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Digital
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Digital Inclusion Initiative

NATIONAL REPORT

FOR NORTH MACEDONIA

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LIST OF ABBREVIATIONS

AAC	Augmentative and Alternative Communication
AEC	Agency for Electronic Communications
BCO	Broadband Competence Office
CERTs	Computer Emergency Response Teams
CSO	Civil Society Organization
CVD	Coordinated Vulnerability Disclosure
CRPD	UN Convention on the Rights of Persons with Disabilities
DESI	Digital Economy Society Index
DRA	Digital Readiness Assessment
EBRD	European Bank for Reconstruction and Development
EMIS	Education Management Information System
ENER	Electronic National Register (context: national legislative platform)
EU	European Union
FEEIT	Faculty of Electrical Engineering and Information Technologies
GDPR	General Data Protection Regulation
ICT	Information and Communication Technology
INNOFEIT	Innovation Center at FEIT (context: Faculty of Electrical Engineering and Information Technologies)
ITU	International Telecommunication Union
M&E	Monitoring and Evaluation
MDT	Ministry of Digital Transformation
MEPSO	Macedonian Electricity Transmission System Operator
MISA	Ministry of Information Society and Administration
MON	Ministry of Education and Science
MOOCs	Massive Open Online Courses
NIS2	Network and Information Security Directive 2
OECD	Organisation for Economic Co-operation and Development
PDPL	Personal Data Protection Law
SDGs	Sustainable Development Goals
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
VET	Vocational Education and Training
WCAG	Web Content Accessibility Guidelines

INTRODUCTION

The national report was created within the project Digital Inclusion Initiative (DII[1]), a regional project implemented in Albania, Bosna and Herzegovina, Kosovo, North Macedonia and Serbia funded by the European Commission. The goal of the project is to enhance the role of civil society organisations (CSOs) from the Western Balkans in advocating for participatory democracies and the EU accession process by strengthening their capacities for policy development and advocacy for digital inclusion.

Data and information presented in the national report are collected through a policy questionnaire fulfilled after the analysis of digitalization and digital inclusion policy documents. Consultations with relevant institutions, experts, users of digital services, members of vulnerable groups and civil society organisations as well as focus group were used to complement desk research and to obtain stakeholders' perspective on equity-related issues in the process of digitalization and to formulate recommendations for policy improvement.

1 www.diiproject.net

1. CONCEPTUALISING DIGITAL INCLUSION

Digital inclusion in the Macedonian legal framework is defined through the concept of *digital accessibility*, which refers to the development of websites, mobile applications, electronic documents, and digital tools in a way that enables persons with disabilities to access their content without obstacles. This is defined in a Draft-Law on Accessibility of Websites and Mobile Applications of Public Sector Institutions (2024), which provides one of the closest definitions of digital inclusion.

Furthermore, *social inclusion* is defined as protection of vulnerable groups, such as children and young people, women and other vulnerable groups through cybersecurity education programs and online safety initiatives in the Cybersecurity Strategy 2025-2028.

More broadly, based on the National Development Strategy of North Macedonia, 2024-2044, digital solutions are viewed as *tools that enable inclusion*, particularly in essential public services such as healthcare, education, social protection, child protection, and infrastructure (p.40).

In the Draft National ICT Strategy 2023-2030, although not directly defining, refers to *digital inclusion* as an aim to be achieved through digital governance by applying various digital tool and strategies that deliver public services across different sectors (p.29). It specifically mentions *people with special needs* in terms of ensuring inclusivity in the process of digital transformation: digitalization of public services and their availability to this group of people (digitalization of medical records for example) to allow their full participation in societal processes while being informed (ibid, p.30). In implementing the principle of digital inclusion, existing websites of state institutions and e-services/digital tools offered in all areas are to be reviewed and adapted to the needs of persons with disabilities.

The National Strategy for the Rights of People with Disabilities (2023-2030) specifically focuses on digital accessibility measures, including persons with disabilities and adults with incapacity to work.

Finally, the National Youth Strategy (2023-2027) includes provisions for *improving digital skills among the youth*, ensuring that young people are included in the digital economy.

Although there is no one single definition on digital inclusion, in North Macedonia, the public sector takes a responsibility to support citizens *to access and utilize digital technologies*. Yet, focus group discussion reveal that, in the context of North Macedonia, vulnerable groups specifically at risk for digital exclusion are not clearly defined. For instance, vulnerable groups linked to digital inclusion sometimes refer to people with disabilities, children in institutions, the elderly, and adults with low digital skills, but definitions remain unclear and inconsistent. This lack of clarity is also acknowledged by some policymakers and experts working in the field of supporting public sector with digital tools, who agree that while vulnerable groups are generally identified,

their definitions in the context of digital inclusion remains imprecise (Focus group interviews with policymakers and experts, 16.05.2025). They further emphasize that the absence of precise mapping and data on these groups hinders targeted interventions. Additionally, civil society organizations (CSOs) highlight that digital inclusion is often confused with digital literacy, and there is no clear national definition, making it difficult to assess its level or existence (Focus group interviews with CSOs, 16.05.2025).

Thus, there is no clear conceptualization of digital inclusion in North Macedonia, and it is recommended that it should be defined based on how someone is classified as digitally excluded (age, group, use of technology) but moreover, add dynamic aspect to the concept, as digital technologies and consequently groups that could be considered as digitally excluded, evolve. Namely, as digital technology is progressing so fast, adopting and using digital technologies requires constant upgrades of knowledge. Finally, it was suggested that digital inclusion should distinguish between people using digital tools and the purpose of using them. Lack of access to devices and digital tools, even among those using social media, contributes to economic and digital exclusion. Many people for instance use digital tools for social media, communication and following news, but do not use it for research, professional advancement, jobs, banking, skills development etc.

2. NATIONAL CONTEXT FOR DIGITAL INCLUSION

2.1. General contextual data

North Macedonia's economic and demographic landscape, reflects a developing nation with persistent socio-economic challenges. In 2023, the nominal GDP was USD 15.76 billion (GDP North Macedonia, 2023, p.3), with real GDP at USD 11.68 billion, indicating modest economic output. The average net salary in 2024 was EUR 708.7 (Average monthly net wage paid per employee, 2024, p.1), and gross salary was EUR 1,066.3, (Average monthly gross wage paid per employee, 2024, p.1*)* Unemployment stood at 12.3% in Q3 2024, (Active population in the Republic of North Macedonia, III quarter, 2024, p.1). Education levels vary: 27.7% of the population completed only primary education, 44.8% upper-secondary, and 19.6% higher education in 2021, while illiteracy was low at 1.2% (Statistical Atlas, Census, 2021, p.67). Socio-economic vulnerabilities are evident, with 22.9% of the population at risk of poverty and social exclusion in 2021. Demographically, 17.2% of the population was over 65, and 38.4% lived in rural areas, highlighting an aging population and urban-rural divide.

2.2. Data concerning digital skills and habits in using digital technologies

In North Macedonia, communication technology usage has seen significant growth, with 87% of residents having internet access in 2023 (Usage of information and communication technologies in households and by individuals, State Statistical Office 2024, p.2), though only 28% have fast broadband connections (256 kbit/s or higher). In 2020, 71% of individuals aged 16-74 used the internet daily, a 27% increase from 2012, while weekly (non-daily) usage was low at 9% (ibid). Mobile penetration is high, with 2.65 million cellular connections in 2025 (146% of the population), 92.9% of which are broadband (3G, 4G, or 5G). Social media usage is notable, with 1.2 million users in 2023, and platforms like Facebook Messenger and Instagram reaching 42.6% and 39.5% of the eligible population, respectively (ibid).

The ICT sector is the fastest-growing, with 5G network expansion by operators like Makedonski Telekom and A1, supported by a skilled, English-proficient workforce and government incentives. However, digital skills lag, with only 31.6% of individuals having basic or above-basic digital skills in 2019, compared to the EU's 56.1%, and rural-urban disparities persist, with 38.4% of the population in rural areas (Share of individuals having at least basic digital skills, by sex, 2021-2023). Finally, 130 000 citizens as of July 2024 (7%) have used e-government services from the national platform e-uslugi (OECD, Public Administration in the Republic of North Macedonia, 2024) while 32% of all citizens have used overall e-government (Digital Economy Society Index, DESI, 2022, p.69). Interviews with vulnerable groups reveal that even when internet access is available, it is often not used for personal

development or to access public services that could simplify daily life. This is perceived to be due to overall "scarcity of targeted support programs" (Digital Inclusion of Roma: Current Patterns, Trends, and Barriers, 2025, p.11).

Finally, discussion with various groups show that the data gathered on use of digital technologies by the State Statistical Office captures factual data on spread of digital technologies and broadband access, but do not capture actual usage, and the purpose of use of technologies.

Table 1 Indicators for monitoring digital inclusion-individuals

No.	Indicator	Population Group	Value / Description
1	% of the population that uses the internet (Usage of information and communication technologies in households and by individuals, 2024)	Male	94.8%
		Female	92.4%
		Older people (65–74)	81.9%
		Unemployed people	93.4%
		Total population	93.6%
2	% of population that uses e-government services	National platform (2024)	130 000 as of July 2024 (7%) for the national platform uslugi (OECD, Public Administration in the Republic of North Macedonia, 2024); 32% as of 2021 for overall e-government (Digital Economy Society Index, DESI, 2022)
		General population (2021)	32% (Digital Economy and Society Index, DESI, 2022)
3	% of the population that actively uses social media (Usage of information and communication technologies in households and by individuals, 2024)	Male	84.4%
		Female	84.1%
		Older people (65–74)	65.1%
		Total population	84.2%
4	% of the population with basic, intermediate, and advanced digital skills	Total population (2021)	35 % as of 2021 (Share of individuals having at least basic digital skills, by sex, 2021-2023)
5	% of the population that uses smartphones or other mobile devices to access the internet	Total population (2025)	93% (Digital Macedonia, 2025)

Sources: State Statistical Office North Macedonia latest data available per indicator

Table 2 Indicators for monitoring digital inclusion-households
(Usage of information and communication technologies in households and by individuals, 2024)

No.	Indicator	Household Category	Value / Description	Researcher's Note
1	% of households with internet access	Urban Rural Total (all households)	92.1% 88.5% 90.8%	
2	% of households that use personal computers to access the internet	Total (all households)	36.5% as of 2018	Not tracked in Macedonia from 2018 onwards
3	% of households that use laptops to access the internet	Total (all households)	40.1% as of 2018	Not tracked in Macedonia from 2018 onwards
4	% of households that use smartphones to access the internet	Total (all households)	68.8% as of 2018	Not tracked in Macedonia from 2018 onwards

Sources: State Statistical Office North Macedonia latest data available per indicator

2.3. Overview of the relevant strategic-legislative framework

The key documents relevant for development of digital inclusion in the strategic-legislative framework of North Macedonia include:

- Law on Electronic Communications (2022, amended in 2024) – regulates the electronic communications sector, ensures affordable digital access, expands broadband coverage, and promotes universal service. The latest, amended, law was adopted in October 2024 to better reflect the nature of "digital transformation" (ibid).
- Law on Personal Data Protection (2020) – aligned with the GDPR, ensures data security and trust in digital participation.
- Draft Law on Information Security – provides a framework for cybersecurity and user privacy but remains unadopted since 2019 (latest draft from 2023).
- The Strategy for Cyber Security (2025–2028) integrates the National Council for Cyber Security into the National Council for Digital Transformation (2025-2027) and establishes a dedicated cyber security sector within the Ministry of Digitalization (ibid, p.8).
- The Draft National ICT Strategy (2023–2030) aims to digitalize public and business processes. The ICT Strategy is expected to be adopted in the first half of 2025 (2024), currently under adoption. Focus group with representatives of citizens' organizations and policymakers reveal that it does not clearly define and grasp digital inclusion conceptualization and measures. Relevant for digital inclusion, the strategy focuses on expanding broadband internet access nationwide, including rural areas (Draft National ICT Strategy 2023-2030), enhancing e-governance services to facilitate

citizen access to public services (ibid), and developing programs to support digital innovators, particularly creating opportunities for people with disabilities.

- The National Strategy for Employment (2021–2027) includes preparing a concept for introducing digital skills in primary and secondary schools (2021, p.83), widening digital skills training offerings for adults (ibid, p.84), and introducing specialized programs to enhance digital competencies among workers (ibid).
- The National Strategy for Youth (2023–2027) promotes digital skills among youth for participation in the digital economy. It aims to equip young people aged 16–29 with relevant digital knowledge for the modern economy, targeting 68% of youth to achieve average or above-average digital skills by 2027 (ibid, p. 21).
- Education Strategy and Action Plan (2018–2025) integrates digital technologies in education to enhance literacy and inclusion, especially among marginalized children (ibid, p.19). The strategy emphasizes digital literacy as a key component of social inclusion and includes the development and implementation of a national digital literacy standard for every primary education cycle (ibid, p.88). It promotes systematic ICT and digital literacy education in primary and secondary schools, increased continuous enrollment of marginalized groups (including Roma and children with special educational needs), creation of ICT literature in Macedonian and minority languages (ibid, p.60), utilization of ICT in learning processes (ibid, p.176-182), digital, one-stop-shop platforms for students (ibid, p.176), scholarships for Roma and children with special educational needs (ibid, p.19), implementation of digital literacy programs in schools and lifelong learning initiatives (ibid), and enhancement of research capacities related to digital transformation (ibid).
- The National Strategy for People with Disabilities (2023–2030) and its action plan focus on ensuring public sector information is accessible in formats easily understood by people with disabilities (2023, p.14). They promote digitized and effective procedures to simplify qualifying for social security (ibid, p.64), monetary compensation (ibid, p.66), and pension or invalid insurance based on disability status (ibid, p.67). The strategy also supports securing schoolbooks in digital formats, including audio and braille versions (ibid, p.72), and eases procedures for people with disabilities seeking employment or connecting with employers (ibid, p.103).
- National Strategy for Social Inclusion (2010–2020) aims to improve digital access for marginalized communities yet no updated version currently exists.
- Action Plans under Digital Europe Programme (2024–2026) aim to align national actions with EU priorities on digital inclusion.
- National Programme for Adoption of EU Acquis (2021–2025) outlines harmonization with EU digital standards and includes steps for digital skill development. It includes the development and acquisition of digital tools and platforms to support people with autism and children with hearing or speech impairments (ibid, p.380).

- Smart Specialisation Strategy (2024–2027) supports innovation and inclusive growth through digitalization across sectors: agriculture, industry, energy, ICT and construction. It aims to improve local industry competitiveness through digitalization and offers incentives for businesses to transition to digital operations (ibid).
- National Development Strategy (2024–2044, p.40) outlines long-term development goals focused on accelerated, inclusive, and sustainable growth. Under Strategic Area 5.1, it prioritizes digital inclusion through alignment of formal and informal education with labor market needs, encourages public-private partnerships such as digital innovation hubs and tech parks, supports the recognition of non-formal digital learning (e.g. online courses), and invests in adult learning, vocational education, and gender-equal access. It also emphasizes improving digital access for rural and low-income populations and aims to reduce the digital skills gap as part of the EU Digital Decade targets.
- The National Development Strategy (2024–2044) and the Program for the Work of the Government (2024–2028) support the establishment of digital hubs and innovation centers (ibid, p.14).
- The Concept for Distance Learning (2020) created during the pandemic, outlines online learning models but lacks concrete action steps.
- The Open Government Partnership National Action Plan (2024–2026, p.99) works to improve access to information and data, notably enhancing the electronic judicial portal (www.sud.mk) to be accessible for people with visual impairments through text-to-speech technology.
- The Strategy for Reforming the Public Administration (2023–2030), under Priority Area 4 (Digital Transformation), aims to establish a disability estimation system and a national registry of people with disabilities (Strategy for reforming the public administration, 2023, p.98), improve the e-pension system (ibid), establish an ICT Agency (ibid, p.99), increase the number of electronically offered services, introduce digital assistants to communicate with citizens and businesses (ibid, p.101), and raise awareness of e-services (ibid, p.103).

Based on these legal and strategic frameworks, it can be concluded that North Macedonia has *comprehensive yet incoherent policy and legal framework* across which the issue of digital inclusion is scattered. What has been observed during the analysis of these documents, has been confirmed by focus groups, which is a lack of clear conceptualization of digital inclusion/exclusion, most affected group and intra-sectorial coherence in addressing digital inclusion. Furthermore, the legislative and strategic framework instrumental to improved digital inclusion – specifically the ICT strategy has been in procedure for a long time due to change in leadership and constant revision.

2.4. Governance

Prior to 2025, digitalization was under the jurisdiction of the Ministry of Information Society and Administration

(MISA). After amending the Law on the Organization and Work of State Administration Bodies in mid 2024, a new Ministry of Digital Transformation took over this subject-area. Additionally, there is a state regulatory body - the Agency for Electronic Communications, regulating the telecommunications market. Furthermore, the Agency for Audio and Audiovisual Media Services is another state regulatory body for the audio and audiovisual services in the country. Moreover, a National Council for Digital Transformation was established as an intersectoral body to promote inclusive digital development (Decision for forming a National Council for Digital Transformation, 2024). This Council is chaired by the Prime Minister, providing key role to the council, as well as 12 other members: ministers, business chamber and academic representatives. The Council however does not include CSO which could potentially further support its work, having in mind their proactive role in addressing exactly digital inclusion.

The strategic framework on digital transformation foresees the establishment of an Agency for Digital Transformation which would be responsible to, among other things, achieve the objectives set out in the Concept for Digital Transformation of Society which underscores the need for a comprehensive and inclusive process of digital transformation (Concept for Digital Transformation of Society, 2023). As of March 2025, this Agency has not been officially established, but its scope of competencies is set out and include: coordination of activities between governmental institutions, coordination before law-drafting, standard setting for ICT and cybersecurity, providing general guidelines for the digital transformation of the public administration and public awareness (Concept for Digital Transformation of Society, 2023, p.2). Additionally, the new government announced drafting a law for access of individuals with disabilities - the first of its kind.

2.5. Financing of digital inclusion policies

There is no specific tracking on financing for digitalization in North Macedonia, less so on digital inclusion. The government has introduced policies and incentives to bolster the Information and Communication Technology (ICT) sector's growth. These measures include foreign investment incentives, startup support programs, and initiatives aimed at fostering innovation within the sector.

One of the major projects in the digitalization of the country has been the Macedonia Connects project, funded by USAID and the Macedonian government (USD 5 million total), aiming to transform North Macedonia into the world's first all-broadband wireless country by 2006, providing internet access to 95% of the population, including remote rural areas, and connecting all 461 primary and secondary schools. More recently, the National Broadband Plan aims to achieve 25 Mbps in urban areas and 10 Mbps in rural areas by laying 90,000 km of fiber-optic cables (35,000 km completed by 2025).

A 2018–2025 project, supported by the Western Balkans Investment Framework, focuses on expanding ultra-

fast internet access from 43.8% to 60% of households, targeting 47,000 additional households through the construction of a National Transport Optical Network to connect underserved "white" and "grey" zones and public institutions. The government has also pursued EU integration by adopting regulatory frameworks to foster competition in the telecom sector, with investments in 5G and LTE-A technologies by mobile network operators like MakTel and A1 Macedonia. About 83.74% of households had internet access in 2021, yet 28% had fast broadband connections (>256 kbit/s) in 2023, indicating a lag in fixed broadband compared to mobile (99.9% 4G coverage), (Macedonia Transformed Through Broadband, 2010).

North Macedonia's participation in the EU's Digital Europe Programme opened avenues for funding aimed at enhancing digital infrastructure, cybersecurity, and digital literacy. This participation complements other EU programs like Horizon Europe, which also provide financial support for digital initiatives (Digital Europe Programme opens to candidate countries Montenegro, North Macedonia, Albania, and Serbia to access calls for funding, 2023). EBRD has been actively supporting the digitalization of the transmission grid operator MEPSO to prevent outrages.

International investors have also shown interest in North Macedonia's digital landscape. For instance, Bulgarian venture fund Eleven Ventures invested EUR 2 million in Native Teams, a North Macedonia startup facilitating employment solutions for freelancers and self-employed individuals globally (Supporting the Start-Up Scene in North Macedonia Brings Foreign Investment and Creates Jobs, 2023).

While detailed data with figures on digitalization and on transparency and efficiency of spending specific to digital inclusion is limited, the government's proactive approach to e-Government services reflects efforts to improve transparency and data accessibility. The combination of national budget allocations, international funding, and private sector involvement suggests a multi-source funding environment, though clear, dedicated funding lines for digital inclusion remain diffuse. International cooperation and private sector initiatives further support the efficiency and expansion of digital transformation programs. According to focus groups with representatives of vulnerable groups and CSOs, a key challenge is that digitalization strategies often remain unexecuted due to an over-reliance on donor funding rather than systematic and sustainable national budget allocations. Participants from CSOs elaborated that this dependency results in a lack of a sustainable, long-term vision and poor horizontal coordination between ministries.

2.6. Alignment between selected EU framework and national legislation

A most recent step towards alignment of North Macedonia with EU frameworks, was the adoption of the Cybersecurity Strategy 2025–2028 on January 21, 2025 (EU-North Macedonia 20th Subcommittee on Innovation, Information Society and Social Policy, 2025). The country has implemented the Personal Data Protection Law (PDPL) No.42 (2020), aligning its

data protection framework with the EU's General Data Protection Regulation (GDPR), (Education Profile: North Macedonia, 2025).

North Macedonia's strategic objectives reflect the EU's Digital Decade policy programme 2030, focusing on enhancing digital skills, securing sustainable digital infrastructures, transforming businesses digitally, and digitalizing public services (Digital Public Administration Factshee, 2024, p.2). However, the European Commission has emphasized the necessity for North Macedonia to ensure the independence of its regulatory bodies, particularly in aligning with the EU's Telecoms Code (EU-North Macedonia 20th Subcommittee on Innovation, Information Society and Social Policy, 2025). Further alignment is also needed with the EU's 5G cybersecurity toolbox rules (ibid). There is also a need for full alignment of national media laws with the Audiovisual Media Services Directive and the forthcoming European Media Freedom Act to ensure compliance with EU standards (ibid).

The Draft-Law on Accessibility of Websites and Mobile Applications of Public Sector Institutions (2024) is another notable step toward aligning with EU Directive 2016/2102 of the European Parliament and of the Council of 26 October 2016 on the Accessibility of the websites and mobile applications of public sector bodies, with CELEX number 32016L2102. The law, which falls under the Ministry of Digital Transformation, is currently undergoing a public discussion. It has not yet been adopted as of June 2025. According to the national legislative register of Macedonia, the timeframe for conducting the regulatory impact assessment is set to end on 30.04.2025 (Regulatory Impact Assessment, 2025). The national implementation plan for North Macedonia outlines strategies to address EU priorities, particularly in vocational education and training (VET), aligning with the Osnabrück Declaration's policy actions for 2021–2025 (European Training Foundation ETF, 2025).

The country has made some progress in inclusive education, particularly in primary education. As of the 2023/2024 school year, there was a 10% increase in the enrolment of pupils with special educational needs in mainstream primary schools. Additionally, the number of educational assistants in primary education reached 820 (Key Findings on North Macedonia related to the Knowledge Economy, 2024). North Macedonia has achieved near full 3G and 4G coverage and has extended 5G coverage to 16 cities, ranking 30th globally for mobile broadband speeds (Digital Readiness Assessment, 2023, p.2).

In terms of digital literacy, the country has yet to adopt long-term information and communication technology (ICT). There are at the moment two draft National ICT Strategies awaiting public discussion on the national platform (one for 2023-2027 and one for 2023-2030) with overlapping content. The newest draft which according to focus group participates is a new draft law, is not publicly available. The strategy, according to the interviews and focus groups are slow as there was change of Minister of Digital Transformation, and governance discontinuity usually reflects into policy discontinuities and full revision of ongoing

strategies by incoming ministers. Another interviewee pointed out that there are many different interests, especially voiced from private sector inside the ICT strategies, thus a lot of lobbying additionally protracts the process. Yet, representatives from the Ministry of Digital Transformation expected that the strategy will be adopted before the summer holidays.

Additional aspects to be mentioned is that concerns have been raised about the independence of the regulator for electronic communications, especially following the dismissal of all five members of the Agency for Electronic Communications (AEC) Commission in September 2024 (ibid, p.68). Overall, the country has yet to prioritize the establishment of a policy framework according to EU standards, ensuring digital inclusion, indicating a gap in addressing comprehensive digital inclusion strategies (Western Balkans Competitiveness Outlook, 2024, p.20).

Digitalization in the 2024-2027 EU Reform Agenda for North Macedonia (Reform and Growth Facility for The Western Balkans Reform Agenda of North Macedonia, 2024-2027) is highlighted under Policy Area 2 (Energy/Digital Transition), Sub-Area 2.2. Digitalization, where it outlines that one of the aims of the reform agenda is to "close the digital skills gap" (ibid, p.53). Furthermore, Integration of digital competences into secondary education curricula based on the European Digital Competences Framework (ibid, p.20), and, understandably, providing training for teachers in digital and green skills to improve student readiness for the digital economy, notably female teachers (ibid, p.20,24). Concretely regarding digital inclusion, emphasis is given on digital accessibility for persons with disabilities, aligned with the UN Convention on the Rights of Persons with Disabilities (ibid, p.26), and required efforts to expand broadband access and reduce the digital divide, particularly for smaller businesses and rural areas (ibid, p.57). Area of reforms include cybersecurity, digital infrastructure, and digital public services. Regarding cybersecurity, measures include the adoption of legislation aligned with the NIS2 Directive (by June 2025) to enhance cyber resilience (ibid, p.22), establishment of operational national and governmental Computer Emergency Response Teams (CERTs) (by June 2026), (ibid, p.54), and implementation of frameworks like Coordinated Vulnerability Disclosure (CVD) and crisis management (by December 2026), (ibid, p.55).

2.7. Monitoring and evaluation mechanisms for relevant policies

There are no available state reports on actual monitoring of digital policies in general, and digital inclusion in particular. In a review from June 2024, the State Audit Office concludes that there is no sufficient monitoring established in aligning domestic legal framework with the digitalization legal framework (140 laws are not aligned), presenting an administrative barrier for citizens but also for tracking and monitoring progress.

The State Audit Office of North Macedonia conducted a performance audit on the effectiveness of the National e-Services Portal, finding in March/April 2024 (State Audit Office, 2024), that the digitization

of services has been slow, with insufficient promotion and low utilization of e-services. The audit reveals that while the government has made some efforts toward digitization, these efforts are only partially effective. The portal does not fully meet the needs of citizens and businesses for efficient, comprehensive, high-quality, and cost-effective electronic services, highlighting the need for improved implementation, promotion, and user engagement to enhance the portal's effectiveness. The report also notes that the price for accessing the e-services should be made more accessible.

According to the report, there is a lack of promotion and awareness among citizens and the business community by the Ministry of Information Society regarding the digitization of processes in institutions and the electronic services offered through the national portal. At the same time, the absence of digital skills among citizens contributes to the insufficient utilization of the opportunities provided by the e-services portal.

Several other strategic documents outline commitments for monitoring and evaluation (M&E). The former National ICT Strategy (2021–2025), emphasized the development of a comprehensive M&E framework to track progress in areas such as ICT governance, infrastructure development, cybersecurity, e-services, digital skills, research, innovation, and international cooperation. The National Youth Strategy 2023–2027 outlines that the Agency for Youth and Sport, along with other state institutions, is responsible for implementing and monitoring progress. The strategy plans for two action plans (2023–2025 and 2025–2027) and includes organizing thematic discussions by the Parliament and Government. An external independent evaluation by experts or organizations is also planned to assess the strategy's performance (National strategy to increase youth participation, 2023). The National Development Strategy 2024–2044 integrates monitoring and evaluation mechanisms within its financial framework to ensure transparency and effectiveness in resource allocation, particularly in areas like green infrastructure, digital transformation, and human capital development. Under the UN Sustainable Development Cooperation Framework, an M&E plan was agreed to track progress towards the SDGs, including digital aspects (Republic of North Macedonia and United Nations Sustainable Development Cooperation Framework, 2020).

Despite these commitments, it remains unclear who specifically monitors digital inclusion policies. The Ministry of Digital Transformation and inter-ministerial working groups coordinated by the Prime Minister's Office are noted as having monitoring roles, as is the Agency for the Protection of the Right to Free Access to Public Information, though no public reports are available. Focus groups with policymakers and representatives of citizens' organizations highlighted that the lack of intra-institutional coordination and lack of clear definition of digital inclusion, makes it hard for institution to follow coherently achievements in digital inclusion.

3. KEY SECTORS – ROLE AND CONTRIBUTION TO DIGITAL INCLUSION

The development of digital inclusion requires professional inputs from specific institutions and sectors and the cooperation of several sectors within each country. For this reason, this chapter gives an overview of the roles and jurisdictions of different actors.

3.1. Intersectoral cooperation

In July 2024 a National Council for Digital Transformation was formed. This is an intersectoral body composed of representatives of the government, public institutions, private companies, civil society (business chambers and Macedonian Banking Association), and academia (Concept and Roadmap for Digital Transformation of Society, 2023). According to the State Audit Office, this coincil lack concrete activities and results (Slow digitalization, insufficient promotion and weak use of e-uslugi, 2025). This body enacted the National Concept for digital transformation of the society which, among other things, binds the Government to connect all households to broadband internet in a period of 5 years (Government adopts Concept for Digital Transformation of Society, 2023), improve access via text-to-speech technology to people with disabilities (Roadmap For Digital Transformation, 2023), as well as to focus efforts on fostering digital literacy and skills to young people, socially vulnerable groups, the elderly and so on (Decision on Forming a National Council for Digital Transformation of Society, 2024, p.3). Overall, the Council seeks to provide digital transformation in line with the best international practices (ibid), meaning that inclusivity is a staple of its work. While the council indeed has the potential to support implementation of digital inclusion measures, its activity is still nascent.

3.2. Contribution of different sectors

Digitalization progress varies across sectors in North Macedonia. **Telecommunications** and **Public administration** show the most progress due to their wide service availability and infrastructure development.

Education Sector

Digitalization in education is advancing through national strategies, donor-driven projects, and assistive technology initiatives, though systemic gaps in equipment, training, and accessibility remain. National strategies (ICT Strategy 2021–2025, Education Strategy 2018–2025) aim to integrate ICT in schools, modernize teaching, and enhance teachers' digital skills (North Macedonia Report, 2024). The EDUINO platform and televised lessons were pivotal for remote learning during COVID-19, ensuring educational continuity (Digitalisation and e-Services in North Macedonia: Functional Analysis, 2021). The "e-Accessible Education" project (2010–2015), led by Open the Windows and funded by USAID, equipped 31 primary schools with assistive technologies, trained teachers, and provided

resources to improve access for students with disabilities (Policy Brief: Inclusive Education in North Macedonia, 2024). UNICEF-supported initiatives localized the Cboard app in Macedonian and Albanian, developed the "Suze (FEIT)" text-to-speech voice, and introduced tools like Govorko (Towards a free software-based communication tool for children with disabilities, 2020) and Cibord (FEIT) to support children with communication difficulties. Despite progress, only 33% of primary and secondary schools have assistive technologies, and schools lack inventories of digital equipment, hindering maintenance and planning (Policy Brief: Inclusive Education in North Macedonia, 2024). Civil society organizations highlight insufficient teacher training, outdated curricula, and a lack of systemic government support, with most inclusion efforts driven by donors and NGOs. Focus groups with representatives of vulnerable groups identified a specific cause for this challenge, explaining that teacher training in digital skills is often hindered by what they perceive as strict and poorly implemented criteria from the Bureau for Development of Education.

Key Education Initiatives:

- EDUINO platform: Facilitated remote learning during the COVID-19 pandemic.
- Cboard app: Localized for Macedonian and Albanian to aid children with communication challenges.
- "e-Accessible Education": Introduced assistive technologies in 31 schools, enhancing inclusivity.
- Govorko and Sibord: Free software tools supporting students with disabilities.

Health Sector

In Health, platforms like "Moj termin" (Health Systems in Action North Macedonia, 2021, p.7) and e-zdravstvo.mk (First web platform with information on health services and routine childhood immunization in one place, 2023) support appointment scheduling and access to health information. Telemedicine expanded during the pandemic, though overall e-health services remain limited (Maintaining Essential Health Services in North Macedonia, 2020). In health, there is no systematic monitoring of citizen satisfaction with digital services, and feedback mechanisms are limited. Programs specifically targeting vulnerable groups are not well-documented, and while some digital literacy initiatives exist, they do not sufficiently address the needs of those at risk of digital exclusion (ibid).

Financial Services

Financial services are highly digitalized, with online banking, mobile payments, and digital identity systems widely available (Republic of North Macedonia and Mastercard launch National Digital Identity Service to help grow digital economy, 2021). However, vulnerable groups, including older adults and low-income populations, face challenges using e-banking due to limited digital literacy and awareness of cyber risks, increasing their vulnerability to cybercrime (Ageing in digital societies: enablers and barriers to older persons exercising their social rights, 2022, p.5). The National Bank's financial inclusion strategy promotes literacy,

but targeted programs for at-risk groups are scarce (The national strategy for financial education and financial inclusion in North Macedonia, 2021). Experts emphasize the need for a national digital identity system to enhance security and streamline access to digital tools across sectors.

Social Welfare

In social welfare, some services (e.g., social assistance, child benefits) are accessible through the national e-portal, with systems like the Social Welfare Information System adapted during COVID-19 to support vulnerable groups (Protecting North Macedonia's Poorest from COVID's Economic Impacts, 2022). However, there is no established feedback system for vulnerable users, and digital skills initiatives are often too generic to meet specific needs, particularly for persons with disabilities or rural populations.

Public Administration

Public administration has advanced significantly, with e-services like Skopje's e-tax portal (City of Skopje), gradezno-zemjiste.mk for urban planning (Gradezno zemjiste) and the LoGeS software piloted in 11 Eastern region municipalities for streamlined local services (LOGES, 2023). The forthcoming Super App ELI, announced in October 2024 by Minister Stefan Andonovski, will enable mobile access to administrative services, including digital ID cards and driver's licenses via a mobile wallet (ID Wallet) (Reform Agenda and Digitalization 2024-2027, 2025). Challenges persist government websites are not fully accessible for persons with disabilities, and the e-uslugi system is complex, leading many to prefer in-person services. Focus groups suggest simplifying forms, automating data cross-checking (e.g., eliminating redundant document uploads), and adopting solutions like document vending machines used in Kosovo.[2] Additionally, UNDP-led efforts identified barriers to digital access and provided recommendations for improving digital literacy across different social groups. The findings have informed strategies to improve digital skills, particularly among marginalized groups, ensuring that digital transformation benefits all segments of society (Research Report on the use of Digital Tools by Citizens and Assessing the Digital Gap, 2023). These are just a few examples of such initiatives.

Economy and Telecommunications

In the economy, the 2022 the Law on Payment Services modernized payment systems (Digital Readiness Assessment, 2023, p.15). The economy benefits from 88% household internet access and 96.2% of larger companies online, fueling e-commerce growth (58% of the population shops online as of 2024) (The Current State of North Macedonia's eCommerce Market: Trends, Opportunities, and Challenges, 2025). Strategic documents promote inclusive digital services for people with disabilities and those lacking skills or access (Ageing in digital societies: enablers and

2 The government is evaluating website redesigns to meet accessibility standards for persons with disabilities (FEIT, 2023)

barriers to older persons exercising their social rights, 2022, p.5). The telecommunications sector, driven by operators like Makedonski Telekom, A1 Macedonia, and emerging players like 4iG, supports connectivity and digital inclusion through initiatives like the Telekom Foundation and free Wi-Fi in rural areas (Municipality of Negotino, 2010; Skopje1, 2024). Private sector contributions include Brainster's "Study Now, Pay When Employed" IT education program and eBionics' 3D-printed bionic arms, which enhance accessibility (Brainster; Youth from North Macedonia, 2020). UNHCR's Doniraj Kompjuter initiative provides IT equipment to refugees, boosting digital access (Advancing Digital Inclusion, 2023).

Research and Innovation

The research and innovation sector lags in digital inclusion, with no systemic incentives like subsidies or grants to drive progress (Digital Readiness Assessment, 2023, p.2). Collaboration between academia and industry is sporadic, and higher education programs rarely address digital inclusion. For example, the State Faculty of Electrical Engineering offers only one relevant course (project management and ethics) in its telecommunications program (FEIT, 2022). Academic research on digital inclusion is minimal, with only three identified papers (E-Inclusion: Digital Divide and ICT Acceptance Among Elderly People in Macedonia Compared to Bulgaria and Romania, 2015).[3]

Cross-Sector Challenges

Health, financial services, and social welfare lack systematic monitoring of citizen satisfaction with e-services, hindering improvements. Accessibility for persons with disabilities is a recurring issue, particularly in health and administration, where websites and services often fail to meet standards. Digital inclusion relies heavily on donor-driven and civil society initiatives, with government-led systemic support limited. UNDP's research highlights barriers to digital access and recommends tailored digital literacy programs for marginalized groups to ensure inclusive transformation (Research Report on the use of Digital Tools by Citizens and Assessing the Digital Gap, 2023).

3 Digital inclusion is underrepresented in academic research, with limited focus in higher education curricula (E-Inclusion, 2015).

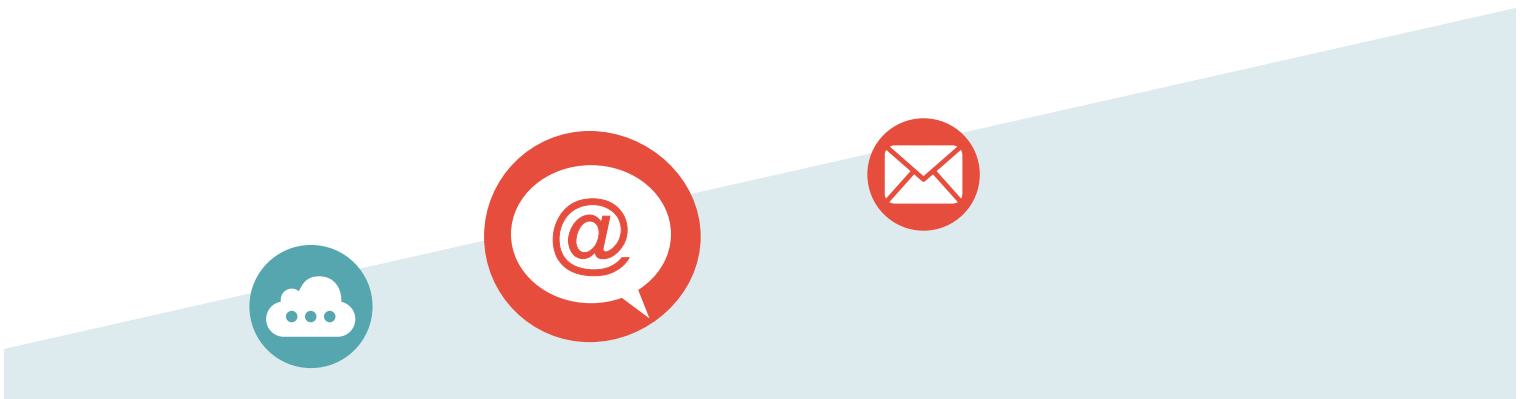

Table 3 Data on specific sectors and digital inclusion

Sector	Are there digital services, if yes which?	Is there monitoring of quality of and satisfaction with these services? (Y/N)	Are there special services for vulnerable groups, if yes which?	Are there identified barriers for vulnerable groups related to digital services, if yes which?
Education	Massive Open Online Courses MOOCs; EDUINO online platform; televised lessons; e-education services via national portal and MoES platforms; digital textbooks;	N	USB sticks for mobile internet for ~30,000 students; EDUINO offline content; assistive tech (big-button keyboards, trackballs, joysticks, switches, and touchscreen monitors); Augmentative and alternative communication (ACC) tool	Uneven infrastructure across schools; lack of digital skills among teachers; only 33% schools have assistive technology; (except for the AAC tools which are publicly available); no follow-up on previous equipment durability
Telecommunications	Multiple operators: Macedonian Telekom, A1, Lycamobile, Telekabel, Neotel; national and regional TV and radio operators.	N (no standardized, nationwide mechanism)	Internet kiosks in rural areas; Projects for internet access in rural areas, free internet, digital literacy programs through foundations (Telekom Foundation, A1); "Computer for Every Child" initiatives;	Infrastructure barriers – lower broadband penetration in rural areas
Health	E-health (e-zdravstvo.mk), "My Term" platform for medical appointments, telemedicine services (e-ambulance and digital tools) used during COVID-19 pandemic	N	Insufficient support for persons with disabilities;	No access to assistive technologies; Lack of digital skills and technology access
Financial services	Online banking, mobile banking, electronic payment systems, national digital identity.	N	General digital literacy programs, but no specific targeting of vulnerable groups	No access to assistive technologies; Lack of digital skills and technology access
Social welfare	Portal uslugi.gov.mk for access to social services	N	Some services were eased during COVID -19 pandemics for most vulnerable groups	Limited targeted programs; General digital literacy programs may not adequately address specific needs.

Sector	Are there digital services, if yes which?	Is there monitoring of quality of and satisfaction with these services? (Y/N)	Are there special services for vulnerable groups, if yes which?	Are there identified barriers for vulnerable groups related to digital services, if yes which?
Research and innovation	Sporadic cooperation between academia and industry (example UNICEF and Foundation Telekom Macedonia).	N	Limited innovative services for vulnerable groups; No systemic subsidies for digital inclusion;	Not a topic on the agenda of academic research
Administration	E-portals for issuing certificates (birth, marriage), personal documents, vehicle and property registration; e-tax portal (Skopje); Veles municipality services; urban planning (gradezno-zemjiste.mk).	N	Some services available in Albanian and English but no other minority languages; not adapted for disabled persons.	Lack of digital skills and technology access, limited language accessibility; lack of awareness of citizens of the availability of e-uslugi

3.3. Role of the civil society sector (CSO) and CSO-led initiatives

The civil society sector (CSO) in North Macedonia, is very active in digital inclusion, through specific organizations and targeted initiatives. Initiatives such as Doniraj Kompjuter aim to provide IT equipment to disadvantaged communities, but their impact is limited due to scale and sustainability challenges. Another notable development is the localization (availability in Macedonian and Albanian) of the Cboard application, an augmentative and alternative communication (AAC) tool designed to assist children with communication difficulties. This project was a collaborative effort involving the Faculty of Electrical Engineering and Information Technologies (FEEIT), the Association for Assistive Technology "Open the Windows," the Institute of the Macedonian Language "Krste Petkov Misirkov," and Melon Inc., with support from UNICEF's North Macedonia office (Cboard digital application giving voice to every child, 2022). UNICEF additionally launched e-zdravstvo.mk in April 2023 with the Ministry of Health and integrates all digitally available health services, offering a dedicated section on immunization and serving as a one-stop-shop for trusted health information (First web platform with information on health services and routine childhood immunization in one place, 2023). Furthermore, UNICEF organizes the Generation Unlimited Youth Challenge, and during the 2019/2020 rendition of the contest awarded a team from North Macedonia for their digital inclusion innovation with funding of $15,000 to help

them scale (Youth from North Macedonia win global recognition for their digital inclusion innovation, 2020), and supports overall young entrepreneurs that create digital solutions for inclusion (Young "Smarters" create digital solutions for inclusive restaurant services, 2020).

One notable actor is Metamorphosis, a very proactive CSO contributing to policy advocacy, which provided detailed public input on the National ICT Strategy during its consultation phase (Contribution of the Metamorphosis Foundation to the public consultation on the draft National ICT Strategy 2021-2025 and the accompanying Action Plan, 2021). Metamorphosis also advances a safer digital environment through its Vistinomer fact-checking initiative, combating misinformation.

CSOs also complement state efforts by conducting direct educational programs focused on youth and marginalized communities. A prominent example is YMCA Bitola, (part of the YMCA global movement). In 2024, it launched a Digital Community Hub, tackling digital education challenges among rural populations. The Hub organized 160 workshops for 2,946 participants, issuing over 490 HP LIFE certificates, promoting digital skills, mental health in the digital age, and educational partnerships (YMCA, 2024).

The "Media Literacy for Rural Youth" project, led by the Youth Cultural Center – Bitola, focused on improving media literacy among rural youth. Through the production of short TV stories on key topics, it reached approximately 30,000 students in the Pelagonia region, effectively complementing formal education (SEENPM, 2021).

These activities reveal systemic issues in digital inclusion. For instance, YMCA Bitola emphasized that, "despite urban improvements, rural and marginalized groups still face digital education challenges," indicating regional disparities (YMCA, 2024). The UNDP-led Digital Gap Assessment also identified barriers and offered recommendations to improve digital literacy for marginalized groups (Research Report on the use of Digital Tools by Citizens and Assessing the Digital Gap, 2023).

The "Macedonian Model of E-Municipality" project, funded by the Slovak Ministry of Finance, addressed digital readiness disparities among municipalities, found that many municipalities lacked the financial and technical resources, IT infrastructure, and skilled staff for digital transformation, leading to limited e-services and a deepening digital divide (ibid).

Unfortunately, successful CSO initiatives rarely get continuous support and often need to be discontinued, although they have filled in necessary gaps in digital inclusion. Additionally, the public sector has not supported initiatives such as "Doniraj Kompjuter", an informal citizen imitative that repairs computers and provides it to families in need (conclusive of May 2025, 4,000 such computers were donated). According to the estimate of Doniraj Kompjuter, there are about 250,000-300,000 households that are still in need for computers and hardware to ne digitally included.

Based on discussion with CSOs, they are sometimes and sporadically engaged in discussion by public sector. Yet they see inefficiencies in cross-sectorial coordination,

lack of continuity and lack of stable mechanism for public-CSO sector collaboration on the topic of digital inclusion. It is encouraging however to understand from focus group discussions that CSOs are eager to support both the advocacy and educational role in digital inclusion and want to implement community projects across the country. For this, they see it instrumental to work with schools, universities, pensioners associations.

Focus group discussions and interviews with vulnerable groups also pointed out that CSOs are mostly focused on early development and education of youth, while the elderly are not encompassed in CSO programs. Older vulnerable citizens expressed interest to be education and involved in educational programs to be able to leverage technologies and ease their lives.

Finally, CSOs see their role also in defining clearly digital inclusion and consequently following and monitoring progress.

3.4. General conclusion on intersectoral cooperation

Intersectoral cooperation in North Macedonia regarding access to digital technologies and the development of digital competencies is present but remains fragmented and inconsistent. While there are initiatives from the government, private sector, and civil society, they lack strong coordination and systemic integration across sectors. Policymakers also identify significant barriers to effective intersectoral collaboration, noting that mistrust and a lack of data-sharing between institutions hinder interoperability and burden citizens with redundant processes.

The Ministry of Digital Transformation as policymaker has the potential to centralize the issue of digital inclusion and design systemic way of creating and monitoring related policies, finances and impact.

4. RELEVANT RESEARCH ON THE TOPIC OF DIGITAL INCLUSION

While there are no available reports from public institutions in North Macedonia monitoring reports from the UNDP, OECD, and European Commission highlight North Macedonia's progress in digital transformation that emphasize the need for stronger institutional capacity, sustainable financing, and broader digital literacy to fully realize its digital potential.

4.1. Overview of research findings

First and foremost, European Commission reports find that persons with disabilities face significant discrimination due to infrastructure barriers, lack of access to information and services, and social exclusion, with many lacking access to assistive information technology (North Macedonia Report, 2022). Individuals from vulnerable groups with sensory or mobility disabilities report significant challenges due to unavailable or unaffordable assistive technologies, which severely limits their digital inclusion. Even when tools like text-to-speech exist, they are perceived as expensive and underfunded, with a view that the state does not sufficiently prioritize funding for such essential assistive technologies. A national survey found that two-thirds of respondents who declared some form of disability do not have access to assistive technology, and those that do have it through NGO efforts or have acquired it themselves (Research Report on the Use of Digital Tools by Citizens and Assessing the Digital Gap, 2023, p.8). As such a group there have been efforts to address their exclusion, specifically in the domain of media literacy and human rights (ibid, p.29).

Furthermore, the 2024 European Commission Progress Report for North Macedonia found that students with special needs are similarly at risk of digital exclusion due to "barriers in infrastructure, insufficient access to information and services (North Macedonia Report, 2024)." On a policy level, in January 2025, the Ministry of Information Society and Administration (MISA) held the first public debate regarding a law on accessibility for persons with disabilities to state websites and applications (MISA, 2025). This law has been on the national electronic platform for public discussion since January 2024 (ENER). The law seeks to "enable people with disabilities, people with visual impairments, as well as older citizens to fully and equally participate in the digital society (MISA, 2025)." And this leads to the second vulnerable group, seniors (60+) who are more likely to face digital exclusion due to a lack of digital skills and technology access (Research Report on the Use of Digital Tools by Citizens and Assessing the Digital Gap, 2023, p.22). The only policy response towards this group is to ensure "easy and understandable accessibility to content, operability of the interface and sustainability of the technical implementation (MISA, 2025)."

Similarly, low-income households are at a risk of digital exclusion due to their limited ability to access digital technology and services (Research Report on

the Use of Digital Tools by Citizens and Assessing the Digital Gap, 2023, p.7). Thus, a factor leading to digital exclusion not inherent to a certain vulnerable group is access to the internet, IT equipment, broadband etc. In North Macedonia, in 2022, 76% of all households had access to fixed broadband internet, while nationwide broadband coverage with 30-100 Mbps at 83% and >100Mbps at 63%. Mobile broadband take-up increased to 86.12% (North Macedonia Report, 2023, p.89) with access to the Internet being prevalent among 89% of respondents Research Report on the Use of Digital Tools by Citizens and Assessing the Digital Gap, 2023). The fixed broadband coverage in the country with fast broadband amounts to 88% as per the report published by the Broadband Competence Office (BCO) in March 2024 (North Macedonia Report, 2024, p.68). Even though these are good trends, this is also one reason why school-going children in some cases are vulnerable groups, with a study finding that as many as 36% of them do not have access to computers or tablets at school, affecting their ability to develop digital skills (Research Report on the Use of Digital Tools by Citizens and Assessing the Digital Gap, 2023, p.12).

In a research from UNDP from 2024 on use of digital tools by citizens, although some respondents believe that there are no obstacles for women and girls to access digital technologies or participate in digital life, some see "women's weaker digital skills (17%), as well as the price of services (16%) and availability (9%) are also considered an obstacle" (ibid, p.7). A particularly hard-hit group is the Roma population, whose low skills and access to technology hinder their ability to enjoy rights and access digital services, which are gradually becoming the medium for enjoying rights (healthcare, education, employment, social protection, etc.), (North Macedonia Report, 2023, p.39). Direct testimonies from vulnerable individuals via focus groups highlight that homeless persons, welfare recipients, and low-income groups face particularly limited internet access, hindering their engagement with digital technologies. These focus groups also revealed a more fundamental barrier, with participants pointing out that families at social risk who lack basic utilities like water and electricity are seen as being far from achieving digital inclusion. Representatives of these groups emphasized that fundamental state-led support for basic needs is a prerequisite before digital tools can be effectively utilized.

Furthermore, disparities in access are reported among children, where those from wealthier and more aware families have better access to digital tools, while others are excluded due to factors like uninformed parents and insufficient school resources, such as computers. They point out that families at social risk who lack basic utilities like water and electricity are seen as far from achieving digital inclusion, emphasizing the need for fundamental state-led support and awareness initiatives before digital tools can be effectively utilized.

The Digital Readiness Assessment (DRA) by UNDP (2023) places North Macedonia in the 'Systematic' phase of digital readiness, recognizing significant progress in establishing digital foundations and strategic focus. However, it underscores the need to further cultivate

a digital business culture and improve digital literacy among citizens (Digital Readiness Assessment, 2023). Similarly, the European Commission's progress Report on North Macedonia 2024 acknowledges advancements in digital transformation strategies but highlights the unfinished status of the long-term ICT strategy (2021–2026) and stresses the importance of sustainable financing and administrative capacity for effective digital governance (North Macedonia Report, 2024, p.68).

Complementing these findings, the OECD's Public Administration in the Republic of North Macedonia report from 2024 evaluates the country's digital policy implementation within broader public administration standards, providing insights into its institutional effectiveness in managing digital initiatives (Public Administration in the Republic of North Macedonia OECD, 2024). Based on the report, North Macedonia lacks a strong legislative or strategic policy framework to advance digital government reforms. The absence of a central policy for administrative simplification and burden reduction further hampers progress. Responsibility for digital transformation was recently assigned to the Ministry of Digital Transformation (MDT), but its capacity needs strengthening (ibid, p.11). The report notes that frequent changes in ministerial leadership (five ministers in two years) have destabilized reform co-ordination. The central administrative services portal (Uslugi) has seen a tripling of users but still captures only a small share of potential users (ibid).

According to the ITU report, the country has adopted key policies, such as the National Strategy on Achieving Equal Rights for Persons with Disabilities, emphasizing accessible information and communication technologies (ICT), (Digital Skills Assessment, 2022, p.12,15). According to the EU commission progress report from 2023, despite these policies, there have been delays and gaps in fully aligning national legislation with the EU acquis, particularly concerning the rights of persons with disabilities (North Macedonia Report, 2023, p.6). This is mainly due to lack of practical implementation of the legislature (Public Administration in the Republic of North Macedonia OECD, 2024).

According to the EU commission progress report from 2023, while North Macedonia ratified the UN Convention on the Rights of Persons with Disabilities (CRPD), many national laws still do not fully reflect its principles. EU Directive 2019/882 on accessibility requirements for products and services is not yet transposed into national legislation, leaving gaps in accessibility mandates for ICT, banking, and public services.

Although the Law on Prevention and Protection Against Discrimination was amended in 2020, enforcement remains weak, especially in ensuring accessible services and infrastructure for persons with disabilities. While the 2023–2030 National Strategy includes provisions for accessible ICT, implementation is limited and inconsistent.

Persons with disabilities continue to face barriers to political participation, including inaccessible voting stations and lack of disability-friendly election materials.

Social services and financial assistance schemes do not fully cover the diverse needs of persons with disabilities, leading to economic exclusion.

The country lacks strong enforcement mechanisms to hold institutions accountable for non-compliance with disability rights laws. The Ombudsman's Office has limited capacity to process complaints and enforce disability rights, reducing legal recourse options.

Although there are already existing initiatives to bridge the skills gap in ICT, due to poor implementation of the existing legislative framework the UNDP has recommended an initiative called the Digital Skills Development Strategy, which would aim to enhance ICT accessibility, as well as development of digital skills especially for marginalized communities (Digital Readiness Assessment, 2023, p.2).

Finally, according to the focus group discussions, the factors leading to digital exclusion can easily be ascertained after the identification of vulnerable groups, since the nature of their "vulnerability" can be ascribed as a factor of exclusion. Meanwhile, research on digital inclusion in North Macedonia uses different definition to assess the issue.

a) National research evidence on factors contributing to digital inclusion

North Macedonia's digital inclusion efforts are shaped by multiple intersecting factors, including accessibility to digital public services, education system reforms, infrastructure development, and targeted policies for vulnerable populations. While the national e-portal offers both online and offline administrative services, including accessibility features, challenges remain in ensuring equitable digital access and alignment with EU digital policies (North Macedonia Report, 2024, p.68).

In education, the introduction of the Education Management Information System (EMIS) and digital textbooks marks progress, but gaps persist in developing students' digital skills and strengthening teachers' capacities in line with the EU Digital Education Action Plan (ibid). The need for a holistic digital literacy framework is evident, as highlighted in the draft National ICT Strategy 2021-2025 and the Education Strategy 2018-2025, which emphasize integrating ICT into education to enhance digital literacy (ibid, p.65). Despite these efforts, North Macedonia lags regional peers in digital public service availability, with a score of 36 compared to the Western Balkans average of 43 (ibid, p.69).

At the household level, connectivity is nearly universal in terms of electricity and television ownership, but equitable access to digital devices remains a concern, particularly for vulnerable groups (see above section), (Research Report on the Use of Digital Tools by Citizens and Assessing the Digital Gap, 2023, p.11). Initiatives such as "Donate a Computer," which emerged during the COVID-19 pandemic, illustrate the potential for redistributing digital devices to those in need (Recommendations for the 2021-2025 ICT Strategy regarding digital inclusion, 2021), while locally developed accessibility tools like "Kiko" and "Hana" improve digital access for visually impaired

users (OKNO, 2023). The "Digital Menu" initiative further demonstrates innovation in digital inclusivity by catering to individuals with visual, auditory, and cognitive impairments (Young "Smarters" create digital solutions for inclusive restaurant services, 2020). However, as mentioned previously, the ICT education system remains largely inaccessible for many persons with disabilities, highlighting a structural barrier to their digital participation. With this being the leading driver of digital exclusion, there have been several policy-level attempts at remedying.

The National Employment Strategy 2021-2027 acknowledges the country's low adult participation in education and training, with digital skills acquisition lagging behind EU averages. In 2019, only 32% of individuals aged 16-74 had basic digital skills, compared to 56% in the EU, and only 8.9% of adults were engaged in education, far below the EU's 16.8% average (Digital Agenda Observatory – Report on the current state and roadmap for advancing the Digital Agenda in North Macedonia, 2022, p.58). To bridge these gaps, the government aims to increase adult education participation to 16% by 2027 and raise digital literacy among individuals aged 16-74 to 45% (ibid). Employment-focused IT training programs target unemployed youth, with initiatives providing advanced and introductory IT skill development, often through co-financed models. A clear example of this is the Agency of Employment's open calls for basic and advanced digital skills for unemployed persons under the age of 34 (Agency for Employment). The Basic IT Skills course was offered as an online training. The clear commitment by State bodies covering employment and education to cover these topics demonstrates that, first and foremost access, but also being equipped with the necessary skills and literacy is paramount in today's ICT-dominated world, and thus main factors of inclusive digitalization.

b) Evaluation of policies aimed at digital inclusion

North Macedonia's policies aimed at digital inclusion exhibit both strengths and critical gaps. The country has made progress by introducing national strategies, such as the ICT Strategy 2021-2025 and the Education Strategy 2018-2025, which emphasize digital literacy and the integration of ICT in education. The launch of the Education Management Information System (EMIS) and digital textbooks in primary schools marks a significant step towards digital transformation in education. However, while these efforts demonstrate a commitment to enhancing digital skills, the policies fall short in ensuring widespread access to digital devices and reliable internet, particularly for vulnerable groups. This is a significant gap which has been left to citizen initiatives like Doniraj Kompjuter to address. The national e-portal provides administrative services both online and offline, including accessibility features, yet the country underperforms in digital public service availability compared to regional peers, highlighting gaps in the practical implementation of e-governance initiatives. As mentioned previously, while initiatives such as "Donate a Computer" and digital accessibility tools like "Kiko" and "Hana" contribute to inclusivity, there is no

comprehensive government-led framework for ensuring equal digital access for persons with disabilities.

The public administration benefits from targeted digital skills training programs, yet others are not systematically targeted, especially the elderly. However, participation rates in adult education and digital training remain significantly below EU averages, pointing to the need for stronger incentives and outreach strategies. Moreover, policies aimed at improving digital literacy and workforce upskilling often lack mechanisms for monitoring their long-term impact and sustainability. The National Employment Strategy 2021-2027 sets ambitious goals with an increase in adult (18+) participation in education to 16% by 2027 and a target of 45% digital literacy among individuals aged 16-74 (Digital Agenda Observatory – Report on the current state and roadmap for advancing the Digital Agenda in North Macedonia, 2022, p.59), These are ambitious goals and achieving them requires more than just training programs-it necessitates infrastructure investments, affordability measures, and digital inclusion mandates across all public services (IPA 2019 Action Programme for the Republic of North Macedonia, 2024, p.35). These goals are set due to a lack of sufficient work force with the necessary digital literacy, i.e. the skills mismatch with labour market needs (Digital Agenda Observatory – Report on the current state and roadmap for advancing the Digital Agenda in North Macedonia, 2022, p.59). Overall, North Macedonia's policies require more robust implementation, cross-sectoral coordination, and targeted interventions for marginalized groups to ensure that digital transformation benefits all citizens equitably. A lack of implementation of policies is a common finding of all EU Progress Reports.

4.2. Presentation of additional identified key results presented in relevant research, bearing in mind the project's objectives

Metamorphosis, a North Macedonian CSO, stresses citizen-focused digitalization reforms in its April 2025 report, calling for civil society and expert involvement in reform creation, implementation, and monitoring, enhanced institutional capacities through training and technology, transparent digital solutions via open data aligned with locally adapted European laws, and strategic digital literacy programs through education. Their 2024 AI research highlights risks of discrimination and privacy violations, especially for vulnerable groups like people with disabilities, the elderly, and children, advocating for GDPR-compliant laws, ethical AI standards, and a Coalition for Responsible AI to ensure fairness in healthcare, education, and employment (Research on the Impact of New Technologies, with a Particular Focus on Artificial Intelligence, on Human Rights Online, 2024). Their 2024 analysis of 24 public sector websites reveals significant WCAG 2.1 non-compliance, creating accessibility barriers for disabled users, and recommends developer training, guideline adoption, and audits (Analysis of accessibility of websites in North Macedonia, 2024). Metamorphosis's 2024 National Strategy for Digital Literacy initiative addresses COVID-19-related gaps like

inadequate remote education and cyber vulnerabilities, aligning with EU laws like the Digital Services Act to boost digital and media literacy for participation in education, public services, and civic engagement.

Additionally, Metamorphosis has prepared a research report on the impact of artificial intelligence (AI) on human rights, with a particular focus on vulnerable groups such as people with disabilities, the elderly, children, pregnant women, and those in disadvantaged positions (e.g., workers or consumers). Key findings highlight that AI systems can exacerbate discrimination and violate rights like privacy and data protection if not ethically designed and regulated, especially through algorithmic biases embedded in training data that disproportionately affect sensitive groups.

4.3. Summary of research findings

The legislative framework of North Macedonia related to digital inclusion shows intention to address this issue but remains fragmented and without systemic approach. The Draft Law on Accessibility of Websites and Mobile Applications (2024) anchors digital inclusion in accessibility, aligning with EU Directive 2016/2102 to ensure barrier-free digital access for persons with disabilities. The National Development Strategy (2024-2044) positions digital tools as enablers of inclusion across sectors like education and healthcare, while the Draft National ICT Strategy (2023-2030) promotes digital governance to enhance service delivery. The Law on Electronic Communications (2022, amended 2024) supports broadband expansion to reduce digital exclusion. However, the absence of a unified legal definition and the outdated National Strategy for Social Inclusion (2010-2020) reveal gaps in addressing vulnerable groups comprehensively, with implementation lagging policy ambitions. The concept of digital inclusion in North Macedonia emphasizes accessibility and skills development, resonating but not fully overlapping with the project definition of enabling personal and professional success through digital support. The National Strategy for People with Disabilities (2023-2030) mandates accessible e-services, while the Education Strategy (2018-2025) integrates digital literacy into curricula, targeting youth inclusion in the digital economy. Yet, the lack of a centralized "one-stop-shop" for digital inclusion policies hampers coherence. Vulnerable groups including people with disabilities, seniors, low-income households, and Roma are recognized, but specific measures, like the Roma Inclusion Strategy's 30% ICT skills target by 2030, lack concrete programs, underscoring the need for targeted action.

The institutional capacity to support digital inclusion is constrained. The establishment of the Ministry of Digital Transformation in 2024 and the National Council for Digital Transformation marks progress toward coordinated governance. However, the proposed Agency for Digital Transformation remains unestablished as of March 2025, limiting strategic oversight. The European Commission's 2024 Progress Report highlights weak administrative capacity and reliance on foreign funding, with only 39% of planned reforms implemented in 2023. Monitoring

and evaluation systems are outlined in strategies like the National ICT Strategy (2021-2025), but no public reports exist, reflecting a critical gap in assessing policy impact and ensuring accountability.

Although CSOs and to a very limited extent private sector fill in significant gaps in addressing digital inclusion, their efforts are not plugged in the systemic policy frameworks, they are not regularly consulted and have no financial sustainability to continuously support digital inclusion. There are many successful CSO and international initiatives that are good models in partially bridge these gaps. The YMCA Bitola's Digital Community Hub trained nearly 3,000 youths in 2024, focusing on rural and marginalized groups. The UNDP's Digital Gap Assessment informs strategies for inclusive digital literacy, while the "Donate a Computer" initiative equips vulnerable communities with devices. However, these efforts are limited in scale and sustainability, with Metamorphosis being a rare CSO voice in policy advocacy specifically on the topic of digital inclusion. The private sector's contributions, like Brainster's deferred tuition model for IT education, show promise but lack systemic integration with public strategies, highlighting the need for stronger public-private partnerships.

Finally, many initiatives such as e-uslugi are not sufficiently promoted, brought closer to its users, while the elderly are not targeted with digital inclusion programs in any way.

5. EXAMPLES OF NATIONAL PRACTICES

Several successful cases of supporting digital inclusion in North Macedonia can be highlighted:

1. Donate a Computer, *2016-ongoing* (Doniraj Kompjuter)

   This citizen initiative provides digital devices to marginalized groups, particularly students and low-income individuals, by collecting and refurbishing used computers for redistribution. It managed to collaborate with a lot of partner businesses, institutions, and individuals, collecting and refurbishing donated computers before distributing them to those in need. Led by a volunteer network and supported by civil society organizations and businesses, this initiative played a crucial role during the COVID-19 pandemic, when remote learning highlighted the digital divide. The action managed to donate thousands of computers (4,000 so far), significantly increasing access to digital education and services. The initiative also raised awareness of digital inequality and promoted sustainability through device reuse. It managed to equip 55 schools with IT equipment (Initiation Donate a computer, 2024). Yet, public institutions have not reached out to potentially partner or scale this successful initiative.

2. Education Management Information System (EMIS) *2024-ongoing*

   The idea was the development of a digital database for educational institutions; introduction of digital textbooks in primary education; equipping schools with digital infrastructure; and training teachers in digital competencies in order to digitize and centralize the management of the education system, improving access to digital tools and resources for students and teachers. The structure merged the two largest systems for administrative work and establish efficient control mechanisms, increased use, improved integration and general use of new technology with various possibilities for data analysis and processing (MON). It managed to improve educational administration and planning, enhanced availability of digital learning materials, and a gradual increase in digital literacy among students and teachers. This project was led by the Ministry of Education and Science, supported by EU and international partners.

3. Digital Inclusion: partnership of the Foundation Telekom for Macedonia and UNICEF for inclusion of children and youth with disabilities *2019-ongoing* (Telekom, 2020).

   In 2019, the Foundation Telekom for Macedonia and UNICEF launched a partnership to promote digital inclusion for children and young people with disabilities. This collaboration aimed to co-create innovative digital solutions that enhance access to education and community participation. One key initiative was the "Generation Unlimited" Design Thinking Challenge, which invited young innovators to propose digital solutions addressing barriers faced by individuals with disabilities. The top ten teams, each including at least one person with a disability, participated in workshops to further develop their ideas. Another significant project was the "Without Barriers" accessibility map, a digital platform allowing users to identify and share information about accessible and non-accessible public spaces, such as buildings, transport, and recreational

areas. This tool aimed to improve mobility and accessibility for individuals with disabilities. The partnership built upon previous collaborations, including the establishment of early childhood development centers in rural areas, and reflected a commitment to leveraging technology for social inclusion. The latest initiative took place in 2023, and it is unclear if it is still ongoing.

- In comparison, the case of the e-Uslugi digital platform serves as an example of a promising but poorly executed initiative, illustrating how digital solutions can fall short without coordinated implementation and institutional support.

E-uslugi digital platform for public services *(2019-ongoing)* has much bigger potential than its current realization. Several reports confirm this as well. It has the potential to be the one-stop-shop for all public services in the country but it fails to live up to its potential. This is evident by the fact that less than half of the citizens actually use it, and secondly because there are inter-institutional barricades that inhibit its growth and usability. Finally, electronically issued documents still face some reluctance from public institutions concerning their validity (North Macedonia Report, 2024, p.26), (Study on the quality of e-services for business entities in North Macedonia). From January 2025 a new law has promised to equalise electronically issued documents with physically issued ones, but its practical implementation remains to be assessed (RadioMOF, 2025).

Focus group discussion reveals that e-uslugi resonates with a prior initiative like 'Computer for Every Child,' which, while aiming to provide equipment, reportedly suffered from a lack of adequate content, leading to ineffective use and eventual removal of some equipment. The same happens with e-uslugi, the initiative is launched, but there is no adjacent awareness raising content, engagement with citizens, and even buy-in from administration for the initiative to experience a massive impact as it has the potential to do so. This experience underscores the crucial need for full synchronization of equipment, educational content, and supporting legal frameworks for such initiatives to achieve effective outcomes.

6. KEY CHALLENGES AND AREAS FOR IMPROVEMENT

6.1. Challenges in ensuring digital inclusion

Based on the overall assessment of digital inclusion in North Macedonia including desktop research and field research including focus groups and interviews with relevant stakeholders, the following key areas challenges and areas of improvement have been identified:

- A **lack of coherent policy framework**, with **lack of clear definition of digital inclusion**, and the **absence of a unified "one-stop-shop" policy for digital inclusion** leads to fragmented efforts across sectors. Multiple strategies (e.g., Draft National ICT Strategy, Education Strategy) address digital inclusion, but without centralized coordination, implementation is inconsistent, reducing effectiveness. Focus groups with citizens' organizations provided a potential reason for this inconsistency, observing that national strategies are often simply rebranded without substantial changes. In the view of these organizations, this approach lacks innovation and consistently fails to effectively address critical areas like gender equality, disability, or digital inclusion. Cross-institutional working groups are nascent, yet as in other policy areas, not particularly efficient and without track record of successful work.
- There is **no efficient monitoring and evaluation system set for digital inclusion progress**, with no public monitoring reports available. This hinders accountability and the ability to assess policy impact, as noted in the outdated National ICT Strategy (2021–2025) and lack of data on outcomes. As a highly intersectional policy area but also fundamental for supporting own population in times of drastic technological shifts, digital inclusion can only thrive on clear baseline and continuous data gathering.
- There is **limited digital literacy**, especially among vulnerable groups, where only 35% of the population has basic digital skills (2021), with older people (81.9% internet usage vs. 93.6% overall) and those with lower education (27.7% with only primary education) facing significant barriers, limiting access to e-services and opportunities. This poses a challenge for further exclusion for job opportunities, social inclusion and citizen participating in key decision-making processes. Vulnerable groups also highlight **barriers to training**, noting that teacher training in digital skills can be hindered by strict or poorly implemented criteria from the Bureau for Development of Education (BDE), while seniors often face a general lack of training opportunities.
- While urban households have 92.1% internet access, rural areas lag at 88.5%, with lower broadband penetration restricting access to digital services. Confirming these findings, citizens' organizations report that **rural areas face weak internet signals, lack of equipment, and low technical readiness**, which restricts digital inclusion. This gap exacerbates exclusion for rural and marginalized communities like Roma. This gap also prevents economic development, e.g. tourism development and

attractiveness of these locations for economic activity, which could further lead to lack of economic opportunities and laggard areas of the country.

- There is an inadequate accessibility for people with disabilities, where **two-thirds of individuals with disabilities lack assistive technologies**, and e-services often fail to meet accessibility standards, despite policies like the Draft Law on Accessibility (2024). Slow implementation further isolates this group. Furthermore, citizens' organizations report that state digital services are often complex, with dysfunctional interfaces, rendering them inaccessible to many citizens due to design and information barriers.

- There is a weak institutional capacity and funding sustainability. **Frequent leadership changes and reliance on foreign funding undermine long-term digital inclusion efforts.** The unestablished Agency for Digital Transformation (as of May 2025) limits efficient governance. This is compounded by challenges highlighted by policymakers, such as **shortages of qualified IT personnel and weak IT departments within ministries**, which impede digitalization efforts. Furthermore, they point to a fragmented approach to digitalization that often lacks a unified strategy, leading to inefficiencies.

- There is **no sufficient initiative by private sector actors, economic chambers and other business support organizations to facilitate and support digital inclusion on the side of the job market.** While there are initiatives that offer on the job trainings, and unique initiatives like Banister's vouchers for students to obtain skills and pay for trainings after being employed, there is still **lack of dedicated private sector support programs specifically for digital inclusion.**

- There is **no sufficient utilization and partnership with CSOs to address digital inclusion**, besides track record of CSOs filling in gaps of digital inclusion initiatives.

6.2. Areas for improvement

- **Development of unified policy framework for digital inclusion**. The Ministry of Digital Transformation should spearhead the development of a centralized, cohesive digital inclusion strategy to streamline efforts across sectors, replacing fragmented policies like the National ICT Strategy and Education Strategy. Preconditions for this include prioritization of digital inclusion as a policy area by the Ministry of Digital Transformation, clearly defining digital inclusion and affected groups, setting data depository and baseline indicators, and set a policy design intra-sectorial working group to work on coherent digital inclusion policy with clear mandates, including representatives from government, CSOs, and private sectors, to replace inefficient cross-institutional groups. Such engagement would also require alignment with EU frameworks such as the European Declaration on Digital Rights, which is why it is important for the EU units within the Ministry of Digital Transformation and the Ministry of European Integration to be actively involved.

- **Setting up of a robust monitoring and evaluation system for digital inclusion.** The

Ministry of Digital Transformation needs to create a transparent monitoring and evaluation framework with public reporting to track digital inclusion progress and ensure accountability. For this aim, the **ministry should develop baseline data collection protocols**, integrating indicators like those in the Digital Economy and Society Index (DESI) to measure access and skills. The Ministry of Digital Transformation should also publish annual digital inclusion reports, building on the National ICT Strategy's intent. It should also engage CSOs and academia to conduct independent audits, ensuring objective assessments.

- **Enhance digital literacy for vulnerable groups programs.** The Ministry of Digital Transformation should scale up targeted digital literacy programs for older people, low-educated individuals, and other vulnerable groups to boost participation in e-services and job markets. In collaboration with the Ministry of Education, it should integrate digital skills into curricula, aligning with the EU DigiComp Framework, as per the Education Strategy 2018-2025. The Government can provide continuous funding for CSO-led initiatives, like YMCA Bitola's Digital Community Hub, to deliver community-based training for seniors and Roma. The Ministry of Education should also provide continuous teacher training on digital competencies to ensure inclusive education delivery. Older people need better access to continuous digital literacy and skills trainings.

- **Dedicated efforts for bridging the urban-rural digital divide and opening-up economic opportunities via support for digitalization of rural areas.** The Ministry of Digital Transformation should work on expanding broadband infrastructure and affordability in rural areas to ensure equitable access, supporting economic and tourism development. It should enforce the Law on Electronic Communications to achieve universal broadband by 2028. It should also subsidize internet costs for rural households, leveraging partnerships with telecom providers. Finally, the Ministry can establish digital hubs in rural areas, as proposed in the National Development Strategy 2024-2044, to provide access points and ongoing trainings for populations in rural areas tailored for different ages and needs.

- **Improved accessibility for people with disabilities.** The Ministry of Digital Transformation should ensure that all e-services and digital tools meet accessibility standards, reducing exclusion for people with disabilities. It should also support the implementation of the Draft Law on Accessibility (2024) by 2027, mandating text-to-speech and braille-compatible formats. The Ministry of Digital Transformation should also allocate funding for assistive technologies in schools and public institutions, building on initiatives like the e-Accessible Education Project. It can partner with CSOs to monitor compliance and gather user feedback, as recommended above.

- **Strengthen institutional capacity and sustainable funding.** With a Ministry dedicated to digital transformation, there is an opportunity for the Government of North Macedonia to build stable institutional frameworks and reduce reliance on foreign funding to ensure long-term digital inclusion

efforts. It should operationalize the National Council for Digital Transformation with clear governance roles, as established in 2024. Furthermore, the Government should increase budget allocations for digital inclusion and tracking expenditures via a centralized database. International funding should match digital inclusion needs but should not be source to fully rely on. Finally, the Ministry of Digital Transformation should be strengthened in terms of staff and capacity to maintain reform momentum, addressing concerns about frequent changes.

- **Increased private sector engagement with digital inclusion.** There is a need to encourage private sector initiatives to support digital inclusion through job market integration and training programs. Some mechanisms could include offering tax incentives for companies investing in digital skills programs, expanding models like Brainster's voucher system, or state aid schemes for companies with dedicated digital inclusion efforts. The Ministry of Digital Transformation can foster public-private partnerships as seen in the Foundation Telekom for Macedonia's projects, to scale digital literacy initiatives. It can also maintain a database of companies with expressed interest to support digital inclusion and mobilize when needed. Finally, the Ministry can engage economic chambers and digital consultancies to develop sector-specific digital inclusion strategies, aligning with the National Strategy for Employment 2021-2027.

7. RECOMMENDATIONS FOR POLICY IMPROVEMENT

This chapter will include specific recommendations on two levels, general population and vulnerable groups at risk of digital exclusion.

7.1. Recommendations concerning all general population

There is a need for a stronger legislative framework to advance digital government reforms (Public Administration in the Republic of North Macedonia, 2024). Ongoing efforts are required to enhance digital literacy among citizens to fully utilize available technologies (Digital Readiness Assessment, 2023). There are several policy level actions that can be undertaken. For example:

- Develop and enact laws that establish **clear guidelines for digital governance** while ensuring alignment with the EU acquis (for example the European Interoperability Framework and Interoperable Europe Act).
- Establish a **centralized digitalization expenditure database.** The Ministry of Digital Transformation should create a unified database to track all digitalization-related expenditures across sectors, including education, health, and telecommunications. This database should categorize spending specifically for digital inclusion initiatives, such as those targeting vulnerable groups (e.g., Roma, old people, people with disabilities). Such database will enhance transparency but also support finance mobilization.
- To enhance policy design, citizens' organizations recommend that **calls for participation in working groups be made public and actively involve all interested organizations**, not just select working groups, to ensure broader input. Implementing robust accountability mechanisms to ensure strategies are fully executed, including clear consequences for non-completion, is also recommended to drive meaningful progress.
- Implement the Law on Electronic Documents, Electronic Identification, and Trust Services to **enhance the legal recognition of electronic documents and signatures.** This implementation has been promised to begin as of January 2025 (Radio MOF, 2025).
- **Strengthen existing laws to protect personal data** and secure digital infrastructures, aligning with the EU's General Data Protection Regulation (GDPR) and Network and Information Systems (NIS) Directive (Digital Readiness Assessment, 2023, p.18).
- Offer **specialized training programs for teachers to enhance their digital competencies**, enabling them to effectively impart digital skills to students (Empowering Macedonian Youth to bridge media literacy and critical thinking gaps, 2025).
- Create a **centralized database for diplomas and essential documents**, enabling ex officio data exchange between institutions to reduce bureaucratic burdens, and conducting accurate diagnostics of citizens' digital skills to inform targeted intervention.

- Establish initiatives like the YMCA's Digital Community Hub to **offer free digital education, focusing on high school and upper-grade primary students**, thereby fostering digital inclusion at the grassroots level (YMCA, 2024).

7.2. Recommendations relating to vulnerable groups at risk of digital exclusion

To prevent digital exclusion and promote digital inclusion for vulnerable groups in North Macedonia, decision-makers civil society organizations (CSOs), can draw on the following recommendations:

- **Integrate comprehensive digital literacy curricula and teacher training**. With 36% of school children lacking access to computers or tablets and only 32% of adults possessing basic digital skills (2019), systemic educational reforms are critical to prevent exclusion among youth and marginalized groups, ensuring lifelong digital competence. The Ministry of Education and Science should mandate the integration of digital literacy as a core component of primary and secondary curricula, aligned with the EU DigiComp Framework, by 2026. This includes updating the Education Strategy (2018-2025) to ensure all students, especially those with disabilities and from rural areas, have access to digital tools and assistive technologies in schools. Additionally, establish mandatory digital skills training for teachers, incorporating the European Framework of Digital Competencies for Educators, to enhance their capacity to deliver inclusive digital education. Organizations like YMCA Bitola could partner with schools to provide supplementary digital literacy workshops targeting Roma, rural students, and children with disabilities, leveraging initiatives like the Digital Community Hub to scale impact. From the perspective of vulnerable groups, implementing education to foster critical thinking and media literacy is emphasized as necessary for enabling both young and old to discern reliable online information and navigate the digital world safely.

- **Enhance accessibility of e-health services for vulnerable groups.** Limited accessibility of e-health services excludes people with disabilities and those with low digital skills, exacerbating healthcare disparities. Two-thirds of disabled individuals lack assistive technologies, underscoring the need for inclusive digital health solutions. The Ministry of Health should prioritize making e-health platforms, such as "My Term" and e-zdravstvo.mk, fully accessible by 2027, incorporating text-to-speech, braille-compatible formats, and non-majority language options (e.g., Albanian) to comply with the Draft Law on Accessibility (2024). The Ministry should allocate funding to provide assistive technologies in healthcare facilities for people with disabilities and seniors. CSOs should advocate for user feedback mechanisms to monitor e-health service accessibility and conduct awareness campaigns to educate vulnerable groups, particularly seniors and low-income households, on using these platforms.

- **Expand affordable broadband access in rural areas.** Despite 88.8% fixed broadband coverage (2024), rural areas and marginalized groups like Roma face connectivity barriers, limiting access to digital services and opportunities, with only 75.57% of households having fixed broadband in 2022. The Ministry of Digital Transformation and the Agency for Electronic Communications should enforce the Law on Electronic Communications (2022, amended 2024) to achieve universal broadband coverage by 2028, prioritizing rural and Roma communities. Subsidize internet costs for low-income households and partner with private providers like Makedonski Telekom and A1 Macedonia can offer affordable plans. CSOs should monitor broadband expansion progress and advocate for community-based internet access points, such as internet kiosks, in underserved areas to bridge connectivity gaps.

- **Protect vulnerable groups from abuse based on AI tools.** Desgin of legal frameworks, such as the EU's General Data Protection Regulation (GDPR) and North Macedonia's data protection laws, to safeguard these rights, alongside ethical standards to ensure fairness, transparency, and safety. It underscores the importance of protecting vulnerable populations from discriminatory AI applications in areas like healthcare, education, and employment, advocating for inclusive policies, stakeholder collaboration, and public awareness to prevent harm and promote equitable access to technology. The formation of a Coalition for Responsible AI in North Macedonia is proposed to foster ethical AI development, ensuring it respects human dignity and prevents systemic biases against marginalized groups (Research on the Impact of New Technologies, with a Particular Focus on Artificial Intelligence, on Human Rights Online, 2024).

- **Scale targeted digital inclusion programs for vulnerable groups.** CSO initiatives are critical but limited in scale, with few active players addressing digital exclusion. The government should establish a grant fund by 2026 to support CSO-led digital inclusion initiatives, focusing on vulnerable groups like Roma, seniors, and people with disabilities. This fund, potentially managed by the National Council for Digital Transformation, should prioritize projects replicating and leveraging successful models like "Donate a Computer" and YMCA Bitola's Digital Community Hub. CSOs, such as Metamorphosis and others, could collaborate to develop scalable programs, such as mobile digital literacy clinics, to train seniors, Roma, and rural communities in using e-services and digital tools, ensuring sustainability through partnerships with private sectors and international donors like UNDP.

- **Strengthen monitoring and accessibility of e-services.** North Macedonia scores 36 in digital public service availability (2024), below the regional average of 43, with no public monitoring reports. Inaccessible e-services exclude vulnerable groups, particularly people with disabilities, necessitating stronger governance and accountability to ensure inclusive digital transformation. The Ministry of Digital Transformation should operationalize the Agency for Digital Transformation by mid-2026 to oversee a

unified digital inclusion strategy, including a robust monitoring and evaluation framework for e-services as outlined in the National ICT Strategy (2023-2030). Ensure all government websites and e-services, like uslugi.gov.mk, comply with accessibility standards for people with disabilities by 2027, incorporating regular user feedback mechanisms. CSOs should conduct independent audits of e-service accessibility and publish reports to hold institutions accountable, while partnering with the government to co-design inclusive digital platforms for low-income and disabled users.

- **Provide incentives for private sector to foster digital inclusion**. Offering tax incentives or subsidies for companies that invest in digital literacy programs, provide affordable devices, or develop accessible technologies for vulnerable groups such as people with disabilities, seniors, and rural communities, would encourage meaningful participation. For instance, replicating models like Brainster's "Study Now, Pay When Employed" IT training program through public-private partnerships could scale digital skills development, particularly for unemployed youth and low-income groups. Additionally, the Ministry of Digital Transformation should collaborate with economic chambers to create sector-specific digital inclusion strategies, ensuring businesses integrate inclusive practices into their operations. Establishing a centralized database to track private sector contributions, as recommended in the policy improvement section, would enhance transparency and facilitate coordination, fostering a sustainable ecosystem where private sector innovation complements public efforts to bridge the digital divide.

- **A long-term recommendation from CSOs is a creation of a national fund**, supported by both the state budget and donor contributions, that is proposed to provide equipment, training, and sustained support for marginalized groups like the Roma and persons with disabilities.

- As a short-term, urgent measure, organizations suggest **providing internet vouchers and devices to at-risk students** through effective collaboration between the Ministry of Education and local governments.

- **Strengthen support for local institutions**, such as social work centers and schools as they are closest to citizens but often have limited technical capacity and resources. Support should include providing training and simple protocols to help these institutions effectively assist digitally excluded individuals and facilitating partnerships and networking with civil society organizations to offer field assistance and enhance local institutional capabilities.

- **Involve local governments more actively in training vulnerable groups**, establishing clearer definitions for vulnerable categories, and ensuring universal internet access is treated as basic infrastructure.

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ANNEX 1.
SUMMARY OF RESEARCH FINDINGS

TOPIC	CLAIMS This finding is not at all consistent with the research findings in my country	AVAILABLE ANSWERS				
		This finding is partially consistent with the research findings in my country	This finding is very consistent with the research findings in my country	This finding is completely consistent with the research findings in my country	Assessment is not possible due to a lack of research or other reasons	
EQUALITY OF ACCESS TO THE INTERNET AND DIGITAL TECHNOLOGIES	Research shows a significant difference in access to the Internet and digital technologies between urban and rural areas. People from rural areas often have limited access to the internet and technology.	1	2	3	4	5
Provide a brief explanation of your answer. When explaining your answer, supplement your answer with numerical indicators and/or other research findings in your national context whenever possible.		There is a disparity in access to digital technologies between urban and rural populations in North Macedonia, but not as significant. Specifically, 92.1% of urban households have internet access compared to 88.5% of rural households, indicating a modest but significant gap. Rural areas also face connectivity barriers, with lower broadband penetration limiting access to digital services (Section 4.1.a). While fixed broadband coverage is 88.8% nationwide across rural areas, rural communities, alongside marginalized groups like Roma, experience reduced access to high-speed internet (Section 4.1.a). Additionally, the Program for Sustainable Local Development and Decentralization (2021–2026) prioritizes broadband expansion in rural areas, acknowledging their lag in ICT adoption (Section 1). Overall, the research confirms an urban-rural digital divide, with rural populations facing greater challenges in accessing reliable internet and digital tools, impacting their inclusion in the digital economy and services.				

TOPIC	CLAIMS This finding is not at all consistent with the research findings in my country	AVAILABLE ANSWERS This finding is partially consistent with the research findings in my country	This finding is very consistent with the research findings in my country	This finding is completely consistent with the research findings in my country	Assessment is not possible due to a lack of research or other reasons	
EQUALITY OF ACCESS TO THE INTERNET AND DIGITAL TECHNOLOGIES	Research shows a significant difference in access to the Internet and digital technologies among different socioeconomic groups. Older people, people with disabilities, people with lower levels of education, etc., have limited access to the internet and technology.	1	2	**3**	4	5
Provide a brief explanation of your answer. When explaining your answer, supplement your answer with numerical indicators and/or other research findings in your national context whenever possible.		**Older People (65-74 years old)**: Internet usage among older people is lower at 81.9%, compared to 93.6% for the total population. Older people face digital exclusion due to limited digital skills and technology access, with policies only recently addressing accessible content for this group (Section 4.1.a). **People with Disabilities**: Two-thirds of individuals with disabilities lack access to assistive technologies, severely limiting their digital participation. Despite policies like the National Strategy for People with Disabilities (2023-2030) mandating accessible e-services, practical implementation lags, exacerbating exclusion. **People with Lower Levels of Education**: While there is no data on the digital skills levels per level of education, 27.7% of the population in North Macedonia has only primary education and only 32% of adults have basic digital skills, far below the EU average. Low educational attainment correlates with reduced digital literacy, hindering access to digital tools and services.			

TOPIC	CLAIMS This finding is not at all consistent with the research findings in my country	AVAILABLE ANSWERS This finding is partially consistent with the research findings in my country	This finding is very consistent with the research findings in my country	This finding is completely consistent with the research findings in my country	Assessment is not possible due to a lack of research or other reasons	
DIGITAL SKILLS	Many studies indicate that a significant part of the population (especially older people and people with low levels of education) lacks basic digital skills, significantly hindering their use of digital tools and access to important information.	1	2	3	4	5
Provide a brief explanation of your answer. When explaining your answer, supplement your answer with numerical indicators and/or other research findings in your national context whenever possible.	The findings in this report confirm that a significant portion of North Macedonia's population, particularly older people and those with low levels of education, lacks basic digital skills, substantially hindering their ability to use digital tools and access critical information. Only 35% of the total population had basic, intermediate, or advanced digital skills in 2021, well below the EU average of 56%. Older individuals (65-74 years) are especially affected, with 65.1% actively using social media compared to 84.2% overall, reflecting limited digital proficiency For those with lower education levels, the findings suggest that 27.7% of the population has only primary education, correlating with low digital literacy, as only 32% of adults aged 16-74 had basic digital skills in 2019. This skills gap restricts access to e-services, with just 7% of the population using the national e-government platform in 2024. The 2024 European Commission Progress Report and UNDP assessments highlight the need for targeted digital literacy programs to bridge this divide, particularly for these vulnerable groups.					

TOPIC	CLAIMS This finding is not at all consistent with the research findings in my country	AVAILABLE ANSWERS This finding is partially consistent with the research findings in my country	This finding is very consistent with the research findings in my country	This finding is completely consistent with the research findings in my country	Assessment is not possible due to a lack of research or other reasons	
IMPACT OF THE COVID-19 PANDEMIC	The pandemic accelerated the transition to digital services in education, work, and everyday life. Research shows that many people have become more aware of the importance of digital skills and tools during this period, but there are still major differences in the ability to adapt.	1	2	3	4	5
Provide a brief explanation of your answer. When explaining your answer, supplement your answer with numerical indicators and/or other research findings in your national context whenever possible.	The COVID-19 pandemic significantly accelerated the transition to digital services in North Macedonia, increasing the awareness of digital skills and tools while exposing existing disparities in digital access. The findings suggest that the crisis prompted rapid adoption of remote learning, with initiatives like the EDUINO platform and over 8,000 televised video lessons enabling education continuity (Section 3.2). This shift underscored the importance of digital competencies, particularly for students and educators, as highlighted by the Concept for Distance Learning (2020), which introduced creative tools like blended and game-based learning (Section 2.3). However, the pandemic also revealed stark inequities: 36% of schoolchildren lacked access to computers or tablets, severely limiting their participation in digital education (Section 4.1.a). Initiatives like "Donate a Computer" emerged to address this gap, redistributing devices to marginalized groups (Section 5.1). While e-services expanded, low adoption rates—only 7% used the national e-government platform in 2024—indicate persistent barriers, particularly for rural areas and vulnerable groups like seniors and low-income households (Section 2.2). The 2023 UNDP Digital Readiness Assessment confirms that, despite increased digital reliance, gaps in infrastructure and skills continue to hinder equitable access, amplifying the digital divide during the crisis (Section 2.7).					

TOPIC	CLAIMS This finding is not at all consistent with the research findings in my country	AVAILABLE ANSWERS This finding is partially consistent with the research findings in my country	This finding is very consistent with the research findings in my country	This finding is completely consistent with the research findings in my country	Assessment is not possible due to a lack of research or other reasons	
TRUST IN TECHNOLOGY	Research shows that citizens' concerns regarding the privacy and security of data when using digital services can further affect their willingness to engage in the digital world.	1	2	3	4	5
Provide a brief explanation of your answer. When explaining your answer, supplement your answer with numerical indicators and/or other research findings in your national context whenever possible.	While specific data on rising concerns isn't provided, the combination of weak governance, limited e-service uptake, and ongoing cybersecurity efforts implies that privacy and security worries are a significant barrier to digital engagement, particularly for vulnerable groups. The 2024 OECD report highlights structural challenges, noting that the absence of a robust legislative framework for digital government reforms, coupled with weak administrative capacity, undermines trust in digital services (Section 2.4). The Law on Personal Data Protection (2020), aligned with GDPR, aims to secure digital participation, but implementation remains inconsistent, potentially fueling apprehensions (Section 2.3). Additionally, there is low adoption of e-services, with only 7% of the population using the national e-government platform in 2024, suggesting distrust or reluctance possibly linked to privacy concerns (Section 2.2). The National Strategy for Cyber Security (2025-2028) seeks to address these issues through education and safety measures, but its recent adoption means its impact is yet to be felt.				

TOPIC	CLAIMS This finding is not at all consistent with the research findings in my country	AVAILABLE ANSWERS This finding is partially consistent with the research findings in my country	This finding is very consistent with the research findings in my country	This finding is completely consistent with the research findings in my country	Assessment is not possible due to a lack of research or other reasons	
TRAINING INITIATIVES	There are a growing number of programmes and initiatives that focus on increasing digital literacy, especially among vulnerable groups, such as older adults, women, and people with disabilities. Research often emphasizes the need for continuous education and training in this area, along with the need to enrich the offer.	1	2	3	4	5
Provide a brief explanation of your answer. When explaining your answer, supplement your answer with numerical indicators and/or other research findings in your national context whenever possible.	There is a modest but growing number of programs and initiatives aimed at increasing digital literacy in North Macedonia, with some focus on vulnerable groups like older adults, women, and people with disabilities, though the scale and impact remain limited. Initiatives such as the YMCA Bitola's Digital Community Hub (2024) trained 2,946 participants, including disadvantaged youth, in digital skills, issuing over 490 certificates (Section 3.3). The Foundation Telekom for Macedonia and UNICEF partnership (2019) targeted children and youth with disabilities through projects like the "Generation Unlimited" Challenge and the "Without Barriers" accessibility map, promoting digital inclusion (Section 5.1). The National Strategy for Employment (2021-2027) includes IT training for unemployed youth, with co-financed programs addressing digital skills gaps (Section 4.1.c). However, there is a scarcity of targeted support programs for groups like the Roma, despite the 2022-2030 Roma Inclusion Strategy setting a 30% ICT skills target (Section 3.1). For older adults, specific initiatives are lacking, though policies aim for accessible content (Section 5.1.c). The 2023 UNDP Digital Readiness Assessment and 2024 European Commission Report emphasize the need for continuous education and broader offerings, noting that only 32% of adults have basic digital skills, far below EU averages (Section 4.1.a). While efforts are emerging, they are fragmented, pointing to the need for more comprehensive, sustained training programs to bridge the digital literacy gap for vulnerable groups.				

TOPIC	CLAIMS This finding is not at all consistent with the research findings in my country	AVAILABLE ANSWERS This finding is partially consistent with the research findings in my country	This finding is very consistent with the research findings in my country	This finding is completely consistent with the research findings in my country	Assessment is not possible due to a lack of research or other reasons	
CHALLENGES IN EDUCATION	Research shows that the education system in our country is still not fully adapted to digital learning. Additional investments in infrastructure and teacher training are needed to enable the integration of digital tools into teaching.	1	2	3	4	5
Provide a brief explanation of your answer. When explaining your answer, supplement your answer with numerical indicators and/or other research findings in your national context whenever possible.	The findings indicate that North Macedonia's education system is not fully adjusted to digital learning, with significant gaps in infrastructure and teacher training hindering the integration of digital tools. The Education Strategy (2018-2025) and National ICT Strategy (2021-2025) prioritize digital literacy and ICT integration, introducing initiatives like the Education Management Information System (EMIS) and digital textbooks in primary schools (Sections 2.3, 4.1.e). However, 36% of schoolchildren lack access to computers or tablets, limiting digital learning opportunities (Section 4.1.a). The 2020 Concept for Distance Learning suggest that there should be introduction of tools like blended learning. Teachers' digital competencies are also insufficient, with the 2021-2025 ICT Strategy acknowledging critical gaps in training (Section 3.2.). The 2023 UNDP Digital Readiness Assessment highlights the need for systemic upgrades in ICT infrastructure and educator skills to align with the EU Digital Education Action Plan (Section 4.1.d). While efforts like the Project for e-Accessible Education (2010-2015) introduced assistive technologies in 31 schools, their sustainability is unclear (Section 3.2). Additional investments in infrastructure - such as devices and broadband - and comprehensive teacher training aligned with the European Framework of Digital Competencies for Educators are essential to enable effective digital learning integration (Sections 3.2, 4.1.c).				

TOPIC	CLAIMS This finding is not at all consistent with the research findings in my country	AVAILABLE ANSWERS This finding is partially consistent with the research findings in my country	This finding is very consistent with the research findings in my country	This finding is completely consistent with the research findings in my country	Assessment is not possible due to a lack of research or other reasons	
POLITICAL AND INSTITUTIONAL SUPPORT	Research indicates the need for stronger policies and strategies at the national level to improve digital inclusion. There are initiatives at the government level, but more coordination and resources are needed.	1	2	3	4	5
Provide a brief explanation of your answer. When explaining your answer, supplement your answer with numerical indicators and/or other research findings in your national context whenever possible.	There is a need for more coherent policies and strategies at the national level to improve digital inclusion in North Macedonia, despite existing government initiatives, due to persistent gaps in coordination and resource allocation. The National ICT Strategy (2023-2030) and Draft Law on Accessibility (2024) aim to enhance digital governance and accessibility, but the absence of a unified "one-stop-shop" policy for digital inclusion hampers coherence (Sections 1; 2.3). The 2024 European Commission Report notes that only 39% of planned reforms were implemented in 2023, reflecting weak administrative capacity and reliance on foreign funding, which raises sustainability concerns (Section 2.7). The establishment of the Ministry of Digital Transformation and the National Council for Digital Transformation in 2024 marks progress, but the proposed Agency for Digital Transformation remains unestablished as of March 2025, limiting oversight (Section 2.4). Monitoring and evaluation mechanisms, outlined in the National ICT Strategy (2021-2025), lack public reporting, undermining accountability (Section 2.7). The 2023 UNDP Digital Readiness Assessment and OECD reports emphasize the need for enhanced coordination, sustainable financing, and broader digital literacy efforts to ensure inclusive digital transformation, particularly for vulnerable groups (Section 2.4).				

ANNEX 2.
SUMMARY OF SUCCESSFUL CSOS LED INITIATIVES ON DIGITAL INCLUSION IN NORTH MACEDONIA

Name of action	Implementing org/ins.	Partners (if applicable)	Description of action (objectives/goals/activities)	Target groups	Results
Donate a computer	Donate a computer	/	This citizen initiative sought out to provide digital devices to marginalized groups, particularly students and low-income individuals, by collecting and refurbishing used computers for redistribution.	Marginalized communities, vulnerable socio-economic groups, especially children.	The action managed to donate hundreds of computers, significantly increasing access to digital education and services. The initiative also raised awareness of digital inequality and promoted sustainability through device reuse. It managed to equip 55 schools with IT equipment
Education Management Information System (EMIS)	Ministry of education and science	EU	The idea was the development of a digital database for educational institutions; introduction of digital textbooks in primary education; equipping schools with digital infrastructure; and training teachers in digital competencies in order to digitise and centralize the management of the education system, improving access to digital tools and resources for students and teachers.	Education staff.	improve educational administration and planning, enhanced availability of digital learning materials, and a gradual increase in digital literacy among students and teachers.
Digital Inclusion	Foundation Telekom for Macedonia	UNICEF	promote digital inclusion for children and young people with disabilities. This collaboration aimed to co-create innovative digital solutions that enhance access to education and community participation.	Young people with disabilities.	Concluded two other projects and managed to promote digital inclusion on a wider scale.
Generation Unlimited	Foundation Telekom for Macedonia	UNICEF	invited young innovators to propose digital solutions addressing barriers faced by individuals with disabilities. The top ten teams, each including at least one person with a disability, participated in workshops to further develop their ideas.	Young people, people with disabilities.	10,000$ reward for the winning team with the best idea.
Without Barriers	Foundation Telekom for Macedonia	UNICEF	a digital platform allowing users to identify and share information about accessible and non-accessible public spaces, such as buildings, transport, and recreational areas. This tool aimed to improve mobility and accessibility for individuals with disabilities.	People with disabilities.	Over time, the platform will be developed in cooperation with competent institutions, local organizations and parent associations.

https://www.facebook.com/DigitalInclusionInitiative

diiproject.net