectors to enhance productivity, efficiency, and service delivery. In Kosovo, this transformation is critical for driving economic growth, improving public services, and addressing sector-specific challenges. By leveraging ICT solutions, key sectors such as agriculture, healthcare, and SMEs can unlock new opportunities, foster innovation, and strengthen resilience in a rapidly changing global economy.

2.4.1 Digital Agriculture

Agriculture is a cornerstone of the economy, contributing approximately 7.4% to the Gross Domestic Product (GDP) and accounting for nearly 23% of total employment as of 2022[106c]. This significant contribution underscores the sector's vital role in ensuring food security, sustaining rural livelihoods, and promoting economic stability. However, the sector faces challenges such as small farm sizes, fragmented land ownership, limited access to markets, and outdated farming practices.

Despite the widespread internet access and ongoing advancements in digital governance, digitalization in the agricultural sector continues to lag behind. Adoption of digital tools by farmers remains low, and e-government systems and services specific to agriculture are underdeveloped. The situation is further exacerbated by the absence of a comprehensive information system able to support rural advisory services, limiting the ability of farmers to access timely and relevant guidance. Moreover, there is currently no structured platform for knowledge exchange among agricultural advisors, researchers, and other key actors within the Agricultural Knowledge and Innovation System (AKIS), which limits the spread of innovation and best practices. As advancement efforts are being made on its path toward EU pre-accession, addressing the gaps is critical to aligning with EU standards, enhancing sectoral competitiveness, and ensuring sustainable rural development.

Many farmers and rural populations still rely on traditional farming methods. Limited digital literacy and a general perception that new technologies are challenging to learn discourage farmers from adopting innovative tools that could improve their productivity and efficiency. The "Digital Agriculture Kosovo 2023"[106d] report identifies IoT-enabled agronomic recommendation systems, IoT soil moisture sensors, automated hydroponic systems, and accounting software as the most pressing solutions for the agricultural needs. Additionally, initiatives such as the planned Smart Village Laboratory in Prizren aim to integrate IoT solutions to enhance farming productivity[105].

A survey conducted by FAO and the Initiative for Agriculture Development(IADK) conducted in 2022[107a] with approximately 200 farming households highlighted that, while most agricultural households have internet access and own smartphones, they use them for agriculture only seldomly. Financial barriers, insufficient training opportunities, and consequential low digital literacy are recognized as obstacles that prevent a wider spread use of available technologies. Nevertheless, over 70% of surveyed farmers expressed an interest in adopting new technologies, recognizing potential benefits such as improved market access and increased productivity.

In November 2024, in collaboration with the Food and Agriculture Organization (FAO), initiated the development of a Digital Agriculture Programme and Action Plan[106]. This initiative aims to create a comprehensive strategy for the digital transformation of the agricultural sector and rural areas, aligning it with European Union (EU) pre-accession requirements and international best practices under the lead of the Ministry of Agriculture, Forestry and Rural Development (MAFRD). The Programme seeks to enhance efficiency, competitiveness, inclusivity, resilience, and sustainability within the sector. It emphasizes the integration of gender-responsive measures and addresses the specific needs of smallholder farmers. A formal working group, led by MAFRD, has been established to ensure an inclusive approach, incorporating input from a wide range of stakeholders. The development process includes focused discussions on key thematic areas, with stakeholders contributing insights to formulate the vision and strategic objectives for digital agriculture transformation.

Under the Digital Agriculture Programme and Action Plan, key areas for digital transformation in agriculture include strengthening e-government and data infrastructure to enable efficient, data-driven decision-making across the sector. Priorities include integrating core agricultural information systems in line with the EU Common Agricultural Policy (CAP) and simplifying and digitizing the delivery of agricultural and rural development interventions. Expanding digital access to rural advisory services, promoting knowledge exchange, and improving the reach and quality of digital public services in rural areas are also central to the agenda. Equally important is advancing digital inclusion to ensure that rural communities are not left behind, alongside building digital skills and fostering multi-stakeholder collaboration to support innovation and long-term resilience in the sector[109].

[106a]Rilindja e Gjelbër, 2023. Assessment Report on Circular Economy Policies and CSO/SME Capacities. [pdf] Pristina: Balkan Green Foundation. Available at: https://balkangreenfoundation.org/uploads/files/2023/October/09/Assessment_Report_on_CE_Policies_and_CSO_SME_Capacities1696857999.pdf [Accessed 13 Apr. 2025]

[106b]European Environment Agency (EEA), 2024. Kosovo – Circular Economy Profile. [pdf] European Environment Agency. Available at: [Accessed 13 Apr. 2025]

[106c]Ministry of Agriculture, Forestry and Rural Development (MAFRD), 2023. Kosovo Agriculture in Numbers 2023. Available at: https://www.mbpzhr-ks.net/repository/docs/Kosovo_Agriculture_in_numbers_2023.pdf [Accessed 13 Apr. 2025]

[106d]Brini, M. (2023) Digital Agriculture Kosovo 2023: Improving the employment and income generation opportunities in rural areas in Kosovo. Available at: https://www.researchgate.net/publication/376315310_DIGITAL_AGRICULTURE_KOSOVO_2023_Improving_the_employment_and_income_generation_opportunities_in_rural_areas_in_Kosovo (Accessed: 24 January 2025)

[105] n 12

[107a]FAO and IADK survey on the digital agriculture landscape in Kosovo, 2022, FAO's internal document

[106] Food and Agriculture Organization (FAO), 2024. Kosovo launches the development of the Digital Agriculture Programme and Action Plan with FAO support. [online] Available at: https://www.fao.org/digital-villages-initiative/europe/news-and-articles/news-and-articles-detail/kosovo-launches-the-development-of-the-digital-agriculture-programme-and-action-plan-with-fao-support/en [Accessed 09 Feb 2025]

2.4.2 Digital Health

Digital health is a critical component of the sector-centric digital transformation, with the potential to enhance healthcare delivery, improve patient outcomes, and address longstanding challenges in the healthcare system. By leveraging ICT solutions such as telemedicine, Electronic Health Records (EHRs), and health data analytics, Kosovo aims to modernize its healthcare sector and improve accessibility, particularly for underserved and rural populations.

Rural women face more significant sociocultural and financial barriers in accessing healthcare compared to their urban counterparts[107]. They often lack access to personal vehicles, and the high cost of taxis or other transportation options further limits their access to health services. Additionally, some rural women require family permission to visit doctors, underscoring the intersection of gender and sociocultural challenges. Utilization of preventive care remains low, with 53.9% of the population having never received a general health examination. Comparatively, the average annual outpatient visits are significantly lower than in the WHO European Region (1.99 visits vs. 7.4 visits per inhabitant). Addressing such barriers through digital health platforms could improve access to healthcare for vulnerable populations, especially in rural areas. Solutions could include telemedicine consultations to minimize travel time and cost, as well as awareness campaigns using digital tools to educate rural populations about their healthcare rights.

Digitalization would improve health services, particularly in managing non-communicable diseases (NCDs) and maternal health through enhanced data collection and analysis. Improved monitoring of crucial health indicators such as maternal and neonatal care, vaccination coverage, morbidity and mortality, including causes of deaths, and service utilization, will enable more effective interventions and resource allocation. By facilitating outreach to underserved populations, digitalization can bolster demographic resilience and advance health equity, ensuring that essential services reach those who need them most. Furthermore, implementing telemedicine and remote consultation platforms will break down geographical barriers, expand access to healthcare professionals, and improve the timeliness and convenience of care for all.

Efforts include integrating ICTs in healthcare but face challenges due to a lack of specific budgeted programs for the health sector digital transformation[108]. Only 12% of hospitals are equipped with integrated digital patient records. Only 19% of rural residents report using mobile health applications, reflecting limited awareness and adoption of digital healthcare solutions. Primary healthcare centers are 60% integrated into the BHIS system, with a target of full integration by 2030[109]. However, less than 12% of visits are currently registered in the system. e-government initiatives aim to integrate healthcare systems into a unified platform for patient data sharing and telemedicine, improving service delivery and accessibility[110].

The Basic Health Information System (BHIS) is actively used in 29 Family Medicine Centres, covering most healthcare facilities for patient records and vaccination data. As of 2023, over 904,270 vaccinations were recorded in the BHIS system[111]. The Electronic Health Record (EHR) initiative aims to create a comprehensive system integrating radiology, laboratory, and prescription data for all people by 2026. The platform will support telemedicine and risk management for chronic diseases. Plans include implementing Hospital Information Systems (HIS) across general hospitals and a Blood Transfusion Information System to ensure traceability and safety.

[107] n 63
[108] n 17
[109] n 12
[110] n 12
[111] n 99

2.4.3 The Role of SMEs

SMEs contribute 75% to the GDP, but digital adoption remains limited. Donor-funded programs like Access have supported 62 SMEs in transitioning to digital platforms[112]. The focus is on enabling SMEs to adopt ICT solutions through grants, training programs, and streamlined digital processes, fostering innovation and economic growth[113].

The "Empowering Kosovo's Private Sector in the Digital Age" initiative, supported by the European Union, aims to enhance digital transformation among small and medium enterprises (SMEs)[114]. A significant aspect of the initiative is the introduction of an Electronic ID system (eID), which facilitates secure online transactions, improving e-commerce and e-business processes. The initiative targets over 35,000 businesses and focuses on boosting SMEs' operational efficiency and productivity by streamlining access to public e-services and digital tools. Training programs and workshops have been provided to support digital literacy and adoption among business owners.

The Innovation Centre Kosovo (ICK) is a key institution driving entrepreneurship, innovation, and digital transformation, particularly in the Information and Communication Technology (ICT) sector[115]. Established in 2012, ICK provides a wide range of support services to startups and entrepreneurs, including business incubation, co-working spaces, mentorship programs, and specialized training courses. The center focuses on fostering economic growth and increasing youth employability by equipping individuals with the necessary skills to thrive in the digital economy. As of 2023, ICK has supported over 450 startups, with a success rate of 60% in securing investment or achieving sustainability. The center has trained more than 10,000 individuals in various digital skills, such as software development, digital marketing, and business management. Additionally, ICK has hosted over 800 events, including hackathons, workshops, and networking sessions, bringing together industry experts, investors, and young entrepreneurs.

One of ICK's notable initiatives is its pre-incubation program, which provides aspiring entrepreneurs with structured guidance to refine their business ideas, develop prototypes, and prepare for market entry. The center has also established strong partnerships with international organizations, such as the European Bank for Reconstruction and Development (EBRD) and the Swedish International Development Cooperation Agency (SIDA), to provide financial and technical support to startups. ICK places a strong emphasis on gender inclusion, with 30% of supported startups being female-led. Moreover, the organization promotes sustainability by encouraging eco-friendly business practices and supporting green technology startups.

2.5 Building Block 5: Digital-Centric Innovation Ecosystem

A robust digital-centric innovation ecosystem is a key driver of Kosovo's digital transformation. It fosters creativity, entrepreneurship, and technological advancements that contribute to economic growth and social development. The innovation ecosystem has been evolving rapidly, fueled by a growing ICT sector, an active startup community, and supportive institutional policies. However, barriers such as limited funding, infrastructure gaps, and skills shortages hinder its full potential.

2.5.1 Digital Innovation Ecosystem

Kosovo's Innovation Ecosystem Index score of 1.09 (Stage 1: Basic) highlights significant gaps in fostering innovation[116]. These include limited collaboration between universities, startups, and industry; outdated academic curricula that fail to address modern technological demands; and a

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[112] n 12
[113] n 43
[114] WeBalkans (n.d.) Empowering Kosovo's private sector in the digital age. Available at: https://webalkans.eu/en/stories/empowering-kosovos-private-sector-in-the-digital-age/ (Accessed: 23 January 2025)
[115] Innovation Centre Kosovo (n.d.) Home. Available at: https://ickosovo.com/ (Accessed: 24 January 2025)
[116] n 13

lack of graduates equipped to contribute to the digital economy. Building robust networks and reforming education to align with industry needs are key priorities for ecosystem development.

The IT Barometer 2021-2022, published by the Kosovo ICT Association (STIKK), provides an in-depth analysis of the digital and IT innovation ecosystem[117]. The report reveals that the ICT sector is growing steadily, with most companies specializing in software development, IT services, and outsourcing. Approximately 83% of ICT companies are adopting cloud computing solutions, indicating a shift toward digital transformation. Additionally, 52% of these companies export their services, primarily to European markets, reflecting Kosovo's growing presence in the global digital economy. The ecosystem faces several challenges, including a shortage of skilled IT professionals, with 78% of companies surveyed reporting difficulties in finding qualified staff. The authorities, in collaboration with industry stakeholders, are working on initiatives to bridge the skills gap through vocational training and educational reforms. Investment in digital innovation is on the rise, with 65% of surveyed businesses planning to expand their operations by adopting emerging technologies such as artificial intelligence and blockchain. However, limited access to financing remains a key barrier, as only 30% of businesses have secured funding for digital expansion. Kosovo's IT innovation ecosystem is supported by key stakeholders, including institutional initiatives, donor-funded programs, and business accelerators such as ICK and the KODE project. These efforts aim to create a conducive environment for startups and foster entrepreneurship in the digital sector.

The Digital Transformation Center Kosovo, established by BMZ and implemented by GIZ, plays a crucial role in strengthening the digital and IT innovation ecosystem[118]. The center is housed at the Innovation and Training Park (ITP) Prizren, which serves as a hub for startups, entrepreneurs, and ICT companies. It offers training programs in digital skills, supports technology-driven business models, and facilitates collaboration between the public and private sectors to enhance digital transformation. The center's key initiatives include promoting digital literacy, innovation, and entrepreneurship, with a focus on youth and women’s participation in the digital economy. The center has facilitated partnerships with local institutions to provide technical assistance and capacity-building programs, enabling SMEs and startups to leverage emerging technologies. Furthermore, the Digital Transformation Center has a strong emphasis on sustainable digital development, supporting efforts to align Kosovo’s digital policies with European standards. The center contributes to job creation and economic growth, with a particular focus on increasing Kosovo's competitiveness in the global digital marketplace.

The Competence Centre for Agriculture is envisioned as a central hub to drive the digital transformation of the Kosovo's agricultural sector[119]. The Competence Centre aims to serve multiple functions, including technology validation, where both local and international digital agricultural technologies are tested and validated to provide concrete data on Return on Investment (ROI), encouraging farmers to adopt innovative solutions. Additionally, the centre offers training services, conducting periodic hands-on training sessions to assist farmers in integrating digital solutions into their farming practices, thus accelerating the adoption of modern agricultural methods. Another crucial function of the centre is providing centralized services, such as agronomic recommendations based on satellite and in-situ solutions, along with the use of drone technologies to deliver real-time, actionable insights to farmers. The Competence Centre is a vital part of a broader strategy to modernize the agriculture sector by establishing a multi-functional facility that focuses on technology validation, practical training, and agronomic support. It is expected to play a pivotal role in fostering local AgTech development and leveraging open-source solutions to advance digital agriculture in Kosovo.

[117] Kosovo ICT Association (STIKK) (2022) IT Barometer 2021-2022. Available at: https://stikk.org/wp-content/uploads/2023/07/IT_Barometer_2021-2022_STIKK.pdf(Accessed: 24 January 2025)
[118] Federal Ministry for Economic Cooperation and Development (BMZ) (n.d.) Digital Transformation Center Kosovo. Available at: https://www.bmz-digital.global/en/initiatives/digital-transformation-center-kosovo/ (Accessed: 24 January 2025)
[119] n 108
[123a] Innovation and Training Park Prizren. (2024). Digital Innovation Gateway for Kosovo – DIG-4K. Available at: https://itp-prizren.com/dig-4k/ [Accessed 29 May 2025].

In 2024, Kosovo became a member of the European Union's Digital Europe Programme (DEP), marking a significant milestone in its digital transformation efforts. A central initiative under this membership is the establishment of the Digital Innovation Gateway (DIG-4K), the Kosovo's first European Digital Innovation Hub (EDIH)[123a]. DIG-4K is designed to support the digital transformation of micro, small, and medium-sized enterprises (MSMEs), startups, public institutions, and other organizations across the Kosovo. Its services focus on four key areas: providing test-before-invest facilities that allow users to experiment with digital technologies; supporting digital skills development through targeted training; offering innovation and business development services; and facilitating access to finance and EU-wide networks. DIG-4K operates as a one-stop-shop for digital transformation, offering tailored support in deploying advanced technologies such as artificial intelligence, cybersecurity solutions, and cloud computing. The hub also promotes user-centric design and supports the development of digitally enabled public services. By integrating local expertise with EU-level resources, DIG-4K strengthens the digital ecosystem, with a particular emphasis on fostering innovation in sectors such as agriculture, health, education, e-commerce, and manufacturing. It aims to improve competitiveness, drive economic growth, and support the transition to a digitally empowered society.

2.5.2 Digital Startups and Entrepreneurship

The Capacity to Support Startups score of 1.87 underscores Kosovo's challenges in providing institutional support, funding, and mentorship for startups[120]. Limited capacity to create a startup-friendly environment stifles entrepreneurial growth. The ICT sector contributes 8.3% to the GDP, yet only 6% of startups operate in technology-related fields[121]. This highlights the need for focused support to grow the ICT startup ecosystem. Kosovo ranks among the lowest in startup funding in the region. New programs like Youth Online and Upward (YOU) aim to address this gap, focusing on training for digital entrepreneurs[122]. Efforts to support startups include providing funding opportunities through donors like USAID, World Bank, and GIZ, alongside fostering a favorable regulatory environment[123].

Kosovo has seen several startups achieving significant success and recognition in the global market. Among them, Gjirafa[124], Kutia[125], and Solaborate[126] stand out as exemplary success stories, showcasing the potential of the growing digital economy.

Gjirafa, often referred to as the "Albanian Amazon," has established itself as a regional leader in e-commerce and digital advertising[127]. The company provides a variety of online services, including e-commerce, video streaming, and cloud-based solutions tailored for Albanian-speaking communities across the Balkans. Another startup in thetech ecosystem is Kutia, a software development company, it specializes in custom software development, offering services in web and mobile application development, cloud solutions, and IT consulting[128]. Solaborate, another tech startup, offers cutting-edge collaboration and communication tools by integrating artificial intelligence, IoT, and cloud technology[129].

[120] n 13
[121] n 17
[122] n 12
[123] n 43
[124] Gjirafa (n.d.) About Gjirafa. Available at: https://gjirafa.com/about (Accessed: 24 January 2025).
[125] Kutia (n.d.) Company overview. Available at: https://kutia.net (Accessed: 24 January 2025)
[126] Solaborate (n.d.) HELLO 2: Smart collaboration platform. Available at: https://www.solaborate.com (Accessed: 24 January 2025)
[127] n 128
[128] n 129
[129] n 130

2.5.3 Role of Universities and Research Institutions

The Smart Specialization Strategy (S3) has been developed through collaboration among universities, research institutions, and industry stakeholders to identify the Kosovo's key competitive advantages in the digital economy[130]. This strategy incorporates the Quadruple Helix Model, promoting collaboration between academia, industry, authorities, and civil society to foster innovation and digital transformation. The S3 has been instrumental in creating synergies that enable alignment of its research and digital innovation priorities with EU standards and funding opportunities.

The Riinvest Institute, in collaboration with universities and small and medium-sized enterprises (SMEs), has conducted extensive research on digital landscape and developed policy recommendations to support the digital economy. Their research has influenced institutional policies on fostering public-private partnerships in digital innovation, emphasizing the need for investment in research and development to sustain long-term economic growth. For instance, Riinvest's participation in drafting the Smart Specialisation Strategy (S3) and preparing a concept note for establishing the Strategic Advisory Council, which proposes a Quadruple Helix model involving academia, industry, public authorities, and civil society, has been instrumental in aligning Kosovo's research and digital innovation priorities with EU standards and funding opportunities. Additionally, Riinvest examined how the growing digital economy affects Kosovo's manufacturing sector exports and discusses policy implications, further contributing to the development of the Kosovo's digital economy[131].

The European Union (EU) has been instrumental in supporting digital innovation ecosystem through various initiatives. One such initiative is the EU for Innovation Program, which aims to foster innovation and entrepreneurship in the Western Balkans[132]. This program facilitates partnerships between universities and small and medium-sized enterprises (SMEs) to co-develop digital solutions across various sectors, including agriculture, fintech, and smart cities. A key component of this initiative is the establishment of Living Labs, collaborative environments where students and researchers work alongside industry experts to develop and test pilot projects. These Living Labs operate as intermediaries among cities, regions, firms, third-sector organizations, research institutions, and people, promoting joint value co-creation and rapid prototyping to accelerate innovation and business development.

Additionally, the Western Balkans Research and Innovation Infrastructure Roadmap highlights the role of the EU for Innovation Program as an acceleration initiative consisting of training and support mechanisms designed to enhance the region's research and innovation capacities[133]. This roadmap underscores the EU's commitment to strengthening the digital innovation landscape in Kosovo and the broader Western Balkans region.

Through these efforts, the EU aims to create a conducive environment for digital innovation in Kosovo, leveraging collaborative partnerships to drive economic growth and technological advancement.

Kosovo's universities actively participate in Erasmus+ projects, fostering collaboration with European institutions to develop innovative digital curricula, exchange best practices, and establish research partnerships with local SMEs[134]. These initiatives have modernized ICT programs and

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[130] Western Balkans Info Hub (n.d.) Advancing Kosovo's digital transformation. Available at: https://westernbalkans-infohub.eu/news/advancing-kosovos-digital-transformation/ (Accessed: 24 January 2025)

[131] Riinvest Institute (n.d.) Digital capacities in manufacturing sector in Kosovo. Available at: https://www.riinvestinstitute.org/En/raportet-kerkimore/390/digital-capacities-in-manufacturing-sector-in-kosovo/ (Accessed: 24 January 2025)

[132] European Commission (n.d.) Living labs and open innovation. Available at: https://digital-strategy.ec.europa.eu/en/news/living-labs-and-open-innovation (Accessed: 24 January 2025)

[133] Balkan Innovation (n.d.) Western Balkans Research and Innovation Infrastructure Roadmap. Available at: https://www.balkaninnovation.com/download/docs/Western%20Balkans%20Research%20and%20Innovation%20Infrastructure%20Roadmap.pdf/8a5d338b7c974a757837e1ebbde0a08f.pdf (Accessed: 24 January 2025)

[134] European Commission (n.d.) Erasmus+ Programme Guide. Available at: https://erasmus-plus.ec.europa.eu/programme-guide (Accessed: 24 January 2025)

equipped students with industry-relevant digital skills. These projects exemplify the commitment of academic institutions to advancing digital education and fostering industry collaboration. Through Erasmus+ partnerships, universities are aligning their programs with European standards, ensuring that graduates possess the skills necessary to thrive in the evolving digital landscape.

2.5.4 Public-Private Partnerships

Public-Private Partnerships (PPPs) are a critical component of Kosovo's digital-centric innovation ecosystem. By leveraging the resources, expertise, and networks of both the public and private sectors, PPPs enable the efficient development and deployment of digital technologies. These partnerships foster innovation, improve service delivery, and address infrastructure gaps, playing a key role in broader digital transformation goals.

The Private Sector Partnerships to Strengthen Higher Education initiative by USAID is a five-year program aimed at enhancing higher education system to better meet labor market demands, particularly in the ICT and agriculture sectors[135]. The project focuses on strengthening collaboration between universities and private sector employers, updating curricula to align with industry needs, and increasing students' practical skills through internships and hands-on learning opportunities. As a result, educational institutions have improved partnerships with industry stakeholders, introduced market-driven academic programs, and enhanced students' employability. The initiative aims to foster applied research capabilities and equip graduates with the competencies needed to drive economic growth.

The Digital Governance Strengthening Project for Service Delivery, also known as Digital Kosova, is an initiative launched by Kosovo in partnership with the World Bank[136]. The project aims to modernize governance and improve the delivery of public services through digital innovation. With a budget of €18.5 million, co-designed and financially supported by the World Bank, the initiative seeks to enhance digital governance and redefine public administration's approach to service delivery. It aligns with e-governance Strategy 2023-2027, contributing to the advancement of the e-Kosova portal, which currently serves over 986,000 registered users with over 230 online electronic services. The project emphasizes placing people at the center of service design, organizing services around significant life events, and ensuring inclusivity by providing access to digital services for all individuals, including those without direct access to digital devices. The Government of Japan has also supported preliminary activities through grants totaling $800,000, facilitating the implementation of planned reforms within the Digital Kosova Project.

The Kosovo e-governance Activity is a five-year initiative launched in August 2023, funded by the U.S. Agency for International Development (USAID)[137]. Its primary goal is to enhance the accessibility and delivery of services to individuals through the use of information technology. A key component of this activity is supporting the public institutions in expanding and improving the eKosova platform, along with other online services, by automating digital services. This collaboration involves various stakeholders, including public institutions and private sector partners, to ensure efficient and user-friendly service delivery. The initiative aims to provide residents with a broad range of essential public services online, thereby reducing operational costs, improving transparency, and increasing public engagement.

The e-government Strategy 2023–2027 emphasizes public-private partnerships (PPPs) to foster innovation and improve e-government services[138]. The strategy highlights the importance of collaborating with private sector stakeholders to enhance the quality, accessibility, and efficiency

[135] USAID Kosovo (2023) Private sector partnerships to strengthen higher education. Available at: https://www.usaid.gov/kosovo/fact-sheets/aug-21-2023-private-sector-partnerships-strengthen-higher-education (Accessed: 24 January 2025)
[136] Office of the Prime Minister of Kosovo (2023) Launch of the Digital Governance Strengthening Project for Service Delivery. Available at: LINK (Accessed: 24 January 2025)
[137] USAID Kosovo (2024) Kosovo e-Governance Activity. Available at: https://www.usaid.gov/kosovo/fact-sheets/dec-12-2024-kosovo-e-governance-activity (Accessed: 24 January 2025)
[138] n 43

of digital services, aligning with Kosovo's broader Digital Agenda 2030 goals. The strategy also prioritizes cybersecurity and data protection, aiming to align with EU standards through collaboration with international cybersecurity firms. Another key component is capacity-building initiatives, where the public authorities work with private sector entities to upskill employees in digital governance and administrative practices. The authorities plan to promote hackathons, innovation challenges, and pilot projects to foster joint innovation between public and private sectors.

The Critical Infrastructure Resilience (CIR) Activity is a five-year initiative funded by the U.S. Agency for International Development (USAID) and implemented by DAI Global LLC[139]. The project aims to enhance cyber governance and build capacity within the institutions and among critical infrastructure operators to effectively plan for, respond to, and recover from cyberattacks. The CIR Activity focuses on strengthening cybersecurity governance, enhancing technical and human capacity to manage cyber incidents, and supporting the identification, prioritization, and procurement of appropriate cybersecurity technology solutions. This initiative collaborates with both public institutions and private sector entities to bolster cyber defenses, particularly in the e-government, telecommunications, and energy sectors.

The Kosovo Cyber Security Strategy 2023–2027 underscores the pivotal role of public-private partnerships (PPPs) in bolstering the nation's cybersecurity framework[140]. The strategy emphasizes that ensuring the security and resilience of the digital domain is a shared responsibility among multiple stakeholders, including both public institutions and private sector entities. It advocates for the establishment of an effective and inclusive PPP system founded on mutual trust and shared responsibility. This collaborative approach is deemed essential for timely and trusted information sharing, which is crucial for enhancing the overall cyber resilience. By fostering such partnerships, the strategy aims to facilitate knowledge exchange, improve threat awareness, and coordinate responses to cyber threats, thereby strengthening the nation's capacity to protect its cyberspace.

2.5.5 Digital Innovation Hubs and Technology Parks

Digital innovation hubs and technology parks are critical enablers of digital transformation, fostering innovation, entrepreneurship, and economic growth. These facilities provide infrastructure, resources, and networks for startups, SMEs, and researchers to develop and scale digital solutions. By facilitating collaboration among authorities, academia, and the private sector, they serve as dynamic ecosystems that drive technological advancements and attract investment.

Kosovo inaugurated Tech Park Pristina in October 2023, a 4,000-square-meter facility designed to support the development of startups and the broader ICT sector. This €1.2 million investment by the Ministry of Economy aims to foster collaboration within the innovation ecosystem, offering mentorship and assistance to both startups and established companies. The park provides 26 offices, meeting rooms, training spaces, green areas, and a 1,600-square-meter indoor networking area. It aspires to generate over 300 qualified jobs and accommodate more than 60 companies and startups, positioning Kosovo as a center for technology and entrepreneurship. The Kosovo Association of Information and Communication Technology (STIKK) will manage the park for the next five years. The park aims to boost Kosovo's tech ecosystem[141].

The Innovation and Training Park (ITP) Prizren is a joint initiative between institutions and the German Government, representing a combined investment of €16 million, equally funded by both parties. This collaboration has transformed a former military camp into a 40-hectare tech hub with nearly 50 buildings for innovation, entrepreneurship, and skills development, aiming to bolster

[139] DAI Global LLC (n.d.) Kosovo Critical Infrastructure Resilience (CIR) Activity. Available at: https://www.dai.com/our-work/projects/kosovo-critical-infrastructure-resilience-cir-activity (Accessed: 24 January 2025)
[140] Ministry of Internal Affairs of Kosovo (2023) Cyber Security Strategy 2023–2027. Available at: LINK (Accessed: 24 January 2025)
[141] Ministry of Economy of Kosovo (2023) Technology Park Tech Park Pristina inaugurated. Available at: LINK (Accessed: 24 January 2025)

Kosovo's economic growth and foster regional cooperation[142]. It supports IT companies, startups, and innovators, offering facilities for research and product development. The park connects businesses, public institutions, academia, and NGOs to drive entrepreneurship, create skilled jobs, and enhance incomes. Established in 2022 within ITP Prizren, the Digital Transformation Center (DTC) Kosovo drives digital innovation through a public-private partnership. It connects businesses, academia, and civil society, offering services in digital skills, innovation, funding access, and ecosystem development. DTC strengthens SMEs and fosters digital economy[143].

In September 2024, Kosovo inaugurated the Technological Park in Kamenica, transforming a former Youth Center with a €204,000 investment[144]. Managed with the Municipality and Cactuss Education, it provides training labs, mentorship, and workspaces for youth in tech, entrepreneurship, and digital skills. Hosting 500+ students annually, it offers courses in software development, AI, and cybersecurity while supporting startups through networking and workshops. The park bridges academia and industry, fosters job creation, attracts investment, and promotes inclusivity, aligning with Digital Agenda 2030 to strengthen its ICT sector.

In January 2025, the Alliance of Tech Parks and Incubators of Kosovo (ATIK) proposed strategies to advance the ICT sector, urging political parties to prioritize innovation[145]. The proposal focuses on legal reform, institutions support (including a Ministry of Technology and CTO role), financial backing for ICT enterprises, and education reforms in AI and vocational training. It advocates for an Independent Development Fund to support tech startups and increased funding for tech parks and incubators. ATIK emphasizes the need for stronger public-private partnerships to align education with labor market demands. The initiative aims to position Kosovo as a regional leader in digital innovation and economic growth by fostering multi-stakeholder collaboration.

2.5.6 Enabling Environment for Innovation

The Fund for Innovation and Entrepreneurship, established by the Ministry of Industry, Entrepreneurship, and Trade (MIET), plays a crucial role in fostering an enabling environment for digital innovation by supporting startups, SMEs, and industry development[146]. The fund provides a comprehensive range of support mechanisms, including pre-incubation, incubation, startup, and early-stage growth assistance. It aims to enhance the competitiveness of innovative SMEs by promoting the introduction of new products, services, and manufacturing technologies, ultimately contributing to the economic development. As part of the fund's initiatives, businesses can access financial support, mentoring, training programs, and market access opportunities to help them scale and sustain their operations. Since its establishment, the fund has allocated millions of euros in grants and technical assistance to support innovation-driven enterprises, fostering job creation and economic diversification. For example, the fund has been instrumental in financing over 50 startup projects and facilitating partnerships between local businesses and international investors, thereby increasing Kosovo's presence in the global innovation landscape.

In 2023, the fund introduced a €1.5 million grant scheme aimed at strengthening the ICT sector, with a focus on emerging technologies such as artificial intelligence (AI), blockchain, and green technology. This initiative aims to boost the capabilities of Kosovo-based SMEs to compete in international markets and accelerate the digital transformation of key economic sectors. Furthermore, the fund encourages collaboration between academia and industry, offering

[142] Innovation and Training Park Prizren (n.d.) Welcome to Innovation and Training Park Prizren. Available at: https://itp-prizren.com/ (Accessed: 24 January 2025)
[143] Innovation and Training Park Prizren (n.d.) Digital Transformation Center. Available at: https://itp-prizren.com/digital-transformation-center/ (Accessed: 24 January 2025)
[144] Office of the Prime Minister (2024) The Technological Park was inaugurated in Kamenica with a value of 204 thousand euros. Available at: LINK (Accessed: 25 January 2025)
[145] Kosovo ICT Association (2025) ATIK submits to political parties the proposal for the development of the ICT sector in Kosovo. Available at: https://stikk.org/en/atik-submits-to-political-parties-the-proposal-for-the-development-of-the-ict-sector-in-kosovo/ (Accessed: 25 January 2025)
[146] European Commission (2019) EU Support to Startups in Kosovo. Available at: https://neighbourhood-enlargement.ec.europa.eu/system/files/2019-08/ipa_2018_041246.07_eu_support_to_start-ups.pdf (Accessed: 25 January 2025)

incentives for Research and Development (R&D) projects and knowledge transfer initiatives. These efforts align with development strategies and ambitions to position as a regional hub for digital innovation. Through targeted investments and strategic partnerships, the Fund for Innovation and Entrepreneurship continues to empower the business community, enabling startups and SMEs to leverage digital technologies and contribute to thelong-term economic growth and competitiveness.

In October 2024, the Ministry of Industry, Entrepreneurship, and Trade (MIET), in collaboration with the Government of Luxembourg, announced an innovation grant scheme aimed at supporting startups and established Micro, Small, and Medium-sized Enterprises (MSMEs)[147]. This initiative seeks to empower businesses by providing financial and technical assistance to develop and implement innovative projects, thereby driving economic growth, job creation, and export enhancement. The grant scheme is a part of a broader effort to strengthen the entrepreneurial ecosystem, fostering competitiveness in both local and international markets. The scheme offers financial support of up to €1 million, distributed across several funding categories such as research and development, technology adoption, and business process optimization. As part of the eligibility criteria, businesses are required to present proposals that demonstrate innovation potential, market feasibility, and sustainability. The grant program prioritizes sectors such as information technology, renewable energy, manufacturing, and agribusiness, aiming to diversify the economic base and reduce dependency on traditional industries.

The Kosovo Credit Guarantee Fund (KCGF) plays a crucial role in enhancing the financial environment for micro, small, and medium-sized enterprises (MSMEs)[148]. Established in 2016 with support from international financial institutions, such as the World Bank, the European Union, and the German Development Bank (KfW), KCGF provides partial credit guarantees to banks and financial institutions, reducing lending risks and enabling businesses to access much-needed financing. The fund aims to stimulate private sector growth by facilitating credit access for businesses that might otherwise struggle to secure loans due to lack of collateral. By allocating capital for credit guarantees, KCGF has the potential to attract nearly $200 million in private sector investments, thereby facilitating access to finance for businesses pursuing digital innovation and economic development. As of 2024, KCGF has supported over 10,000 loans for MSMEs across various sectors, with a total guaranteed amount exceeding €150 million. The fund focuses on providing financial support to sectors such as agriculture, ICT, manufacturing, and trade, contributing to job creation and economic diversification.

In its recent expansion efforts, KCGF introduced a Digital Innovation Loan Guarantee Program, aimed at supporting startups and SMEs engaged in digital transformation initiatives. This program offers guarantees covering up to 70% of loan amounts, encouraging banks to finance technology-driven businesses that are investing in software development, cybersecurity, and digital marketing. Additionally, KCGF is partnering with financial institutions to introduce more favorable lending terms, such as lower interest rates and extended repayment periods, specifically for digital innovation projects. The impact of KCGF extends beyond financial support, as the fund also provides capacity-building programs to educate businesses on financial management, investment planning, and strategic growth. This initiative aligns with the broader economic development strategy, which seeks to position itself as a regional leader in entrepreneurship and innovation. The fund's efforts are expected to contribute significantly to the digitalization agenda, supporting MSMEs in adapting to technological advancements and increasing their competitiveness in both local and international markets.

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[147] LuxDev (2024) Innovation grant scheme launched to support MSMEs in Kosovo. Available at: https://luxdev.lu/en/news/project/KSV/023 (Accessed: 25 January 2025)
[148] World Bank (2025) Kosovo invests in competitiveness and connectivity with World Bank support. Available at: https://www.worldbank.org/en/news/press-release/2025/01/16/kosovo-invests-in-competitiveness-and-connectivity-with-world-bank-support (Accessed: 25 January 2025)

2.5.7 Intellectual Property Environment

To strengthen the Intellectual Property Rights (IPR) system, the European Union has supported Kosovo through various initiatives, such as the "EU Support for the Intellectual Property Rights System in Kosovo" project, which led to the adoption of new legislation on patents, industrial designs, trademarks, and trade secrets[149]. This project also focused on raising public awareness about the importance of IPR protection and building the capacities of relevant institutions. Additionally, the Law No. 06/L-049 on Scientific Innovation and Transfer of Knowledge and Technology regulates the field of scientific innovation and knowledge transfer, aiming to promote research and development activities and facilitate collaboration between research institutions and the private sector[150].

Despite these advancements, Kosovo faces challenges in the full implementation and enforcement of IPR laws. Continuous efforts are needed to enhance institutional capacities, increase public awareness, and ensure effective enforcement mechanisms. Strengthening the IPR framework is crucial for attracting investment, stimulating innovation, and supporting the sustainable economic development.

The Information and Communication Technology sector has experienced significant growth, becoming a vital driver of job creation and economic development. However, the rapid expansion of digital innovation has highlighted challenges related to IPR within the sector. A study by the American Chamber of Commerce in Kosovo revealed that approximately 42% of surveyed businesses believe that Kosovo lacks adequate legislation in the area of intellectual property, indicating a need for further development in this domain[151].

To address these challenges, initiatives have been undertaken to enhance IPR awareness and protection among ICT enterprises. For instance, the ICK, in collaboration with USAID's Commercial Justice activity, organized a roundtable discussion emphasizing the critical role of IPR in business growth[152]. This event provided startups and young entrepreneurs with insights into various forms of IPR protection, such as trademarks, design rights, copyrights, patents, and trade secrets. A notable example shared during the discussion was that of Digital School, a Kosovo-based company that expanded to over 500 international locations by prioritizing IPR protection, underscoring the importance of safeguarding intellectual assets for global success.

2.5.8 Opportunities and Challenges

Kosovo's pursuit of digital transformation presents a landscape rich with both opportunities and challenges. The Digital Agenda 2030, approved by the authorities in June 2023, aspires to establish Kosovo as a competitive digital economy. This cross-sectoral strategy emphasizes the development of advanced digital infrastructure, the digitalization of businesses and public services, enhancement of digital skills, and a robust cybersecurity framework. The agenda aligns with European Union strategies, such as the 2030 Digital Compass and the Gigabit Society Strategy,

[149] European External Action Service (n.d.) EU helps ensure intellectual property rights are better protected in Kosovo. Available at: https://www.eeas.europa.eu/delegations/kosovo/eu-helps-ensure-intellectual-property-rights-are-better-protected-kosovo_en (Accessed: 25 January 2025)
[150] Assembly of Kosovo (n.d.) Law No. 06/L-049 on Scientific Innovation and Transfer of Knowledge and Technology. Available at: LINK (Accessed: 25 January 2025)
[151] American Chamber of Commerce in Kosovo (2019) Intellectual Property Rights in Kosovo and the European Union. Available at: https://www.amchamksv.org/wp-content/uploads/2019/02/ENG-IPR-in-Kosovo-and-European-Union.pdf (Accessed: 25 January 2025)
[152] USAID Kosovo (n.d.) Intellectual property rights experts share insights with Kosovo businesses. Available at: https://www.usaid.gov/kosovo/news/intellectual-property-rights-experts-share-insights-kosovo-businesses (Accessed: 25 January 2025)

aiming to position Kosovo as a "gigabit society" that leverages technology to drive economic growth and improve public services[153].

1. Opportunities

Digital transformation offers Kosovo a significant opportunity to stimulate economic development by fostering innovation across various sectors. The integration of digital technologies can lead to the creation of new business models, products, and services, thereby enhancing the overall competitiveness and economic resilience.

The implementation of e-governance platforms like e-Kosova is poised to significantly enhance the accessibility and efficiency of public services for individuals. By centralizing various public services into a unified digital portal, e-Kosova aims to reduce administrative burdens and streamline service delivery. As of recent data, the platform offers approximately 230+ online services to individuals, businesses, and institutions, including the issuance of civil status documents, utility payments, property taxes, judiciary services, police clearances, and pension benefit administration. The digital shift facilitated by e-Kosova not only improves service efficiency but also enhances transparency and fosters trust in public institutions. By providing people with real-time access to information and services, the platform reduces opportunities for corruption and promotes accountability within public operations. For instance, the e-Kosova portal includes features such as the publication of calls for grants and subsidies from all public institutions, online application forms, and the publication of beneficiaries for each call, including their projects and financial offers[154]. This level of transparency ensures that people are well-informed and can hold institutions accountable for their actions.

Furthermore, the e-Kosova platform has been instrumental in facilitating essential services during critical times. Initially, it played a crucial role in managing vaccine appointments during the COVID-19 pandemic, demonstrating its capacity to handle high-demand services efficiently. Building on this success, the platform has expanded its services to include various other public services, reflecting its potential to serve as a comprehensive digital resource for people. In addition to enhancing service delivery and transparency, e-Kosova contributes to economic development by streamlining processes that were previously time-consuming and resource-intensive. For example, the platform's integration of services related to grants and subsidies ensures equality in treatment, easy access to information and applications, fair and professional evaluation, and quality management. This digitization effort not only reduces operational costs for the institutions but also encourages public engagement and trust in public institutions. As of March 2025, the integrated and proactive services for the childbirth life event have been launched, marking the first milestone in implementing a crucial reform of transforming the public administration towards a life-event-based people-centric service delivery. In addition, in February 2025, the eKosova mobile app for Android and iOS platforms was launched. This is a crucial step in strengthening digital inclusion since (as mentioned in this report) 98 %+ of people have access to the Internet through mobile phones.

Kosovo has made significant strides in enhancing its digital infrastructure, aiming to improve connectivity and provide better access to digital services for both urban and rural populations. A notable achievement is the connection of every village to high-speed broadband internet, accomplished with support from the World Bank. This initiative has resulted in one of the highest internet penetration rates in Europe, benefiting approximately 60,000 residents across 201 villages, and connecting nearly 5,000 households, 107 schools, and 43 health institutions to high-speed internet with speeds up to 100 Mbps[155].

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153 International Monetary Fund (2024) Kosovo: Selected Issues. Available at: https://www.elibrary.imf.org/view/journals/002/2024/365/article-A006-en.xml (Accessed: 25 January 2025)

154 "Open Government Partnership" (n.d.): Commitment XK0001. Available at: https://www.opengovpartnership.org/members/denmark/commitments/XK0001 (Accessed: 25 January 2025)

155 World Bank (2023) Every village in Kosovo now connected to high-speed broadband internet with World Bank support. Available at: https://www.worldbank.org/en/news/press-release/2023/03/21/-every-village-in-kosovo-now-connected-to-high-speed-broadband-internet-with-world-bank-support (Accessed: 25 January 2025)

In parallel, Kosovo is actively advancing the deployment of 5G technology to further enhance connectivity. In October 2020, the United States and Kosovo signed a Memorandum of Understanding to strengthen cooperation on 5G security, emphasizing the importance of secure and reliable communication networks[156]. Building on this foundation, IPKO, a leading telecommunications provider, has achieved a significant milestone by establishing 100 fully functional 5G locations across the Kosovo[157]. As informed by Kosovo's central authorities, by the end of 2024, the public Kosovo Telecom (VALA) had achieved 65% 5G coverage of Kosovo. This expansion ensures robust 5G coverage in all major hubs, significantly enhancing internet speeds and service reliability.

2. Challenges

Despite notable advancements in digital infrastructure, Kosovo continues to face significant challenges in upgrading its network capabilities to meet future demands. The current reliance on coaxial cable technology, which offers speeds up to 100 Mbps, is increasingly viewed as inadequate for the development of a future gigabit society[158]. This limitation underscores the necessity for substantial investments in fiber-optic networks and the deployment of 5G technology. A comprehensive review of wireline access technologies indicates that copper-based networks, including coaxial cable systems, dominate the telecommunications landscape[159]. While Fiber-To-The-Home (FTTH) technology has been introduced, its deployment remains limited, primarily serving business clients. In recent years, major operators such as IPKO Telecommunications and TiK have initiated FTTH deployments, favoring Gigabit Passive Optical Network (GPON) architectures. However, these efforts are still in the early stages and require significant expansion to achieve widespread coverage. While Kosovo has made commendable progress in enhancing its digital infrastructure, the current dependence on coaxial cable technology presents challenges in meeting future connectivity demands. Significant investments in fiber-optic networks and 5G deployment are essential to ensure that the digital infrastructure can support the evolving needs of its population and economy.

Kosovo's labor market is currently experiencing a significant skills mismatch, with a substantial portion of the workforce lacking the necessary education and skills to meet employers' demands. The skills mismatch is multifaceted, encompassing both vertical and horizontal discrepancies[160]. Vertical mismatch occurs when an individual's level of education is not aligned with job requirements, while horizontal mismatch refers to a disparity between one's field of study and occupational role. A study by the GAP Institute revealed that 54% of respondents faced a horizontal mismatch between their education and occupation, with 61% of these being men and 39% women.

As Kosovo continues its digital transformation, the associated risks to data privacy and cybersecurity have become increasingly significant. Despite having "satisfactory" infrastructure, the institutions are frequently targeted by cyberattacks, leading to violations of individuals personal data by both domestic entities and external actors. For instance, the Kosovo Police (KP), which handles substantial amounts of sensitive personal information daily, faces constant cyber threats. A representative of the KP, noted, "We have attacks constantly, every day, every minute," emphasizing the persistent nature of these threats[161]. Experts caution that privacy breaches often

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[156] U.S. Department of State (2020) United States-Kosovo Memorandum of Understanding on 5G Security. Available at: https://2017-2021.state.gov/united-states-kosovo-memorandum-of-understanding-on-5g-security/ (Accessed: 25 January 2025)
[157] Koha Ditore (2024) IPKO achieves historic milestone in expanding 5G network. Available at: https://www.koha.net/en/reklama-marketing/ipko-me-arritje-historike-ne-zgjerimin-e-rrjetit-5g-ne-nivel-kombetar-1 (Accessed: 25 January 2025)
[158] n 6
[159] Berisha, M. and Shala, A. (2020) 'Challenges and opportunities in Kosovo's telecommunications infrastructure: A roadmap for future development', Telecommunications Policy, 44(8), p. 101976. Available at: https://www.tandfonline.com/doi/full/10.1080/01468030.2020.1756541 (Accessed: 25 January 2025)
[160] GAP Institute (2021) Mismatch between education and occupation in Kosovo. Available at: https://www.institutigap.org/documents/35811_mismatchbetweeneducationandoccupation.pdf (Accessed: 25 January 2025)
[161] Prishtina Insight (2023) Challenges and initiatives in safeguarding privacy and cybersecurity in Kosovo. Available at: https://prishtinainsight.com/challenges-and-initiatives-in-safeguarding-privacy-and-cybersecurity-in-kosovo-mag/ (Accessed: 25 January 2025)

stem from institutions meant to protect such data, highlighting the need for increased civic awareness regarding personal data protection. The Commissioner for the Information and Privacy Agency emphasized that institutions frequently violate individuals' personal data under the guise of transparency. In the context of this report, central authorities informed that while it is very true that cyber incidents occur all the time, there have not been any significant data breaches due to these incidents. Cases of personal data protection law violations addressed by IAP have not typically been a result of cyber-attacks, but rather as a result of some mishandling of such data by controllers and processors of such data.

Innovators in Kosovo face significant challenges in securing financing from both public and private sectors, which hampers the growth of digital initiatives[162]. High interest rates and stringent collateral requirements make it difficult for entrepreneurs to obtain loans from financial institutions. This issue is particularly acute for startups and microenterprises, which often lack the necessary financial history and assets to meet these demands.

The digital transformation agenda is ambitious, with clearly defined benchmarks and timelines that reflect alignment with EU standards and other international standardized instruments or legal acts. However, achieving these goals within the proposed timeframe demands critical reflection. Key targets, such as universal broadband access, the digitalization of most public services, and the development of a secure digital identity infrastructure, rely heavily on funding and institutional capacity, effective coordination, and the overall digital maturity of the public sector. Staying on course will require Kosovo to address persistent challenges, including fragmented institutional roles, limited digital competencies within public administration, and unequal rural access. Leveraging external support from the EU Growth Plan and development partners will be essential, but must be matched by streamlined project execution and robust oversight. Adopting a phased, adaptable implementation strategy, underpinned by continuous monitoring and responsive governance, can help turn these ambitious goals into inclusive and sustainable results.

[162] Fazliu, A. (2024) 'Why do information technology companies in Kosovo fail? An analysis of factors', Journal of Information Technology Case and Application Research, 26(3), pp. 222–255. doi: 10.1080/15228053.2024.2380191

3.Conclusion

Kosovo has demonstrated a strong commitment to digital transformation, achieving significant progress across various sectors. However, to fully harness its digital potential, it must address key challenges, including infrastructure gaps, digital skill shortages, and regulatory constraints. Ensuring inclusive and equitable access to digital resources, particularly for rural communities and marginalized groups, remains a critical priority. The successful implementation of Kosovo's Digital Agenda 2030 will require a coordinated effort among public authorities, private sector stakeholders, and international partners. A comprehensive approach focused on fostering innovation, enhancing cybersecurity, and investing in digital literacy can accelerate the journey towards becoming a digitally advanced society aligned with European and global standards. Sustainable policies that balance technological growth with social inclusion, environmental considerations, and economic resilience are vital for the future of the digital economy.

Strengthening digital policies and governance is essential to create an enabling environment for digital transformation. Kosovo must enhance its regulatory frameworks to align with EU standards, particularly in areas such as data protection, cybersecurity, and emerging technologies like artificial intelligence and blockchain. Developing a digital transformation roadmap that integrates sectoral efforts and encourages public-private partnerships (PPPs) can foster innovation and investment. Additionally, improving regulatory transparency and reducing bureaucratic hurdles will attract more investments in the ICT sector and encourage startup growth. Monitoring and evaluation mechanisms should also be implemented to track progress and ensure data-driven policy adjustments.

Expanding digital literacy and inclusion initiatives is equally crucial to build a digitally skilled workforce. Kosovo should integrate digital literacy into its education curriculum, focusing on coding, cybersecurity, and emerging technologies. Targeted training programs for marginalized communities, including women, youth, elderly, and persons with disabilities, can help close the digital skills gap. Teacher capacity-building programs must be enhanced to equip educators with the necessary skills to deliver effective digital education. Reskilling and upskilling initiatives for workers in traditional sectors and awareness campaigns to promote digital literacy, particularly in rural areas, will support the broader adoption of digital tools and services.

Investing in secure digital infrastructure is critical to creating a resilient and inclusive digital economy. Kosovo should prioritize expanding broadband infrastructure, particularly in underserved areas, and accelerate the deployment of 5G networks to support emerging technologies. Strengthening cybersecurity measures, such as advanced threat detection systems and a domestic cyber incident response team, is essential for safeguarding digital assets. Enhancing cloud computing infrastructure and integrating technology into urban planning through smart city initiatives can further improve public services and sustainability.

Kosovo needs to increase funding access for startups through venture capital, grants, and crowdfunding platforms to foster innovation and entrepreneurship. Establishing innovation hubs and incubators can provide mentorship, networking, and technical support for entrepreneurs, while collaborations between universities and the private sector can drive research and development. Tax incentives and financial support schemes will attract tech investments, and initiatives to support women in technology can help bridge the gender gap in entrepreneurship and leadership roles within the ICT sector.

Kosovo should continue enhancing its e-government services to improve efficiency and public engagement. Expanding the e-Kosova platform with additional services, ensuring accessibility for all people, and implementing interoperability frameworks can streamline public service delivery. Leveraging artificial intelligence and big data analytics will improve policy decision-making, while robust data privacy frameworks will build public trust in digital systems. By adopting these measures, Kosovo can position itself as a digital leader in the Western Balkans, fostering innovation, driving economic resilience, and creating a more inclusive digital society.

Furthermore, to ensure that digital transformation truly benefits all segments of society, Kosovo must embrace an inclusive approach that reflects the Leave No One Behind principle at every implementation stage. This means extending digital access and services to those traditionally marginalized, such as rural populations, non-majority communities minorities, women, youth, and persons with disabilities and elderly. Digital strategies must be designed with equity in mind, embedding accessibility, affordability, and relevance as core tenets of all public digital initiatives. Initiatives such as providing assistive technologies in schools, promoting inclusive digital literacy programs and lifelong learning in digital skills, and supporting grassroots innovation in underserved areas are essential to closing persistent gaps. By integrating inclusion into its digital agenda, Kosovo can create a society where every individual has the opportunity to participate meaningfully in the digital economy and public life.

Finally, the Digital Agenda 2030 outlines a strong and inclusive vision for digital transformation. However, turning this vision into reality within the planned timelines will demand more than strategic intent; it will require focused implementation, coordinated institutional efforts, and adapting to emerging challenges. Given the scale of the targets and existing capacity constraints, a pragmatic, results-driven approach is essential. Success will depend on enhancing coordination across institutions, investing in human capital and digital systems, and fully using support from the EU and other development partners. Balancing ambition with realism and maintaining a steady focus on execution will be key to achieving meaningful, lasting progress in the digital journey.

4.Key Recommendations

The following strategic and actionable recommendations are presented to translate digital ambitions into measurable, inclusive, and sustainable outcomes. These are organized into five thematic blocks.

In implementing these recommendations, Kosovo should adopt a phased, realistic, and adaptive approach to digital transformation timelines. Ambitious targets must be continuously reassessed and aligned with institutional capacity, financing, and reform progress. Embedding flexibility into digital planning processes, supported by regular progress reviews and responsive course corrections, will be essential to managing expectations and ensuring steady, credible advancement.

The recommendations below are designed to guide central and local institutions, development partners, and private sector stakeholders in accelerating digital development while remaining grounded in implementation realities.

Block 1: Governance and Institutional Coordination

1.1. Strengthening Digital Leadership Structures: Enhance the mandate and coordination capacity of the Digital Transformation Council and the Agency for Information Society to drive multi-sectoral collaboration and policy execution. Anchor political oversight within the Prime Minister's Office.

1.2. Establish a Central Project Management and Delivery Unit: Create a dedicated digital delivery unit to support line ministries in implementing ICT projects, ensuring technical assistance, project pipeline quality, and consistent progress tracking.

1.3. Create a Digital Transformation Roadmap Tracker: Operationalize a tracking mechanism to monitor key milestones and commitments under the Digital Agenda 2030 and EU Growth Plan reforms.

1.4. Implement Capacity-Building Programs for Digital Champions: Train designated digital transformation focal points in each ministry to serve as connectors between technical teams and policymakers.

1.5. Formalize Municipal Engagement in central Digital Policy: Establish a coordination mechanism for municipalities to participate in the co-design and implementation of digital public services and infrastructure planning.

Block 2: Legal and Policy Environment

2.1. Adopt Priority Digital Legislation: Ensure swift passage and enforcement of pending laws related to eID, cybersecurity, personal data protection, and interoperability, in line with EU acquis.

2.2. Establish a Central Cybersecurity Agency: Designate and Resource a lead institution responsible for the cybersecurity strategy implementation, incident response coordination, and cyber risk management.

2.3. Develop an AI and Emerging Technologies Regulatory Framework: Introduce regulatory guidance on the ethical and responsible use of AI and other emerging technologies in public administration.

2.4. Conduct Legal Harmonization Reviews: Systematically review and revise existing laws that create duplication or barriers to digital service delivery, such as in civil registration, health, or taxation.

2.5. Enhance Public Awareness of Digital Rights and Protections: Roll out a Kosovo-wide public awareness campaign to inform people about their rights, protections, and responsibilities in digital environments.

Block 3: Digital Infrastructure and Connectivity

3.1. Map and Prioritize Digital Connectivity Gaps: Conduct granular mapping of underserved areas and align broadband investment priorities with socio-economic development needs.

3.2. Launch a Universal Service Fund for Digital Access: Design and activate a financing mechanism to support last-mile connectivity for remote and marginalized communities.

3.3. Modernize Public Sector ICT Infrastructure: Invest in cloud adoption, secure data centers, and digital infrastructure upgrades across central and local institutions.

3.4. Ensure Redundancy and Resilience in Critical Infrastructure: Develop policies and infrastructure to ensure digital service continuity and cybersecurity resilience, particularly for essential services.

3.5. Promote Open Access Network Models: Encourage infrastructure sharing among telecom operators to lower deployment costs and expand rural broadband coverage.

Block 4: Digital Services and User-Centric Innovation

4.1. Expand e-Kosova with High-Demand Services: Prioritize the onboarding of life-event-based services (e.g., school enrollment, business permits) into e-Kosova.

4.2. Fully Operationalize the Interoperability Platform: Ensure all priority institutions are connected and exchanging data securely through the Interoperability Platform.

4.3. Implement a Digital ID Wallet: Advance Kosovo's Digital ID and wallet system for secure, user-friendly authentication and access to public and private services.

4.4. Introduce Service-Level Standards and Monitoring: Establish SLAs for digital public services to guarantee timely delivery and quality control, including people feedback mechanisms.

4.5. Support Local Digital Innovation in Service Delivery: Create a small-grants program or sandbox for municipalities and NGOs to develop innovative, people-led digital service solutions.

Block 5: Digital Skills, Inclusion, and Innovation Ecosystems

5.1. Develop a Digital Skills and Jobs Strategy: Integrate formal and informal education pathways to build foundational and advanced digital competencies across all age groups.

5.2. Build Digital Literacy Through Community Hubs: Establish digital access points with training support in libraries, municipal offices, and community centers, particularly in rural areas.

5.3. Scale Youth-Focused Digital Upskilling Initiatives: Expand programs like YOU (Youth Online and Upward) to reach more youth through coding bootcamps, internships, and online micro-credentials.

5.4. Create a Women in Digital Kosovo Initiative: Promote gender-inclusive access to digital skills and career pathways through mentorship, scholarships, and targeted entrepreneurship support.

5.5. Establish a Network of Digital Innovation Hubs: Foster regional startup ecosystems by co-funding innovation spaces linking universities, SMEs, and the public sector to solve local challenges.