

# Bosnia and Herzegovina Digital Development Country Profile



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As digital transformation is a complex and dynamic process, this document is to be treated as a living document that can be amended at any time depending on the availability of additional information. Comments and additional inputs should be sent to the ITU Office for Europe (EURregion@itu.int).

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## Abbreviations and acronyms

<b>ASW</b>	Association of Social Workers
<b>AZLP</b>	Agency for Personal Data Protection in Bosnia and Herzegovina
<b>BD</b>	Brcko District
<b>BIH</b>	Bosnia and Herzegovina
<b>CCA</b>	Common Country Analysis
<b>CERT</b>	Computer Emergency Response Team
<b>COP</b>	Child Online Protection
<b>CRA</b>	Communications Regulatory Agency
<b>CSIRT</b>	Computer Security Incident Response Teams
<b>CSO</b>	Civil Society Organization
<b>DIAL</b>	Digital Impact Alliance
<b>EBRD</b>	European Bank for Reconstruction and Development
<b>EGDI</b>	E-Government Development Index
<b>EMF</b>	Electromagnetic field
<b>EU</b>	European Union
<b>EPR</b>	Extended Producer Responsibility
<b>FADN</b>	Farm Accountancy Data Network
<b>FAO</b>	United Nations' Food and Agriculture Organization
<b>FSA</b>	Food Safety Agency
<b>FTTH</b>	Fibre to the home
<b>FTTX</b>	Fibre to the premises
<b>G4</b>	Fourth Generation
<b>G5</b>	Fifth Generation
<b>GCI</b>	ITU Global Cybersecurity Index
<b>GDP</b>	Gross domestic product
<b>GDPR</b>	General Data Protection Regulation
<b>GHZ</b>	Gigahertz
<b>GIZ</b>	Deutsche Gesellschaft für Internationale Zusammenarbeit
<b>GMTI</b>	GovTech Maturity Index
<b>GNI</b>	Gross national income
<b>HCI</b>	Human Capital Index
<b>ICM</b>	Integrated case management
<b>IFS</b>	International Forum of Solidarity
<b>ILO</b>	International Labour Organization
<b>IPA</b>	Instrument for Pre-Accession Assistance
<b>IPARD</b>	Pre-accession Assistance in Rural Development
<b>ITU</b>	International Telecommunication Union
<b>KBIT</b>	Kilobit
<b>LTE</b>	Long Term Evolution
<b>MBIT</b>	Megabit
<b>MOE</b>	Ministry of Education
<b>NATO</b>	North Atlantic Treaty Organization
<b>NDGS</b>	National digital government strategy
<b>NGO</b>	Non-Governmental Organization

<b>NIS</b>	Network and Information Security
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>OSCE</b>	Organization for Security and Co-operation in Europe
<b>OSI</b>	Online Service Index
<b>P.C.</b>	Per capita
<b>PES</b>	Public employment service
<b>PHPA</b>	Plant Health Protection Administration
<b>SOC</b>	Security Operations Center
<b>SME</b>	Small and Medium Size Enterprise
<b>STEM</b>	Science, Technology, Engineering and Mathematics
<b>TII</b>	Telecommunication Infrastructure Index
<b>UN</b>	United Nations
<b>UN CRPD</b>	United Nations Conventions on the Rights of Persons with Disabilities
<b>UNDP</b>	United Nations Development Programme
<b>UNEP</b>	United Nations Environment Programme
<b>UNICEF</b>	United Nations Children’s Fund
<b>UNITAR</b>	United Nations Institute for Training and Research
<b>USAID</b>	United States Agency for International Development
<b>USD</b>	United States Dollar(s)
<b>UNSDCF</b>	United Nations Sustainable Development Framework
<b>UN WOMEN</b>	United Nations Women
<b>WEEE</b>	Waste from Electrical and Electronic Equipment
<b>WIMAX</b>	worldwide interoperability for microwave access
<b>WIPO</b>	World Intellectual Property Organization
<b>WMS</b>	Waste Management System

## **1. Introduction**

### **1.1. Background and Context**

Development through digital transformation is a complex issue and touches on many enablers, from broadband availability to policies and sectoral e-strategies, as well as specific programs fostering digital inclusion or the development of innovative communities.

Various independent research projects have been carried out by the International Telecommunication Union (ITU), United Nations (UN) agencies, and stakeholders in understanding these enablers, their impact on countries, the gaps, and opportunities. However, these studies may not reflect the inherent interdependencies among them. There is a need to provide a simple view and narrative about a country's capacity to digitally transform, and the various components contributing to this process.

Digital development through digital transformation has become ever more important since the outbreak of the COVID-19 pandemic, and various UN agencies and other stakeholders have assisted countries in their respective capacities relying substantially on the digital component.

Extending the availability and accessibility of products and services, and empowering citizens, workers, and students in their daily engagements and needs, during times of lockdown have become clear priorities in all countries. The ability to leverage the progress made in the digital sphere has become an important factor in determining resilience during the COVID-19 crisis and its aftermath.

As the situation is developing into a new normal where “digital” is not only a solution to an emergency but a long-term investment against risk, it is necessary to unravel the various dimensions of digital development in different countries as information and communication technologies (ICTs) become increasingly important for the achievement of the Sustainable Development Goals (SDGs) by 2030.

## 1.2. Objective of the Report

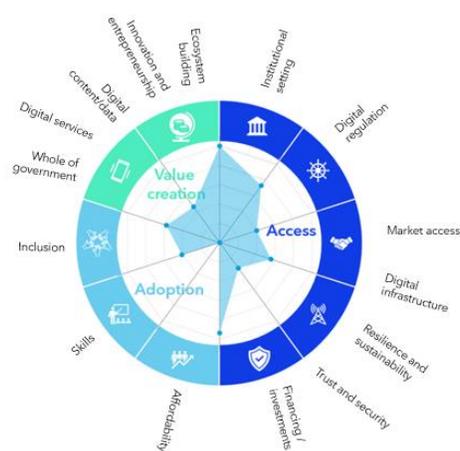
The aim of the Digital Development Country Profiles series is to provide a comparative analysis for priority countries of the European region, namely Albania, Bosnia and Herzegovina, Georgia, Moldova, Montenegro, North Macedonia, Serbia, Türkiye and Ukraine.

The Report addresses digital transformation based on the various experiences of the ITU, the UN specialized agency for ICTs, and other UN system organizations, offering a broad overview of the activities and projects being implemented at the national level and in the wider region.

This report seeks to build a reference for discussions on digital development at the country level in Bosnia and Herzegovina. It will serve as a guide for future dialogue with the country’s stakeholders and pave the way for increasing fit-for-purpose engagements of the UN system in the country. It will equip decision-makers at the national level and international stakeholders with an overview of the various components of digital development at the country level.

## 1.3. Methodology

The research has identified a *three-building block framework* that analyses digital transformation from a variety of perspectives, enabling an understanding of how the various dimensions of digital development interact at the country level. Below is a summary of each building block and an elaboration of how each dimension fits in the overall digital development scenario of the country. The figure on the side demonstrates a visual representation of the framework, with its building blocks and related components. It also shows Bosnia and Herzegovina’s standpoint across these components, which will be further depicted in this report.



**1) Access:** Robust ICT infrastructure represents a critical precondition for the transformation of a country. It provides the foundation for innovative services and economic activity to take place. With the Covid-19 pandemic, countries and communities lacking connectivity faced a greater disruption than those who did not, therefore raising the overall importance of reliable and safe infrastructure and services that are available to all. ICT infrastructure needs to be evaluated based on several aspects critical to meaningful connectivity. Government holds a central role in promoting the right strategies collaboratively across various entities. This includes setting in place the conditions for the right mix of policies and regulations to facilitate the attainment of universal and affordable connectivity, through resilient infrastructure deployments that ensure ubiquitous network coverage including “last mile” and hardest-to-connect areas.

**2) Adoption:** Developing digital skills and building human capacities to empower citizens, strengthen employability, and create new job opportunities is essential to match the needs of the gigabit society. At the same time, on a company inward-looking perspective, skills for digital transformation of businesses are needed to adapt to new and emerging economic models. The pandemic has exacerbated pre-existing inequalities and marginalization, especially amongst refugees, migrants, persons with disabilities, women, girls, and elderly people. While connectivity is the backbone of digital transformation, adopting a “people-centric” digital transformation is vital to ensure that all members of society are not only connected but meaningfully connected and thus, fully enjoy, without discrimination, the fruit of an ever-growing digital world. To this end, special emphasis should be given to bridging the digital divide and equipping all groups of society, including groups of people with specific needs, to take advantage of ICTs, based on principles of equality, diversity and inclusion. This should be done by enabling digital skills development, but also by uplifting ICT tools and services for inclusion and accessibility purposes. This is essential to support the widest exercise of the right to participate in public affairs.

**3) Value Creation:** Access to government services by citizens and businesses enables productivity, transparency, and equality in digital development. Ensuring that public services are delivered digitally, in an equitable manner, is an important component of digital transformation, triggering a reduction in costs and bureaucracy, and increasing efficiency and transparency. Governments also have an important role in ensuring that public sector transformation becomes a catalyst for broader digital transformation. Most economic benefits accumulate when ICTs are also used to transform other sectors, such as agriculture or health, which are key to unlocking job creation and economic growth and inclusion. At the same time, careful attention is needed to ensure that such digital services do not become a factor of isolation by further marginalizing some communities. Beyond the digitalization of all sectors, there is a need to create an enabling environment supporting digital innovation to accelerate not only the digital economy but also the digital transformation in a country. The ability to digitally innovate domestically is also considered a sign of maturity which leverages the two building blocks addressed above: Access and Adoption. Without entrepreneurship-driven innovations, economic opportunities remain unexplored and the global competitiveness of countries in an increasingly digital landscape is put at risk. Through strong digital innovation ecosystems, countries can benefit from increased productivity, economic growth, and employment opportunities that catalyze digital transformation and ensure that long-term digital development has a positive impact on the country’s broader economic development.

The country profiles benefited from secondary research information, including various ITU publications, activities, and statistics. Moreover, the content from other stakeholders’ publications and deliverables were considered. Each piece of content is presented using the context of the relevant building block under which the information has been inserted.

## 2. Country Profile – Bosnia and Herzegovina

### 2.1. Building Block 1: Access

Broadband development is of primary importance and remains a prerequisite to ensure digital development. It is a fundamental enabler for business continuity and innovative economic activities, as well as a mean to inclusion and meaningful participation into the public debate, social and societal activities. . Safe and reliable access to the next generation of infrastructure (fixed, mobile, wireless, satellite and their combinations) and deployed ICTs are key requirements for advancing sustainable development. Creating the right conditions for digital technologies to be broadly utilized will accelerate economic growth . From revamping institutional practices to revising legal frameworks, expanding digital access to all demographic groups must be on the policy agendas of forward-looking leaders and based on the equality – diversity – inclusion principles.

This section will provide a general overview of i) the institutional setting in place in charge of governing policy related to ICTs and digital development in the country; ii) rules and regulations related to digital; iii) the state of digital infrastructure; iv) market dynamics; v) security matters; vi) system resilience; and vii) funding arrangements.

#### 2.1.1. Institutional Setting

There are several actors in the public sector establishing the agenda regarding digital policy in Bosnia and Herzegovina. In addition to the central government, political powers are delegated and diversified to a pair of constitutive entities: the Federation of Bosnia and Herzegovina (FBiH) and Republika Srpska (RS), as well as the Brcko District (BD) as a separate area, and limited jurisdiction and responsibility of the national level (BiH)<sup>1</sup>. At the national level, the Ministry of Civil Affairs and the Ministry of Communications and Transport are responsible for international representation of the country and international cooperation related to education, science and technology, which also incorporates ICTs.<sup>2</sup> The mandate for developing policy related to ICT, including operational jurisdiction, breaks down at the entity level on FBiH and RS. For FBiH, the task falls to the Ministry of Transport and Communications, the Federal Ministry of Education and Science<sup>3</sup> and in some limited way on the Ministry of Development, Entrepreneurship, and Craft. It is worth noting that there are also ministries coordinating science and technology in all 10 cantons across the FBiH. As for RS, the Ministry of Scientific and Technological Development, Higher Education

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<sup>1</sup> For further elaborations in this document, acronym BiH means Bosnia and Herzegovina meaning national level, FBiH means Federation of Bosnia and Herzegovina relating to one of two entities, RS means Republika Srpska as another entity, and BD means Brcko District, also part of internal organization of the country.

<sup>2</sup> Digital Innovation Profile: Bosnia and Herzegovina, ITU (2018), [https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT\\_Brochure%E2%80%93DIP%20BosniaH\\_431106 .pdf](https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT_Brochure%E2%80%93DIP%20BosniaH_431106.pdf).

<sup>3</sup> Digital Innovation Profile: Bosnia and Herzegovina, ITU (2018), [https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT\\_Brochure%E2%80%93DIP%20BosniaH\\_431106 .pdf](https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT_Brochure%E2%80%93DIP%20BosniaH_431106.pdf).

and Information Society plays a crucial role in policymaking decisions<sup>4</sup>. Besides this Ministry, the Ministry of Transport and Communications is also relevant, especially on aspects related to infrastructure planning and development. When it comes to infrastructure development, at the National level, the Ministry of Communications and Transport holds a policy maker role, including national policy, strategic documents and legislation, and the Communications Regulatory Agency (CRA) is the independent regulatory body, whose mandate extends to nationwide telecommunications policy.<sup>5</sup> Finally, the Ministry of Security leads the cybersecurity agenda.

## 2.1.2. Digital Regulation

### *Digital and ICT policies and regulations*

The two latest major policies addressing the need to reinforce the connectivity rates throughout the country are the Policy for Development of Information Society for 2017-2021<sup>6</sup> and the 2017-2021 Electronic Communications Sector Policy.<sup>7</sup> These documents also illustrate how the country seeks to align itself with EU standards. However, according to the latest Bosnia and Herzegovina EU Progress Report (2022), the country did not make any progress in adopting a countrywide strategy and action plan for the development of the information society.<sup>8</sup> The main objectives of the Policy for Development of Information Society for 2017-2021<sup>9</sup> were to Establish a Digital Single Market; Establish interoperability framework and standards; Foster trust and security; Establish fast and ultra-fast Internet access; Encourage development in the software industry, as well as research and development; Enhance digital literacy, knowledge and e-inclusion; and Implement ICT to address the key challenges of BiH society. The main objectives of the 2017-2021 Electronic Communications Sector Policy<sup>10</sup> were to Enhance competitiveness within Europe; Increase productivity and efficiency in business; and Improve public and e-government services.

It is also important to view these policies in relation to broadband mapping efforts. Bosnia and Herzegovina has borrowed from the regulatory framework created by their EU counterparts, using it to guide the work in connectivity. Specifically, the implementation of the “Ordinance on Infrastructure and Special Data Planning of the Federation of Bosnia and Herzegovina” (Official Gazette of FBiH,

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<sup>4</sup> Digital Innovation Profile: Bosnia and Herzegovina, ITU (2018), [https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT\\_Brochure%E2%80%93DIP%20BosniaH\\_431106\\_.pdf](https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT_Brochure%E2%80%93DIP%20BosniaH_431106_.pdf).

<sup>5</sup> Digital Innovation Profile: Bosnia and Herzegovina, ITU (2018), [https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT\\_Brochure%E2%80%93DIP%20BosniaH\\_431106\\_.pdf](https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT_Brochure%E2%80%93DIP%20BosniaH_431106_.pdf).

<sup>6</sup> Official Gazette BiH, No. 42/17, <http://www.sluzbenilist.ba/page/akt/LhPPM81UcxE=>

<sup>7</sup> In 2018, the Broadband Commission for Sustainable Development, a joint initiative of the ITU and UNESCO, produced a list of broadband policies found across the world that can be viewed at the following link: <https://www.broadbandcommission.org/Documents/Policy%20Section%20Documents/BRoadbandPolicies2018.pdf>.

<sup>8</sup> Bosnia and Herzegovina EU Progress Report, DG NEAR (2022), [https://neighbourhood-enlargement.ec.europa.eu/bosnia-and-herzegovina-report-2022\\_en](https://neighbourhood-enlargement.ec.europa.eu/bosnia-and-herzegovina-report-2022_en)

<sup>9</sup> Bosnia and Herzegovina: Report on the preparation of post-2020 strategy, Regional Cooperation Council (2019), <https://www.rcc.int/download/docs/BiH-report-Post-2020-Strategy.pdf/9162326626436839b9796ba573476fcb.pdf>.

<sup>10</sup> Digital Innovation Profile: Bosnia and Herzegovina, ITU (2018), [https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT\\_Brochure%E2%80%93DIP%20BosniaH\\_431106\\_.pdf](https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT_Brochure%E2%80%93DIP%20BosniaH_431106_.pdf).

#1845/2014)<sup>11</sup> and the “Rule on Method for Establishment and Maintenance of Network Cadaster” (RS Official Gazette #58/2012<sup>12</sup>) have brought the country closer to EU standards. Moreover, a pair of geoportals should provide more up-to-date information on the state of broadband throughout the country:

- the Geoportal of the Federation of Bosnia and Herzegovina, which is operated by the Federal Administrators for Geodetic and Property Affairs;<sup>13</sup>
- the Geoportal of the Republika Srpska, which is operated by the Republic Administrators for Geodetic and Property Affairs.<sup>14</sup>

These systems, while useful for integrating spatial data, have not collaborated to create a nation-wide broadband mapping system that offers a clear picture on Bosnia and Herzegovina’s digital infrastructure. By the Law on Communications BiH (BiH Official Gazette #31/03, 75/06, 32/10, 98/12), the CRA has been established as the national level agency to work on this matter. However, the CRA does not have the jurisdiction to require lower level of government and local administration to share information. This is the case as local administrations already hold the jurisdiction on infrastructure project licensing and verification at local government level. Hence, the process of sharing data only works on a voluntary basis. The CRA has sought to address this long-standing challenge. Yet, insufficient cooperation and regulations have made it difficult to mobilize public resources to achieve this collective goal<sup>15</sup>. Besides the broadband mapping issues, the Law on Communications BiH is outdated in many ways. There is however a long-term initiative to create new and better aligned legislations in electronic communications and media to fit the EU ECC Directive and needs in the country.

ITU is now assisting the CRA with a three-step technical assistance program that will enable the Agency to establish and run its own national broadband mapping system. The first phase of technical assistance consisted in the elaboration of a policy paper "Enabling Environment for Broadband Mapping in Bosnia and Herzegovina". The second phase will assist the country in defining technical specifications for the implementation of broadband mapping systems. The third phase covers all aspects pertaining the sustainability of work, by making the CRA autonomous in managing and operating the broadband mapping systems and its entire value chain, meaning collecting, organizing, and reporting on the ICT data and broadband landscape.

It is also worth noting that, as of 2021, the Ministry of Communications and Transport BiH, has taken steps to create a broadband strategy that would not only improve service mapping, but would also provide

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<sup>11</sup> To find the text of this statute, visit the following link: <https://fbihvlada.gov.ba/bosanski/zakoni/2014/uredbe/36h.html>.

<sup>12</sup> To find the text of this statute, visit the following link: <https://www.paragraf.ba/propisi/republika-srpska/zakon-o-premjeru-i-katastru-republike-srpske.html>.

<sup>13</sup> For more information on the department, visit their website at the following link: <https://www.fgu.com.ba/en/572.html>.

<sup>14</sup> For more information on the department visit their website at the following link: <https://www.geoportal.rgurs.org/geoportal/>.

<sup>15</sup> Broadband Mapping Systems in Europe and Regional Harmonization Initiatives, ITU (2021), [https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2020/RRF/21-01-15%20Background%20Paper\\_Broadband%20Mapping%20Systems%20in%20Europe%20and%20Regional%20Harmonization%20Initiatives\\_final\\_clean.pdf](https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2020/RRF/21-01-15%20Background%20Paper_Broadband%20Mapping%20Systems%20in%20Europe%20and%20Regional%20Harmonization%20Initiatives_final_clean.pdf).

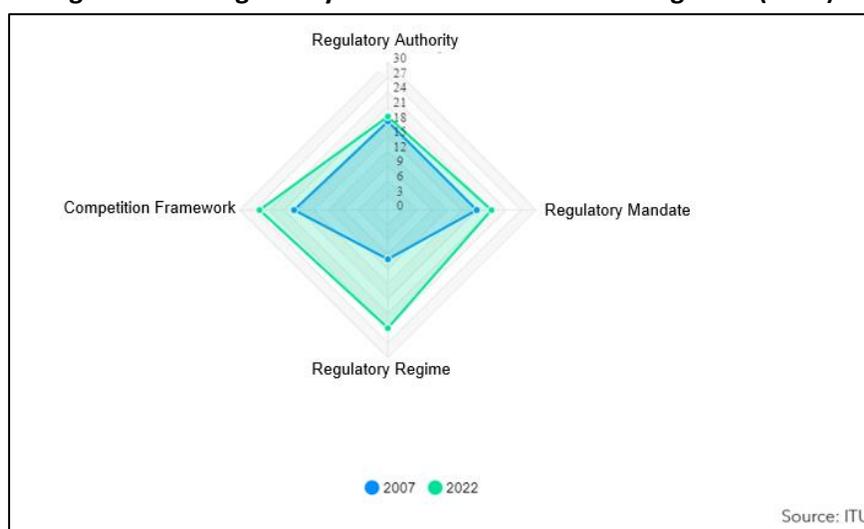
insights into the quality of digital infrastructure. The Ministry plans to achieve this by turning to existing geoportal databases that are modeled off EU regulatory frameworks.

In a broader regulatory context, Bosnia and Herzegovina scored 90.0 in the 2022 ITU ICT Regulatory Tracker rankings, a single point higher than where it stood in the 2021 tabulation<sup>16</sup>. This shows that only minimal changes were seen in a single-year period. The ITU Tracker pinpoints the changes taking place in the ICT regulatory environment. The Tracker also facilitates benchmarking and the identification of both trends and gaps in ICT legal and regulatory frameworks, allowing decision-makers to make the cases for further reform to achieve a vibrant and inclusive ICT sector. It evaluates this process by creating a comprehensive metric that draws on 50 indicators grouped into four clusters:

1. Regulatory authority (focusing on the functioning of the regulatory entity): Bosnia and Herzegovina scores a 19 out of 20;
2. Regulatory mandates (who regulates what): Bosnia and Herzegovina scores 21 out of 22;
3. Regulatory regime (what regulation exists in major areas): Bosnia and Herzegovina scores 24 out of 30;
4. Competition framework for the ICT sector (levels of competition in the main market segments): Bosnia and Herzegovina scores 26 out of 28.

Based on these benchmarks, Bosnia and Herzegovina is among the group of countries with a *Fourth-Generation regulatory regime (G4)*, that is integrated and led by economic and social policy goals. The country's 2022 overall result is stronger than the latest European average of 86.87 recorded in 2020, and markedly higher than the latest world average of 73.7 in 2019.<sup>17</sup>

**Figure 1. ICT Regulatory Tracker – Bosnia and Herzegovina (2022)**

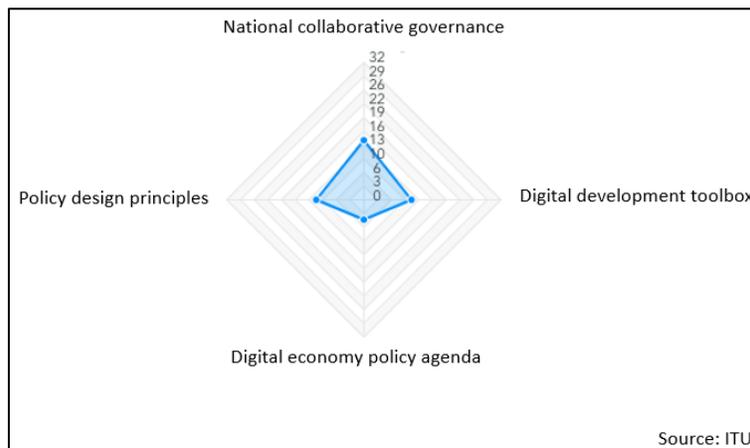


<sup>16</sup> ITU Regulatory Tracker, ITU (2022), <https://app.gen5.digital/tracker/country-cards/Bosnia%20and%20Herzegovina#overall-score>.

<sup>17</sup> Global ICT Regulatory Outlook 2020, ITU (2020), [https://www.itu.int/dms\\_pub/itu-d/opb/pref/D-PREF-BB.REG\\_OUT01-2020-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-BB.REG_OUT01-2020-PDF-E.pdf).

At present, the gold standard for regulatory policy is the *Fifth Generation (G5)*, which focuses on collaboration amongst diverse stakeholders within the ICT space and in other aspects of the national economy. Bosnia and Herzegovina is currently in a transitioning phase. The country has a score of 40.74 in the G5 benchmark in 2021, far below the latest Europe average of 69.88 in 2020.<sup>18</sup> From these results, Bosnia and Herzegovina has significant room for improvement, particularly when noting their scores for Pillar III (Digital Development Toolbox) and Pillar IV (Digital Economy Policy Agenda).<sup>19</sup>

**Figure 2. G5 Benchmark – Bosnia and Herzegovina (2021)**



### Next generation infrastructure: 5G Regulations

The Electronic Communications Sector Policy for Bosnia and Herzegovina for 2017-2021 is the latest strategic document which encompassed activities to boost the competitiveness of the ICT sector and invest into 5G.<sup>20</sup> This plan of action not only viewed the issue of connectivity as central to positioning the country for success in the future economy, but it also articulated how improvements in infrastructure will facilitate the process of EU integration. There are several measures that speak to these goals:

- Constructing broadband networks that will enable high-speed transmission and provision of new services, thus ensuring reliable access to multimedia and interactive content;
- Stimulating the application of broadband wireless access networks in rural areas to reduce the digital divide among the population;

<sup>18</sup> The Benchmark of Fifth Generation Collaborative Regulation, ITU (2021), [https://digitalregulation.org/wp-content/uploads/G5Benchmark\\_ReviewBoardReport\\_21062021.pdf](https://digitalregulation.org/wp-content/uploads/G5Benchmark_ReviewBoardReport_21062021.pdf).

<sup>19</sup> The Benchmark of Fifth Generation Collaborative Regulation, ITU (2021), [https://digitalregulation.org/wp-content/uploads/G5Benchmark\\_ReviewBoardReport\\_21062021.pdf](https://digitalregulation.org/wp-content/uploads/G5Benchmark_ReviewBoardReport_21062021.pdf).

<sup>20</sup> For more information on this strategy, visit the following link: <http://www.sluzbenilist.ba/page/akt/WBr1TX3CmYY=> (Bosnian).

- Ensuring technical preconditions for the implementation of broadband Internet access for all users, especially schools and educational institutions;
- Involvement and active participation of Bosnia and Herzegovina in international projects related to broadband access.

In addition to this strategy, the government started focusing on how networks are governed across the country. In March 2019, the Council of Ministers confirmed the proposal of the CRA to issue licenses in May 2019 to (existing) service providers which already hold the 3G market and spectrum licenses. This measure aimed at extending service providers' commercial mobile services to 4G technology by licensing some new RF bands as 800 MHz and 2600 MHz, affecting coverage in both entities. While 5G development was not the main priority motivating this policy change, the decision to allocate spectrum at specific intervals (i.e., 800 MHz, 900 MHz, 1.800 MHz, 2.100 MHz and 2.600 MHz) provides operators with the conditions to deploy 5G technologies within these frequency ranges. This way, it ensured that the 5G investment cycle begins earlier as issuing new licensing is not needed. In addition to these measures, other initiatives were taken to improve the country's connectivity rates. For example, CRA has released public statements which underline how embracing 5G could be key in unlocking business opportunities as well as creating "smart cities" and other IoT applications in the country.<sup>21</sup>

However, the commercialization process is mainly focused on 4G coverage and there is little publicly available information regarding 5G spectrum assignment protocols. This is partially caused by the fact that Bosnia and Herzegovina has launched the 4G rollout too late compared to its European peers. In turn, delaying the commercial rollout of 5G. Major players in the telecommunications field have stated that they are in the process of crafting rollout plans. For example, BH Telecom has claimed that they have adopted a strategy for the implementation of 5G as far back as 2017.<sup>22</sup> Based on the latest information available, they have also shared that their investments in 4G and 5G were higher in 2019 than at any point in the previous three years. The company has indicated that funds have gone towards the refurbishment of infrastructure, raising the likelihood that the company is gearing up for pre-commercial trials of 5G technologies. Other entities, such as HT Mostar, have also made statements claiming that they are in the process of introducing 5G into their networks<sup>23</sup>.

Among telecom service providers in the larger market, BH Telecom has been most vocal about its trial runs with 5G technologies. In 2019, the company announced that they had tested these upgrades in a "multivendor environment," making the claim that they were the first operator in Bosnia and Herzegovina to harness this innovation<sup>24</sup>. While information regarding the status of these trials has been sparse, the company has indicated that they plan to expand 5G into underserved rural areas. At the height of the

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<sup>21</sup> For more information on these developments, visit the following link: <https://ba.ekapija.com/people/2864850/aleksandar-mastilovic-savjetnik-direktora-rak-a-5g-je-samo-protocna-tacka-u> (Bosnian).

<sup>22</sup> 5G implementation in non-European Union countries of the Europe region, ITU (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/pref/D-PREF-THEM.19-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-THEM.19-2021-PDF-E.pdf).

<sup>23</sup> 5G implementation in non-European Union countries of the Europe region, ITU (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/pref/D-PREF-THEM.19-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-THEM.19-2021-PDF-E.pdf).

<sup>24</sup> 5G implementation in non-European Union countries of the Europe region, ITU (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/pref/D-PREF-THEM.19-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-THEM.19-2021-PDF-E.pdf).

COVID-19 pandemic, BH Telecom's spokespersons highlighted how enhanced networks would help close the long-standing digital inequities found outside of urban centers<sup>25</sup>.

Despite the progress made in this area, there are still barriers to surmount to advance on 5G implementation. Case in point, there are no guidelines for electromagnetic field (EMF) limit levels, primarily because most vendors in the country are focused on 4G expansion. As it stands, the "Rule on Restricted Electromagnetic Radiation", which implies that all users of the radio spectrum must harmonize their day-to-day operating procedures, is the most relevant for those working on 5G policy. Nevertheless, CRA has made it clear that they will keep the public informed about how 5G expansion might influence electromagnetic exposure<sup>26</sup>.

### **2.1.3. Digital Infrastructure**

While policymakers have expressed an interest in improving connectivity throughout the country, statistics tell a story that is more complicated. Figures compiled by the ITU show that the percentage of individuals and households using the Internet both hover around 75%, lower than the European average of 86.8% and 87.6%, respectively<sup>27</sup>. Moreover, there are about 55.5 active mobile-broadband subscriptions per 100 inhabitants, greatly below the European and world averages, and only 22 fixed telephone subscriptions per 100 inhabitants, which is also lower than the European average.<sup>28</sup> While there is minimal information on 4G coverage, it is estimated that 97% of the population has access to 3G networks, close to the European average of 99%<sup>29</sup>. Finally, there are approximately 24 broadband subscriptions per 100 inhabitants, below the European average of about 35 subscriptions<sup>30</sup>.

Table 1 provides a useful summary of ITU indicators related to telecommunications and the Internet in Bosnia and Herzegovina while also comparing them to European and global standards. These statistics shows that, while Bosnia and Herzegovina registers progress in raising the level of connectivity, some challenges must be addressed to close the widening gap that exists between the country and its regional peers, and to reach European and averages.<sup>31</sup>

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<sup>25</sup> 5G implementation in non-European Union countries of the Europe region, ITU (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/pref/D-PREF-THEM.19-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-THEM.19-2021-PDF-E.pdf).

<sup>26</sup> For more information, visit the following link: <https://startbih.ba/clanak/5g-mreza-i-zdravlje-rak-priprema-servis-u-cilju-informisanja-javnosti-o-trenutnom-elektromagnetnom-zagadenju-u-bih/126358>.

<sup>27</sup> World Telecommunication/ICT Indicators Database 2022 – Retrieved June 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>.

<sup>28</sup> World Telecommunication/ICT Indicators Database 2022 – Retrieved June 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>.

<sup>29</sup> World Telecommunication/ICT Indicators Database 2022 – Retrieved June 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>.

<sup>30</sup> World Telecommunication/ICT Indicators Database 2022 – Retrieved June 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>.

<sup>31</sup> For reference, the Europe Office of the ITU covers 46 countries based within the larger region. For a list of these countries, visit the following link: <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/MemberCountriesinEurope.aspx>.

**Table 1. Key Telecommunications and Internet Indicators in Bosnia and Herzegovina alongside European and World Averages <sup>32</sup>**

Key Indicators (2021)	Bosnia and Herzegovina	Europe	World
Fixed telephone subs per 100 inhabitants	21.07	31.2	11.2
Mobile cellular subs per 100 inhabitants	114	118.2	109.9
Active mobile broadband per 100 inhabitants	55.56	105.3	83
3G Coverage (% of population)	97%	99%	95%
LTE/WiMAX coverage (% of population)	93%	98.7%	87.6%
Individuals using Internet (%)	75.68%	86.8%	62.6%
Households with Internet Access (%)	75.49%	87.6%*	65.7%*
Fixed broadband subs per 100 inhabitants	24.39	34.7	16.7
Fixed broadband subs by speed (% of total):	--		
256 kbit/s to 2 Mbit/s	3%	0.3%*	1.8%*
2 to 10 Mbit/s	36%	6.4%*	6.7%*
>> 10 Mbit/s	61%	92.3%*	89.9%*

\* 2020 Data (latest official data available)

According to the ITU Report on *The Status of Connectivity in 9 Non-EU Countries of Europe Region* (2021), and recent ITU's statistics, Bosnia and Herzegovina lags its peers of the 9 non-EU countries<sup>33</sup> of the Europe Region in several key areas on the *availability* of connectivity<sup>34</sup>. Regarding the availability of connectivity, a trio of indicators are crucial to provide perspective on the situation in Bosnia and Herzegovina:

- Percentage of the population covered by at least an LTE/WiMAX mobile network: Bosnia and Herzegovina has increased its coverage rate by about 10% since 2020, with a rate of 93% in 2021. However, the country remains second to last among the 9 countries as its coverage rate only exceeds Ukraine (91.60%).<sup>3536</sup>
- Estimated proportion of households with internet access at home: Around 75% of the population has access to the Internet at home in the country according to statistics from 2021, putting the country second to last compared to its peers, just in front of Moldova (66.75 %).<sup>3738</sup> This is a

<sup>32</sup> World Telecommunication/ICT Indicators Database version July 2022 – Retrieved November 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>

<sup>33</sup> The 9 non-EU Countries of the Europe Region refers to the following: Albania, Bosnia and Herzegovina, Georgia, Montenegro, Moldova, North Macedonia, Serbia, Turkey, and Ukraine.

<sup>34</sup> The Status of Connectivity in 9 Non-EU Countries of Europe Region, ITU (2021), [https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2021/Meaningful%20Connectivity/Report%20-%20The%20Status%20of%20Connectivity%20in%209%20non-EU%20countries%20of%20Europe%20region\\_final\\_clean.pdf](https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2021/Meaningful%20Connectivity/Report%20-%20The%20Status%20of%20Connectivity%20in%209%20non-EU%20countries%20of%20Europe%20region_final_clean.pdf).

<sup>35</sup> World Telecommunication/ICT Indicators Database 2022 – Retrieved June 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>.

<sup>36</sup> Data for Ukraine is for the year 2020 which is the latest official data available for this indicator.

<sup>37</sup> World Telecommunication/ICT Indicators Database 2022 – Retrieved June 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>.

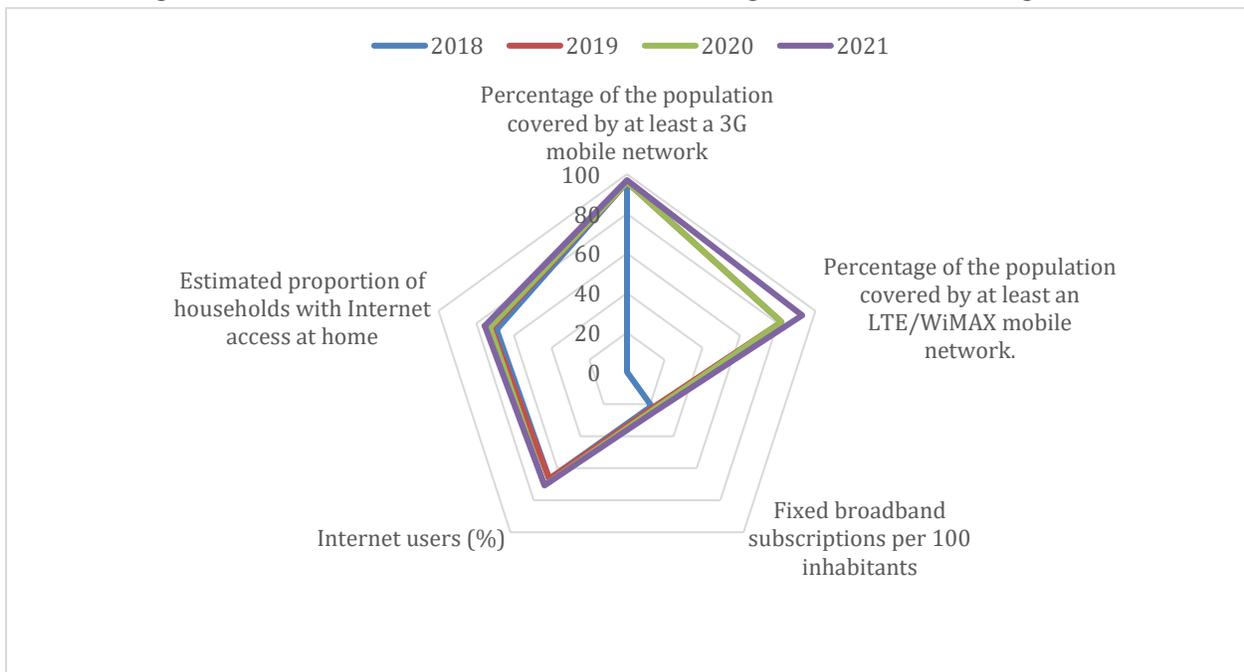
<sup>38</sup> Data for North Macedonia and Ukraine is for the year 2020 which is the latest official data available for this indicator.

notable increase considering that this indicator was at 55% back in 2015.<sup>39</sup> However, it also shows that the country is increasing its rate at a slower paced than its regional peers, as in 2019, the country was positioned 5<sup>th</sup> out of the 9 countries. The country is also short of the European average of 87.6%.

- Number of fiber connections per 100 inhabitants: Information from 2019 suggests that the number of fiber-to-the-home (FTTH) connections is the lowest in the region, far below the 9-country average of 3.2 set in 2015.<sup>40</sup>

Figure 3, which can be found below, looks at basic indicators of ICT-access in Bosnia and Herzegovina for the following years: 2018, 2019, 2020, and 2021.

**Figure 3. The basic indicators of ICT-access and usage in Bosnia and Herzegovina<sup>41</sup>**



<sup>39</sup> The Status of Connectivity in 9 Non-EU Countries of Europe Region, ITU (2021), [https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2021/Meaningful%20Connectivity/Report%20-%20The%20Status%20of%20Connectivity%20in%209%20non-EU%20countries%20of%20Europe%20region\\_final\\_clean.pdf](https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2021/Meaningful%20Connectivity/Report%20-%20The%20Status%20of%20Connectivity%20in%209%20non-EU%20countries%20of%20Europe%20region_final_clean.pdf).

<sup>40</sup> The Status of Connectivity in 9 Non-EU Countries of Europe Region, ITU (2021), [https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2021/Meaningful%20Connectivity/Report%20-%20The%20Status%20of%20Connectivity%20in%209%20non-EU%20countries%20of%20Europe%20region\\_final\\_clean.pdf](https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2021/Meaningful%20Connectivity/Report%20-%20The%20Status%20of%20Connectivity%20in%209%20non-EU%20countries%20of%20Europe%20region_final_clean.pdf).

<sup>41</sup> World Telecommunication/ICT Indicators Database 2022 – Retrieved June 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>.

### 2.1.4. Market Access

According to the ITU *Measuring Information Society Report 2018*, Bosnia and Herzegovina has taken several steps to ensure that its policies are aligned with the requirements for integration into the EU. Regulations for telecom have been modelled off those held by the EU, while providers who did not have licensed spectrum were allowed to introduce outside competition into the flourishing industry.<sup>42</sup> Investment into the industry has taken off in recent years, as figures from 2017 indicate that nearly 90 million (USD) was dedicated to improving the country’s position in the region.<sup>43</sup>

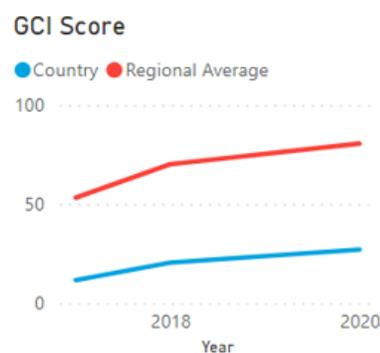
When looking at competition in the mobile market, three vendors have a prominent role in the domestic market. BH Telecom, whose work is based in the Federation, is the largest providers. HT Eronet, which is focused to the market in the Federation, rivals of the BH Telecom which also focused the market on the Federation. Third operator m:tel (MTEL, Telecom Srpska) owns a considerable share of the market found in Republika Srpska. Although all three operators are present in the whole market in Bosnia and Herzegovina and in formal way the competitiveness is establish, all of them focus on specific regions in the country, where each of them dominates limiting the real market competition. Despite a limited degree of close coordination, the three market actors have mobilized their resources to develop mobile networks that are synched at the national level<sup>44</sup>.

### 2.1.5. Trust and Security

According to the 2021 ITU Global Cybersecurity Index, Bosnia and Herzegovina ranks 43<sup>rd</sup> out of 46 countries in the Europe region with an overall score of 29.44. Looking at the period 2017-2020, the country scores significantly lower than the European Average (see figure 4).<sup>45</sup> Internationally, the country is 110<sup>th</sup> out of 182 countries.<sup>46</sup>

This index is a trusted reference that measures the commitment of countries to cybersecurity at a global level to raise awareness of the importance and different dimensions of the issue and assess countries’ ICT sector resilience and reliability. It highlighted that legal measures adopted by key institutions were an area of relative strength. However, it acknowledged that organizational measures

**Figure 4. Comparison of Bosnia and Herzegovina and Regional Average GCI scores over the period 2017-2020**



<sup>42</sup> Measuring the Information Society Report – Volume 2, ITU (2018), <https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-2-E.pdf>.

<sup>43</sup> Measuring the Information Society Report – Volume 2, ITU (2018), <https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-2-E.pdf>.

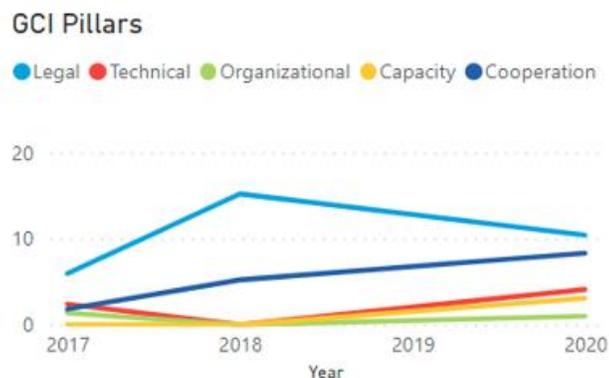
<sup>44</sup> Measuring the Information Society Report – Volume 2, ITU (2018), <https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-2-E.pdf>.

<sup>45</sup> Global Cybersecurity Index 2021, ITU (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf).

<sup>46</sup> Global Cybersecurity Index 2021, ITU (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf).

employed across a variety of relevant stakeholders stood as an area of potential growth. Figure 5 below shows the evolution of the overall GCI score per pillars of Bosnia and Herzegovina across 2017 to 2020.

**Figure 5. Bosnia and Herzegovina GCI scores per pillars over the period 2017-2020<sup>47</sup>**



To counter these challenges, Bosnia and Herzegovina has taken concrete steps to ensure the overall reliability of its digital infrastructure. For instance, the country is party to the Budapest Convention on Cybercrime.<sup>48</sup> The Convention was signed in February 2005, the status was ratified in May 2006, and came into full force in September 2006. The Council of Ministers BiH has adopted the Decision<sup>49</sup> which tasked the Ministry of Security BiH to establish the CERT/CSIRT<sup>50</sup> for institutions of BiH. Besides the Ministry of Security, the Ministry of Communications and Transport has adopted the “Information Security Management Policy in the Institutions of Bosnia and Herzegovina for the period of 2017-2022,” reporting on its progress to the Council of Ministers<sup>51</sup>. Finally, a working group was assembled to produce a national-level cybersecurity strategy by the same leading Ministry.<sup>52</sup> Altogether, while there are no laws related to cybersecurity at present, these actions suggest concrete steps in that direction. This process is supported by UNDP and OSCE, which provide technical assistance in legislation and regulation building, capacity building, and experience sharing and adoption.

BiH is in the process of establishing a broader cybersecurity framework to meet all requirements and recommendations from the EU NIS Directive as well as NIS2<sup>53</sup>, including establishing the Unique Contact (Focal) Point, which is still the subject of political discussion. As the current state of cybersecurity is still completely unclear, there is no clear decision on how the jurisdiction and responsibility could be shared

<sup>47</sup> Global Cybersecurity Index 2021, ITU (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf)

<sup>48</sup> For a full list of participating countries, visit the Council of Europe’s website on the Budapest Convention: <https://www.coe.int/en/web/cybercrime/the-budapest-convention>.

<sup>49</sup> For more information, please visit this webpage: <http://www.sluzbenilist.ba/page/akt/g4E0HNrVpsc=>

<sup>50</sup> CERT stands for ‘Computer Emergency Response Team’; CSIRT stands for ‘Computer Security Incident Response Team’  
<sup>51</sup> National Cybersecurity Strategies in Western Balkan Economies, Geneva Centre for Security Sector Governance (2021), <https://www.dcaf.ch/national-cybersecurity-strategies-western-balkan-economies>.

<sup>52</sup> National Cybersecurity Strategies in Western Balkan Economies, Geneva Centre for Security Sector Governance (2021), <https://www.dcaf.ch/national-cybersecurity-strategies-western-balkan-economies>.

<sup>53</sup> The EU NIS Directive is the EU Directive on security of network and information systems which provides legal measures to boost the overall level of cybersecurity in the EU. You can find more information at: <https://digital-strategy.ec.europa.eu/en/policies/nis-directive>

between the national and entity levels, as well as between ministries at the same and different levels of government.

The latest alarm on current low readiness, resistance and prevention on cyber-attacks appeared in September 2022, when the Parliament of Bosnia and Herzegovina, the Council of Ministers BiH and other institutions and agencies were attacked and disabled for work for almost 2 weeks because of ransomware crypto worm. Some assessments on current cybersecurity resilience and readiness as well as raising-awareness campaigns and events have been launched at the end of 2022, related to the package of assessments undertaken by relevant institutions in partnership with UNDP (under the "Building Cybersecurity in Bosnia and Herzegovina" Project, financed by the GIZ, and implemented by the UNDP Country Office in Bosnia and Herzegovina).

In recent years, officials in Bosnia and Herzegovina have been mindful of how these “policy gaps” needed to be addressed to facilitate the process of EU integration. In fact, investing in digital was listed as a priority in the 2015 “Strategic Framework” published by the Council of Ministers.<sup>54</sup> However, many of the institutional and regulatory changes called for in this foundational document have not been fully realized. The existing division of governing powers among central authorities and entity representatives has been cited as a major obstacle to these reforms.<sup>55</sup>

The passage of the Policy of Electronic Communications of Bosnia and Herzegovina 2017-2021 back in 2017 was seen by experts as indicative of that commitment. Its contents mirror many of the objectives outlined in the Digital Agenda for Europe.<sup>56</sup> Harmonizing existing legislation to abide by EU standards, especially in the domain of digital security, is expected to help the country maximize the benefits of digital transformation.

Regarding the laws, which undergird Bosnia and Herzegovina’s position on cybersecurity, there are numerous pieces of legislation which touch on this issue at both the state and entity levels, as follow (but not strictly limited to):

- The Rulebook on the maintenance and special technical security measures for personal data (BiH Official Gazette # 67/09) allows for officials to appoint an administrator to oversee personal data registries, revise security measure strategies, and implement prescribed technical safeguards;
- The Law on Protection of Classified Data (BiH Official Gazette # 54/05, 12/09) places limits on the accessibility of information that may pose a threat to the security or interests of the country;
- The Law on Electronic Signature (BiH Official Gazette # 91/06) requires that technical measures and procedures be in place to safely use electronic signatures;

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<sup>54</sup> For more information on the Strategic Framework, visit the following link:

<http://www.dep.gov.ba/naslovna/default.aspx?id=1706&langTag=bs-BA>.

<sup>55</sup> Bosnia and Herzegovina, EU Cyber Direct (2022), <https://eucyberdirect.eu/atlas/country/bosnia-and-herzegovina>.

<sup>56</sup> Digital Innovation Profile: Bosnia and Herzegovina, ITU (2021), [https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT\\_Brochure%E2%80%93DIP%20BosniaH\\_431106\\_.pdf](https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT_Brochure%E2%80%93DIP%20BosniaH_431106_.pdf).

- The Law on Electronic Document (BiH Official Gazette # 58/14) sets the standards for the management of electronic archives, including those that contain classified data;
- The Law on Electronic Business Activities (RS Official Gazette #s 59/09, 33/16) mandates that providers of information security services adopt transparency and accountability measures in their work with relevant institutions.<sup>57</sup>
- The Strategy on Cybersecurity of the Armed Forces of Bosnia and Herzegovina (Ministry of Defense BiH, 2017)
- The Law on Protection of Personal Information (BiH Official Gazette # 46/06, 76/11, 89/11)
- The Law on Information Security (RS Official Gazette # 70/11)
- The Law on Electronic Signature (RS Official Gazette # 106/15)
- The Law on Electronic Document (RS Official Gazette # 106/15)
- The Rulebook on Measures for Information Security (RS Official Gazette # 91/12)
- The Law on Information Security, Networks Security and Security of Information Systems FBiH (official draft, pending for adoption)
- Policy on Information Security Management in Institutions of Bosnia and Herzegovina (BiH Official Gazette # 38/17)

The entities tasked with upholding these measures, as well as addressing matters related to data protection and cybersecurity threats, include, but not limited to, the following:

- Bosnia and Herzegovina: Department for Informatics and Telecommunication Systems (Ministry of Security of Bosnia and Herzegovina);<sup>58</sup> Ministry of Communications and Transport
- Federation of Bosnia and Herzegovina: Crime-police sector<sup>60</sup> (part of the Ministry of Internal Affairs), Ministry of Transport and Communication;
- Republika Srpska: Directorate for Information and Communication Technologies<sup>61</sup>, Unit for Preventing High-tech Crime (both are organization units of the Ministry of Internal Affairs for Republika Srpska),<sup>62</sup> and the Ministry for Scientific and Technological Development, Higher Education and Information Society.<sup>63</sup>

This list is non-exhaustive, and their relation and jurisdiction are subject to political agreement and might be changed. However, the above- listed institutions have significant impact on processes related to digital development.

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<sup>57</sup> Data Protection and Cybersecurity Laws in Bosnia and Herzegovina, Sanja Voloder and Stefan Cosovic (2021), <https://cms.law/en/int/expert-guides/cms-expert-guide-to-data-protection-and-cyber-security-laws/bosnia-and-herzegovina>.

<sup>58</sup> This department also covers cybersecurity affairs for the Federation of Bosnia and Herzegovina (FBiH).

<sup>59</sup> For more information on the department, visit the following link: <http://www.msb.gov.ba/>.

<sup>60</sup> For more information on the unit, visit the following link: <http://www.fmup.gov.ba/v2/>.

<sup>61</sup> For more information on the directorate, visit the following link: <https://mup.vladars.net/index.php?vijest=ministarstvo&vrsta=ikt>.

<sup>62</sup> For more information on the unit, visit the following link: <https://mup.vladars.net/eng/index.php>.

<sup>63</sup> For more information on the ministry, visit the following link: <https://www.vladars.net/sr-sp-cyrl/Pages/default.aspx>.

### **Online gender-based violence**

Bosnia and Herzegovina is a party to all core international human rights treaties and has domestic legislation protecting human rights, including women’s rights. However, there are gaps in legal framework that make it difficult for survivors of online-based violence to access legal remedies. Moreover, there are very few lawyers who deal with Internet rights in the country, and prosecutors generally do not take the issue of online threat seriously. Survivors also rarely seek justice through civil lawsuits because it is an expensive process. The law does not regulate special protection mechanisms to guarantee the protection of women against violence online. Bosnia and Herzegovina is part of the global Women Rock IT project to gather evidence on this type of violence, which was developed by the OneWorld Platform for Southeast Europe (OWPSEE). The UN in Bosnia and Herzegovina is stepping up to address concerns related to online hate speech, as part of the “UNCT Bosnia and Herzegovina Plan of Action on Hate Speech” adopted in February 2022.

### **Building trust and confidence in the use of ICTs for children and the Youth**

Bosnia and Herzegovina ratified the Council of Europe Convention on the Protection of Children against Sexual Exploitation and Sexual Abuse (“the Lanzarote Convention”) in November 2012<sup>64</sup> and is a member of the WePROTECT Global Alliance to End Child Sexual Exploitation Online.<sup>65</sup>

The criminal legislation in Republika Srpska has been revised to criminalize online violence and abuse in accordance with the Lanzarote Convention. However, there are no country-wide legal framework in place. According to a 2020 ITU report on the ‘Status of national child online protection ecosystems in ‘South-Eastern Europe’,<sup>66</sup> the varying levels of authority active in child online protection and lack of coordination among them also affects the work of policymakers and is an impediment to greater child online safety. For instance, it can undermine program evaluation as data collection in the post-intervention phase can be derailed by the lack of cross-jurisdictional collaboration. This leads to an increasing risk of having policies and programs on child online protection that are not evidence-based.

The institutional framework dealing with this issue include government and non-government institutions like the CRA, the Ministry of Communications and Traffic, the Ministry of Security, the Ministry for Human Rights and Refugees, the Ministry of Justice, the Federal Police Directorate, the Criminal Policy Research Centre, the NGO “Save the Children”, the University of Sarajevo-Faculty for criminology and safety studies,

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<sup>64</sup> Building a Europe for and with children, Council of Europe (2012), [https://www.coe.int/t/dg3/children/News/B-HRatification\\_en.asp](https://www.coe.int/t/dg3/children/News/B-HRatification_en.asp).

<sup>65</sup> Status of national child online protection ecosystems in South Eastern Europe, ITU (2020), <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Publications/FINAL%20REPORT.pdf>.

<sup>66</sup> Status of national child online protection ecosystems in South Eastern Europe, ITU (2020), <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Publications/FINAL%20REPORT.pdf>.

etc.<sup>67</sup> Certain agencies, such as the Institution of Ombudsman for Human Rights, have made a concerted effort to navigate this complicated legislative landscape. Yet the recommendations issued by this Institution are not binding.<sup>68</sup>

The legal aspect of online safety and protection of children needs to be addressed. Government involvement in this area is evident, however governmental agencies and departments could propel this topic further into the public space to help raise awareness of child online protection and safety. Education and training for civil servants and professionals must be a part of future activities to increase the level of competence and strengthen capacity building of all professionals working with children. As in most countries that are trying to tackle the challenges of keeping children and young people safe online, coordination and cooperation among all relevant stakeholders could be improved, and more actions undertaken. More focused, nation-wide, and scientifically approved research would provide a stable basis for future activities and help to understand the current digital space threats and trends facing children and youth in child online protection.<sup>69</sup>

Civil society has stepped up to bring attention to child safety in the digital space. The Safer Internet Center in Bosnia and Herzegovina is operated by the International Forum of Solidarity (IFS), Emmaus International,<sup>70</sup> and is supported by various organizations and stakeholders in the field of online safety. It was established with the aim to prevent sexual exploitation and abuse of children in the online environment, and to provide information and effective tools to youth, children up to 8 years old and their families on how to navigate the Internet in a safe and responsible way.<sup>71</sup> Beyond these educational offerings, the Safer Internet Center has an active free helpline to support local users concerned about the spread of sensitive materials and established a hotline to report extreme or illegal content, and to connect individuals with experts and specialists focusing on child online protection. The center also engages in a variety of activities undertaken to raise public awareness and promote online safety. To this end, the center organized the 2022 edition of Safer Internet Day, which is celebrated in Bosnia and Herzegovina since 2011, and conducts regular activities such as a quiz that children can take to assess their understanding of risks associated with the digital environment.<sup>72</sup> So far, 50,000 children participated in the quiz over the past five years. The data gathered through this quiz plays an essential role in measuring and monitoring children's and youth's level of awareness of this issue.

It is highly commendable that Emmaus (IFS-Emmaus) is one of the leaders of online safety in Bosnia and Herzegovina. However, there is an evident need for more varied stakeholder involvement. There are some activities supported by industry stakeholders, but Internet service providers and the digital technology

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<sup>67</sup> Status of national child online protection ecosystems in South Eastern Europe, ITU (2020), <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Publications/FINAL%20REPORT.pdf>.

<sup>68</sup> Child Protection Index 2.0 for Bosnia and Herzegovina, World Vision International (2019), [https://www.wvi.org/sites/default/files/2019-06/Child%20Protection%20Index%202.0%20for%20BiH\\_engl\\_0.pdf](https://www.wvi.org/sites/default/files/2019-06/Child%20Protection%20Index%202.0%20for%20BiH_engl_0.pdf).

<sup>69</sup> Status of national child online protection ecosystems in South Eastern Europe, ITU (2020), <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Publications/FINAL%20REPORT.pdf>.

<sup>70</sup> For more information, visit the organization's website at the following link: [www.sigurnodijete.ba](http://www.sigurnodijete.ba)

<sup>71</sup> For more information, visit the organization's website at the following link: <https://www.sigurnodijete.ba/en/>.

<sup>72</sup> For more information, visit the following link: <https://www.saferinternetday.org/en-US/in-your-country/bosnia-and-herzegovina>.

industry need to be more involved in child online protection in Bosnia and Herzegovina. A multi-stakeholder approach stands up best to the challenges of child online protection in the digital world and needs coordination, management, and active participation of a wide range of stakeholders.<sup>73</sup> The development of a child online protection strategy, policy, legislation, and regulation based on internationally recognized recommendations is necessary to achieve change in protecting children's rights in the digital environment.<sup>74</sup>

Through its Child Online Protection (COP) Guidelines, ITU is supporting countries in Europe Region and beyond to adopt a strategic and holistic approach to child online protection, that brings all components together at the country level, and provides expert guidance on the various dimensions of COP, including for children, parents and educators, industry and policymakers.<sup>75</sup>

With the lead of the CRA, Bosnia and Herzegovina is one of the countries in the Europe Region that has engaged and dedicated great efforts in the roll-out of the ITU COP Guidelines. The Bosnian, Croatian and Serbian versions of the Guidelines have been translated by the CRA and officially launched in December 2020. A media campaign was also undertaken in 2020 targeting parents and educators, media and information literacy experts from institutions and NGOs, to raise awareness on the topic and promote the availability of the translated guidelines.

### **2.1.6. Resilience and Sustainability of Digital Infrastructure**

Several measures have been taken to strengthen Bosnia and Herzegovina's digital infrastructure, with the understanding that these improvements would be necessary for the country's further progress toward EU integration.

Currently, the country focuses on finding political agreement on jurisdiction, diversification, minimal CERT capacity functions standardization, launching of BH CERT Network as well as establishing Cybersecurity Council to act as the Unique National Focal Point in line with the EU NIS1/NIS2 Directive. However, national CERT will not be established. At present, the Republika Srpska has established the RS-CERT in full capacity, the Ministry of Defense BiH has the Military CERT (established by the NATO experts and with financial and technical support from the NATO), the Federation will be establishing the FBIH-CERT with UNDP support through the Strengthening Cybersecurity in BiH Project. Under this same project support by UNDP, it is also estimated that the Ministry of Security BiH will establish the BH-CERT in 2023, not as the national CERT, but as a CERT for government institutions at the national level without any coordination jurisdiction in BiH. Academic CERT is also established in August 2022 (supported by the OSCE Country Office BiH) at the University of Sarajevo's Tele-Informatic Center. However, deeper coordination

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<sup>73</sup> Status of national child online protection ecosystems in South Eastern Europe, ITU (2020), <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Publications/FINAL%20REPORT.pdf>.

<sup>74</sup> ITU Global Project on Child Online Protection "Creating a safe and empowering digital environment for children". Project concept note, ITU, [https://www.itu-cop-guidelines.com/files/ugd/9ad503\\_478d6281e6d34cd7905b9d3ce6d1cc15.pdf](https://www.itu-cop-guidelines.com/files/ugd/9ad503_478d6281e6d34cd7905b9d3ce6d1cc15.pdf)

<sup>75</sup> For more information on the Guidelines, visit the following link: <https://www.itu-cop-guidelines.com/>.

and collaboration between existing CERTs is lacking. SOCs<sup>76</sup> centers are not present in Bosnia and Herzegovina but there is an indication that some commercial SOCs could appear in 2023 to provide SOC services.

In addition, policy tools, such as broadband mapping, have been used by relevant policymakers to identify pre-existing vulnerabilities within digital infrastructure. The geoportal platforms for each political entity, referring to FBiH and RS, have provided valuable information on service shortcomings.<sup>77</sup> However, these systems have not been harmonized, meaning that it is unclear as to whether infrastructure extends coverage throughout the country. The Ministry of Communications and Transport is working to remedy this problem. Though, the timetable for the publication of this information remains unclear.

Overall, while coordination amongst the different institutions in charge of ICT infrastructure in the country can be challenging, their involvement and coordination is crucial for a resilient and sustainable digital infrastructure.

### **2.1.7. Financing and Investments**

Over the years, a few investors from abroad have funneled their fundings into Bosnia and Herzegovina to grow its ICT sector. This has been an objective of policymakers in both Sarajevo and Banja Luka, as they have sought to offer incentives to draw foreign investment. This plan of action has attracted companies from around the world including:

- Telekom Srbija (partner of m:tel / Telekom Srpska)
- Hrvatski Telekom (part of Deutsche Telekom Group, partner of JP Hrvatske telekomunikacije d.d. Mostar / Eronet HT)
- United Media Group (partner of Telemach d.o.o. Sarajevo)

To attract foreign firms, the country usually put forward that the national regulations for the industry closely mirror that of the EU, removing regulatory barriers for EU countries that wished to invest, as well as providing cultural similarities. These two aspects makes the country a natural choice for Western investors, and overall a destination for ICT investors.

As mentioned earlier in this Country Profile, the Government has sought to increase the competitiveness of ICT industries. This has included policy measures such as revamping broadband delivery and extending existing networks.<sup>78</sup> Critically, it has also tried to participate in international projects related to digital

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<sup>76</sup> SOC stands for Security Operation Center

<sup>77</sup> Broadband Mapping Systems in Europe and Regional Harmonization Initiatives, ITU (2021), [https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2020/RRF/21-01-15%20Background%20Paper\\_Broadband%20Mapping%20Systems%20in%20Europe%20and%20Regional%20Harmonization%20Initiatives\\_final\\_clean.pdf](https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2020/RRF/21-01-15%20Background%20Paper_Broadband%20Mapping%20Systems%20in%20Europe%20and%20Regional%20Harmonization%20Initiatives_final_clean.pdf).

<sup>78</sup> For more information on this strategy, visit the following link: <http://www.sluzbenilist.ba/page/akt/WBr1TX3CmYY=> (Bosnian).

policy, viewing multinational initiatives as a space for knowledge-sharing activities. In pursuing these various activities, the country sets itself as a burgeoning market whose untapped potential could be maximized by foreign benefactors.

## 2.2. Building Block 2: Adoption

Fully unpacking the use of ICTs by various groups in society can allow for a more informed understanding of the digital divide, as well as offering insight into which policy interventions can guarantee equitable access. This requires a closer look at the myriad of dimensions of digital inclusion, including i) measures designed to increase the affordability of digital services; ii) interventions created to enhance the skills of individuals; and iii) proposals that extend access to ICTs for all in Bosnia and Herzegovina.

### 2.2.1. Affordability

To ensure that connectivity is being inclusive and accessible for all, and thus meaningful, there is a need for such connectivity to be affordable. *Access* and *affordability* are thus together the strongest determinants of another factor of connectivity, *uptake*.

According to the ITU Report on *The Status of Connectivity in 9 Non-EU Countries of Europe Region* (2021), Bosnia and Herzegovina finds itself behind regional standards on an *affordability* standpoint.<sup>79</sup> In 2021, the mobile-data basket cost was around 2.03% of gross national income (GNI) per capita for an allowance of 2 GB, compared to the 0.6% average seen at the European level.<sup>80</sup> Meanwhile, the cost for fixed broadband was almost 2.3% of GNI per capita, while in Europe that figure is at 1.4%.<sup>81</sup> On this point, Bosnia and Herzegovina stands above the 2% GNI per capita monthly mark set by the Broadband Commission as a threshold for affordability, meaning that policymakers should take action to guarantee affordable access for all inhabitants, and therefore get closer to closing the digital divide.

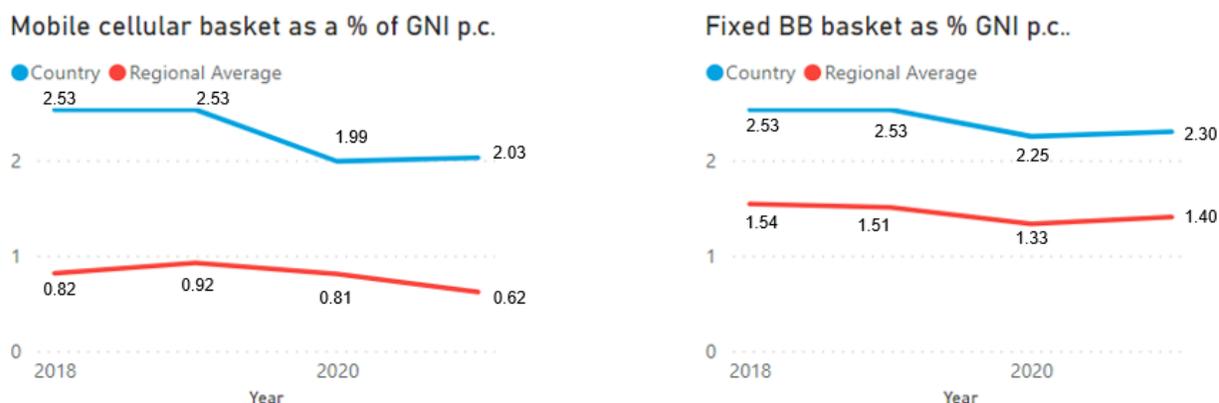
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<sup>79</sup> The Status of Connectivity in 9 Non-EU Countries of Europe Region, ITU (2021), [https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2021/Meaningful%20Connectivity/Report%20-%20The%20Status%20of%20Connectivity%20in%209%20non-EU%20countries%20of%20Europe%20region\\_final\\_clean.pdf](https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2021/Meaningful%20Connectivity/Report%20-%20The%20Status%20of%20Connectivity%20in%209%20non-EU%20countries%20of%20Europe%20region_final_clean.pdf)

<sup>80</sup> ICT Price Baskets (IPB), ITU (2021), <https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/IPB.aspx>.

<sup>81</sup> ICT Price Baskets (IPB), ITU (2021), <https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/IPB.aspx>.

**Figure 6. 2018-2021 evolution of mobile cellular basket and fixed broadband basket as % of GNI per capita**



### 2.2.2. Skills

Many attempts have been made to increase the overall quality of public education in Bosnia and Herzegovina. A number of these efforts have pinpointed the role that ICTs can play in improving learning and education outcomes, acknowledging that it is crucial for students to have the skills needed to compete in the digital economy. However, results have been mixed. For instance, the common core curriculum contains numerous passages which explicitly highlight the need for digital skills and related competencies. A guiding document entitled “Priorities in integrating entrepreneurial and digital competence into education systems in Bosnia and Herzegovina 2019-2030” echoes this point, believing that a tech-centric education would align the country with the European Digital Competence Framework. Yet, ICT and Digital Skills training programme are still in the development phase. In addition, the definition of objectives to be reached with the education digitalization and improvement, and a related actions plan, in particular with regard to the integration of digital and blended learning with the curriculum, is still lacking. This underscored the need for a more coherent and strategic vision.<sup>82</sup> Overall, the education system continues to lack common standards for the different levels of education, as well as for teacher training and performance evaluation.<sup>83</sup> The findings from the ITU-UNICEF Report on ‘*Connectivity in Education: Status and Recent Development in 9 non-EU countries of the Europe Region*’ (2021) show that the disjointed digitization process, as well as its difficult-to-measure targets, will hold the country back as it pursues fully-fledged EU integration.<sup>84</sup> According to ITU’s statistics, basic and advanced digital skills rates in Bosnia and Herzegovina are below European average (see figure 5), with only 36.55% of the population having

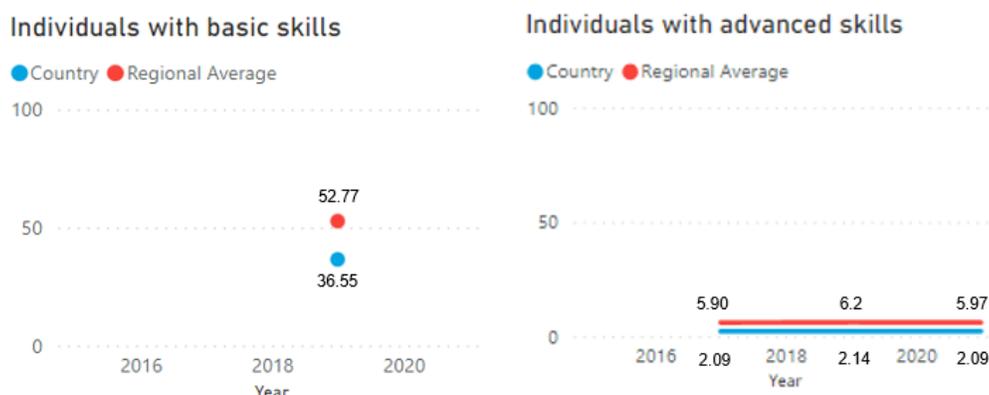
<sup>82</sup> “Reimagine Education” Questionnaire, UN Country Team in Bosnia and Herzegovina (2020)

<sup>83</sup> Bosnia and Herzegovina EU Progress Report, DG NEAR (2022), [https://neighbourhood-enlargement.ec.europa.eu/bosnia-and-herzegovina-report-2022\\_en](https://neighbourhood-enlargement.ec.europa.eu/bosnia-and-herzegovina-report-2022_en)

<sup>84</sup> Connectivity in education: Status and recent developments in nine non-European Union countries, ITU-UNICEF (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-CONN\\_EDUC-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-CONN_EDUC-2021-PDF-E.pdf).

basic digital skills in 2019 versus 52.77% of the population at the European level. Additionally, no statistics are available on standard digital skills, which further demonstrates the data gap the country is facing.<sup>85</sup>

**Figure 7. % of individuals with basic and advanced digital skills in Bosnia and Herzegovina vs. Europe**



The COVID-19 pandemic brought renewed attention to distance learning. Children belonging to minority communities, such as Roma children and children with disabilities, or from rural areas, were the most affected; inter alia, reinforcing existing disparities. Continuity of early childhood education was particularly challenging. While the majority of institutions have issued instructions for online applications, according to a needs assessment conducted by UNICEF and UNESCO, in March 2020, 82 per cent of children who attended pre-school prior to the pandemic had interrupted their education.<sup>86</sup> Despite facing many challenges, some successful “e-learning” programs were also implemented. For instance, government ministries like the entity-level Ministry of Education and Culture in Republika Srpska coordinated televised lessons, while others such as Sarajevo Canton’s Ministry of Education, Science and Youth offered training sessions for local teachers. UNICEF also played an active role in evaluating the educational programs launched during this crisis period, with the goal of leveraging these findings to guide the direction of e-learning in Bosnia and Herzegovina.<sup>87</sup> Looking beyond the pandemic, the transition to e-learning underscored the importance of investing in ICTs, as they have made a difference in improving education delivery. UNDP has recently launched the Economic Governance for Growth Project supported by the Government of Norway to enhance digital skills and entrepreneurship among young people. Among other, support is provided to set up STEM laboratories in elementary schools throughout the country (equipment, TA and mentoring for teachers through a collaborative digital platform).

When it comes to the digital skills of the workforce, a 2020 assessment conducted by UNDP noted how the schooling system is lagging behind industry developments, meaning that the educational offerings

<sup>85</sup> World Telecommunication/ICT Indicators Database 2022 – Retrieved December 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>.

<sup>86</sup> Rapid Situation and Needs Assessment – Education in Bosnia and Herzegovina Phase II, UNICEF Bosnia and Herzegovina and UNESCO Bosnia and Herzegovina (2020), [https://bosniaherzegovina.un.org/sites/default/files/2020-10/UNICEF\\_UNESCO%20RNA%202%20Phase%202020%20final.pdf](https://bosniaherzegovina.un.org/sites/default/files/2020-10/UNICEF_UNESCO%20RNA%202%20Phase%202020%20final.pdf).

<sup>87</sup> “Reimagine Education” Questionnaire, UN Country Team in Bosnia and Herzegovina (2020)

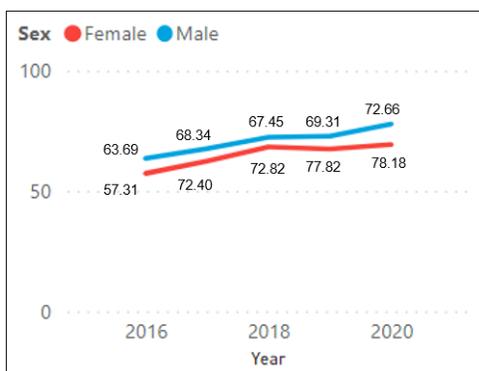
made available by schools are not meeting the needs of industry leaders.<sup>88</sup> As a result, graduates in these fields are not equipped with the skills they need to succeed, disadvantaging them at a time when they are competing with others found across the globe. Companies considering relocating must deal with this reality, as many are faced with the choice of educating new hires or accepting under-prepared applicants. Policymakers should thus pay particular attention to reforming the education curricula to meet the need of the digital economy, but also provide reskilling and upskilling support for the workforce.

### 2.2.3. Inclusion

Guided by the United Nations Sustainable Development Cooperation Framework (UNSDCF) 2021-2025, the UN in Bosnia and Herzegovina is committed to improving digital inclusion for all.<sup>89</sup> Strategic Priority III (People-centered governance and rule of law) is most closely linked with this goal. It emphasizes how digital technologies must be leveraged to improve public performance and support digital governance. It pursues the overarching aim to ensure that all people, including refugee, asylum seekers, women, and other groups of population and minorities, contribute to, and benefit from more accountable and transparent governance systems that deliver quality public services, and ensure rule of law.<sup>90</sup>

#### *Bridging the gender digital divide*

**Figure 8. Percentage of internet users per sex over the period**



According to ITU statistics, in 2021 in Bosnia and Herzegovina, men use the internet slightly more than women with 79.2% and 72.7% respectively.<sup>91</sup> Figure 8. demonstrates that this gendered difference has been widening since 2020. Yet, this gendered difference is relatively limited looking at the 15-24 demographic cohort, with 98.6% of women using the internet, compared to 100% for men<sup>92</sup>. The gender-based difference in computer usage is also present with 69.1% of usage for men compared 62.8% for women according to the latest ITU data (2020)<sup>93</sup>. While the gender divide is not

<sup>88</sup> Software Skills Need Industry Assessment in Bosnia and Herzegovina, UNDP Bosnia and Herzegovina (2020), <https://www.undp.org/bosnia-herzegovina/publications/software-industry-skills-needs-assesment-bosnia-and-herzegovina>

<sup>89</sup> Bosnia and Herzegovina and the United Nations Sustainable Development Cooperation Framework 2021-2025, UN Country Team in Bosnia and Herzegovina (2021), [https://bosniaherzegovina.un.org/sites/default/files/2021-06/Sustainable%20development\\_WEB.pdf](https://bosniaherzegovina.un.org/sites/default/files/2021-06/Sustainable%20development_WEB.pdf).

<sup>90</sup> Bosnia and Herzegovina and the United Nations Sustainable Development Cooperation Framework 2021-2025, UN Country Team in Bosnia and Herzegovina (2021), [https://bosniaherzegovina.un.org/sites/default/files/2021-06/Sustainable%20development\\_WEB.pdf](https://bosniaherzegovina.un.org/sites/default/files/2021-06/Sustainable%20development_WEB.pdf).

<sup>91</sup> World Telecommunication/ICT Indicators Database 2022 – Retrieved June 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>

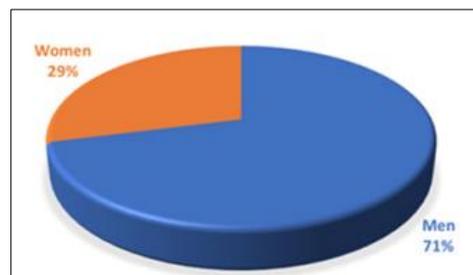
<sup>92</sup> World Telecommunication/ICT Indicators Database 2022 – Retrieved June 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>

<sup>93</sup> World Telecommunication/ICT Indicators Database 2022 – Retrieved June 2022, ITU (2022), <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx>

prominent, these indicators still show that work remains to be done to extend access and ownership to women.

According to a 2021 ITU and UN Women Report on ‘Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries’, in terms of participation in the ICT sector, women do not constitute a sizable portion of the workforce.<sup>94</sup> Statistics indicate that the sector is 71% male and 29% female.<sup>95</sup> While there are many reasons for this lack of representation, it can be explained by differing career preferences and limited individual support.<sup>96</sup> According to the Gender Action Plan (GAP) for Bosnia and Herzegovina, despite

**Figure 9. Employment in ICT companies among men and women**



gender balanced enrolments in the educational process, the advancement opportunities for girls and women remain limited, as does access to positions requiring high qualifications. This is primarily due to existing stereotypes of male/female professions and difficulties to balance professional and family life.<sup>97</sup>

**Figure 10. Average salary between men and women in ICT fields**



Women’s participation in the start-up sector is also relatively low. Only 10% of entrepreneurs in the ICT sector are women. For those that are involved with companies, only 6% of all women are the highest-paid employee at their respective firms.<sup>98</sup> In fact, women are paid about 78% of what their male peers earn in the ICT sector.<sup>99</sup> Additionally, many women in this field suffer from vertical segregation and thus face difficulties to reach the executive level. Overall, it is estimated that just 23.8% of companies across all sectors in Bosnia and

Herzegovina are led by female executives.

<sup>94</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf)

<sup>95</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf).

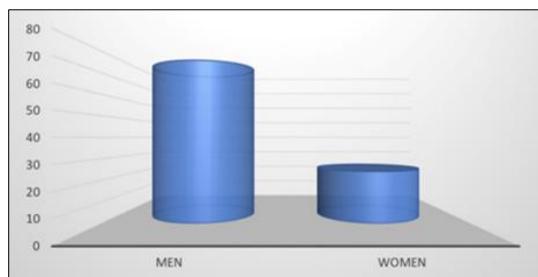
<sup>96</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf).

<sup>97</sup> Moving towards the Gender Equality Index – Bosnia and Herzegovina 2022, UN Women (2022), <https://eca.unwomen.org/sites/default/files/2022-11/EIGE-Eng%20web.pdf>

<sup>98</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf).

<sup>99</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf).

**Figure 11. Percentage of ICT graduates among men and women**



When looking at gender balance in ICT education, female under-representation remains a main issue. As it stands, women are more likely than men to graduate in disciplines including education, social sciences and art, natural sciences, mathematics, statistics and health.<sup>100</sup> Yet, they are overshadowed by men in fields that include engineering, manufacturing, construction and services.<sup>101</sup> Female pupils in primary and secondary school show higher interest in natural sciences than male pupils, while the interest in ICT is almost at the same level. However, when it comes to specific career choices, already at this age male pupils prefer to pursue the occupations of programmer, mechanical engineer, civil engineer or electrical engineer, while the female pupils mostly prefer the occupations of doctor, psychologist or journalist.<sup>102</sup> This gender divides occurring in the choice of academic discipline is greatly due to existing social norms dissuading female students from considering male-dominated studies and professions. In Bosnia and Herzegovina, 33 per cent of girls report that their families would not encourage them to take up university studies in a STEM field.<sup>103</sup> Ensuring that women and girls interested in STEM and ICTs are encouraged to join the sector thus remains a challenge to be addressed in the country.

### Good practices in informal ICT education

Several initiatives are in planning or are underway to address the gender digital divide in Bosnia and Herzegovina. For instance, UNICEF, UN Women and UNDP have joined forces to launch the IT Girls Initiatives in BiH. IT Girls are aiming to in fill the digital gender gap, promote equal opportunities for girls and boys in education and access to technology, and foster gender equality in the marketplace, workplace, and community through provision of high-quality digital skills through formal and non-formal education system, advocating for employment and workplace standards in the area of human resource management, and overall advocacy for equal opportunities, and confidence-building for women and girls. So far IT Girls partnered with 7 Ministries of Education in both entities and the Department of Education of Brčko District in 22 primary and 28 secondary schools. IT Girls empowered more than 2,000 girls and young women with new skills, knowledge, opportunities for networking and mentorship, including around

<sup>100</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf).

<sup>101</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf).

<sup>102</sup> Gender gap in the STEM fields and proposed intervention programmes, UN Women (2020), [https://eca.unwomen.org/sites/default/files/Field%20Office%20ECA/Attachments/Publications/2021/8/Gender%20Gap%20in%20STEM%20BiH\\_ENG-min.pdf](https://eca.unwomen.org/sites/default/files/Field%20Office%20ECA/Attachments/Publications/2021/8/Gender%20Gap%20in%20STEM%20BiH_ENG-min.pdf)

<sup>103</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf).

500 girls who attend IT Girls Clubs in their primary and secondary school, with around 100 teachers trained in programming and electronics.<sup>104</sup>

Finally, Microsoft's DigiGirlz project has been launched to increase awareness of the value of women in ICT fields, ensuring that they are provided with the conditions to succeed.<sup>105</sup>

There are also a few programs running in Bosnia and Herzegovina that target both women and men. For instance, Bit Alliance and its partners organized CoderDojo hosted a series of training camps in 12 cities that provided over 1,100 attendees with critical coding skills.<sup>106</sup> ENABLE BiH is another high-profile effort to introduce primary schoolers to ICT education, with the goal of preparing them for advanced study in tech-adjacent subjects.<sup>107</sup>

### *ICT and Digital Accessibility for Persons with Disabilities*

Bosnia and Herzegovina signed the Convention on the Rights of Persons with Disabilities (UN CRPD) and its Optional Protocol in 2009.<sup>108</sup> The UN CRPD stipulates (Article 9 – Accessibility) that countries should ensure equal access of persons with disabilities to the physical environment, transportation, and ICTs. In May 2017, the CPRD provided its concluding observations of the situation in Bosnia and Herzegovina, based on the State party Report.<sup>109</sup> While noting policy advancements and commitments, mainly with the “Strategy for advancement of rights and status of persons with disabilities in the Federation on Bosnia and Herzegovina (2016-2021)”, it highlighted critical concerns such as and issued the following recommendations, among others, to improve accessibility in the country:

- Adopt a comprehensive accessibility strategy and an action plan with sufficient budget, an efficient monitoring mechanism and benchmarks for the removal of barriers, with enforceable and effective sanctions for non-compliance;
- Promote universal design for all buildings, public services and public transport;
- Provide accessible information and social communication media, with special attention to electronic media;

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<sup>104</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf),

<sup>105</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf).

<sup>106</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf).

<sup>107</sup> Digitally empowered Generation Equality: Women, girls and ICT in the context of COVID-19 in selected Western Balkan and Eastern Partnership countries, ITU and UN Women (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-EQUAL.01-2021-PDF-E.pdf).

<sup>108</sup> For more information on UN conventions ratified by Bosnia and Herzegovina, visit the following link: <https://indicators.ohchr.org/>.

<sup>109</sup> To read the Committee's report, visit the following link: [https://tbinternet.ohchr.org/\\_layouts/15/treatybodyexternal/Download.aspx?symbolno=CRPD%2fCO%2fCO%2f1&Lang=en](https://tbinternet.ohchr.org/_layouts/15/treatybodyexternal/Download.aspx?symbolno=CRPD%2fCO%2fCO%2f1&Lang=en).

- Pay attention to the links between Article 9 of the Convention and Targets 9.1, 11.2 ad 11.7 of the SDGs.<sup>110</sup>

The strategy recommended by the Committee would aim at eliminating information and communication barriers as a means of facilitating the full integration of individuals with disabilities into Bosnian society.<sup>111</sup> It also calls on the authorities to ensure that persons with disabilities can participate in public affairs, noting that increasing familiarity with modern technologies could achieve this overarching goal.<sup>112</sup> The committee drew great attention to the possibility of expanding employment opportunities to individuals with disabilities, many of whom may not be prepared for the digital economy.<sup>113</sup> Much remains to be done for Bosnia and Herzegovina to implement recommendations issued by the Committee.

In 2021/2022, UNICEF started a pilot project targeting 20 education institutions of Sarajevo Canton and Republika Srpska, that aims to equip schools with modern assistive technologies and their teachers with skills and knowledge for the use of such technologies for inclusive education. The project is to be scaled up to one additional administrative unit in 2023. In addition to this, UNICEF produced the first Bosnia and Herzegovina catalogue of AT, with a range of products accompanied by market availability and estimated value per each unit.

ITU is committed to advancing digital accessibility. Accessibility is not only embedded in the ITU's strategic goals and targets, it is also reflected in their core conviction that persons with disabilities should have access to suitable ICTs in all Member State countries by 2023.<sup>114</sup> The ITU Office for Europe actively collaborates with partner organizations to foster enabling environments that seek to create an inclusive digital society within the wider region. The efforts to promote ICT accessibility consist of the following tracks:

- Annual ITU-EC Forum on Accessible Europe: ICT for All<sup>115</sup>;

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<sup>110</sup> Targets include 9.1 (“Develop sustainable, resilient and inclusive infrastructures”), 11.2 (“Affordable and sustainable transport systems”), and 11.7 (“Provide access to safe and inclusive green and public spaces”).

<sup>111</sup> Strategy for advancement of rights and status of persons with disabilities in the Federation of Bosnia and Herzegovina (2016-2021), Government of the Federation of Bosnia and Herzegovina (2016), [https://fbihvlada.gov.ba/file/strategija1/Strategy%20for%20advancement%20of%20rights%20and%20status%20of%20persons%20with%20disabilities%20in%20the%20Federation%20of%20Bosnia%20and%20Herzegovina%20\(2016-2021\)EN-4.pdf](https://fbihvlada.gov.ba/file/strategija1/Strategy%20for%20advancement%20of%20rights%20and%20status%20of%20persons%20with%20disabilities%20in%20the%20Federation%20of%20Bosnia%20and%20Herzegovina%20(2016-2021)EN-4.pdf).

<sup>112</sup> Strategy for advancement of rights and status of persons with disabilities in the Federation of Bosnia and Herzegovina (2016-2021), Government of the Federation of Bosnia and Herzegovina (2016), [https://fbihvlada.gov.ba/file/strategija1/Strategy%20for%20advancement%20of%20rights%20and%20status%20of%20persons%20with%20disabilities%20in%20the%20Federation%20of%20Bosnia%20and%20Herzegovina%20\(2016-2021\)EN-4.pdf](https://fbihvlada.gov.ba/file/strategija1/Strategy%20for%20advancement%20of%20rights%20and%20status%20of%20persons%20with%20disabilities%20in%20the%20Federation%20of%20Bosnia%20and%20Herzegovina%20(2016-2021)EN-4.pdf).

<sup>113</sup> Strategy for advancement of rights and status of persons with disabilities in the Federation of Bosnia and Herzegovina (2016-2021), Government of the Federation of Bosnia and Herzegovina (2016), [https://fbihvlada.gov.ba/file/strategija1/Strategy%20for%20advancement%20of%20rights%20and%20status%20of%20persons%20with%20disabilities%20in%20the%20Federation%20of%20Bosnia%20and%20Herzegovina%20\(2016-2021\)EN-4.pdf](https://fbihvlada.gov.ba/file/strategija1/Strategy%20for%20advancement%20of%20rights%20and%20status%20of%20persons%20with%20disabilities%20in%20the%20Federation%20of%20Bosnia%20and%20Herzegovina%20(2016-2021)EN-4.pdf).

<sup>114</sup> Connect 2030 – An agenda to connect all to a better world, ITU (2020), <https://www.itu.int/en/mediacentre/backgrounders/Pages/connect-2030-agenda.aspx>.

<sup>115</sup> For more information, visit the following link: <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2020/AE21/default.aspx>.

- Regional Competition: Innovative Digital Solutions for Accessible Europe<sup>116</sup>;
- ICT Accessibility Assessment for Europe Region<sup>117</sup>;
- Technical Assessment in Enhancing ICTs Accessibility at a Country Level – Example of Serbia<sup>118</sup>;
- Capacity building in ICT Accessibility.<sup>119</sup>

### **ICTs for Refugees and Asylum-Seekers**

Bridging the digital divide when it comes to this very vulnerable population has primarily been the responsibility of UN agencies and Civil Society Organizations (CSOs) due to the absence of comprehensive strategy from the Government. To this end, initiatives are being carried out under the UNSDCF 2021-2025 that put special emphasis on increasing the inclusion of refugees and asylum seekers.

The pandemic has exacerbated already existing inequalities when it comes to access to digital technologies, robust broadband and availability of digital resources. This has considerably affected children on the move in Bosnia and Herzegovina, who were very limited in terms of access to online education and digital content. In order to bridge the digital divide for populations affected by displacement, UN agencies provided support through programmes such as the Akelius Digital Language Learning course, aiming to provide refugee, migrant and asylum-seeking children with language learning opportunities, but also with necessary equipment in order to access other content. The Akelius Digital Language course is currently being implemented in two reception centres and 9 primary schools in three cantons through formal and non-formal activities. UN agencies are also providing support to refugee and asylum-seeking children from Ukraine, focusing on providing the children and one local primary school with necessary ICT equipment in order to ensure access to different distance learning platforms, including All-Ukrainian online school, Google classroom, several distance learning platforms and the Akelius Digital Language course, allowing them to follow the Ukrainian curricula. UNICEF has engaged learning support officers to provide support and monitor the children during their learning.

### **2.3. Building Block 3: Value Creation**

One of the most important triggers of the digital transformation at the national level is the government's approach to ICTs for governance, administrative purposes, and the delivery of public services online.

This section will look at i) the approach to e-government in Bosnia and Herzegovina; ii) the administration of digital services; iii) the management of digital content and data; iv) the policies which have spurred

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<sup>116</sup> For more information, visit the following link: <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2020/AE21/Regional-Competition.aspx>.

<sup>117</sup> For more information, visit the following link: [https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2020/AE20/event/D-PHCB-ICT\\_ACCESS\\_EUR.01-2021-PDF-E.pdf](https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2020/AE20/event/D-PHCB-ICT_ACCESS_EUR.01-2021-PDF-E.pdf).

<sup>118</sup> For more information, visit the following link: <https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Pages/Events/2021/SNS/Default.aspx>.

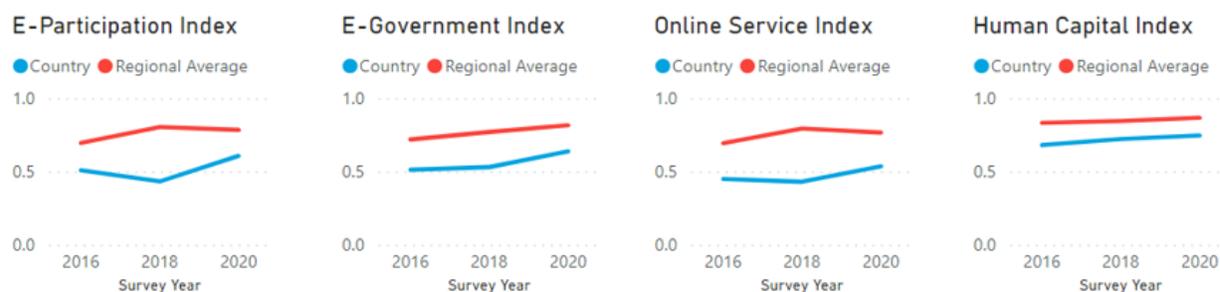
<sup>119</sup> For more information, visit the following link: <https://www.itu.int/en/ITU-D/Digital-Inclusion/Persons-with-Disabilities/Pages/ResourcesOnICTAccessibility.aspx>.

innovation and entrepreneurship; and v) the efforts which have been pursued to create an environment that spurs innovation.

### 2.3.1. Whole-of-Government

E-government remains a work in progress for Bosnia and Herzegovina. According to the UN’s 2020 edition of the *E-Government Survey*, the country possesses a mid-tier score on the E-Government Development Index (EGDI).<sup>120</sup> It is also grouped into the middle level of the Online Service Index (OSI), which is a tool used to examine the scope and quality of digitalized services. Finally, it received high marks in the Telecommunication Infrastructure Index (TII) and the Human Capital Index (HCI).<sup>121</sup> In sum, the country is benefitting from its efforts to modernize its infrastructure, but it has a long journey to reach the level of the Europe region average. Similar to the EGDI, the 2020 e-Participation Index ranks the country lower than the region average. Nevertheless, the country is assessed as a country with high e-participation level, that revolves around the use of ICT to engage people in public decision-making, administration and service delivery positions.<sup>122</sup> With more support from the government, citizens could also have easier access to e-governance processes and services as well as be more efficiently integrated in the ICT and tech sectors. Figure 12 below provides an overview of Bosnia and Herzegovina’s scores across these indexes in comparison to the European average over the period 2016-2020.

**Figure 12. Bosnia and Herzegovina vs. Europe E-Government Development index scores for the period 2016-2020<sup>123</sup>**



<sup>120</sup> The EGDI is a metric that assesses characteristics like digital infrastructure, ICT access, and social inclusion in attempt to grade the performance of national e-government systems. For more information, visit the following link: <https://publicadministration.un.org/egovkb/en-us/About/Overview/-E-Government-Development-Index>.

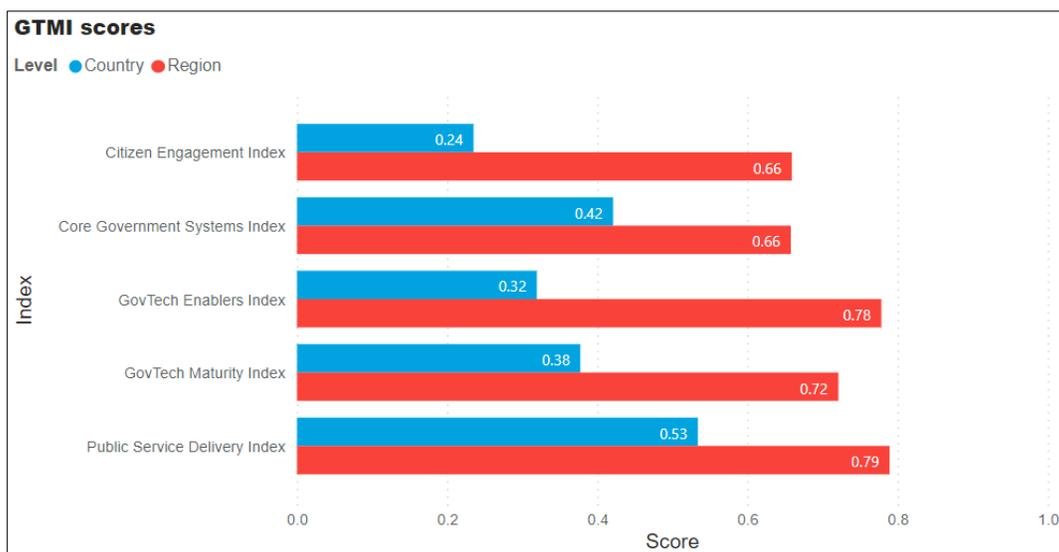
<sup>121</sup> The TII revolves around the developmental status of telecommunications infrastructure in each country, whereas the HCI is concerned with the quality of human capital and its effect on the national workforce.

<sup>122</sup> 2020 UN E-GOVERNMENT SURVEY, p.280-281, retrieved from <https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2020>

<sup>123</sup> The EGDI is a metric that assesses characteristics like digital infrastructure, ICT access, and social inclusion in attempt to grade the performance of national e-government systems. For more information, visit the following link: <https://publicadministration.un.org/egovkb/en-us/About/Overview/-E-Government-Development-Index>.

Figure 13 provides an overview of Bosnia and Herzegovina’s GovTech Maturity Index (GMTI) scores in comparison to Europe.<sup>124</sup> The country is classified as ‘medium’ on this index, being the second to last group of the classification. Bosnia and Herzegovina is also below European average on all indexes.

**Figure 13. Bosnia and Herzegovina vs. Europe GovTech Maturity Index scores<sup>125</sup>**



There are strategies in place which reveal how policymakers aim to pursue digitalization efforts. The Policy for Development of Information Society for 2017-2021 makes note of how ICTs can improve services used in daily life. Moreover, the Strategic Framework for Public Administration Reform for 2018-2022 outlines how service delivery will be improved to match European standards, many of which emphasize the value of digital solutions.<sup>126</sup> The Foreign Policy Strategy for 2018-2023 also draws attention to how ICTs can be implemented to address “key challenges” facing this multi-ethnic society.<sup>127</sup> Taken together, these plans show how the government seeks to integrate these technologies at all levels.

The main ministries that are directly linked with e-services policy include the following groups:

- Ministry of Civil Affairs (BiH);
- Ministry of Communications and Transport (BiH);
- Federal Ministry of Interior (FBiH);
- Federal Ministry of Traffic and Communication (FBiH);

<sup>124</sup> GovTech Maturity Index (GTMI), The World Bank; <https://www.worldbank.org/en/programs/govtech/gtmi>

<sup>125</sup> GovTech Maturity Index (GTMI), The World Bank; <https://www.worldbank.org/en/programs/govtech/gtmi>

<sup>126</sup> Bosnia and Herzegovina: Report on the preparation of post-2020 strategy, Regional Cooperation Council (2019), <https://www.rcc.int/download/docs/BiH-report-Post-2020-Strategy.pdf/9162326626436839b9796ba573476fcb.pdf>.

<sup>127</sup> Bosnia and Herzegovina: Report on the preparation of post-2020 strategy, Regional Cooperation Council (2019), <https://www.rcc.int/download/docs/BiH-report-Post-2020-Strategy.pdf/9162326626436839b9796ba573476fcb.pdf>.

- Ministry for Internal Affairs (RS);
- Minister for Administration and Local Government (RS);
- Ministry of Scientific and Technological Development, Higher Education and Information Society (RS).

The ITU can support countries as they seek to roll out e-government services with the GovStack initiative.<sup>128</sup> This multi-stakeholder initiative is led by ITU, the Government of Estonia, the Government of Germany, and the Digital Impact Alliance (DIAL). It aims to accelerate countries' ownership of e-government solutions and, in doing so, improve services for social wellbeing.<sup>129</sup> For Bosnia and Herzegovina, there is an opportunity to work alongside GovStack to learn the best practices from the leading countries in the field of government digital transformation. This would also elevate the country's digital agenda, allowing for the roll-out cost-effective digital public services.<sup>130</sup> ITU and UNDP are coordinating on identifying ways to join the effort in supporting the digitalization of governmental services and sharing the expertise of the GovStack Initiative to build the capacity and empower all the relevant stakeholders.

Digital skills of public servants are an important aspect of digital transformation, ensuring public sector's capacities and capabilities to fully adopt and implement new ways of working. UNDP has created a Community of Practice for digital transformation in the public sector in Bosnia and Herzegovina<sup>128</sup> as a platform for knowledge sharing and cooperation among public sector employees, and designed a Digital Transformation Academy, in cooperation with Civil Service Agencies in Bosnia and Herzegovina, as a tailor-made training programme.

### 2.3.2. Digital Services

Digital services, should it be e-public services or the digitalization of economic sectors, are fundamental enablers of digital transformation. E-learning, for instance, can expand the horizons of students and expand the pool of qualified human resources. Other areas, such as e-agriculture can have a strong impact on the economic development of the country and e-health can significantly improve citizens wellbeing and quality of life. In case of Bosnia and Herzegovina, officials are exploring ways to leverage technologies for service public delivery. Implementing policy changes and taking the right approach towards service development and delivery could speed up country's digital transformation.

E-services, by and large, are underdeveloped at both the national and entity levels. For instance, numerous countries within the Western Balkans have a national digital government strategy (NDGS).

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<sup>128</sup> For a complete rundown of GovStack's services to government clients, visit the following link: <https://www.govstack.global/our-solution/>.

<sup>129</sup> For more information about GovStack, visit the following link: <https://www.govstack.global/>.

<sup>130</sup> Scalable e-Government Solutions for Developing Countries via the GovStack initiative, GovStack (2021), [https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2021/Scalable%20e-government%20solutions%20for%20developing%20countries/GovStack\\_General%20Info\\_v20210705\\_ET4C.pdf](https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2021/Scalable%20e-government%20solutions%20for%20developing%20countries/GovStack_General%20Info_v20210705_ET4C.pdf).

Bosnia and Herzegovina does not have a NDGS owing to its complex political system.<sup>131</sup> Furthermore, the country lacks a list delineating service offered by the government that can be accessed by citizens through an online portal.<sup>132</sup> The lack of clarity on this issue underlines complexity of further actions to be made in the domain of digitization and digitalization.

Electronic signature, one of the core elements streamlining the digital services development, is regulated in the country by the Law on Electronic Signature of BiH published in the Official Gazette 91/06 of 2006. Any individual or legal entities can obtain an electronic signature and have a trusted tool for interacting with other stakeholders. This is because all personal data of users are processed in accordance with the EU General Data Protection Regulation (GDPR).<sup>133</sup> USAID is also working alongside domestic policymakers to digitize service delivery.<sup>134</sup> USAID has launched a project in 2020 to promote the use of e-signatures, as well as promoting measures that improve the efficiency of administration. This ongoing project includes supporting local authorities to adopt a country-wide e-signature service. It also seeks to improve ICT procurement protocols within four pilot countries of FBiH through establishing a centralized application. In July 2018, following the recommendations and guidelines of the European Interoperability Framework 2.0, Bosnia and Herzegovina adopted an interoperability framework that intended to facilitate exchange of electronic documents and electronic services between authorities at the same government level, government bodies of different levels, and with EU institutions and governments of other countries. The adoption of this framework created prerequisites for development and provision of e-services aimed at meeting the needs of citizens, businesses, local authorities, etc.<sup>135</sup>

A shortage and lack of qualitative online services from statistical agencies is also noted. There is a need to build and develop a digital data portal which can be easily accessible and integrated across BHAS, FIS, RIS and the EU, providing a common framework which enables comparison of the administrative data at all levels as well as data storage, analysis and visualization of data trends. Having such a data portal following the guidelines of EUROSTAT would also be important in view of the EU accession journey.

A few programs designed to support the growth of e-services have been launched in Bosnia and Herzegovina. In February 2020, an initiative To support the digitalization of governmental services.<sup>136</sup> This initiative grew into a fully-fledged project focused on digital transformation in the public sector.<sup>137</sup> This which is working with all the key institutional partners and providing support in promoting new capabilities and leveraging technology and innovation for more effective and inclusive governance and

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<sup>131</sup> Government at a Glance: Western Balkans, OECD (2020), <https://www.oecd.org/gov/government-at-a-glance-western-balkans-a8c72f1b-en.htm>.

<sup>132</sup> Government at a Glance Western Balkans 2020 – Bosnia and Herzegovina Country Fact Sheet, OECD (2020), <https://www.oecd.org/gov/government-at-a-glance-bosnia-and-herzegovina.pdf>.

<sup>133</sup> <https://unija.com/sl/bosnia-and-herzegovina-electronic-signature/>

<sup>134</sup> Fact Sheet: E-Governance in Bosnia and Herzegovina, USAID (2020), <https://www.usaid.gov/bosnia-and-herzegovina/fact-sheet/fact-sheet-e-governance-bosnia-and-herzegovina>

<sup>135</sup> <http://www.sluzbenilist.ba/page/akt/yTFWjYpK0o=>

<sup>136</sup> For more information on this effort, visit the following link: <https://www.undp.org/bosnia-herzegovina/blog/digital-transformation-public-sector-bosnia-and-herzegovina>.

<sup>137</sup> For more information about the project, visit the following link: [https://www.undp.org/bosnia-herzegovina/projects/digital-transformation-public-sector-bih\\_](https://www.undp.org/bosnia-herzegovina/projects/digital-transformation-public-sector-bih_)

public sector delivery. The project is currently developing a Blueprint for e-service portals in Bosnia and Herzegovina, intended as both a methodology and open source solution and structured baseline for provision of e-services by the public sector, with key building blocks developed, key registers digitalized and key integrations defined. This concept is currently being piloted in Canton Sarajevo and Municipality Center Sarajevo, with several fully transactional e-services planned for delivery.

For companies looking to digitalize, knowing where to start begins with knowing where they are today. UNDP DigitalBIZ project developed the "Digital Pulse" – a digital self-assessment tool that comprehensively analyses the company's digitalization aptitude in six business areas. It has an automated data-driven advisory feature, since the way it assesses the company and formulates recommendations depends entirely on the users' answers. Data gathered provides valuable insights to the UNDP and its institutional partners on the businesses' digital skills gaps and needs. To this moment, some 700 companies performed almost 2000 digital maturity self-assessments.<sup>138</sup> The average maturity level over six areas of business (digital communication and sale, digital customers' and partners' management and relations, human resources and their digital skills, cybersecurity awareness and practices, use of digital tools in business decision-making, and use of digital technologies in manufacturing and service provisioning) is around 30%. The Digital Pulse results indicate the growing need to provide tailored advisory support for digital transformation. Two key areas with the significant improvement potential are related to usage of digital technologies in manufacturing and services and cyber security. From the value-creation stand point, the pre- and after-sale services are inadequately used, and can be further digitalized in order to offer less expensive and more effective ways of revenue generation for companies. This is particularly important for smaller companies, which lack labour force.

UNICEF and USAID are finalizing the implementation of a programme fostering digital and innovative solutions for public sector infrastructures' coordination and social service delivery which targeted 10 locations. It piloted and established Integrated Case Management (ICM) mechanisms between Public Employment Services (PES) and the Association of Social Workers (ASW) to reach out and serve the most vulnerable population, those at risk of social exclusion and most distant from the labour market with all available resources from employment activation and social assistance policies.

### **ICTs in Education**

According to ITU-UNICEF 2021 Report on "*Connectivity in Education: Status and recent developments in 9 non-EU countries of Europe region*", on a data management standpoint, there is no comprehensive system that contains information gathered from schools at the entity and national level.<sup>139</sup> Statistical gaps have long been cited as a major impediment to evidence-based decision making related to local schools. Even though there is a legal framework for data collection, gathered information remains relatively patchy. To counter this issue, ITU and UNICEF are coordinating efforts. ITU is currently supporting the CRA on

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<sup>138</sup> For more information about the project, visit the following link: <https://www.undp.org/bosnia-herzegovina/news/support-digitalization-micro-small-and-medium-enterprises-bih-project-digitalbiz-presented-free-online-tool-digital-pulse>.

<sup>139</sup> Connectivity in education: Status and recent developments in nine non-European Union countries, ITU-UNICEF (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-CONN\\_EDUC-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-CONN_EDUC-2021-PDF-E.pdf).

enabling the implementation of a national broadband mapping system, while UNICEF provided support to the CRA on mapping ICT devices in all primary, secondary, central and satellite schools nationally. In December 2022, UNICEF and the CRA signed a MoU, with which the mapping data was transferred to the CRA. Following the mapping exercise, an interactive dashboard was also developed, allowing data presentation per administrative unit. As such, the data and the dashboard installations have been transferred to all 12 Ministries of Education (MoEs). Some MoEs, such as the Ministry in Tuzla Canton, published the dashboard on their official website<sup>140</sup>, thus allowing public presentation of schools' resources and investment needs.

The Mapping revealed that 583 (more than 25%) of BiH schools have no Internet connection at all. Out of which, 579 are satellite schools which are mostly located in the outskirts of bigger centers or in the rural areas. This is a glaring example of the significant differences that are observed in the availability of ICT resources between urban and rural areas. For schools that do have internet connection, only 13% meet the minimum standard. Strikingly, the average student per computer ratio in BiH is of 19,9, whilst in the OECD countries, it is of 1,2. As outline in figure 14 below, in terms of availability of PCs in the country, primary and secondary institutions lack 344,690 PCS to reach the OECD average of 0,83 PC per student. The cost for filling these gaps could be estimated to be over USD 247 million. without counting maintenance cost and staff upskilling.

Public–private partnerships (PPP) is a promising modality for continuous investment in better connectivity and device provision as well as in bridging digital learning gap. It allows to tap into international organizations, civil society organizations and international financial institutions.<sup>141</sup> UNICEF is commissioning PPP feasibility studies for ICT infrastructure investments in 7 administrative units of BiH.

As mentioned in previous sections, the COVID-19 pandemic brought recent attention to the state of e-learning programs in Bosnia and Herzegovina. Many teachers were forced to “digitize” their practices during the initial months of the crisis, taking advantage of app creations and web portals to simulate elements of the classroom experience. International actors also leaped into action. For instance, UNICEF launched a program in May 2020 that connected educators with experts in e-learning, creating a system by which they could learn from specialists in ed-tech. The organization also extended internet access to nearly 2,000 children in Republika Srpska as a means of ensuring learning continuity. Finally, donation drives were sponsored by the organization to provide laptops and tablets to those most in need. This immediate education response to COVID-19, led to a broader effort on providing support to the digitalization of education, which includes both access and quality of digital learning. As part of the COVID-19 response, UNICEF, UNESCO, ILO and UN Volunteer implemented the programme ‘Reimagining education in BiH’ which was directed towards evidence generation about digital teaching, developing state-level ICT in Education standards, or organizing professional development programmes for teachers, among others.

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<sup>140</sup> Visit the website at: <https://mapiranjeikt.montk.gov.ba/>

<sup>141</sup> Connectivity in education: Status and recent developments in nine non-European Union countries, ITU-UNICEF (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/phcb/D-PHCB-CONN\\_EDUC-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/phcb/D-PHCB-CONN_EDUC-2021-PDF-E.pdf).

## Digital Agriculture

Agriculture accounts for nearly 8% of Bosnia and Herzegovina's GDP.<sup>142</sup> According to the latest ILO Labour Force Survey (2021) for BiH, agriculture accounts for 9.4% of the workforce.<sup>143</sup> Yet, issues such as inefficient management of farming properties, structural issues and inadequate policies undermine the sector. These challenges have forced the country to go as far as importing products like grains and tobacco, as for the latter, all production was lost.<sup>144</sup> Innovative e-solutions may help kickstart domestic production in the Balkan country.

There is currently no state Ministry for Agriculture. Even so, Institutions like the Ministry of Foreign Trade and Economic Relations (MOFTER) holds a coordinating role for agriculture, synchronizing with agencies like the Plant Health Protection Administration (PHPA) and the Food Safety Agency (FSA).<sup>145</sup> Collaboration between these stakeholders will be crucial for digitalizing the production of food.<sup>146</sup>

There have been attempts to modernize laws in a diversity of fields, including agriculture, motivated by the country's desire to gain admission into the European Union. A notable example of how BiH seeks to revamp its agricultural practices to take advantage of ICT can be seen in its Strategic Plan for Rural Development 2018-2021.<sup>147</sup> It includes specific provisions related to ICT integration: 6.3.1 calls for creating information exchange programs to help interested rural farmers, while 6.9 articulates the need for data support services to manage domestic agricultural information.<sup>148</sup> While these processes have had some success, friction between the state and its entities remains to be a significant impediment.

Issues with legislation aside, the sector for agriculture has made changes to its practices to meet the standards of its EU partners. For example, as part of its Stabilization and Association Agreement with the European Union, the country is expected to harmonize its systems for the collection of data related to agricultural practices. This obligation also includes participation in the Farm Accountancy Data Network (FADN), a digital resource which monitors the overall productivity of industrial farmers within the socio-

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<sup>142</sup> Bosnia and Herzegovina – Country Commercial Guide, International Trade Administration (2021),

<https://www.trade.gov/country-commercial-guides/bosnia-and-herzegovina-agriculture#:~:text=Domestically%2C%20the%20sectors%20with%20the,20%20percent%20of%20total%20employment>.

<sup>143</sup> Labour Force Survey 2021, Bosnia and Herzegovina, ILO (2021), <https://www.ilo.org/surveyLib/index.php/catalog/6429>

<sup>144</sup> Bosnia and Herzegovina – Country Commercial Guide, International Trade Administration (2021),

<https://www.trade.gov/country-commercial-guides/bosnia-and-herzegovina-agriculture#:~:text=Domestically%2C%20the%20sectors%20with%20the,20%20percent%20of%20total%20employment>.

<sup>145</sup> Food and Agricultural Import Regulations and Standards Country Report – Bosnia and Herzegovina, United States Department of Agriculture (2021),

[https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Food%20and%20Agricultural%20Import%20Regulations%20and%20Standards%20Country%20Report\\_Sarajevo\\_Bosnia%20and%20Herzegovina\\_06-30-2021.pdf](https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Food%20and%20Agricultural%20Import%20Regulations%20and%20Standards%20Country%20Report_Sarajevo_Bosnia%20and%20Herzegovina_06-30-2021.pdf).

<sup>146</sup> The organizations are tasked with upholding agricultural-related laws which include the following: the Food Law (BiH Official Gazette #50/04), the Law on Agriculture, Food and Rural Development (BiH Official Gazette #50/08), and the Law on Genetically Modified Organisms (BiH Official Gazette #23/09).

<sup>147</sup> Strategic Plan for Rural Development of Bosnia and Herzegovina 2018-2021, Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina (2018),

[http://www.mvteo.gov.ba/data/Home/Dokumenti/Poljoprivreda/Strategic\\_Plan\\_for\\_Rural\\_Development\\_of\\_BiH\\_Eng.pdf](http://www.mvteo.gov.ba/data/Home/Dokumenti/Poljoprivreda/Strategic_Plan_for_Rural_Development_of_BiH_Eng.pdf).

<sup>148</sup> Status of Digital Agriculture in 18 countries of Europe and Central Asia, ITU and FAO (2020),

<https://www.fao.org/3/ca9578en/CA9578EN.pdf>.

economic union.<sup>149</sup> Targeted reforms such as these are required for the Balkan country to take advantage of EU assistance, as the country is unable to benefit from the bloc's Instrument for Pre-accession Assistance in Rural Development (IPARD).<sup>150</sup> Given these challenges, it appears that progress towards digitizing the sector for agriculture remains a long-term goal.

FAO has played a significant role in shaping the overall vision of e-agriculture policy. FAO emphasized the pressing need for capacity-building initiatives, digital skill-building programmes, and peer-to-peer learning among all relevant stakeholders involved with the agricultural sector.<sup>151</sup> The FAO also called on the European Union and regional actors to support knowledge exchange between domestic farms, agribusiness leaders, and other major players. Although the pandemic complicated these plans, progress is being made on scaling up digital agriculture. UNDP is providing support through a series of initiatives implemented within the framework of EU programming under the Instrument for Pre-Accession Assistance (IPA). The European Union Support to Agriculture Competitiveness and Rural Development in Bosnia and Herzegovina (EU4AGRI) Project (2020-2024)<sup>152</sup>, implemented with the EU and the Czech Development Agency (CzDA) under IPA, seeks to raise investment in the agri-food sector, increase knowledge and skills needed for the agriculture sector with the aim to upskills and retain the workforce and create jobs, and reinforce the policy environment and regulatory frameworks, including through institutional capacity building. The 'EU4Business' project (2018-2022), rolled-out with the ILO and GIZ and with the financial support of the EU and BMZ, aimed to contribute to the country's economic growth and job creation through support for competitiveness and innovation in export-oriented sectors, as well as in agriculture, food production, tourism and rural development. This project was extended under the 'EU4BusinessRecovery' project (2021-2023)<sup>153</sup>, which particularly focused on reducing the impact of the COVID-19 pandemic on targeted sectors.

## **Digital Health**

Finally, when looking at the state of healthcare in Bosnia and Herzegovina, there are a few areas where the use of technology could improve the experiences of individuals. According to a 2019 report, most of the funding for these services goes towards inpatient hospital treatment.<sup>154</sup> Statistics show that around 3.7% of this budget is dedicated to the administration and management of health systems in the Balkan country. This is a significant jump from 2018 numbers, as the estimate was approximately 3% of the larger

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<sup>149</sup> For more information on this digital tool, visit the European Commission's website at the following link:

[https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/farms-farming-and-innovation/structures-and-economics/economics/fadn\\_en](https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/farms-farming-and-innovation/structures-and-economics/economics/fadn_en).

<sup>150</sup> For more information, visit the Delegation of the European Union to Bosnia and Herzegovina and the European Union Special Representative in Bosnia Herzegovina's website at the following link: [https://europa.ba/?page\\_id=616](https://europa.ba/?page_id=616).

<sup>151</sup> For more information on the report's findings, visit the following link: <https://bosniaherzegovina.un.org/en/160231-bosnia-and-herzegovina-prepares-digital-transformation-agriculture-support-fao>.

<sup>152</sup> For more information, visit this webpage: <https://eu4agri.ba/en/about-eu4agri-project/>

<sup>153</sup> For more information, visit this webpage: <https://www.eu4business.ba/en/o-eu4business-recovery-wp>

<sup>154</sup> Voluntary Review – Implementation of Agenda 2030 and the Sustainable Development Goals in Bosnia and Herzegovina, United Nations (2019), [https://sustainabledevelopment.un.org/content/documents/23345VNR\\_BiH\\_ENG\\_Final.pdf](https://sustainabledevelopment.un.org/content/documents/23345VNR_BiH_ENG_Final.pdf).

budget. The authors of this analysis charge that policymakers should develop solutions to cut the costs for this type of care. Embracing technology could be one means of increasing the efficiency of these systems, as well as improving outcomes for those in need of these services. While the information on how the country seeks to promote e-health is missing, it can be argued that taking advantage of innovations in the market could transform the sector.

### ***Circularity of Materials: E-waste-Management***

The country has taken concrete steps to ensure that electronic wastes were properly managed and recycled, through the adoption of international statutes. Bosnia and Herzegovina integrated the Basel Convention in 2001<sup>155</sup>, and the Stockholm Convention became national law in 2010.<sup>156</sup> The country also adopted the Rotterdam Convention in 2007.<sup>157</sup> According to the European Environment Agency<sup>158</sup>, the current country's legal framework for dealing with various types of waste products includes the following three policies:

- Law on Waste Management in the FBiH (Official Gazette FBiH #33/03 and 72/09);
- Law on Waste Management in the RS (Official Gazette RS #113/113 and 106/15);
- Law on Waste Management in the BD (Official Gazette BD #72/09, 25/04, 1/05, 19/07, 2/08 and 9/09).<sup>159</sup>

In addition, as waste from electrical and electronic equipment (WEEE) is categorized as special category of waste, it is subject of all legal acts that regulate the waste flow.<sup>160</sup>

This trio of laws is informed by policies implemented in the European Union and are completed by rulebooks providing information on how to handle waste streams and e-waste management systems.<sup>161</sup> RS is currently in the process of updating its rulebook on WEEE. Laws covering specific waste streams and the management and roll-out of extended producer responsibility (EPR) are still missing. In addition, all three entities have established a strategy addressing waste management, including e-waste, aiming to align with EU Directives and address the establishment of waste management systems. The main documents are:

- environmental protection strategy of FBiH for the period 2008-2018;

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<sup>155</sup> For a list of countries party to the Basel Convention, visit the following link: <http://www.basel.int/?tabid=4499>.

<sup>156</sup> For a list of countries party to the Stockholm Convention, visit the following link: <http://www.pops.int/Countries/StatusofRatifications/PartiesandSignatoires/tabid/4500/Default.aspx>.

<sup>157</sup> For a list of countries party to the Rotterdam Convention, visit the following link: <http://www.pic.int/Countries/Statusofratification/PartiesandSignatories/tabid/1072/language/en-US/Default.aspx>.

<sup>158</sup> Municipal Waste Management in Western Balkans Countries, Country Fact Sheet: Bosnia and Herzegovina, European Environment Agency (2021),

file:///C:/Users/sarah/Downloads/Bosnia%20and%20Herzegovina%20Country%20Fact%20Sheet.pdf

<sup>159</sup> The abbreviation "BD" refers to the Brčko District of Bosnia and Herzegovina.

<sup>160</sup> An example of law can be found at:

Uredba20o20proizvodima20koji20poslije20upotrebe20postaju20posebne20kategorije20otpada20i20kriterijima20 za20obraC48Dun20i20naC48Din20plaC487anja20naknada.pdf (dws.ba)

<sup>161</sup> The rulebooks can be found at: 87 / 12, 107/14, 8/16, 79/16 i 12/18

- waste management strategy of FBiH and federal waste management plan 2012-2017 of FBiH;
- solid waste management strategy 2017-2026 in RS;
- environmental protection strategy for the period 2016-2026 in BD

By the end of the implementation cycle of FBiH Strategies, none of the targets were reached. Such goals included the establishment of a separate waste collection system in most FBiH municipalities, an operation waste management regional centers in all regions, or to increase the WEEE recycled or recovered rate to reach 70%. The FBiH is adopting a new strategy for the next 10 years, the “Environment Protection Strategy FBiH 2022-2032”<sup>162</sup> following up on the waste management strategy that concluded in 2017. Besides, according to the FBiH Law on Waste Management, the 10 cantons across FBiH are legally obliged to develop their own strategies on waste management, though this obligation is not followed by all.<sup>163</sup>

Some targets defined in the RS strategy include having 100% of the population covered by organized collection of municipal waste; reaching 23% of municipal waste separately collected and recycled; or having a maximum of 77% of municipal waste landfilled. These targets and those found in other strategies are planned to be influenced by the Environmental Strategy of Republika Srpska (ESAP) for the period 2022-2032, adopted in November 2022.<sup>164</sup>

In addition, an Information Waste Management System (WMS) became operational in FBiH in January 2021<sup>165</sup> and oblige all bodies dealing with waste to register and report data to the system. This also allows for public access to the data. As for the RS, this system aims to be finalized current 2023 with the support of UNDP, under the URBANLED and CBIT projects.

While all three entities have made substantive efforts to address electronic waste, the disparity between the different approaches and the lack of coordination among the different entities remains a challenge to correctly address the topic, and a country-wide strategy addressing waste management would be beneficial.<sup>166</sup>

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<sup>162</sup> FBiH Environment Protection Strategy 2022-2032, [https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwi36omCss39AhUYg\\_OHHUroA-AQFnoECC4QAQ&url=http%3A%2F%2Fwww.kfbih.com%2Fudoc%2FFederalna%2520strategija%2520zastite%2520okolisa%25202022-2032.pdf&usg=AOvVaw34D3NlboJAO5rSVIPEqjJO](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwi36omCss39AhUYg_OHHUroA-AQFnoECC4QAQ&url=http%3A%2F%2Fwww.kfbih.com%2Fudoc%2FFederalna%2520strategija%2520zastite%2520okolisa%25202022-2032.pdf&usg=AOvVaw34D3NlboJAO5rSVIPEqjJO)

<sup>163</sup> Municipal Waste Management in Western Balkans Countries, Country Fact Sheet: Bosnia and Herzegovina, European Environment Agency (2021), <file:///C:/Users/sarah/Downloads/Bosnia%20and%20Herzegovina%20Country%20Fact%20Sheet.pdf>

<sup>164</sup> The ESAP can be found at the following link: [https://komorars.ba/wp-content/uploads/2022/06/%D0%9D%D0%B0%D1%86%D1%80%D1%82\\_%D0%A1%D1%82%D1%80%D0%B0%D1%82%D0%B5%D0%B3%D0%B8%D1%98%D0%B0-%D0%B6%D0%B8%D0%B2%D0%BE%D1%82%D0%BD%D0%B5-%D1%81%D1%80%D0%B5%D0%B4%D0%B8%D0%BD%D0%B5\\_%D1%84%D0%B8%D0%BD%D0%B0%D0%BB-%D1%80%D0%B0%D0%B4%D0%BD%D0%B5-%D0%B2%D0%B5%D1%80%D0%B7%D0%B8%D1%98%D0%B5\\_%D0%A0%D0%A1-16.06.\\_compressed-4.pdf](https://komorars.ba/wp-content/uploads/2022/06/%D0%9D%D0%B0%D1%86%D1%80%D1%82_%D0%A1%D1%82%D1%80%D0%B0%D1%82%D0%B5%D0%B3%D0%B8%D1%98%D0%B0-%D0%B6%D0%B8%D0%B2%D0%BE%D1%82%D0%BD%D0%B5-%D1%81%D1%80%D0%B5%D0%B4%D0%B8%D0%BD%D0%B5_%D1%84%D0%B8%D0%BD%D0%B0%D0%BB-%D1%80%D0%B0%D0%B4%D0%BD%D0%B5-%D0%B2%D0%B5%D1%80%D0%B7%D0%B8%D1%98%D0%B5_%D0%A0%D0%A1-16.06._compressed-4.pdf)

<sup>165</sup> The FBiH WMS can be found at: <https://www.otpadfbih.ba/login>

<sup>166</sup> Municipal Waste Management in Western Balkans Countries, Country Fact Sheet: Bosnia and Herzegovina, European Environment Agency (2021), <file:///C:/Users/sarah/Downloads/Bosnia%20and%20Herzegovina%20Country%20Fact%20Sheet.pdf>

ITU, UNEP and UNITAR are currently implementing the *E-Waste Monitor for the Western Balkans*, in close cooperation with the Agency for Statistics of Bosnia and Herzegovina and the Federal Ministry of Environment and Tourism. This multi-stakeholder initiative seeks to train on how to make and collect e-waste statistics, assess e-waste statistics, e-waste management practice, and e-waste legislation landscape in the Western Balkans<sup>167</sup>, and produce the Regional E-waste Monitor Report for the Western Balkans. This will enable analyzing trends in the transboundary movement of e-waste, inform policymakers, industries, and businesses about regional e-waste data, and support the development of national and regional countermeasures through policies, regulations, awareness-raising, and industrial response.

In 2022, UNICEF introduced a methodology for supply monitoring of procured ICT devices. The methodology focuses not only on responsible use of delivered devices, but also on e-waste management practices, which is a completely new area for education system of BiH. The first supply monitoring exercise was conducted on a representative sample of 62 schools which benefited from UNICEF procurement activities in 2021. The analysis shows that 79% of schools have received no instructions on e-waste management from the relevant authorities. Also, more than 43% of electric and electronic devices which are not in use, are kept in school facilities and never disposed.

### **2.3.3. Digital Content and Data**

Much work remains to enhance data privacy in the country. At present, there is one key law that governs potential privacy violations: the Law on Protection of Personal Data (BiH Official Gazette #49/06, 76/11, and 89/11). Adopted in 2006, the piece of legislation sets guidelines for how data is processed by the authorities, all the while enumerating the rights of citizens in this exchange.<sup>168</sup> In spite of these provisions, experts have claimed that it is not aligned with the EU's General Data Protection Regulation (GDPR). The Agency for Personal Data Protection in Bosnia and Herzegovina (AZLP), which is responsible for data privacy, submitted an updated draft to the Ministry of Civil Affairs. However, the law's status remains relatively unclear.<sup>169</sup>

### **2.3.4. Innovation and Entrepreneurship**

Available indicators show a high degree of economic diversity within Bosnia and Herzegovina. Major areas.<sup>170</sup> Transportation, storage, and accommodation are just some of the subfields which have helped

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<sup>167</sup> Albania, Bosnia and Herzegovina, North Macedonia, Montenegro, and Serbia

<sup>168</sup> For more information on the statute, visit the following link:

[https://www.dataguidance.com/sites/default/files/Bosnia\\_and\\_Herzegovina\\_The\\_Law\\_on\\_the\\_Protection\\_of\\_Personal\\_Data\\_PDF](https://www.dataguidance.com/sites/default/files/Bosnia_and_Herzegovina_The_Law_on_the_Protection_of_Personal_Data_PDF).

<sup>169</sup> Data Protection Laws of the World: Bosnia and Herzegovina, DLA Piper (2021),

<https://www.dlapiperdataprotection.com/index.html?t=law&c=BA>.

<sup>170</sup> Bosnia and Herzegovina mini-diagnostic paper, EBRD (2017), <https://www.ebrd.com/publications/country-diagnostics/bosnia-and-herzegovina>.

spur internal growth within the Bosnia and Herzegovina. Yet many have noted that the rates of inhabitants who pursue careers in government are among the highest in the region.

These larger trends have bearing on the overall status of small and medium-size enterprises (SMEs). The Bosnia and Herzegovina Country Strategy 2022-2027 produced by the European Bank for Reconstruction and Development (EBRD), notes that domestic SMEs suffer from low productivity, with the summary report acknowledging that it is due to insufficient skill-building.<sup>171</sup> The insufficient usage of digital technologies, as well as minimal awareness on the need for digital competencies, has also hampered the overall competitiveness of local entrepreneurs. International actors, according to the EBRD report, can fix this multi-pronged issue by knowledge-sharing and capacity-building exercises.<sup>172</sup>

International actors have taken a leading role in developing policy strategies related to domestic entrepreneurship. However, local officials have also been actively involved in creating the regulatory conditions needed to spur economic activity. Although there have been concerns about implementation, documents prepared by leaders in Sarajevo and Banja Luka have outlined how governments can support SMEs. The “Development Strategy for Small and Medium-Sized Entrepreneurship in the FBiH 2022-2027”<sup>173</sup> addresses the following strategic directions:

- Innovations and Digital Transformation for SMEs
- Green Transition for SMEs
- Supportive-Affirmative Business Environment
- Improvement of Entrepreneurship Infrastructure
- Internationalization and Positioning in Regional and Global Supply Chains
- Sustainable Development for SMEs

expressed as strategic objectives:

- Competitive SMEs based on Innovation, Digitalization and Green Circular Economy
- Business Environment Development and Improvement of Entrepreneurship Infrastructure
- Internalization of SMEs in Regional and Global Supply Chains

This document acted as a resource to harmonize legislation on SMEs throughout the country. In 2021, a new Law on Support Measures for SMEs was established. In addition, a draft Development strategy for SMEs in FBiH 2022-2027 has been developed, that draw on pre-existing measures.<sup>174</sup> These reforms are

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<sup>171</sup> Bosnia and Herzegovina Country Strategy 2022-2027, EBRD (2022), <https://www.ebrd.com/bosnia-and-herzegovina-strategy.pdf>.

<sup>172</sup> Bosnia and Herzegovina Country Strategy 2022-2027, EBRD (2022), <https://www.ebrd.com/bosnia-and-herzegovina-strategy.pdf>.

<sup>173</sup> Development Strategy for SMEs in FBiH, <https://www.fmrpo.gov.ba/wp-content/uploads/2022/10/Strategija-razvoja-male-privrede-FBiH-2022-2027-Strateska-platforma-NACRT.pdf> <https://www.fmrpo.gov.ba/wp-content/uploads/2022/10/Strategija-razvoja-male-privrede-FBiH-2022-2027-Strateska-platforma-NACRT.pdf>

<sup>174</sup> 2021 SME Country Fact Sheet – Bosnia and Herzegovina, European Commission (2021), [https://ec.europa.eu/neighbourhood-enlargement/system/files/2021-09/bih\\_-\\_sme\\_fact\\_sheet\\_2021.pdf](https://ec.europa.eu/neighbourhood-enlargement/system/files/2021-09/bih_-_sme_fact_sheet_2021.pdf).

aiming not only to support SMEs in FBiH, but would also apply to the SMEs operating in Brcko District.<sup>175</sup> Besides, the Development Strategy of the Federation of Bosnia and Herzegovina 2021-2027 put a particular emphasis on increasing the digitalization of the economy, and supporting the transfer and development of technologies. It also outlines innovations and digitalization as one of the key accelerators contributing to develop FBiH. Measures include supporting R&D and reinforcing collaboration between the economy and the academia, encourage development of innovative digital solutions and software companies, or enhance the digital skills of the workforce.<sup>176</sup>

For now, the lack of an institutional framework to coordinate SME support at the state level remains to be addressed. Also, inadequate financial instruments mean that aspiring entrepreneurial groups have one less reliable funding stream.<sup>177</sup> In order to address this issue the Development Bank of the Federation of Bosnia and Herzegovina and the Investment and Development Bank of Republika Srpska offer favorable credit terms. While this is an encouraging move in terms of scaling up SMEs, there are also some concerns that the distribution of these financial resources may be determined by political allegiances. Thus, it is essential to provide an effective finance channel for local entrepreneurship for SME groups to gain the capacity to navigate an increasingly competitive global economy.

### **2.3.5. Ecosystem Building**

Bosnia and Herzegovina has struggled to create an environment that encourages innovation in business. According to the 2021 edition of the World Intellectual Property Organization's (WIPO) *Global Innovation Index*, the country is ranked 75<sup>th</sup> out of 132 nations.<sup>178</sup> Their highest score was 51<sup>st</sup> place in the category entitled "Market Sophistication," which examines factors like credit access and market diversification.<sup>179</sup> The country's lowest scores were two 99<sup>th</sup> rankings in "Creative outputs," which looks at elements such as online content, and "Business Sophistication," which considers aspects like the degree of cooperation between universities and businesses.<sup>180</sup> Taken together, these facts underline how officials have a way to go before they can elevate Bosnia and Herzegovina's place in the digital economy.

In addition, the country ranked 83<sup>rd</sup> out of 176 in ITU's latest *ICT Development Index*, 92<sup>nd</sup> out of 141 in the 2019 *Global Competitiveness Index Ranking*, and 95<sup>th</sup> in the 2018 *Global Entrepreneurship Index Ranking*.<sup>181</sup> These indexes concretely identify gaps that remain to be addressed to build an ecosystem that incentivize digital development, and where investment may be channeled into.

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<sup>175</sup> 2021 SME Country Fact Sheet – Bosnia and Herzegovina, European Commission (2021), [https://ec.europa.eu/neighbourhood-enlargement/system/files/2021-09/bih\\_sme\\_fact\\_sheet\\_2021.pdf](https://ec.europa.eu/neighbourhood-enlargement/system/files/2021-09/bih_sme_fact_sheet_2021.pdf).

<sup>176</sup> Development Strategy of the Federation of Bosnia and Herzegovina (2021-2027), [https://fzzpr.gov.ba/files/Strategic%20documents%20of%20FBiH/Development%20Strategy%20of%20the%20FBiH%202021-2027-summary\\_ENG.pdf](https://fzzpr.gov.ba/files/Strategic%20documents%20of%20FBiH/Development%20Strategy%20of%20the%20FBiH%202021-2027-summary_ENG.pdf)

<sup>177</sup> Digital Innovation Profile: Bosnia and Herzegovina, ITU (2019), [https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT\\_Brochure%E2%80%93DIP%20BosniaH\\_431106.pdf](https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT_Brochure%E2%80%93DIP%20BosniaH_431106.pdf).

<sup>178</sup> Global Innovation Index 2021, WIPO (2021), <https://www.globalinnovationindex.org/Home>.

<sup>179</sup> Global Innovation Index 2021, WIPO (2021), <https://www.globalinnovationindex.org/Home>.

<sup>180</sup> Global Innovation Index 2021, WIPO (2021), <https://www.globalinnovationindex.org/Home>.

<sup>181</sup> Regional Good Practices: Accelerating innovation, entrepreneurship and digital transformation in Europe, ITU (2021), [https://www.itu.int/dms\\_pub/itu-d/opb/inno/D-INNO-GOOD\\_PRACT.03-2021-PDF-E.pdf](https://www.itu.int/dms_pub/itu-d/opb/inno/D-INNO-GOOD_PRACT.03-2021-PDF-E.pdf).

The division of power in the country also undermines the process of legislating, as recommendations proposed by one of the two governing powers may not be adopted throughout the entirety of the country.<sup>182</sup> The lack of cross-entity collaboration may also hinder the country's progress.

The private sector has also encountered similar challenges than the public sector when seeking to build a digital ecosystem. Large corporations are not encouraged enough to invest in product development, as they lack the incentive structures to invest in this long-term work.<sup>183</sup> Entrepreneurs have also noted that the shortage of financial instruments designed to support innovation among SMEs. This, together with the a lack of entrepreneurial spirit and state level strategy for innovation stunt the growth of SMEs and entrepreneurship in the country. Despite these issues, concrete steps have been taken to support the ICT and digital sectors. For example, technology parks, such as BIT Center Tuzla and ICBL Banja Luka, have been established, and research organizations such as the 'Entrepreneurship Development Centre' produced scholarships in the sector.<sup>184</sup> UNDP has supported preparations for establishment of the Science and Technology Park Banja Luka, in partnership with the University of Banja Luka and Ministry for Science and Technology, Higher Education and Information Society of Republika Srpska.

### **3. Conclusion**

This document provides a framework to unravel digital development that includes the three building blocks of digital transformation. It provides information about Bosnia and Herzegovina for each domain, based on the experiences and activities of the ITU and other stakeholders operating in the country and wider region.

This report will serve as a reference for discussions on digital development at the country level as well as stocktaking of relevant activities, initiatives and projects and experiences developed by UN agencies involved in digital transformation work in Bosnia and Herzegovina. It aims to provide the baseline study for strategic decisions on initiatives to be undertaken within the UN Sustainable Development Cooperation Framework (UNSDCF), on digital and ICT development matters, to support digital for development. It will serve as a guide for future dialogue with country stakeholders and pave the way for increasingly fit-for-purpose engagements of the UN system in the country.

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<sup>182</sup> Digital Innovation Profile: Bosnia and Herzegovina, ITU (2018), [https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT\\_Brochure%E2%80%93DIP%20BosniaH\\_431106\\_.pdf](https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT_Brochure%E2%80%93DIP%20BosniaH_431106_.pdf).

<sup>183</sup> Digital Innovation Profile: Bosnia and Herzegovina, ITU (2018), [https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT\\_Brochure%E2%80%93DIP%20BosniaH\\_431106\\_.pdf](https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/eBAT_Brochure%E2%80%93DIP%20BosniaH_431106_.pdf).