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DIGITAL ECOSYSTEM COUNTRY ASSESSMENT (DECA)

Armenia

MAY 2024

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DIGITAL ECOSYSTEM COUNTRY ASSESSMENT (DECA)

Armenia

May 2024

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ACRONYMS

ADR	Alternative Dispute Resolution
AI	Artificial Intelligence
AML	Anti-Money Laundering
AMNIC	Armenia Network Information Center
ANEL	Armenian National Engineering Laboratories
API	Application Programming Interface
AUA	American University of Armenia
B2B	Business-to-Business
B2C	Business-to-Consumer
B2G	Business-to-Government
B2O	Business-to-Office
CBA	Central Bank of Armenia
CDCS	USAID Country Development Cooperation Strategy
CEPA	Comprehensive and Enhanced Partnership Agreement
CERT	Computer Emergency Response Team
CMTPL	Compulsory Motor third Party Liability
CSO	Civil Society Organizations
DCCP	Digital Connectivity and Cybersecurity Partnership
DECA	Digital Ecosystem Country Assessment
DFS	Digital Financial Services
DO	Development Objective
eID	electronic Identification Card
EIF	Enterprise Incubator Foundation
EKENG	E-Governance Infrastructure Implementation Agency
EPS	Electronic Payment System
FSP	Financial Service Provider
GIP	Governmental Interoperability Platform
GSMA	Global System for Mobile Communications Association
ICANN	Internet Corporation for Assigned Names and Numbers
ICT	Information and Communications Technology
IFCN	International Fact-Checking Network
IGC	Internet Governance Council of Armenia
IoT	Internet of Things
ISAA	Information Systems Agency of Armenia
ISOC	Internet Society Armenia Chapter
ISP	Internet Service Provider
ISTC	Innovative Solutions and Technology Centre
ITU	International Telecommunication Union
KYC	Know Your Customer
MCI	Mobile Connectivity Index
MFI	Microfinance Institution
MFS	Mediator of the Financial System
MHTI	Ministry of High-Tech Industry
MIC	Microsoft Innovation Center
mID	mobile Identification Card
MNO	Mobile Network Operator
MoH	Ministry of Health
IRI	International Republican Institute
NGO	Non-Governmental Organization
NIH	National Institute of Health
PDPA	Personal Date protection Agency
POC	Point of Contact
PoS	Point of Sale
PSP	Payment Service Provider
PSRC	Public Services Regulatory Commission
PWD	Persons With Disabilities
QoS	Quality of Services
RAN	Radio Access Network
RIPE NCC	Regional Internet Registry for Europe, Middle East and Central Asia
RTGS	Real-Time Gross Settlement

SAED	Synopsys Armenia Educational Department
SME	Small and Medium Enterprises
STEM	Science, Technology, Engineering, and Mathematics
TA	Technical Assistance
TFA	Trade Facilitation Agreement
TFGBV	Technology-Facilitated Gender-Based Violence
TVWS	TV White Space
UNECE	United Nations Economic Commission for Europe
UPU	Universal Postal Union
USF	Universal Service Fund
UTRAMS	Unified Technical Request and Mission Support
WTO	World Trade Organization

Executive Summary

DECA BACKGROUND

The U.S. Agency for International Development (USAID) launched its Digital Strategy in April 2020. The Digital Strategy aims to achieve and sustain open, secure, and inclusive digital ecosystems that contribute to broad-based, measurable development and humanitarian assistance outcomes through the responsible use of digital technology.[1]

The Digital Ecosystem Country Assessment (DECA) is a flagship initiative of the Digital Strategy.[2] It examines three pillars of a nation's digital ecosystem: (1) digital infrastructure and adoption; (2) digital society, rights, and governance; and (3) digital economy. The Armenia DECA was funded by the U.S. Department of State (DoS) through the Digital Connectivity and Cybersecurity Partnership (DCCP) and accounts for both USAID and DoS priorities. The DECA focuses on topics prioritized by the U.S. Government (USG) including critical infrastructure improvements, telecommunications, digital government and local governance, and digitalization of trade. The DECA is also informed by the USAID Armenia Country Development Cooperation Strategy (CDCS), which has two overarching development objectives: advancing democratic transition, and enhancing economic security.[3] The DoS Armenia Integrated Country Strategy (ICS) also informed the DECA.[4]

The Armenia DECA informs the development, design, and implementation of U.S. Government strategies, projects, and activities in Armenia with the primary goal of supporting the USG in better understanding and working to strengthen Armenia's digital ecosystem. The DECA does not evaluate existing programs, but rather assesses the digital ecosystem and identifies how current or future international development programming can build upon or strengthen that ecosystem.

ARMENIA: CONTEXTUAL BACKGROUND

Armenia is a landlocked country situated in the South Caucasus between Western Asia and Eastern Europe and is bordered by Azerbaijan, Georgia, Iran, and Turkey. Since the fall of the Soviet Union in 1991, Armenia has undergone significant transformation, notably in 2018 following nationwide street protests, known as the Velvet Revolution. Free and fair parliamentary elections were held in December 2018, electing Prime Minister Nikol Pashinyan and the My Step Alliance. The government has since made steady and deliberative progress[5]

1 "USAID Digital Strategy 2020-2024," United States Agency for International Development, accessed on January 14, 2024, https://www.usaid.gov/usaid-digital-strategy.

2 "Digital Ecosystem Country Assessments," United States Agency for International Development (USAID), accessed on January 14, 2024, https://www.usaid.gov/digital-strategy/implementation-tracks/track1-adopt-ecosystem/digital-ecosystem-country-assessments.

3 "Country Development Cooperation Strategy (CCDS) - Armenia, 2020-2025," United States Agency for International Development (USAID), accessed on April 8, 2024, https://www.usaid.gov/armenia/cdcs.

4 "Integrated Country Strategy: Armenia," United States Department of State, accessed on April 8, 2024, https://www.state.gov/wp-content/uploads/2022/07/ICS_EUR_Armenia_Public.pdf.

5 Country Development Cooperation Strategy (CCDS) - Armenia, 2020-2025, USAID.

in defining priorities and setting strategies for economic improvement, addressing long-standing issues such as corruption, weak rule of law, and opaque policymaking.[6]

Armenia's economy has undergone a dramatic transformation since independence, and particularly since 2018. Sustained growth, ambitious reforms, and inflows of capital and remittances have created a market-oriented ecosystem. New risks manifested in 2022 due to Russia's war against Ukraine and an escalation in Armenia's military conflict with Azerbaijan. The country has seen an influx of migrants as a result of the conflict between Russian and Ukraine. As of October 2023, as many as 60,000 Russians remain in Armenia, primarily located in the capital, Yerevan. [7] The Armenian economy saw GDP growth of 12.6 percent in 2022, the highest in the region, followed by 8.7 percent growth in 2023.[8] Real GDP growth is expected to continue in the coming years, supported by strong domestic consumption, rising services exports, and large net positive capital flows. However, according to the Economist Intelligence Unit, geopolitical tensions and the prospect of renewed conflict between Armenia and Azerbaijan pose the greatest economic risks.[9]

ARMENIA DECA: KEY FINDINGS AND RECOMMENDATIONS

Cross-cutting

The GoA is committed to enhancing the country's cybersecurity posture. Cybersecurity legislation is in draft form and multiple CERTs have been established. However, governance of cybersecurity in Armenia faces challenges with centralized oversight and the definition of roles among government entities. The cybersecurity workforce is limited. The education system has a growing focus on ICT, with more than 1,000 graduates in ICT subjects per year, but the workforce is shrinking and there is a mismatch between ICT sector needs. In addition, public awareness of cybersecurity is low, causing further exposure to individuals and national security to risks. To better coordinate cybersecurity measures, Armenia aims to establish a cybersecurity agency.

RECOMMENDATION:

- ✓ **Facilitate comprehensive cybersecurity governance and practices.** The international development community could support the growth and resilience of the Armenian cybersecurity sector by promoting an ecosystem approach that focuses on three pillars: policy and governance, workforce development, and cybersecurity market growth. This could can include assistance in knowledge and experience sharing among stakeholders that will help to define clear tasks and responsibilities within the cybersecurity agency. Support for establishing reliable and stable mechanisms for involving private sector professionals in policy and standard development could also help foster collaboration and the establishment of effective cybersecurity initiatives. The international development community could support the localization of international cybersecurity standards into national certification mechanisms which are effective, equitable, and practically applicable, and attuned to Armenia's digital ecosystem. Technical assistance to support the establishment of best practices for the operation and coordination of a national Computer Emergency Response Team (CERT) could continue, including provision of technical expertise and risk assessments for critical infrastructure. The international development community could help to address workforce gaps in

6 "Freedom in the World Country Report, Freedom House, 2024, https://freedomhouse.org/country/armenia/freedom-world/2024.

7 "How Russian Migration Fuels Armenia's IT Sector Growth," Institute for International Political Studies (ISPI), November 6, 2023, https://www.ispionline.it/en/publication/how-russian-migration-fuels-armenias-it-sector-growth-151311.

8 "Poverty and Equity Brief, Armenia," The World Bank, April 2023, https://databankfiles.worldbank.org/public/ddpext_download/poverty/987B9C90-CB9F-4D93-AE8C-750588BF00QA/current/Global_POVEQ_ARM.pdf.

9 "Armenia," The Economist Intelligence Unit, n.d., https://country.eiu.com/armenia.

cybersecurity by providing collaborative support to develop a cybersecurity talent pool. This could include support for curricula design and engagement with the private sector on the development of initiatives such as internship programs, with a focus in Yerevan and the regions.

Armenia faces a significant skills mismatch in its digital talent pool. The formal education system has outdated curricula, neglects soft skills, and offers low professor salaries which discourages ICT talent. While non-formal education and company training programs offer valuable support, they cannot fully compensate for the shortcomings in formal education. Declining birth rates and emigration further jeopardize the future tech workforce, while the concentration of talent in Yerevan stifles development elsewhere in Armenia. The GoA has established two tech centers in other regions of the country, aiming to bridge this gap but attracting skilled workers and improving local infrastructure remain challenging. Armenia's tech startup scene is showing robust growth, yet startups face challenges in longer term viability as support provided by incubators and accelerators is skewed toward early stage projects and there are gaps in later stage funding.

There is limited data on digital literacy in Armenia, but there are few targeted strategies to enhance digital literacy and digital hygiene aimed at the broader population. There is no quantitative data on digital literacy levels among the general population. The absence of national or civic initiatives to boost digital literacy also suggests a fundamental gap in the country's digital ecosystem. Existing awareness-raising and digital literacy efforts have thus far been concentrated in Yerevan, indicating an opportunity for broader nationwide outreach.

RECOMMENDATION:

- ✓ **Boost the digital literacy of the general population and improve ICT education to support the development of the ICT workforce.** The international development community could provide technical assistance to the GoA to fill data gaps in digital literacy by supporting the facilitation of digital literacy assessments. Based on these data, the international development community could support the GoA in developing a national digital literacy strategy, grounded in international best practice and the needs of all of Armenian society. The international development community can facilitate coordination among key stakeholders to advance formal digital literacy education, including the development of appropriate curricula and joint efforts between formal education and the private sector to provide training relevant to workforce needs. Establishment of nationally recognized qualification and certification mechanisms in digital literacy, cybersecurity, cyber hygiene, and other ICT-related fields could also be valuable to fill gaps in testing and certification. The international development community could work with various stakeholders to develop Armenian-language digital literacy and digital hygiene training content to improve general digital literacy. Support could also be provided to bridge the digital literacy gap for elderly citizens through targeted training and awareness-raising initiatives.

Persons with disabilities (PWDs) are the most disadvantaged group in Armenian society in terms of meaningful digital adoption. Persons with disabilities are disadvantaged in terms of device ownership, content accessibility, and adoption of digital services. Substantive gaps in accessibility regulation, AI regulation, and the availability and distribution of up-to-date assistive technology hinders the digital inclusion of PWDs. A deficiency in Armenian language relevant content is also a barrier to the adoption of digital services and advancing digital literacy.

RECOMMENDATION:

- ✓ **Improve accessibility standards and enhance accessibility of technology for better inclusion of persons with disabilities (PWDs).** The international development community could support the integration of mandatory accessibility standards into technological production and the design of digital services. Support could be provided to civil society and the private sector in developing AI-powered and high-tech solutions for assistive technology in order to increase accessibility and content relevance for PWDs in Armenia. These activities could help to instill an understanding of universal design principles and accessibility standards, fostering a collective commitment to inclusivity in the digital ecosystem. The international development community could also support the GoA in updating legal frameworks governing digital accessibility and the utilization of AI in order to safeguard the inclusion of PWDs in future technologies. Support could be provided to boost digital literacy, digitalization awareness, and cyber hygiene skills for persons with disabilities (PWDs), building on international best practices.

Pillar 1: Digital Infrastructure and Adoption

As a landlocked country with infrastructure closely linked to that of its neighbors, Armenia's first mile infrastructure may be subject to risks related to shifting geopolitical relations. Several major telecommunication companies in Armenia are undertaking initiatives to diversify their first mile solutions, though approaches are not coordinated. The backhaul infrastructure in the Armenian telecommunications landscape is relatively advanced. Nevertheless, deficiencies persist, particularly in middle and last-mile connectivity infrastructure in rural and remote areas. The GoA's commitment to expanding fixed broadband to 100% of settlements by 2026 presents an opportunity for collaboration with international development organizations.

The Government of Armenia has not yet established the relevant technical solutions, policies, and implementation mechanisms for sector-wide mandated infrastructure sharing. There are some infrastructure sharing practices among smaller and larger ISPs, although infrastructure sharing is not currently mandated and there are notable gaps in national level standardization and certification for digital infrastructure. The Government has implemented some initiatives and has shown a commitment to mandate infrastructure sharing in the future.

RECOMMENDATION:

- ✓ **Improve digital connectivity infrastructure and regulation to ensure a strong digital foundation.** Consider supporting the GoA in developing a regulatory framework for connectivity infrastructure, including infrastructure construction and operationalization. This could address cost constraints associated with international accreditation for medium and small businesses in the telecommunication sector and thus improve diversification. The international development community could also support diversification of first mile connectivity by gaining and expanding access to submarine cable connection, modeling engagement with other landlocked countries. The GoA could also benefit from technical advisory and policy framework development to bridge gaps in terrestrial infrastructure for the middle mile. Finally, the international development community could support the Government of Armenia in developing regulations concerning mandated infrastructure sharing, which take into account the risks and opportunities of sharing. This could include systemic infrastructure mapping and development of a comprehensive regulatory framework for connectivity infrastructure.

Pillar 2: Digital Society, Rights, and Governance

The Government of Armenia is actively pursuing digital transformation improvements through strategies like the Digitization Strategy and Public Administration Reforms Strategy. The Armenian government's commitment to digitalization is evident in the release of key strategies on digitalization, and establishment of its Information Systems Management Board and its Information Systems Agency, signaling a concerted effort to modernize digital services and bolster information security. The GoA has taken steps in recent years to improve coordination and ownership of government digitalization efforts, including the creation of new bodies and delineation of responsibilities. While these efforts clearly demonstrate a move toward improved collaboration and coordination, the new structure is still in early stages.

RECOMMENDATION:

- ✓ **Support the GoA in the implementation of digitalization strategies through technical assistance and capacity-building efforts.** The international development community could address challenges in implementation and monitoring of progress on digitalization by assisting Armenia in actively monitoring and evaluating the impact of its digital transformation initiatives, ensuring compliance with legal frameworks, and measuring the effectiveness of objectives. The GoA will benefit from the development of mechanisms to facilitate inter- and intra-government collaboration and knowledge exchange, and capacity-building in the areas of digitalization and change management. The international development community can help the GoA address specific challenges related to information security by providing capacity-building on data protection, privacy, and digital hygiene.

Misinformation and disinformation pose threats to Armenia's media environment. Armenia has experienced a rise in mis- and disinformation in recent years, particularly during pivotal events such as the Covid-19 pandemic, cross-border conflicts, and political events. Increasing reliance on social networks as primary sources of news consumption has also transformed the media ecosystem significantly, increasing vulnerability to false narratives. The effectiveness of government communication efforts has been hindered by various factors, including challenges in providing timely and accurate information to the public. Media institutions and CSOs lack the technical and financial resources to address these risks, and public awareness and critical thinking skills could be developed.

RECOMMENDATION:

- ✓ **Bolster the information integrity and media literacy ecosystem.** The international development community could advocate for the government to allocate resources to the development of innovative tools and strategies for identifying, analyzing, and mitigating disinformation across borders. Support could be provided for the development of crisis plans for provision of timely and accurate information, including provision of training and technical assistance to government agencies responsible for disseminating information to the public. Building on digital literacy campaigns noted in prior recommendations, the international development community may facilitate media literacy for the public with a focus on critical thinking and fact-checking. To build the capacity of media outlets and local fact-checking organizations, the international development community could provide resources and training to support expansion of these operations and investments in technology and infrastructure for verifying information. The international development actors could promote international cooperation and knowledge-sharing among fact-checking organizations and media outlets, through training, creation of networks, and access to resources.

Pillar 3: Digital Economy

Armenia's financial sector is undergoing a rapid digital transformation, with the upgrading of payment systems a key priority. Proactive government regulations, the COVID-19 pandemic's impact on consumer behavior, the entry of Google Pay and Apple Pay and other digital payments systems, and an influx of new residents due to the Russia-Ukraine war have accelerated the adoption of digital payments. Despite this progress, the payments infrastructure faces limitations, including an outdated Real Time Gross Settlement (RTGS) system for wholesale payments, missing instant payment systems for account-to-account transfers, and the absence of interoperability between digital wallets and a national QR code standard. International payments are slow and expensive due to high compliance costs that hinder direct correspondent banking relationships between Armenian banks with counterparts in the United States and Europe. The CBA actively works with the GoA and the private sector to address these challenges, but initiatives have yet to solve key challenges. Progress in digital financial inclusion has been driven by improved financial infrastructure, innovative DFSs, and government initiatives promoting non-cash payments and financial education. However, in rural areas there is a persistent preference for cash, limited digital literacy, a lack of financial products designed for rural needs, and lower trust in the financial system.

RECOMMENDATION:

- ✓ **Support the modernization of Armenian payment infrastructure and related regulatory frameworks.** The international development community could facilitate knowledge transfer to accelerate modernization of Armenia's payment system. This could include support to payment system stakeholders in fora for collaboration and sharing of best practices, such as international events and study tours. International organizations and development agencies could also provide technical assistance to upgrade payment infrastructure, including support for modernization of the ArCa retail payment system and support for the development of standardized API architecture. Support could also be provided to address barriers to cross-border payments, including facilitating discussions with international payment providers to explore the possibility of them entering the Armenian market. The international development community could support the Armenian payment system in connecting with global payment systems such as TARGET2 in Europe, which could ease the problem of correspondent banking relationships and reduce costs. Compliance cost barriers to international payments (including compliance with enhanced anti-money laundering (AML) and Countering Finance of Terrorism (CFT)), can be addressed with technical assistance and training to Armenian banks to strengthen their compliance practices and meet international AML/CFT standards and to engage in advocacy efforts to highlight the disproportionate impact of compliance costs on Armenian banks.

Armenia's e-commerce sector has experienced substantial growth over the past years, but gaps remain in the country's regulatory framework, such as the lack of a dedicated e-commerce law and consumer protection issues. Gaps in the regulatory framework leave online shoppers vulnerable to unclear digital contracts, deceptive advertising, undefined delivery timelines, misleading reviews, and weak marketplace security. The lack of a dedicated alternative dispute resolution (ADR) mechanism for resolving e-commerce disputes outside of the traditional court system, and the absence of a specific government agency designated to enforce consumer rights in the e-commerce sector exacerbate this issue.

RECOMMENDATION:

- ✓ **Strengthen the protection and enforcement of consumer rights in the e-commerce sector.** The international development community could provide technical assistance and share best practices on consumer protection from other countries that have successfully addressed similar challenges in e-commerce regulation. Assistance could be provided to ensure alignment with global consumer protection standards, such as EU directives on commercial practices. Support could also be provided to the GoA to create dispute and reporting mechanisms for enforcing consumer protection. The international development community could work in collaboration with the GoA to assess international best practices and explore options for the formation of reporting and dispute mechanisms, such as a dedicated regulatory body responsible for enforcing consumer protection and a centralized online platform for reporting consumer protection violations. The international community could bolster consumer awareness about their rights and safe online practices within Armenia's e-commerce sector. Collaborative efforts could involve partnerships among international NGOs, online marketplaces, and local media outlets.

Armenia's postal services are growing and improving, positioning the country favorably for e-commerce expansion, yet a fragmented logistics landscape hinders progress. Companies rely on independent delivery services, leading to high regional delivery costs and long delivery times. Technology adoption (e.g., IoT tracking) is also limited, further complicating the customer experience. The root causes of this are twofold: businesses lack a full understanding of shared infrastructure benefits, and collaboration among potential partners is difficult due to misaligned priorities.

RECOMMENDATION:

- ✓ **Explore opportunities for development of shared infrastructure in e-commerce through partnerships.** Establishing dedicated forums for collaboration or industry associations could be a pivotal step in fostering discussions about shared infrastructure practices between the government, national post office, and private sector entities. These platforms could provide a neutral space where representatives from the national postal office (Haypost), e-commerce platforms, and delivery companies can discuss best practices, receive capacity-building support, and engage in planning for collaboration through PPPs. The international development community could also support the GoA in designing incentive schemes for businesses engaging in shared infrastructure initiatives.

ROADMAP FOR THE REPORT

The **About this Assessment section** provides background on the DECA framework and goals.

The **DECA Findings section** presents key findings on Armenia's digital ecosystem. This section is organized in three subsections by DECA pillar: digital infrastructure and adoption; digital society, rights, and governance; and digital economy.

The **DECA Recommendations section** outlines way the international development community can leverage and support Armenia's digital ecosystem in achieving improved development outcomes.

Navigation tip: The navigation bar in the footer throughout this report helps you move between sections. Dark blue text will indicate the current section you are in.

About This Assessment

USAID's Digital Strategy aims to improve the Agency's development and humanitarian assistance outcomes through the responsible use of digital technology and to strengthen the openness, inclusiveness, and security of country digital ecosystems. The Digital Strategy and the DECA are part of USAID's holistic approach to achieving the Sustainable Development Goals (SDGs).[10]

As part of the Digital Strategy implementation, the DECA examines three broad areas to understand the opportunities and challenges in a country's digital ecosystem (See Figure 1 and Key Terms Box 1):

1. Digital Infrastructure and Adoption
2. Digital Society, Rights, and Governance
3. Digital Economy

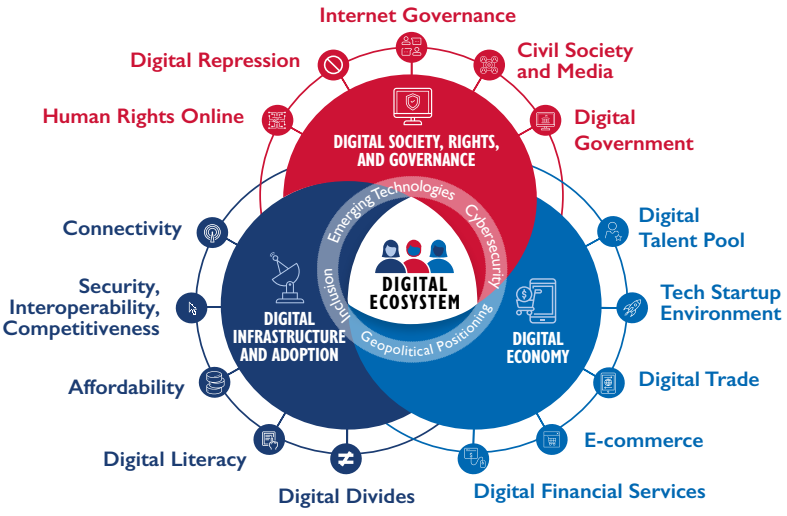
The Armenia DECA took place between October 2023 and May 2024. It involved desk research, consultations with USAID/Armenia and the U.S. Embassy in Yerevan, and virtual interviews. It included 69 interviews with stakeholders from civil society, academia, the private and public sectors, and international development organizations.

KEY TERMS | BOX 1: Digital ecosystem

A **digital ecosystem** is comprised of stakeholders, systems, and an enabling environment that together empower people and communities to use digital technology to gain access to services, engage with one another, and pursue economic opportunities.

The Armenia DECA was funded by the DoS through the Digital Connectivity and Cybersecurity Partnership (DCCP). It accounts for both USAID and U.S. State Department priorities in Armenia. The DECA does not serve as an authoritative source on the country's digital ecosystem, but rather is intended as a rapid assessment of opportunities and challenges tailored to the USG's programmatic priorities. It does not cover all USAID program offices and projects in Armenia in-depth.

FIGURE 1: USAID's Digital Ecosystem Framework



Source: USAID Digital Ecosystem Framework

10 "The 17 Goals," The United Nations, accessed January 15, 2024, https://sdgs.un.org/goals.

DECA Findings

PILLAR 1: DIGITAL INFRASTRUCTURE AND ADOPTION

Digital Infrastructure and Adoption refers to the resources that make digital systems possible and how individuals and organizations gain access to and use these resources. Digital infrastructure includes geographic network coverage, network performance, internet bandwidth, and spectrum allocation as well as telecom market dynamics around security, interoperability, and competitiveness. This pillar also examines behavioral, social, and physical barriers and opportunities for equitable adoption—digital divides, affordability, and digital literacy—who uses and who does not use digital technologies and why.

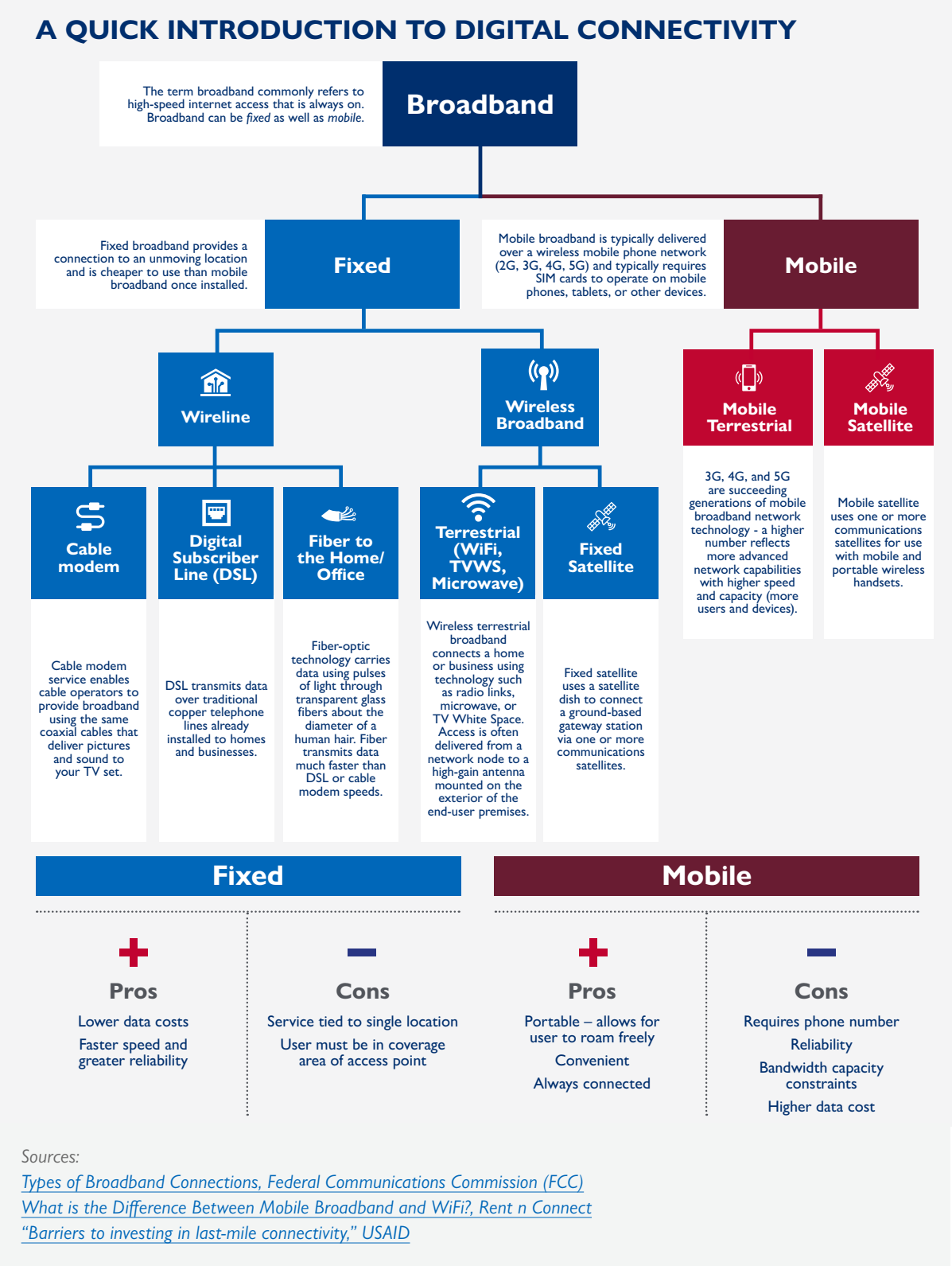
KEY TAKEAWAYS: DIGITAL INFRASTRUCTURE AND ADOPTION

- Armenia's first mile infrastructure is closely linked to neighboring countries and is vulnerable to geopolitical tensions. Major providers aim to diversify international gateways to address the risks.
- Mobile broadband penetration is high and is considered highly affordable, yet access to fixed broadband is limited, particularly in rural areas. The GoA plans to extend fixed broadband to 100 percent of settlements by 2026.
- The divide in internet usage between rural and urban communities is attributable to poor connectivity and resultant quality of services (QoS) issues.
- Infrastructure sharing practices occurs among smaller and larger ISPs, although infrastructure sharing is not currently mandated for the telecommunications sector.
- Digital literacy-related curricula in formal education remain limited, while informal educational initiatives typically struggle with issuing nationally acknowledged qualifications.
- Persons with disabilities are the most disadvantaged group in Armenian society with regard to device ownership and access to online services. Limited accessibility regulation, insufficient and outdated assistive technology, and insufficient inclusion efforts in formal and informal education, including digital literacy, hinder the digital inclusion and participation of PWDs nationwide.

RELEVANT RECOMMENDATIONS

- Improve digital connectivity infrastructure and regulation to ensure a strong digital foundation.
- Facilitate comprehensive cybersecurity governance and practices. [cross-cutting]
- Boost the digital literacy of the general population and improve ICT education to support the development of the ICT workforce. [cross-cutting]
- Improve accessibility standards and enhance accessibility of technology for better inclusion of persons with disabilities (PWDs). [cross-cutting]

FIGURE 2: A quick introduction to digital connectivity



Sources:

Types of Broadband Connections, Federal Communications Commission (FCC)
What is the Difference Between Mobile Broadband and WiFi?, Rent n Connect
"Barriers to investing in last-mile connectivity," USAID

1.1 ARMENIA'S CONNECTIVITY LANDSCAPE

Armenia has near universal mobile connectivity, yet challenges remain in fixed broadband infrastructure. Efforts are underway to diversify first mile international connectivity routes and enhance infrastructure, but the sector faces hurdles such as regulatory gaps and disparities in quality and coverage between rural and urban areas. Current regulatory gaps include national-level standardization and certification for digital infrastructure. (Refer to Figure 2 above for an Introduction to Digital Connectivity and Key Terms Box 2 for definitions of radio spectrum, ISPs, and MNOs.)

1.1.1 KEY STAKEHOLDERS

Responsibilities of government bodies regulating telecommunication are distributed among three key stakeholders.[11] The Ministry of High-Tech Industry (MHTI) is the principal ministry and policymaker for the electronic communications sector.[12] The Ministry was formed in 2019 and assigned the high-tech-related functions from the Ministry of Transport, Communications, and IT. The MHTI is a central body with executive authority that develops and implements the Government's policy in communication, information, information technology and information security, postal services, licensing, granting of permits, and military industry. The ministry is responsible for information technology, spectrum allocations and monitoring, formulation of universal service/access policy goals, and setting technical standards. The Commission on Radio and Television regulates internet content and cable televisions,[13] and the Public Services Regulatory Commission (PSRC) regulates electronic communications and broadband. PSRC's regulatory scope includes quality of service, interconnection rates, licensing, numbering, price regulation, and spectrum assignments. The PSRC shares jurisdiction with the MHTI.[14,15]

KEY TERMS | BOX 2: Radio spectrum, ISPs, MNOs

Radio spectrum refers to the range of electromagnetic radiation frequencies required to deliver radio transmissions. A critical function of telecommunications sector regulatory authorities is designating specific frequency ranges (or bands) for different purposes, including telecommunications, but also for applications such as radio astronomy or other industrial uses. Some bands (e.g., WiFi) are unlicensed, meaning anyone can use them without explicit permission.[16] **Licensed** spectrum requires users (e.g., commercial cellular networks or FM radio broadcasters) to secure a regulator's approval before use. Licenses are typically assigned through spectrum auctions, which aim to establish the economic value of spectrum which is a finite natural resource.

Internet Service Providers (ISPs) deliver access to end-users who use fixed-line and wireless technologies. Wireless ISPs (especially those in rural areas) often aim to take advantage of low licensing and equipment costs by delivering service using unlicensed spectrum. ISPs range in size and scope from small, local providers to providers with international and even global reach.

Mobile Network Operators (MNOs) provide voice and data services through wireless terrestrial networks. They are not shared, so MNOs typically use licensed spectrum bands, which deliver higher quality and more reliable (and more cost-intensive) service.

11 "Supporting Digital Economy and Society in the Eastern Partnership: Cybersecurity Guidelines for the Eastern Partner Countries," EU4Digital, 2020, June 2020, accessed March 21, 2024, https://eufordigital.eu/wp-content/uploads/2020/10/Cybersecurity-guidelines-for-the-Eastern-Partner-countries.pdf.

12 Ministry Of High Tech Industry of the Republic of Armenia, official website, accessed March 19, 2024, https://hightech.gov.am/en/.

13 The Commission on Radio and Television, official website, accessed March 19, 2024, https://tvradio.am/.

14 The Public Services Regulatory Commission (PSRC), official website, accessed March 20, 2024, https://www.psrc.am.

15 Public sector representative, Interview by DECA team, January 2024, online.

16 Permissions is not required for unlicensed spectrum use, but users are typically limited to technical parameters such as transmission power or antenna specifications.

1.1.2 KEY LEGISLATION AND STRATEGIES

Armenia has made significant progress in developing its digital infrastructure and has implemented legal regulations to ensure its effective management and use. Table 1 outlines some of the country's key digital infrastructure regulations and policies. Most notable is the 2005 Law on Electronic Communication and related legal acts, which regulates telecommunications in Armenia. These laws outline general principles and regulatory objectives, but gaps remain in specific procedures and enforcement mechanisms. The Law on Public Services Regulatory Authority delineates procedures for establishing the regulatory body, but may require further refinement to ensure efficient oversight. The Law on Television and Radio governs broadcasting activities, but updates may be necessary to address evolving technological advancements and changes in the media landscape. A draft of the Law on Cybersecurity is presently being developed at the Ministry of High Tech Industry, while the Ministry of the Interior is drafting cyber crime legislation.

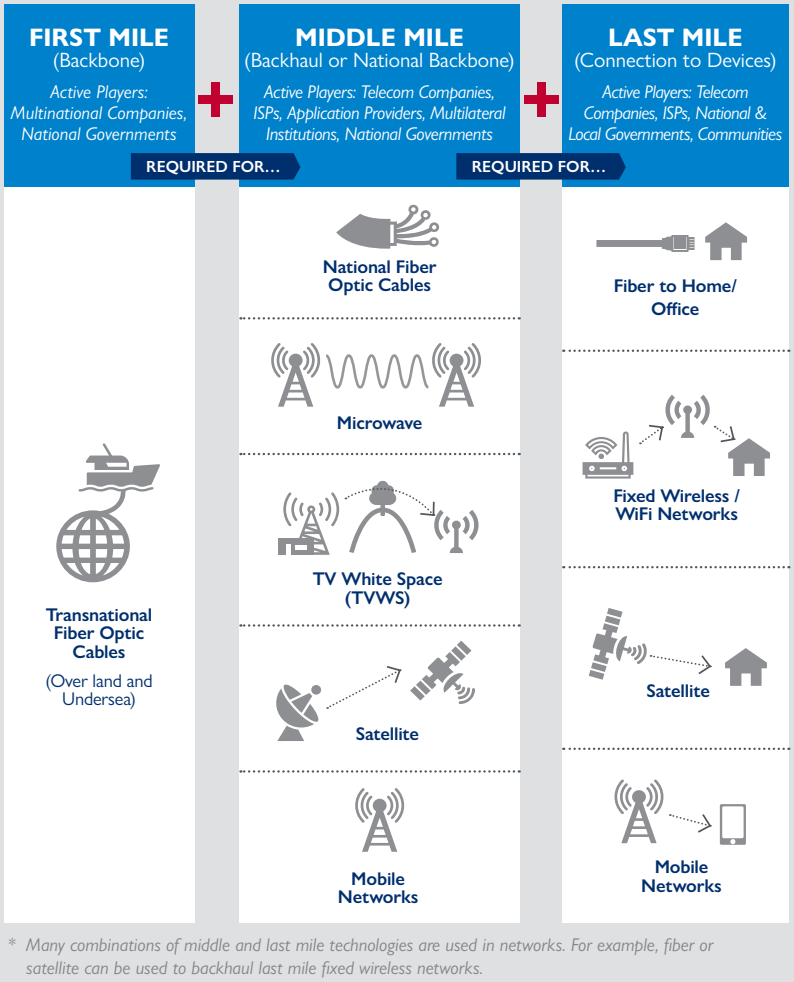
TABLE 1: Telecommunications sector key regulations and policies

The Law on Electronic Communication, (ՀՀ ՕՐԵՆՔ ԷԼԵԿՏՐՈՆԱՅԻՆ ՀԱՂՈՐԴԱԿՑՈՒԹՅԱՆ ՄԱՍԻՆ), 2005 (latest amendments from 2021)	This law is the primary sectoral law regulating telecommunication in Armenia and defines the basic concepts, sets out the general principles of regulation, and sets out the rights and obligations of actors in the telecommunications market. It sets regulatory objectives, principles and rules of licensing, and basic rules of the interconnection of networks and traffic exchange. The law stipulates allocation of limited resources, including radio frequency range, and numbers and segments of satellite orbits.
The Law on Public Services Regulatory Authority, (ՀՀ ՕՐԵՆՔ ՀԱՆՐԱՅԻՆ ԾԱՌԱՅՈՒԹՅՈՒՆՆԵՐԸ ԿԱՐԳԱՎՈՐՈՂ ՄԱՐՄՆԻ ՄԱՍԻՆ), 2003	This law sets forth the specific procedures for establishing the regulatory body for public services and its operation.
The Law on Television and Radio, (ՀՀ ՕՐԵՆՔ ՀԵՌՈՒՏԱՏԵՍՈՒԹՅԱՆ ԵՎ ՌԱԴԻՈՅԻ ՄԱՍԻՆ), 2000	This law is the primary legal act governing the TV and radio broadcasting sector.
The Law on Licensing, (ՀՀ ՕՐԵՆՔ ԼԻՑԵՆԶԱՎՈՐՄԱՆ ՄԱՍԻՆ), 2005	This law is the primary legal act governing licensing procedures across all sectors, including telecommunications.
The Law on Protection of Economic Competition, (ՀՀ ՕՐԵՆՔ ՏՆՏԵՍԱԿԱՆ ՄՐՑԱԿՑՈՒԹՅԱՆ ՊԱՇՏՊԱՆՈՒԹՅԱՆ ՄԱՍԻՆ), 2000	This law is the legal act specifying competition policy across all sectors, including telecommunications.

1.1.3 DIGITAL INFRASTRUCTURE OVERVIEW

Armenia's first mile telecommunications infrastructure is based largely on international partnerships, and thus may be vulnerable to geopolitical uncertainties. At the middle mile, the landscape of broadband accessibility and adoption rates—encompassing both mobile and fixed services—highlights disparities in rural regions. Ongoing initiatives to diversify first mile connections, deploy 5G technology, and improve last-mile connectivity solutions are indicative of a commitment by the GoA and the telecommunications sector to bolster telecommunications infrastructure. (Refer to Figure 3 for information on connectivity infrastructure network.)

FIGURE 3: Connectivity infrastructure network



CONSIDERATIONS FOR RURAL CONNECTIVITY:

Fiber to Home/Office
COST: High fixed costs, low variable costs
DETAILS: Laying fiber to remote, sparsely populated areas can be logistically and financially challenging

TVWS
COST: Moderate fixed costs, moderate variable costs
DETAILS: equipment is more specialized and expensive than WiFi, but can transmit signal around obstacles and across greater distances

Microwave
COST: Low fixed costs, low variable costs
DETAILS: easy and less expensive than fiber to deploy, but requires line-of-sight between radios and there may be licensing restraints

Fixed Wireless / WiFi Networks
COST: Variable fixed costs, low variable costs
DETAILS: relatively easy and inexpensive to set up, but may require line-of-sight between antennas and original backhaul connection, depending on technology used

Satellite
COST: High fixed costs, high variable costs
DETAILS: Using satellite receivers in a remote community can be easy, but service can be expensive

Mobile Networks
COST: Moderate fixed costs, moderate variable costs
DETAILS: deploying equipment in rural areas can be prohibitively expensive, but accessing unused licensed spectrum for community networks may be possible to lower costs

Source: DECA Toolkit

First mile connectivity

As a landlocked country with infrastructure closely linked to that of its neighbors, Armenia's first mile infrastructure may be subject to risks related to shifting geopolitical relations. According to the most recent publicly available data on fiber infrastructure (obtained between 2011 and 2013)[17]Armenia has international internet gateways through Georgia and the Islamic Republic of Iran.[18] Armenia continues to use Georgian fiber-optic networks owned by "Caucasus Online" (CO) for northward data traffic. Traffic to Europe goes through Turk Telecom and Russia's Rostelecom. Armenia also uses the Caucasus Cable System for Black Sea submarine cable connectivity with connecting ports in Georgia and Bulgaria and the Trans-Asia-Europe fiber-optic cable through Georgia. Additional international service is available through microwave radio relays and landline connections to other Commonwealth of Independent States countries, the Moscow international switch, and through satellite. [19]

17 "Armenia: Digital Data, Resilience and Policy Assessment," International Telecommunication Union (ITU), 2021, accessed March 21, 2024, https://www.itu.int/en/ITU-D/Documents/connect2recover/Reports/Armenia-Digital-Data-Resilience-and-Policy-Assessment.pdf.]

18 "Infrastructure Connectivity Map," International Telecommunication Union (ITU), accessed March 21, 2024, https://bbmaps.itu.int/bbmaps/.

19 "Infrastructure Connectivity Map," International Telecommunication Union (ITU), accessed March 21, 2024, https://bbmaps.itu.int/bbmaps/.

Mobile and fixed internet operators are pursuing diversification of international connections through Georgia, Iran, and Turkey. Some interviewees noted that geopolitical considerations may have influenced diversification initiatives,[20] including pursuance of the Black Sea Submarine Cable Project. The project is an infrastructure initiative to enhance telecommunications connectivity among countries bordering the Black Sea, involving the installation of submarine fiber-optic cables across the Black Sea, connecting key coastal points in countries such as Georgia and Bulgaria to facilitate high-speed data transmission.[21] In a move aimed at diversifying infrastructure entering Armenia, Team Telecom acquired a 30 percent stake in SkyTel[22], which owns and operates more than 4,000 km of submarine cable in Georgia and is a crucial connectivity conduit linking the Black Sea to the Armenian border. The EU and the Government of Armenia have confirmed Armenia's participation in the Black Sea Underwater Electricity and Internet Cables project.[23] (See Figure 4 for a transmission map of Armenia.)

FIGURE 4: Transmission map of Armenia



20 Two telecommunication companies and civil society organization, interviews by DECA team, January 2024, online.

21 "World Bank Approves $35 Million Investment for Black Sea Submarine Cable Project Preparatory Activities", accessed June 12, 2024, https://www.worldbank.org/en/news/press-release/2024/05/21/world-bank-approves-35-million-investment-for-black-sea-submarine-cable-project-preparatory-activities

22 "Team Group of Companies has acquired 30% of Georgian SkyTel," Telecom Armenia, May 31, 2023, https://www.telecomarmenia.am/en/news/2023/05/31/team-group-of-companies-has-acquired-30-of-georgian-skytel/857/.

23 "EU-Armenia: joint press release on the Second Political and Security Dialogue," The Diplomatic Service of the European Union, November 15, 2023, https://www.eeas.europa.eu/eeas/eu-armenia-joint-press-release-second-political-and-security-dialogue_en.

Middle mile connectivity

Armenia has challenges with middle mile infrastructure, particularly in rural areas, which has implications for the achievement of widespread connectivity and adoption. Mobile internet penetration is high and data is considered affordable, but challenges persist in fixed broadband availability and adoption, particularly in rural areas where a significant provision gap exists. Efforts are underway to extend fixed broadband to all settlements by 2026, but infrastructure development remains a crucial challenge.

The telecommunications landscape in Armenia has undergone significant transformation from a state-owned monopoly to a competitive market dominated by private enterprises. General telecommunications services in Armenia, including satellite connections, mobile services, and internet connectivity, had been solely provided by the Armenia Telephone Company (ArmenTel), which was initially state-owned and privatized in 1995.[24] In 1997, the GoA granted ArmenTel 15-year monopoly rights on domestic and international telecommunications services in the country, expected to be effective until the end of 2012. In 2007, the Public Services Regulatory Commission (PSRC) dismissed the company's right to monopoly, and other operators were allowed to compete in the market.[25] In 2007, ArmenTel was sold as a private enterprise and is now wholly owned by VimpelCom Ltd., a Russian-Norwegian company.[26]

As of 2024, 178 internet service providers (ISPs) and MNOs operate in Armenia.[27][28] Viva-MTS, Team Telecom, UCOM, and Rostelecom Armenia[29] control 95 percent of the broadband market. (See Figures 4 and 5 below for market share breakdown.) Legally, all ISPs and MNOs are private enterprises, though recently the GoA has acquired 20 percent of MTS Armenia.[30] It is unclear if this change represents a shift from a fully privatized and competitive telecommunications sector to a system with greater government involvement and control.

Mobile broadband availability and adoption

Armenia has a diverse MNO market with three major MNOs (see Figure 5 below), and universal mobile broadband connectivity. Total mobile coverage (2G, 3G and 4G+) has been achieved through connectivity infrastructure expansion, made possible through collaboration among MNOs and the PSRC. A competitive spectrum allocation process took place beginning in 2013 which allocated 3G and 4G spectrum to UCOM, Viva-Cell, and Team Telecom. Obligations were set by PSRC regarding infrastructure development to bridge coverage gaps. The auction set forth the licenses and obligations to introduce 5G mobile broadband networks in the capital city and in two of the other largest cities, including Internet of Things (IoT) technology.[31]

Large providers work actively on alternative last-mile solutions, including deploying 5G technology, OpenRAN, and satellite connectivity.[32] (See Key Terms Box 3 for definitions of OpenRAN and TV White Space.) The

24 "Guide to Armenian Information Technology Companies: Armenia Telephone Company (ARMENTEL) CJSC, " EIF, n.d., accessed March 19, 2024, https://itguide.eif.am/index.php?id=87&lang=0&catid=.

25 ""Armentel" stripped of its monopoly rights," Panorama News, 2007, https://www.panorama.am/en/news/2007/10/01/armental/1380120.

26 Veon website, accessed March 21, 2024, https://www.veon.com/.

27 "Regulated Persons," Public Services Regulatory Commission, accessed March 19, 2024, <https://psrc.am/contents/fields/communications/com_regulated-personss.

28 Public sector representative, interview by DECA team, January 2024, online.

29 Rostelecom is Russia's largest provider of digital services.

30 "Armenian government takes stake in key telecoms firm," CivilNet, 2024, accessed March 21, 2024, https://www.civilnet.am/en/news/762970/armenian-government-takes-stake-in-key-telecoms-firm/.

31 Armenian government takes stake in key telecoms firm, CivilNet,

32 Regional expert, interview by DECA team, January 2024, online; telecommunications company, interview by DECA team, January 2024, online.

PSRC has designated spectrum allocations for UCOM and Team Telecom, demonstrating a concerted effort to usher in the era of 5G connectivity.

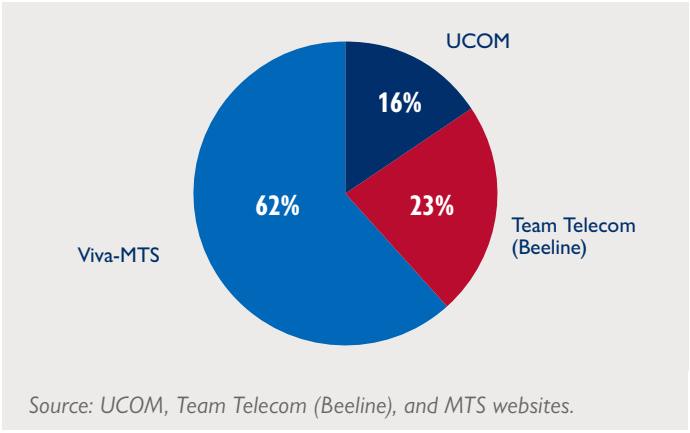
KEY TERMS | BOX 3: OpenRAN and TV White Space

OpenRAN, short for Open Radio Access Network, refers to a network architecture approach in the telecommunications industry that aims to disaggregate hardware and software components in radio access networks (RANs). Unlike traditional RAN architectures, which are typically closed and proprietary, OpenRAN promotes interoperability and flexibility by utilizing standardized interfaces and protocols. This allows network operators to mix and match hardware and software components from different vendors, fostering competition, innovation, and cost efficiency.

TV White Space (TVWS) refers to the unused frequencies in the radio spectrum that exist between television channels. When television broadcasters transmit their signals, they occupy specific frequencies within the spectrum, but not all of these frequencies are used in every geographic location at all times. TVWS technology leverages these unused frequencies to provide wireless broadband internet access. Internet service providers (ISPs) utilizing TVWS can deliver internet connectivity to rural or underserved areas where traditional wired infrastructure is not feasible or cost-effective. TV White Space technology operates in the UHF (Ultra High Frequency) and B2B (Very High Frequency) bands and typically requires specialized equipment to access and utilize these unused frequencies effectively.

According to the ITU ICT Access Survey data from 2020, 100 percent of Armenia's settlements have 3G and 4G coverage,[33] and currently at least two operators provide 4G+ in 91.4 percent of RA settlements.[34] According to PSRC estimations, 91 percent of Armenian settlements will have gained access to 4G coverage provided by two operators by the end of 2024, and at least 80 percent of settlements will have 4G coverage supplied by three operators by 2026.[35] Limited 5G deployment in Armenia reduces Armenia's Mobile Connectivity Index (MCI) coverage score to 90 percent.[36]

FIGURE 5: MNO market shares as of 2023[37]



Source: UCOM, Team Telecom (Beeline), and MTS websites.

33 "Measuring digital development: Facts and figures," International Telecommunication Union (ITU), 2020, accessed March 22, 2024, https://www.itu.int/en/ITU-D/Statistics/Documents/facts/FactsFigures2020.pdf.

34 Public Services Regulatory Commission, interview by the DECA team, January 2024, online.

35 Public sector representative, interview by the DECA team, January 2024, online.

36 "GSMA Mobile Connectivity Index," GSMA, n.d., https://www.mobileconnectivityindex.com/index.html#year=2022&zoneIsocode=ARM. The GSMA MCI is a weighted sum that assesses 10 percent for 2G coverage, 40 percent for 3G coverage, 40 percent for 4G coverage, and 10 percent for 5G coverage.

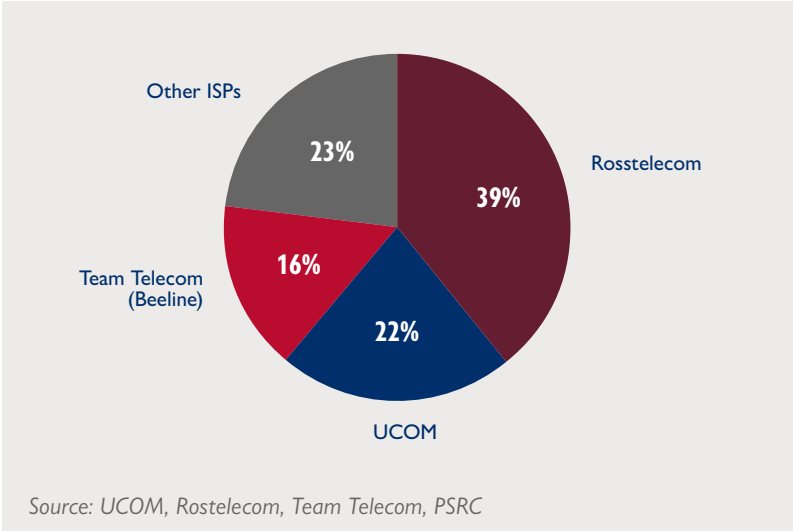
37 https://www.ucom.am/file_manager/Reports/2/Mobile%2023-4.pdf ; https://www.telecomarmenia.am/file_manager/Results%20&%20Reporting/telecom_2023/q4/Mobile%20%204-th%20q%202023%20arm.pdf; https://www.mts.am/docs/default-source/psrc-2022/psrc_q4-2022_arm.pdf?sfvrsn=e91c420_2.

The PSRC and the major MNOs stated in interviews that mobile broadband in Armenia is affordable compared to average prices in Eastern and Western Europe and in proportion to the GDP per capita income in Armenia.[38] The Alliance for Affordable Internet's (A4AI) "1 for 2" target for affordable internet set the threshold at 1GB of mobile broadband data costing two percent (or less) of the average income per capita. In Armenia, mobile broadband data affordable by A4AI standards.[39] Individual users may not discern a significant disparity between Wi-Fi and broadband services in terms of quality, but businesses place a premium on connectivity stability. Interviews with industry leaders pointed out the instability of mobile broadband compared to the reliability offered by fiber-optic connections.[40] The uptake of mobile broadband is high, given the high coverage rates and affordability of mobile data. Mobile internet subscriptions were at 2,475,449 (83.54 percent) in 2020. No data is available on the tendency for 'dual-simming' (subscribers using more than one SIM card).[41]

Fixed broadband availability and adoption

Rostelecom, UCOM, and Team Telecom are the three major ISPs in Armenia. (See Figure 6 below for ISP market shares as of 2023.) Business-to-Consumer (B2C) coverage is only available in 19 cities out of 46 cities as of 2021.[42] According to a 2020 World Bank report 700 out of 952 rural settlements (73.5 percent of rural settlements) do not have access to fiber backhaul networks.[43] The largest fixed broadband network operator, Rostelecom Armenia, has 92 percent coverage of the territory for Business-to-Business (B2B), Business-to-Office (B2O), and Business-to-Government (B2G) services.

FIGURE 6: ISP market shares as of 2023.[44]



Source: UCOM, Rostelecom, Team Telecom, PSRC

38 Two telecommunication companies, interviews by DECA team, January 2024, online. Public sector representative, interview by DECA team, January 2024, online.

39 "Redefining affordability to achieve universal internet access," A4AI, n.d., accessed March 22, 2024, https://a4ai.org/affordable-internet-is-1-for- 2/#:~:text=Changingpercent20howpercent20wepercent20definepercent20affordability,lesspercent20ofpercent20averagepercent20monthlypercent20income.

40 Regional expert, interview by DECA team, January 2024, online. Telecommunications company, interview by DECA team, January 2024, online.

41 "Armenia: Digital Data, Resilience and Policy Assessment," International Telecommunication Union (ITU), 2021, accessed March 21, 2024, https://www.itu.int/en/ITU-D/Documents/connect2recover/Reports/Armenia-Digital-Data-Resilience-and-Policy-Assessment.pdf.

42 Armenia: Digital Data, Resilience and Policy Assessment. International Telecommunication Union]

43 "ICT Usage in Households, by Individuals and in SMEs in Armenia," The World Bank, May 2020, [Not publicly available, referenced in "Armenia: Digital Data, Resilience and Policy Assessment." International Telecommunication Union, https://www.itu.int/en/ITU-D/Documents/connect2recover/Reports/Armenia-Digital-Data-Resilience-and-Policy-Assessment.pdf.]

44 RosTelecom https://www.rtarmenia.am/storage/assets/pdf/E4b3zzgYCc5MVM71m4taYZNoM6umuRFikuOROZIT.pdf ; UCOM https://www.ucom.am/file_manager/Reports/2/Mobile%2023-4.pdf ; Team Telecom https://www.telecomarmenia.am/file_manager/Results%20&%20Reporting/telecom_2023/q4/Mobile%20%204-th%20q%202023%20arm.pdf ; PSRC

According to the ITU, fixed internet subscriptions were at 430,407 (14.52 percent) in 2020.[45] The PSRC stated in an interview that between 2019 and 2024, the number of total broadband internet subscribers has increased by 45.5%, making up about 3,765,323, and fixed broadband adoption increased by 57.1% with a total of 545,876 subscribers of fiber-optics technology. By 2026, the PSRC intends to extend fixed broadband connection via wired fiber-optic or qualitatively equivalent wireless technology to 100 percent of settlements.[46]

1.1.4 COMMUNITY ANCHOR LOCATIONS

Community Anchor Locations (CALs) refer to physical facilities or institutions in a community that play a critical role in providing internet connectivity, access, and services to residents in that area.[47] These locations serve as hubs for internet access and digital resources, often in underserved or rural areas, and can include various institutions or organizations such as schools, libraries, healthcare facilities, and government buildings.

ITU survey data has shown that many schools in Armenia still have feeble internet connections.[48] It is commonplace for an entire school to be served by one slow mobile internet link. Of the 1,158 school responses to a 2021 ITU survey, 500 schools reported the availability of broadband internet; 204 (18 percent) of these schools have a fixed broadband internet connection, and 73 schools (6 percent) reported having no connectivity. A majority of schools report having access to the internet, but it is unclear whether they can be considered to have meaningful connectivity,[49] including sufficient speed and quality of connection. Information regarding the quality and speed of these connections has not been collected, indicating a significant gap in quantitative data and assessment.

Health facilities also experience poor quality of internet connection. According to the 2021 ITU survey, no hospitals reported having 1 Gbps service, which is considered a necessary speed to support bandwidth-intensive applications and services such as transmission of large medical imaging files, telemedicine consultations, and access to cloud-based electronic health records (EHR) systems. The fastest link reportedly available was 300 Mbps, with many having under 10 Mbps. At least two medical facilities in Armavir Marz reported having no internet connection at all.[50]

The lack of meaningful connectivity at Community Anchor Locations could hinder access to education, healthcare, and other essential services that need reliable internet connectivity. Data gaps in assessing the quality and speed of internet connections at CALs may hamper efforts to address connectivity issues effectively.

1.1.5 INFRASTRUCTURE SHARING AND INTEROPERABILITY

Infrastructure sharing and interoperability (see Key Terms Box 4 for definitions) can generate many benefits, including cost savings and increased revenues for providers, and improved connectivity and better prices for consumers. However, risks including operational challenges, the potential for reduced incentives to invest, and

45 "Database on Household Size and Composition 2022: Armenia," United Nations, Department of Economic and Social Affairs, Population Division. 2022, accessed March 22, 2024, https://population.un.org/Household/index.html#/countries/51>.

46 Public sector representative, interview by DECA team, January 2024, online.

47 GeoLinks. 2024. "How Community Anchor Institutions Can Help Close the Digital Divide, GeoLinks, 2024, accessed March 22, 2024, https://geolinks.com/community-anchor-institutions/#:~:text=Accordingpercent20topercent20thepercent20Federalpercent20Communications,agenciespercent20thatpercent20providepercent20outreachpercent2Cpercent20access>.

48 "Armenia: Digital Data, Resilience and Policy Assessment." International Telecommunication Union (ITU), 2021, accessed March 21, 2024, https://www.itu.int/en/ITU-D/Documents/connect2recover/Reports/Armenia-Digital-Data-Resilience-and-Policy-Assessment.pdf.

49 According to the Alliance for Affordable Internet (A4AI), meaningful connectivity can be assessed with four measurable targets of: (1) access to a fast Internet connection; (2) access to an appropriate device; (3) access to enough data; and (4) regular Internet use.

50 Armenia: Digital Data, Resilience and Policy Assessment. International Telecommunication Union.

risks to network resilience are important considerations.[51] Network security is a particular consideration in contexts where networks are under the control of international providers. It is vital that countries have appropriate technical standards and security measures in place to protect against these risks.

The Government of Armenia has not yet established relevant technical solutions, policies, and implementation mechanisms for sector-wide mandated infrastructure sharing. As of early 2024, one of the major operators, Team Telecom, is legally required to share its underground ducts for fiber optic infrastructure. The PSRC has assumed responsibility for facilitating connectivity infrastructure sharing as part of the European Union-Armenia Comprehensive and Enhanced Partnership Agreement (CEPA)[52]. These initiatives show progress and a commitment to mandate infrastructure sharing in the future.

KEY TERMS | BOX 4: Infrastructure sharing and interoperability[53]

Infrastructure interoperability refers to the ability of different systems, technologies, or components to work together and exchange information seamlessly within a given infrastructure or network. Key aspects of infrastructure interoperability include technical compatibility, data exchange, construction and operationalization standards, standardized communication protocols, Application Programming Interfaces, (APIs are a set of rules and tools for building software applications), and certification.

Infrastructure sharing in telecommunications refers to the practice and regulatory requirements that mandate or compel telecommunication operators to share certain network infrastructure elements with other operators. The purpose of such regulations is to promote competition, reduce duplication of infrastructure, and enhance interoperability in the telecommunications sector. Key components include:

- **Network elements:** Physical infrastructure such as towers, antennas, and fiber-optic cables. Operators may be required to provide access to their network elements to other operators, allowing them to use or lease the infrastructure.
- **Spectrum:** Shared spectrum can help ensure fair competition and optimal utilization, especially in cases where spectrum is limited.
- **Ducts and Rights of Way:** Operators may be required to share underground ducts, conduits, or rights of way to facilitate the laying of cables or other network components.
- **Passive Infrastructure**: Base station sites, shelters, and power supply infrastructure. Mandatory sharing may allow other operators to co-locate equipment on existing sites or to share facilities.
- **Backhaul Infrastructure:** Backhaul refers to the network that connects the core network to the base stations. Mandating sharing of backhaul infrastructure can enhance network deployment efficiency and reduce costs.

Source: ITU Journal on Future and Evolving Technologies

The regulatory environment in Armenia neither facilitates collaboration nor prevents redundancy. An interviewee noted that individual telecommunications operators construct their infrastructure independently, with the potential for redundancy. Small and medium enterprises (SMEs) rely on larger Internet Service Providers (ISPs) for access to essential first mile infrastructure.

51 "The infrastructure sharing imperative ," The World Bank Digital Regulation Platform, August 25, 2022, https://digitalregulation.org/the-infrastructure-sharing-imperative/.

52 Public sector representative, interview by DECA team, January 2024, online.

53 Ida Sèmévo Tognisse, Ahmed Dooguy Kora, Jules Degila, "Infrastructure Sharing Model to Connect the Unconnected in Rural Areas," ITU Journal on Future and Evolving Technologies 2, no. 2, 2021, https://www.itu.int/dms_pub/itu-s/opb/jnl/S-JNL-VOL2.ISSUE2-2021-A08-PDF-E.pdf. Lorela Cano, Antonio Capone, Brunilde Sansò., "On the Evolution of Infrastructure Sharing in Mobile Networks: A Survey, ' ITU Journal on Future and Evolving Technologies 1, no. 1, 2020, <https://www.itu.int/dms_pub/itu-s/opb/itujnl/S-ITUJNL-JFETF.V1I1-2020-P10-PDF-E.pdf.

Beyond collaborations within the telecom industry, a symbiotic relationship exists with non-telecom infrastructure. The state-controlled High Voltage Electricity Networks (HVEN)—the infrastructure corridors designed for transmitting and distributing electricity at high voltages—serve as a crucial resource, allowing telecom operators to rent fiber for their operations. UCOM has engaged in a cooperative venture with the Yerevan Municipality, leveraging municipal towers for electricity-related purposes.[54]

There is a notable gap in the current regulatory landscape related to national level standardization and certification for digital infrastructure.[55] Perceptions of this gap differ among diverse stakeholders in the telecommunications sector. Interviewees from major telecommunications companies and the international development sector underscored the importance of establishing adequate national level regulation for infrastructure construction, estimating that such regulation could reduce the prevalence of dark fiber, boost infrastructure interoperability, and reduce infrastructure redundancy.[56] A smaller ISP shared their perception that standardization may be limiting and might adversely affect small and medium providers.[57] International standardization and certification mechanisms may be too costly for medium or small ISPs, potentially ruling them out of the market, which most interviewees believe is fairly competitive at present.[58] Concerns were raised in interviews about the possible lack of expertise in the public sector in drafting standards that correspond to Armenia's telecommunication sector. Standardization regulation could therefore consider proper international knowledge exchanges and careful research on localization.[59] More effective regulatory measures could optimize the responsible deployment and utilization of telecommunications infrastructure—including 5G technology—in Armenia.[60]

An interviewee from an international development organization stated that—in their opinion—comprehensive infrastructure mapping, including the balance of coverage and redundancy, should be the first step before undertaking mandatory sharing and standardization efforts.[61] However, this process faces impediments, as providers are not mandated to submit information on the infrastructure they utilize and build. Major telecommunications operators stressed that national legislation on data-sharing for infrastructure mapping is not adequately implemented, likely because operators are not properly documenting their infrastructure location.[62]

54 ICT Expert, interview by DECA team, January 2024, online. Telecommunications company, interview by DECA team, January 2024, online. Regional expert, interview by DECA team, January 2024, online.

55 Civil society organization, interview by DECA team, December 2023, online. Private sector organization, interview by DECA team, January 2024, online. Cybersecurity policy expert, interview by DECA team, December 2023, online. Two telecommunication companies, interviews by DECA team, January-February 2024, online.

56 Two telecommunication companies, interviews by DECA team, January 2024, online. International development organization, interview by DECA team, December 2023, online.

57 Private sector representative, Interview by DECA team, February 2024, online. Country expert, interview by DECA team, January 2024, online.

58 Country Expert, interview by DECA team, January 2024, online. Two telecommunication companies, Interviews by DECA team, January-February 2024, online.

59 Country expert, Interview by the DECA team, January 2024, Online; Telecommunication Company, Interview by the DECA team, February 2024, Online.

60 Regional expert, interview by DECA team, January 2024, online.

61 International development organization, interview by DECA team, December 2023, online.

62 Two telecommunication companies, interviews by DECA team, January 2024, online.

1.2 DIGITAL DIVIDES

KEY TERMS | BOX 5: The digital divide

The digital divide is the distinction between those who have access to and can use digital products and services and those who are excluded from use of these products and services. Often, digital divides overlap, stemming from inequities in literacy, cost, social norms, or availability of relevant content. Digital divides may be associated with gender, economic status, geography, and age, among other factors.

1.2.1 RURAL-URBAN DIGITAL DIVIDE

A rural-urban divide (see Key Terms Box 5) exists in Armenia's internet connectivity, quality, usage, and affordability, although there are varying perceptions of why this gap exists. A 2020 World Bank report on the type of internet connections used at home by rural and urban Armenians found that 700 out of 952 rural settlements (73.5 percent) did not have fiber backhaul networks. Survey participants shared the following reasons for their households not adopting fixed broadband: not helpful or not interesting (50 percent), equipment costs are too high (19 percent), and broadband is not available in the area (2 percent).[63]

International development and government interviewees noted the limited availability of middle mile infrastructure for fixed broadband in rural communities as the main reason for limited service adoption.[64] Speed also appears to be a challenge, though ISP speed data were not available to the research team and Government-administered speed tests have not taken place. World Bank connectivity speed tests conducted between 2021 and 2022[65] showed an urban-rural divide in equitable pricing. Test data showed that connectivity speeds are about 20 times higher in urban areas, yet data is at the same cost, signifying a prominent divide in the quality of services (QoS). Major fixed broadband providers consider fixed connectivity to be affordable, especially compared to average pricing policies in the region and the EU.[66] ISPs interviewed did not believe there are gaps in QoS between rural and urban communities but rather attributed the limited adoption of fixed broadband to lower income rates among rural communities. Addressing gaps in the availability of speed test data could support analysis of QoS, although interviewees noted that the public sector lacks the technical means and capacity to administer regular national level speed tests.[67]

The prevalence of dark fiber—excess network fiber that was installed but is not turned on, or "lit"—also affects the quality of service in rural areas.. Interviewees representing major and medium ISPs suggested that the prevalence of dark fiber is largely due to a lack of government oversight in infrastructure and ICT production regulation and standardization. Interviewees also suggested that it is due to the dominance of smaller ISPs in rural areas, as small regional providers facilitate and operationalize poorly constructed "dark fiber" infrastructure, enabling them to provide services at low rates. Major and medium ISPs cannot match these rates, given the cost to cultivate and sustain healthier connectivity infrastructure.[68] The presence of dark fiber makes internet connection more affordable, but the quality of service is often poor.

63 "ICT Usage in Households, by Individuals and in SMEs in Armenia," The World Bank, May 2020, [Not publicly available, referenced in "Armenia: Digital Data, Resilience and Policy Assessment." International Telecommunication Union, https://www.itu.int/en/ITU-D/Documents/connect2recover/Reports/Armenia-Digital-Data-Resilience-and-Policy-Assessment.pdf.]

64 ICT Usage in Households. The World Bank.

65 International development organization, interview by DECA team, December 2023, online.

66 Three telecommunication companies, interviews by DECA team, January 2024, online.

67 Public sector representative, interview by DECA team, January 2024, online.

68 Telecommunication company, interview by DECA team, January 2024, online.

Numerous interviewees noted that medium and small ISPs concentrate on providing last-mile services to rural areas. Major providers focus on larger settlements, such as large apartment blocks and businesses. These are less widespread in rural areas,[69] so there are limited commercial gains for major telecommunication companies.[70] The absence of larger ISPs has implications for developing connectivity infrastructure. Major providers refrain from investing as they expect the profits to outweigh investment costs in only 10 to 15 years.[71] Due to these challenges, some rural settlements in Armenia still do not have appropriate, if any, middle mile infrastructure for fixed broadband.

1.2.2 GENDER DIVIDE

The gender digital divide in Armenia is minimal across age groups, except among pension-age persons. The ARMSTAT (2022) household survey shows device ownership and internet access rates by gender and age.[72] Access to computers was generally equitable: 58.60 percent of females and 60.94 percent of males had used a computer 12 months before the study. The most notable gender difference in computer usage was among pensioners: 30.16 percent of male pensioners (65 years or older) and 21.88 percent of female pensioners (63 years or older) had used a computer in the 12 months before the study.

Access to the internet was reasonably equitable: 70.78 percent of females and 71.97 percent of males had used the internet in the 12 months before the survey. There were slightly more female than male mobile phone owners: 79.81 female percent versus 77.72 percent male. Gender differences in mobile phone ownership for different age groups were marginal. (See Box 1 for information on Technology-facilitated gender-based violence (TFGBV) in Armenia.)

BOX 1: Technology-facilitated gender-based violence (TFGBV) in Armenia[73]

Online violence against women and girls remains a major problem in Armenia. According to an EU4GenderEquality report, the persistence of violence against women online is a symptom of a deep-seated gender inequality in society at large, as well as the result of a lack of national laws and regulations to protect women against online violence. According to the 2021 report, women experience sexism, and are subject to misogynist attacks, threats and sexual harassment online, particularly women in politics and women's rights and human rights activists.

Source: EU4GenderEquality Reform Helpdesk, Country Gender Profile for Armenia, August 2021

1.2.3 DIGITAL INCLUSION OF PERSONS WITH DISABILITIES

ARMSTAT data demonstrates that access to the internet and a computer for persons with disabilities (PWDs) was lower than that for the general Armenian population — 40.54 percent of persons with disabilities used a computer in the 12 months prior to the study, whereas this figure was 59.85 percent among Armenians overall. Similarly, internet usage was reported at 49.43 percent for persons with disabilities, in contrast to 71.32 percent for the general population. However, mobile phone ownership among persons with disabilities was slightly

69 International Development Organization, interview by DECA team, December 2023, online. Two telecommunication companies, interviews by DECA team, January 2024, online. Private sector technology company, interview by DECA team, January 2024, online.

70 Two telecommunication companies, interview by DECA team, January 2024, online.

71 Telecommunication company, international development organization, public sector organization, interviews by DECA team, December 2023 - January 2024, online.

72 "Household's Integrated Living Conditions Survey anonymised microdata database," ARMSTAT, 2022, accessed March 22, 2024, https://armstat.am/en/?nid=205.

73 "Country Gender Profile for Armenia," EU4Gender Equality Reform Helpdesk, August 2021, https://www.eeas.europa.eu/sites/default/files/documents/Country%20Gender%20Profile_%20ARMENIA_ENG.pdf.

higher, with 81.08 percent owning a mobile phone compared to 78.86 percent of the general population. Gender disparities further compound these challenges, particularly in computer and internet usage among girls and women with disabilities.[74]

The high levels of mobile phone ownership compared to the low level of internet usage among Armenians with a disability suggests a lack of affordable access or relevant content for PWDs in Armenia.[75] According to interviewees, the main challenges to the digital inclusion of PWDs are limited web content accessibility, including insufficient accessibility regulation, outdated and insufficient assistive technology, and limited formal and informal digital literacy education initiatives and awareness campaigns.[76]

Numerous organizations are actively engaged in the protection of the rights of PWDs, including their digital rights, development of and advocacy for assistive technologies, and digital literacy efforts. Many such organizations are presented in the following sections, but the list is not exhaustive.

Limitations in accessibility regulation

Several interviewees pointed out that there are limitations related to accessibility regulation and insufficient coordination with key regulatory bodies. According to these interviewees, e-government services do not have sufficient provisions for various disabilities.[77] Many online services are either unavailable in Armenian or are too complex, presenting linguistic and cognitive challenges for individuals with learning disabilities. There are currently no legally binding standards for web content accessibility. Civil society organization Disability Rights Agenda (DRA) has audited government websites, including those intended specifically for persons with disabilities, and note that they failed to meet minimal World Wide Web Consortium (W3C) accessibility requirements. Interviewees noted that inclusivity of e-services could be improved if PWDs were included in the design and development of digital services. The GoA's Digitalization Strategy has set targets for making its online content more accessible for PWDs, but it is unclear whether action has been taken to date toward implementation of these targets.

NGOs also noted their concerns related to a perceived lack of transparency on criteria utilized in machine learning algorithms within AI-powered decision aids for classifying, identifying, and registering PWDs. DRA have taken legal action to address what they consider to be deficiencies in transparency and public engagement in the deployment of AI algorithms that affect PWDs.[78]

Outdated and insufficient assistive technology

Prominent gaps remain in ensuring the availability of advanced technologies for PWDs, such as screen readers, decision-making aids powered by artificial intelligence, speech-to-text, and text-to-speech systems. The available solutions in Armenia are low- or medium-tech and several civil society organizations noted in interviews that the GoA is limited in its ability to ensure the reasonable supply and availability of said technology. From their perspectives, this is due to insufficient funding and limited participation of PWDs in relevant decision-making processes.[79] Several interviewees from civil society organizations noted that the lack of timeliness of responses

74 "Country Gender Profile for Armenia," EU4Gender Equality Reform Helpdesk, August 2021, https://www.eeas.europa.eu/sites/default/files/documents/Country%20Gender%20Profile_%20ARMENIA_ENG.pdf.

75 Country Gender Profile for Armeia. EU4 Gender Equality Reform Helpdesk.

76 Two NGO representatives, interviews by DECA team, January 2024, online.

77 NGO representative, interview by DECA team, January 2024, online.

78 NGO representative, interview by DECA team, January 2024, online.

79 NGO representative, interview by DECA team, December 2023, online.

from the MHTI regarding alignment to established criteria and international standards on the widespread use of modern technologies to boost the integration of PWDs is another key barrier.[80]

Technological challenges have also hindered the provision of services for PWDs. To date, unnatural robotic voice outputs and limited applicability for the Armenian language have hindered the adoption of text-to-speech and speech-to-text software. Some civil society organizations have initiated targeted projects to develop more advanced assistive technology in order to bridge this gap. The DRA provides blind and visually-impaired users with text-to-speech engines compatible with screen readers[81] and the White Cane NGO developed a screen-reading website in Armenian. A Computer Laboratory at the Armenian Association of the Blind—established in 2010 with the support of the International Telecommunication Union (ITU)—focuses on the creation of technology solutions for PWDs and provides training for facilitators.[82]

Challenges in formal education for PWDs

Regarding inclusive formal education for PwDs, interviewees from civil society noted the insufficient inclusion policies and facilities (including assistive technologies) at public schools, forcing many children with disabilities to attend special-needs schools which segregate them.[83] Civil society remains at the forefront of digital literacy and technology development efforts which aim to make formal education more inclusive for children with disabilities. White Cane conducts age-aggregated individual and group training on using text-to-speech and speech-to-text software,[84] and the We Can NGO's educational web application for people with intellectual disabilities "Agreak" is being adapted for those with visual impairments.[85] The Havsar Educational Foundation designed an educational application for school children which provides textbook content supported by audio-visual tools.[86] These efforts work in collaboration with international donors, education sector NGOs, the private sector, and the Ministry of Education, Science Culture, and Sport, demonstrating the benefit of multi-stakeholder attention.

1.3 DIGITAL LITERACY

Research and interviews have identified significant gaps in digital literacy in Armenia. The lack of comprehensive quantitative assessments of the general population's digital literacy level is a primary gap. As a result, there are insufficient targeted strategies to enhance digital literacy, digital hygiene, and cybersecurity in formal and informal education settings. Limited content relevance emerges as a recurring factor in digital literacy, with a scarcity of available material in Armenian. This poses a substantial barrier to effective digital literacy initiatives in the country.

1.3.1 DIGITAL LITERACY AND FORMAL EDUCATION

Publicly available data on digital literacy-related curricula in formal education is scarce, indicating a lack of systematic assessment and monitoring of educational efforts in this area, although efforts in this space appear to be increasing. An interviewee noted that general education in schools introduces online safety from the

80 NGO representatives, interviews by DECA team, December 2023 - January 2024, online.

81 Civil society organization, interview by DECA team, December 2023, online.

82 NGO representative, interview by DECA team, January 2024, online.

83 NGO representatives, interviews by DECA team, December 2023 - January 2024, online.

84 NGO representative, interview by DECA team, January 2024, online.

85 NGO representative, interview by DECA team, January 2024, online.

86 NGO representative, interview by DECA team, January 2024, online.

second grade onward, and relevant elementary and secondary education textbooks include increasing content on digital literacy and cyber hygiene.[87] While some schools introduce online safety education from a young age, there is limited coordination and efficiency in designing digital literacy curricula across educational institutions.

1.3.2 DIGITAL LITERACY AND INFORMAL EDUCATION

The private sector and civil society facilitate informal and vocational education initiatives, filling critical gaps in Armenia's educational landscape, particularly in rural and underserved areas. These efforts aim to address the need for practical skills in the rapidly growing field of ICT. Illustrative efforts are outlined below, and while others are not mentioned, such initiatives are limited in number. There is a particular lack of support in digital literacy for the elderly.

The Real School, a high-school level vocational education initiative undertaken by Instigate CJSC in Yerevan and three more regions of Armenia, offers a four-year curriculum designed to create post-graduation employment opportunities in the ICT sector.[88] The Children of Armenia Fund addresses infrastructure gaps and facilitates informal education in digital literacy for children in rural communities. COAF's curricula include topics such as digital growth, sound design, engineering, robotics, and graphic design.[89] Overall, all interviewees agreed that organizations providing informal education typically struggle with issuing nationally acknowledged qualifications to their alumni due to the shortage of human and technical resources and difficulties in effective communication with the public sector.[90]

1.3.3 DIGITAL CONTENT CONSUMPTION AND RELEVANCE

A media content consumption study by the Media Initiatives Center showed that the vast majority of survey respondents in Armenia—75 percent—were using social network platforms in 2021. This is a significant rise from 43 percent in 2015. Facebook and YouTube are the two most popular social networks in Armenia, both used by 90 percent of Armenians with social media profiles. Instagram is the third most popular social network in Armenia with 45 percent of Armenia's population using Instagram.[91]

According to the media content consumption study, internet resources and social networks were the most used sources of information (used daily by 67 percent of respondents) in 2021, followed by national television (59 percent)—see Figure 7. National radio and national TV channels were the most trusted by their Armenian audiences, as 81 percent (radio) and 77 percent (TV) of users said that the information provided by these sources was reliable. The report differentiates between international and Russian TV channels, indicating a decrease in trust and usage frequency toward both, but an increase in trust of national channels. Conversely, the report notes an increase in trust and usage frequency for online resources in general, and relative stability in the use of and trust in Russian online resources.

87 Civil society organization, interview by DECA team, January 2024, online.

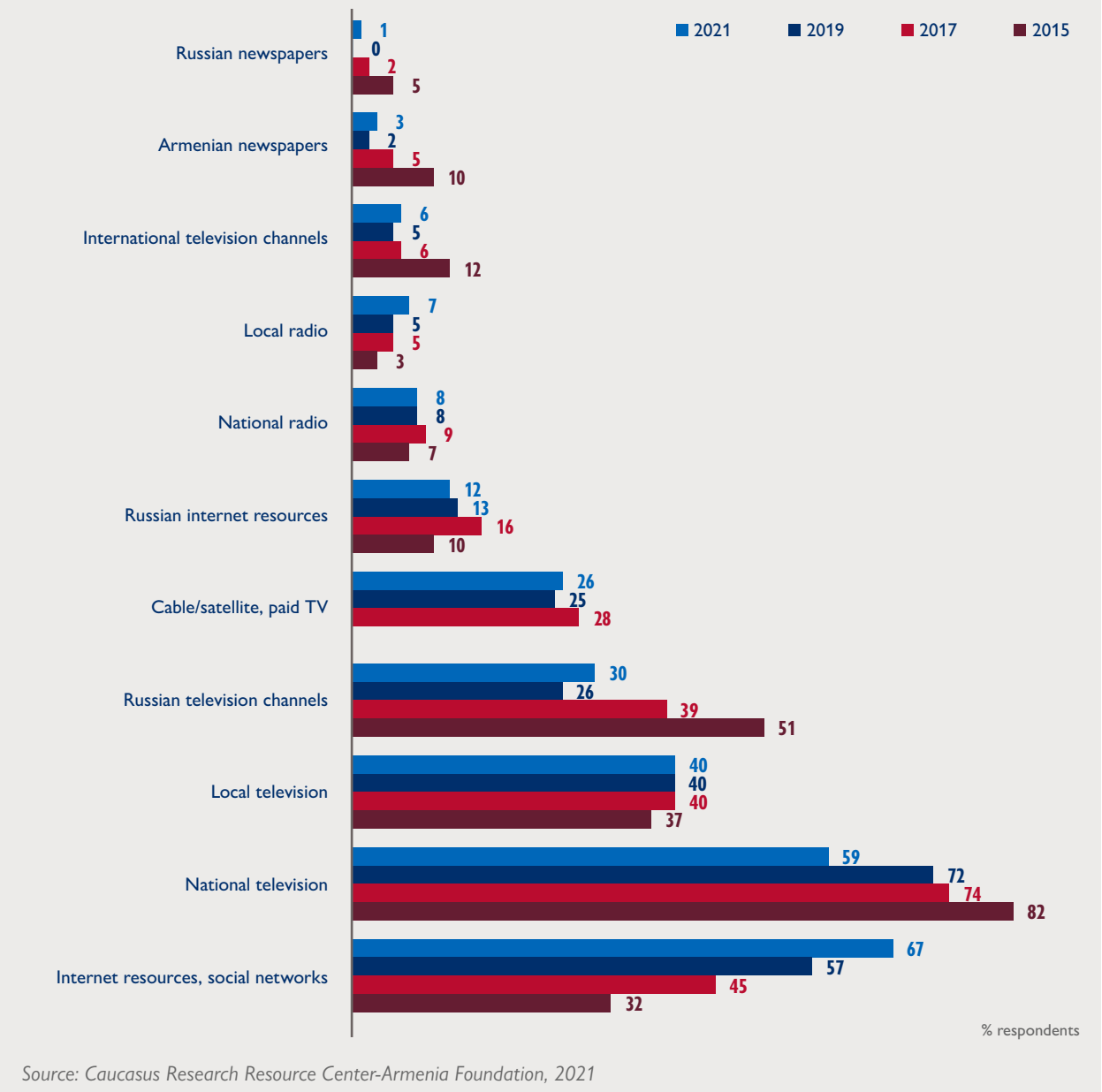
88 NGO representative, interviews by DECA team, December 2023 and January 2024, online. Private sector organization representative, interview by DECA team, December 2023 and January 2024, online.

89 Non-profit organization, interview by DECA team, January 2024, online.

90 Non-profit organization, interview by DECA team, January 2024, online. Sector expert, interview by DECA team, December 2023, online. NGO representative, interview by DECA team, January 2024, online.

91 "Media Consumption and Media Coverage of Reforms in Armenia," USAID, Media Initiatives Center, CRRC Armenia, Analytical Report, October 2021, https://mediainitiatives.am/wp-content/uploads/2022/01/Media-Consumption-in-Armenia-Report.pdf.

FIGURE 7: Daily content consumption 2015-2021[92]



Source: Caucasus Research Resource Center-Armenia Foundation, 2021

To ensure the provision of Armenian language content,[93] national and local television and radio channels are legally required to offer their content in Armenian.[94] Radio programs, films and documentaries, cartoon languages, and the foreign version of Armenian programs must be broadcast with simultaneous translation in Armenian either with a voiceover or with subtitles. The Law of the Republic of Armenia "On Telecommunications" also requires that telecommunications operators in the territory of the Republic of Armenia formulate received and transmitted written messages in Armenian. Any alphabet, such as Armenian, Latin, or Cyrillic, is permissible for spelling and formulation.[95]

92 "Media consumption and media coverage of reforms in Armenia: Analytical Report (for end-line survey.)," Caucasus Research Resource Center-Armenia Foundation, 2021, http://www.parliament.am/legislation.php?sel=show&ID=1464&lang=eng.

93 National programs are programs produced or commissioned by the television or radio companies of RA, or other companies producing television and radio programs, including those translated into Armenian. Local programs are programs that are produced by a particular teleradio company and are subject to the author's right.

94 Media consumption and media coverage of reforms in Armenia: Analytical Report. CCRC.

95 "RA Law on Electronic Communication," 2005, https://www.arlis.am/documentview.aspx?docid=68804.

Despite these regulations, the lack of relevant content in Armenian is one of the most significant barriers to the adoption of digital services. (See Key Terms Box 6.) Only 12.54 percent of apps are in Armenian, placing Armenia 167th out of 177 on the Mobile Connectivity Index (MCI) for local language apps in 2019.[96]

KEY TERMS | BOX 6: Locally relevant content

Locally relevant content goes beyond making content available in the relevant language. Relevant content can refer to content in the local language, content that is created and hosted locally, and content that is relevant to the local population. Content relevance is important to understand and address the usage gap.[97]

1.3.4 DIGITAL LITERACY AND CHILD PROTECTION ONLINE

Armenia has enacted several child protection initiatives for the online space, including resources published by the National Center for Educational Technologies.[98] The primary regulatory bodies working on child protection online are the Ministry of High Tech and Industry (MHTI), the police, and the Investigative Committee.

In 2021, the Union of Operators conducted an online survey of 7,300 schoolchildren across Armenia to assess online safety issues and levels of digital skills among them. Based on the results, between 2021 and 2023, the Union conducted training sessions on Child Online Protection for children, parents, teachers, and school principals in 31 schools across Armenia. The Union has also localized ITU guidelines on child protection,[99] including content for parents and teachers on internet threats and advice for enhancing online safety, guidelines for the telecom sector, and guidelines for policymakers for the Ministry of High Technology and Industry.[100]

1.3.5 DATA INFRASTRUCTURE

Beyond connectivity, there is exploration of on-premise data centers and cloud computing, which demonstrates commitment to enhancing the country's data infrastructure. The development of data centers is one facet of Armenia's telecommunications landscape, with a move toward developing Tier 3 data centers which are designed to meet requirements of large businesses and government entities due to extra fail-safes and uninterrupted availability. Team Telecom is establishing a Tier 3 Plus data center in Yerevan's Jrvej district and a Tier 3 center in the regions, with assistance from Germany. A partnership between the GoA and Amazon Web Services (AWS)[101] also shows promise that the Government is exploring cloud computing options for data governance.

96 "Armenia: Digital Data, Resilience and Policy Assessment," International Telecommunication Union (ITU), 2021, https://www.itu.int/en/ITU-D/Documents/connect2recover/Reports/Armenia-Digital-Data-Resilience-and-Policy-Assessment.pdf.

97 "Connected Society Content in Latin America: Shift to local, shift to mobile," GSMA, 2016, https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/03/content-in-latam-shift.pdf.

98 "A guide to online child protection for parents and educators," National Center for Educational Technologies, 2022, https://lib.armedu.am/article/7729. "A Guide to Protecting Children Online for the Industry," [unavailable]. "A Guide to Child Online Protection for Policy Makers," National Center for Educational Technologies, 2020, https://lib.armedu.am/article/7725. "Online security with Lilith and Sargis," National Center for Educational technologies, 2022, https://lib.armedu.am/article/14021. "Cybersecurity rules for parents and teachers," National Center for Educational Technologies. 2022, https://lib.armedu.am/files/resource/files/2022-02-25/b5dbb8c9e1fb589f3f2cd99bed6c3742.pdf.

99 NGO representative, interview by the DECA team, January 2024, online.

100 NGO representative, interview by the DECA team, January 2024, online.

101 "Armenian government and Amazon Web Services explore tech collaboration

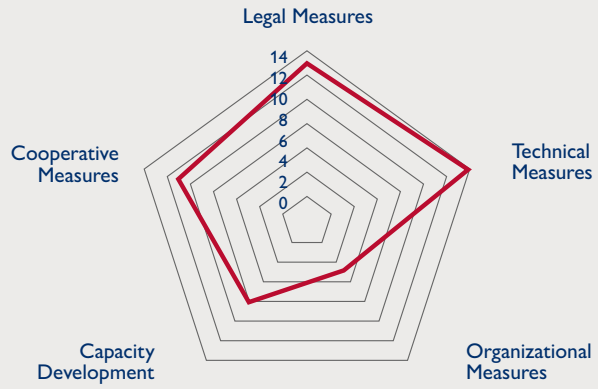
1.4 CYBERSECURITY

Armenia was ranked 79th out of 182 countries in the 2020 Global Cybersecurity Index (see Figure 8 below). The score from the previous assessment in 2017 was 111th place in the world in aspects such as the ICT development index, networked readiness index, global cybersecurity index, and national cybersecurity strategies. These scores signify that although Armenia has improved significantly in recent years, the gap between ICT development and cybersecurity remains wide.[102]

Publicly available data on the cybersecurity of critical infrastructure and essential services in Armenia is scarce. An EU Report on Cybersecurity guidelines for the Eastern Partner countries stated that Armenia lacks essential services for the proper functioning of the society and economy in a manner consistent with the EU's NIS(2) Directive on threat-based cybersecurity measures for critical infrastructures and essential services, albeit without interoperability estimations. (See more on cybersecurity governance in Pillar 2.)[103]

Major MNOs and ISPs in Armenia voluntarily acquire international cybersecurity certifications, such as ISO 27001.[104] However, international standardization remains financially prohibitive for medium and small providers.[105] The GoA does not mandate cybersecurity requirements at present, while the current draft of the cybersecurity law envisions what appears to be a fragmented approach to enforcing minimal cybersecurity standards. (See Pillar 2.) It is not clear at this time how such standards will be mandated and implemented. The draft law may clarify once it is finalized.

FIGURE 8: Armenia's standing in the Global Cybersecurity Index[106]



Development Level
Developing Country
Landlocked Country

Area(s) of Relative Strength
Technical Measures

Area(s) of Potential Growth
Organizational Measures

Overall Score	Legal Measures	Technical Measures	Organizational Measures	Capacity Development	Cooperative Measures
50.47	12.87	13.86	4.87	7.85	11.02

Source: ITU Global Cybersecurity Index

102 "Global Cybersecurity Index." International Telecommunication Union (ITU), 2020, https://www.itu.int/en/ITU-D/Cybersecurity/Pages/global-cybersecurity-index.aspx.

103 "Supporting Digital Economy and Society in the Eastern Partnership: Cybersecurity Guidelines for the Eastern Partner Countries," EU4Digital, 2020, https://eufordigital.eu/wp-content/uploads/2020/10/Cybersecurity-guidelines-for-the-Eastern-Partner-countries.pdf.

104 "UCOM attains prestigious ISO 27001 certification for information security excellence," Ucom, 2023, https://www.ucom.am/en/news/2023/12/23/ucom-attains-prestigious-iso27001-certification-for-information-security-excellence/580/.

105 Five telecommunication companies, interviews by DECA Team, January - February 2024, online.

106 "Global Cybersecurity Index," International Telecommunication Union (ITU), 2020, https://www.itu.int/en/ITU-D/Cybersecurity/Pages/global-cybersecurity-index.aspx.

PILLAR 2: DIGITAL SOCIETY, RIGHTS, AND GOVERNANCE

Digital Society, Rights, and Governance focuses on how digital technology intersects with government, civil society, and the media. This pillar is divided into three sub-pillars: Internet Freedom; Civil Society and Media; and Digital Government. Internet Freedom explores factors that enable or constrain the exercise of human rights and fundamental freedoms online. This includes individual rights to freedom of speech, privacy, and free assembly, and the abuse of these rights through digital repression. Civil Society and Media identifies key institutions and how they report on, advocate for, and influence online freedoms. Digital Government looks at the government's efforts to manage internal information technology (IT) processes and systems, deliver citizen- and business-facing e-services, and engage with the public through digital channels.

KEY TAKEAWAYS: DIGITAL SOCIETY, RIGHTS, AND GOVERNANCE

- Armenia has a formal digitalization strategy, legislation related to digital government, and has established governing bodies for the digitalization process. Legislation on access to information and cybersecurity has not been adopted.
- The GoA has undertaken substantial digital transformation efforts to streamline internal processes and enhance citizen engagement and service delivery through online platforms.
- The government is committed to enhancing the country's cybersecurity posture with draft cybersecurity legislation and establishment of multiple CERTs.
- The media landscape in Armenia is changing drastically due to widespread social media use and an increased public perception that the media does not operate independently.
- Disinformation and misinformation spread rapidly on social media platforms, and traditional media struggle with fact-checking due to capacity and resource constraints. The GoA is in the early stages of implementing actions to tackle disinformation.

RELEVANT RECOMMENDATIONS

- Support the GoA in the implementation of digitalization strategies through technical assistance and capacity-building efforts.
- Bolster the information integrity and media literacy ecosystem.
- Facilitate comprehensive cybersecurity governance and practices. [cross-cutting]

2.1 INTRODUCTION

The GoA has taken various steps since 2000 toward the digital transformation of systems and services. This has included revamping policies, practices, and perceptions related to digital technologies within the public sector. Key policies include the Digitization Strategy (2021)[107] and Public Administration Reforms Strategy (2022).[108]

Armenia's successful advancements in e-government are evidenced by the country's standing in the UN E-Government Development Index. In 2022, Armenia received a score of 0.73, which is above the Western Asia average of 0.69. The country ranked 64th of 198 countries, an improvement from 87th in 2018.[109] The establishment of the Information Systems Management Board in January 2022 and the Information Systems

107 "N 183-L of February 11, 2021 On Approving Armenia's Digitalization Strategy, Program of Strategic Events and Performance Indicators," Armenian Legal Information System (ARLIS), accessed March 29, 2024, https://www.arlis.am/documentview.aspx?docID=149957.

108 "N 691-L of May 13, 2022 On the Approval of the Strategy for Public Administration Reforms, the Road Map and Results Framework for 2022-2024, the List of Person to Ensure the Monitoring and Coordination Of the Implementation of the Strategy," Armenian Legal Information System (ARLIS), accessed March 29, 2024, https://www.arlis.am/DocumentView.aspx?docid=162791.

109 "UN E-Government Knowledge Base: Armenia," United Nations Department of Economic and Social Affairs, n.d., https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/8-Armenia.

Agency of Armenia (ISAA) in April 2022 demonstrates the GoA's commitment to government digital transformation. These entities spearhead initiatives aimed at modernizing digital services, fortifying information security, and fostering economic reform.

Existing and draft legislative frameworks governing areas such as personal data protection, freedom of information, and cybersecurity set the foundation for protecting Armenians from various digital risks. However, challenges persist in areas like cybersecurity governance, where the absence of centralized oversight may pose hurdles to effective policy implementation.

The rise of social media platforms as key channels for sharing information offers unprecedented opportunities for connectivity and engagement, but also amplifies challenges such as the spread of mis- and disinformation. In this evolving ecosystem, media outlets and civil society organizations (CSOs) play pivotal roles in shaping public discourse, advocating for increased media literacy, and safeguarding information integrity. In 2023, the GoA, in collaboration with CSOs, adopted the Concept for Combating Disinformation 2024-2026.[110]

2.2 DIGITAL GOVERNMENT: POLICIES, REGULATIONS, AND KEY ACTORS

KEY TERMS | BOX 7: Digital Government

Digital government[111] denotes the use of digital technologies as an integrated part of government strategies.[112] Successfully navigating digital transformation requires more than adopting new applications. It requires a shift in processes and attitude toward agile and collaborative decision-making.

USAID's digital government model is built around three core functions: management of internal operations, delivery of services, and engagement with stakeholders. The performance of digital government services depends on foundational elements such as change management; human capacity; legislation, policy, and regulation; and digital infrastructure and adoption. Investment in these core components and foundational elements can help government bodies become more coordinated, efficient, resilient, responsive, accountable, and participatory.

Source: USAID Digital Government Model

The GoA initiated digital government efforts in the 2000s, laying the foundation for more recent digitalization efforts. In February 2021, the GoA approved the Digitalization Strategy 2021 - 2025,[113] which outlines the nation's digitalization approach. The strategy has three pillars: public administration, economy, and society. It advances digital transformation through innovative technologies, data policies, and digital government services. It also includes: strengthening cybersecurity measures and digital government systems; establishing common digitalization standards; and coordinating digitalization efforts. The Strategy outlines specific initiatives with key results and deadlines. However, with less than a year remaining, many initiatives appear incomplete and subsequent processes are unclear.

110 "Concept for Combating Disinformation, 2024-2026," accessed March 29,2024. https://foi.am/en/news-events/33149.

111 USAID uses the term "digital government." Other sources use terms like "e-government" or "e-services" to describe the same functions.

112 "USAID Digital Ecosystem Framework," USAID, cited April 28, 2022, https://www.usaid.gov/digital-development/digital-ecosystem-framework.

113 "N 183-L of February 11, 2021 On Approving Armenia's Digitalization Strategy, Program of Strategic Events and Performance Indicators," Armenian Legal Information System (ARLIS), accessed March 29,2024, https://www.arlis.am/documentview.aspx?docID=149957.

In April 2022, the GoA adopted a more comprehensive strategy for Public Administration Reforms (PAR) 2022-2024.[114]This strategy aligns with the broader strategic development agenda as defined in the not yet adopted Armenia Transformation Strategy 2050. The primary objectives of the initial phase of the PAR implementation include items related to policies, services, institutions, people, and participation.

These efforts are a significant step in the country's digitalization efforts, but Armenia faces challenges turning these strategies into tangible outcomes. This is, in part, due to resistance to change within the public sector. There may be a hesitancy to depart from traditional ways of doing work and it is difficult to obtain buy-in from lower level public servants due to their weak understanding of the benefits of digital tools and to their fear that digitalization will result in job losses.[115] The emergence of key public sector champions and active collaboration with the private sector spurred the development of successful initiatives including data management policies, cybersecurity measures, and data center and cloud infrastructure exploration.

2.2.1 POLICIES AND REGULATIONS GOVERNING ARMENIA'S DIGITAL ECOSYSTEM

The GoA has numerous pieces of legislation related to digitalization:

- Laws related to access, storage, and processing of data are outlined in the 2015 Law on the registration, classification, and storage of information, the Personal Data Protection legislation (2015) and the Law on Data Exchange (2019).
- Digital ID and e-signatures are legislated by a series of laws enacted between 2004 and 2018. However, many changes are underway regarding digital identity. (See section 2.3.3.)
- Access to information is covered in the 2003 Law on Freedom of Information. A new law is in process.
- The 2018 Law on Public Consultations regulates how the government engages with the public— including CSOs—on policy and legislation. (See Section 2.3.)

There are local regulations within specific sectors such as healthcare. Legislation related to cybersecurity and combating disinformation is in draft; strategies and concepts have been published. (See a detailed list of GoA digitalization legislation in Table 5, Annex A.)

2.2.2 STREAMLINING COORDINATION EFFORTS

In recent years, the GoA has taken steps to improve coordination and ownership of government digitalization efforts, including the creation of new bodies and delineation of responsibilities. These efforts clearly demonstrate a move towards improved collaboration and coordination, but the new structure is still in early stages.

The Ministry of High-Tech Industry (MHTI) is primarily responsible for policy development on digital transformation. The MHTI's responsibilities include developing and implementing policies related to digitalization, including on cybersecurity and new technologies. The MHTI oversees communications, mail, internet, and space-related affairs as well as establishing and coordinating digital government systems and services. [116]

In January 2022, the Prime Minister of Armenia formed the Information Systems Management Board (the Board). It is comprised of key officials responsible for overseeing digitalization reforms in Armenia. The Board

114 "N 691-L of May 13, 2022 On the Approval of the Strategy for Public Administration Reforms, the Road Map and Results Framework for 2022-2024, the List of Person to Ensure the Monitoring and Coordination Of the Implementation of the Strategy," Armenian Legal Information System (ARLIS), accessed March 29, 2024, https://www.arlis.am/DocumentView.aspx?docid=162791.

115 Private organization, interview by DECA team, January 2024, online. International development organization, interview by DECA team, January 2024.

116 "On The Structure And Functions of The Government," Armenian Legal Information System (ARLIS), March 30, 2018, .https://www.arlis.am/documentview.aspx?docid=188987

"coordinates digital transformation, digital society, and economic reform programs,"[117] and leads partnerships with international and private sector stakeholders. It is led by the Deputy Prime Minister, Mr. Mher Grigoryan, who serves as the Chief Information Officer (CIO) of Armenia. In an interview, a GoA representative explained that the main goal of the Chief Information Officer (CIO) of Armenia and the Board is to facilitate the harmonization of various agencies and their digitalization efforts. Any digital initiative proposed by a government entity must be presented to the Management Board and approved before receiving funding from government or international donor organizations.[118] Representatives from the Ministries of High-Tech Industry, Economy, Justice, and Finance, as well as members from the State Revenue Committee, the Defense Ministry, and the Central Bank of Armenia (CBA), are members of the Board. The President of the Central Bank can nominate a candidate for the position of Secretary of the Management Board.

The Information Systems Agency of Armenia (ISAA) was established in 2022 to modernize digital services provided by the government to the public, to develop basic digital infrastructure, and to enhance information security.[119] ISAA focuses on implementation, including establishing a national digital identity system, crafting a national cybersecurity framework, and enhancing data interoperability among crucial databases maintained by public and private entities.[120] ISAA assists public sector organizations in adhering to regulatory requirements for data mapping and classification. [121]

2.3 MANAGING DIGITAL GOVERNMENT

Every government institution in Armenia is responsible for the management and maintenance of their own data and databases, digital services, official websites, internal systems, and information technology (IT) services. Data management is regulated by interoperability standards and legally stipulated procedures including through the 2015 Law on information registration, classification, and storage of information,[122] as well as other legislation on data interoperability[123] and personal data exchange.[124] (See Table 5 in Annex A.) These laws mandate that government bodies ensure that systems correspond to the established general technical specifications for data management compliance.

Between February and March 2024. the MHTI published various draft laws on public information and freedom of information (amended from initial drafts in December 2023). According to the GoA,[125] adoption of the Law on Freedom of Information and Public Information is expected to facilitate the establishment, development,

117 "About Establishing the Management Board of Information Systems and Approving Its Composition," Armenian Legal Information System (ARLIS), January 21, 2022, https://www.e-gov.am/decrees/item/24354/.

118 Public sector representative, interview by DECA team, January 2024, online.

119 "Digitalization practices across the SME policy spectrum of the Republic of Armenia," Ministry of High-Tech Industry of the Republic of Armenia, n.d., https://www.unescap.org/sites/default/d8files/event-documents/S4a-DigitalizationPractices-Armenia.pdf.

120 "Open Banking," Central Bank of Armenia, accessed March 29.2024, https://www.cba.am/en/news/Pages/news_12-09-19_1.aspx#sthash.BCBFS3E9.dpbs.

121 Public Sector representative, interview by DECA team, February 2024, online.

122 "Registration, Classification and Storage of Information Processed by or Delivered by the Director, as Well as Information by State and Local Self-Governing Bodies, State Foundations and Organizations on Determining the Procedure for Providing a Duplicate," Armenian Legal Information System (ARLIS), October 15, 2015, https://www.arlis.am/documentview.aspx?docid=122108.

123 "On Determining The Security, Interoperability and General Technical Requirements of Electronic Systems Used for Providing Electronic Services or Performing Operations by State and Local Self-Government Bodies, Armenian Legal Information System (ARLIS), August 31, 2015, https://www.arlis.am/documentview.aspx?docid=152169.

124 "On Approving the Procedure for Exchange of Personal Data Through the Electronic Information System and Declaring the Decision N 192 of February 16, 2017 of The Government of The Republic of Armenia to be Void," Armenian Legal Information System (ARLIS), December 19, 2019, https://www.arlis.am/documentview.aspx?docid=137681.

125 "Adoption Of Draft Laws on Amendments and Additions to the Law of The Republic Of Armenia "On Freedom Of Information And Public Information" and Related Laws," Unified Site for Publication of Draft Legal Acts, accessed on March 29, 2024, https://www.e-draft.am/projects/6657/justification.

and modernization of the public information system. Within the proposed legislation, GoA intends to verify and harmonize government databases, ensuring technical compliance of the databases that serve as the cornerstone of the state information system. This includes the implementation of regulation on freedom of information, aligned to international standards, and the execution of a unified information policy. The ongoing data classification and mapping project by ISAA will provide insight into data management policies and facilitate the adoption of cloud infrastructure.[126]

Several interviewees and the civil society organizations (CSOs) that submitted online remarks on the draft lawin December 2023 voiced concerns over the proposed freedom of information legislation.[127] An interviewee[128] suggested that the proposed updates to the law should be regulated by a separate legal act and that the proposed idea of an independent authorized body in the area of FOI does not align with international best practices.[129] Due to concerns raised by CSOs, the Government and CSOs are engaged in discussions on further amendments to the draft law. The draft laws are open to comment, so it remains to be seen how comments will be addressed.

2.3.1 GOVERNMENT DIGITAL TRANSFORMATION

The GoA has introduced several successful digital transformation initiatives to its operations and management. Internal government processes are streamlined and citizen engagement and service delivery are enhances through digital platforms. Key progress has been made in document management, tax management, and electronic payments. Other processes may have been digitalized, but publicly available information about those processes is limited.

In 2010, the GoA adopted the Mulberry Electronic Document Management System, which mandated government agencies to adopt electronic document circulation.[130] The system is utilized by all administrative, local government, law enforcement, and judicial entities. The system facilitates internal documentation, administration, and workflow of government institutions. As part of its ongoing modernization, the system now offers functionalities beyond internal document circulation. An Armenian private IT company emphasized that the system enables online meetings, the creation of government session agendas, and written voting for questions that were not necessary to address during government sessions.[131] The functionalities of the platform are clear, but information on the success of the implementation of this system, including user experience, was not available.

The GoA has implemented digital transformation initiatives in tax management. In 2008, the State Revenue Committee (SRC), through its dedicated IT department, began leveraging information and communication technology (ICT) in its operations. Representatives from local private companies and international organizations acknowledged the significant digitalization progress made by the SRC.[132] With the evolution of the tax system in Armenia, the SRC now has the capability to monitor the efficiency of tax inspections and exercise centralized control over tax administration across the country.

The State Electronic Payment System is one of the most widely used along with the electronic taxation system. Significant advancements have been made in the country's government e-payments infrastructure. In recent

126 Two public sector agencies, interviews by DECA team, January and February 2024, online.

127 "On Freedom of Information and Public Information," Unified website for publication of legal acts' drafts, public opinion submission section on draft legal act, accessed on March 29, 2024. https://www.e-draft.am/projects/6657/digest.

128 Civil society organization, interview by DECA team, January 2024, online.

129 Civil society organization, interview by DECA team, January 2024, online.

130 RA Government Official News on March 2, 2010, accessed on March 29,2024, https://www.gov.am/am/news/item/7793/

131 Private sector organization, interview by DECA team, January 2024, online.

132 Private sector organization, interview by DECA team, December 2023, online. Private sector organization, interview by DECA team, January 2024, online.

years, the State Payment Electronic System[133] evolved from a basic payment portal to a sophisticated payment gateway utilizing Application Programming Interfaces). According to an interviewee, this evolution, combined with state agency information system integration (e.g. the State Revenue Committee (SRC), the Yerevan municipality, the Cadastre committee, and e-payments systems) led to a hundredfold increase in the average receipt amount. The interviewee also indicated ongoing efforts by the Ministry of Finance to enhance the payment gateway's capabilities through the integration of financial institutions. All government bodies that provide on-site services, including payments, must adopt a new centralized subsystem to accept credit cards using physical point-of-sale (PoS) terminals.[134]

2.3.2. GOVERNMENT INTEROPERABILITY FRAMEWORK

The 2015 GoA decision No. 1093-N, "On Establishing General Security, Interoperability, and Technical Requirements for Electronic Systems Used by State and Local Self-Governing Bodies for Electronic Service Provision and Operation" was a major step in establishing the legal framework for interoperability.[135] This decision defined the government information system as a unified electronic information system connecting all existing government information systems. The technical maintenance of the interoperability system was assigned to an operator and the administration was entrusted to the E-Governance Infrastructure Implementation Agency (EKENG) -housed within ISAA.[136]

In 2019, the GoA established decision No. 1849-N,[137] which outlines the procedure for transferring personal data through the electronic information system. According to procedure, personal data may be transferred upon written request to EKENG from any state or local government body. The latter must ensure that minimum technical requirements are met based on the general requirements stipulated by Decision No. 1093-N. EKENG transfers data stored in databases to State and local government bodies at no charge, yet reserves the right to set a service fee. Any legal entity in Armenia or investment fund can get access to the database upon request and proper completion of an application. All entities connecting to the databases must comply with the minimum safety requirements.[138]

If EKENG has doubts about the possible violation of the principles of legality or proportionality as defined by the Law On Personal Data Protection, it can refer the matter to the Personal Data Protection Agency of the Ministry of Justice (PDPA). The PDPA is authorized to provide an opinion for the approval or rejection of the application for data transfer from a legal standpoint. After the agency verifies sufficient grounds for the transfer of personal data, EKENG grants access to the databases.[139]

The Governmental Interoperability Platform (GIP) facilitates data-sharing among various government databases. Government entities that utilize the GIP are connected to vital databases like the State Register of Population at the Passport and Visa Department of the RA Police, and the electronic payment system. Armenia's healthcare

133 "E-payments," https://www.e-payments.am/hy/.

134 Private organization, interview by the DECA team, February 2024, online.

135 "On Determining The Security, Interoperability and General Technical Requirements of Electronic Systems Used for Providing Electronic Services or Performing Operations by State and Local Self-Government Bodies, Armenian Legal Information System" (ARLIS), August 31, 2015, https://www.arlis.am/documentview.aspx?docid=152169.

136 "SIM cards," e-Governance infrastructure implementation agency (EKENG), n.d., .https://www.ekeng.am/en.

137 "On Approving the Procedure for Exchange of Personal Data Through the Electronic Information System and Declaring the Decision N 192 of February 16, 2017 of The Government of The Republic of Armenia to be Void," Armenian Legal Information System (ARLIS), December 19, 2019, https://www.arlis.am/documentview.aspx?docid=137681.

138 "Application form for transferring the requested personal data," e-Governance infrastructure implementation agency (EKENG), accessed March 29, 2024, https://www.ekeng.am/en/sub/e_manage.

139 "Application form for transferring the requested personal data," e-Governance infrastructure implementation agency (EKENG), accessed March 29, 2024, https://www.ekeng.am/en/sub/e_manage.

system is integrated with the Civil Act Registry for birth and death records, the State Register of Population, and the Social Security database (Nork). Links to the taxation system offer employment details necessary for insurance data, while connections to the Education Management Information System (EMIS) provide data on student health conditions for epidemiological control.[140]

2.3.3 GOVERNMENT DIGITAL SERVICE DELIVERY

Numerous GoA initiatives aim to improve government service delivery. These include efforts to enhance the judicial framework, establish information management systems within State institutions, improve online payments, establish a service delivery gateway and identification mechanisms, and provide robust healthcare services.

The GoA has prioritized the design of customer-centric services, taking a collaborative "life-event" approach. All the life events, associated information, and services will be posted on the national services gateway, as a one-stop-shop platform.[141] As part of the delivery of government digital services, ISAA aims to build an interagency 'shared transformation roadmap' for government services. ISAA's role is to provide technical support on implementation standards while building capacity within the government to manage digital platforms.[142] Public sector interviewees noted that the GoA is interested in using ready-made solutions from the private sector or digital public goods to ensure the delivery of secure and reliable services[143]. The GoA is working on the procurement of new services for biometric passports and ID cards.

The backbone for service provision: Existing identification solutions and gaps

A common identity or unique ID is crucial for online service provision and system interoperability. Several digital methods for identification and signature are utilized by the public to interact with government institutions or to access services, each with its own challenges. One of the first methods, implemented in 2009, is the electronic identification (ID) based on a national ID card.

As of February 15, 2023, citizens who received national identification cards are eligible to utilize electronic ID services, which require a valid ID card, key codes (PIN and PUK codes) and a card-reading device. The electronic ID service requires citizens to pay an annual fee of 3,000 AMD (USD 7.5) and to purchase a corresponding device, which costs approximately 6,000 AMD (USD 15).[144] The card reader and the current electronic ID solution are only compatible with Windows operating system, which causes challenges for users. In January 2024, the government announced a public-private partnership program for biometric passport and ID card infrastructure.[145]

Another identification method in Armenia is mobile identification (mID), facilitated through digital mobile service providers including Nikita Mobile LLC, Telecom Armenia OJSC, UCOM CJSC, and VIVACELL MTS CJSC. This method enables citizens to authenticate and use online public services on their mobile phones. Citizens have the option to switch their existing mobile SIM cards with the mID cards to utilize this service by providing their chosen form of ID. Provision of the mID solution varies among different service providers.

140 Public sector interview by DECA team, February 2024, online.

141 Two public sector agencies, interviews by DECA team, January and February 2024, online.

142 Public sector agency, interview by DECA team, January 2024, online.

143 Two public sector agencies, interview by the DECA team, January and February 2024, online.

144 "Information on eID annual fee cost," e-Governance infrastructure implementation agency (EKENG), accessed March 29,2024, https://www.ekeng.am/hy/reader.

145 "International competition for the creation of a digital system for biometric passports and ID cards," Track Investigative Reporters, December 28, 2023, https://hetq.am/hy/article/163157.

Some interviewees raised concerns about the effectiveness and future utilization of mID solutions, noting that, as mobile devices transition from physical SIM cards to eSIM solutions, the utility of mID could be limited.[146]

In February 2023, the GoA established the legal framework for a national identification platform, amending 2017 legislation. In early 2024, the GoA introduced a new national identification system called "Yes em." This initiative aimed to simplify the integration process of existing identification methods for public service providers. "Yes em" combined four identification solutions: eID, mID, identification with the provision of contact details, and a mobile application. Public service providers are mandated by law to integrate their online service delivery platform with the "Yes em" gateway. Once integrated, service users will have the option to select their preferred form of identification.[147]

Accessing e-services in Armenia: Solutions and identified gaps.

Digitalization and online service delivery is an ongoing process in Armenia. Various sectors such as financial, judicial, healthcare, and police and migration services offer a range of services for citizens and businesses. Citizens are able to use e-services to submit online requests and applications, to register for services, and to track their personal documents. (See Figure 9.)

In 2022, the Ministry of Justice of Armenia launched the first Unified Office of Public Services. The centralized office provides citizens access to a range of services including state registration of non-governmental organizations, state registration of rights over property, provision of a statement of information on family status, and many other services across diverse sectors such as Civil Act Registration, State Register of Legal Entities, State Revenue Committee, National Archives, Social Security Service, Migration Service, Cadastre Committee, Burial Bureau, and notary services.[148] Unified Offices of Public Services are operational in postal departments throughout Armenia, including in regional offices and a few bank branches.[149]

Key agencies like the Tax Administration, Ministry of Justice, Police, and Migration Service offer online services. These online services include certificates on family status, document copies, and RA citizen passport certificates. (See list of services Table 2.) All Yerevan citizens are required to book in-person visits online, particularly for migration and passport services. This requirement aims to streamline the service delivery process. However, the lack of an alternative to online booking causes challenges for those with poor connectivity or low levels of digital literacy.

Every year Armenia advances its position in the realm of government digital service provision. The UN E-Government Development Index includes an Online Service Index sub-component. In 2022, Armenia scored .72, which was an increase from 2020 (.70) and a substantial increase from 2018 (.56). (See Figure 9.)[150]

FIGURE 9: Armenia Online Service Index

Source: UN E-government knowledge base

146 Private sector organizations, interview by the DECA team, January and February 2024, online.

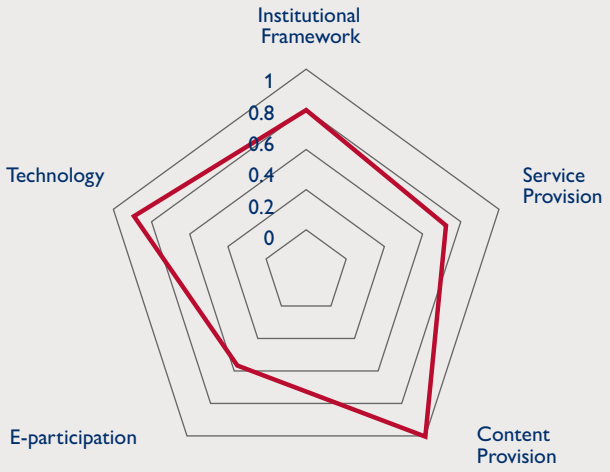
147 ""Yes em" national identification gateway," National Identification Platform, accessed March 29,2024, https://nid.e-gov.am/hy/auth?client_id=c4HibTcQBMYd44P505wRjA&response_type=code&scope=openid&redirect_uri=https%3A%2F%2Fmigration.e-gov.am%2Fhy%2Fcallback&nonce=biaKbZXWGTwvSiTXJXm-rw&state=0flL0fcb_4E4UwhwyCQsbA&acr_values=urn%3Aegov%3Anid%3Aloa%3Aweak+urn%3Aegov%3Anid%3Aloa%3Astrong&code_challenge=XajpNZR47aaDhy_LVyp1e6xJekZRmnDu2aS5Nx3xSwI&code_challenge_method=S256.

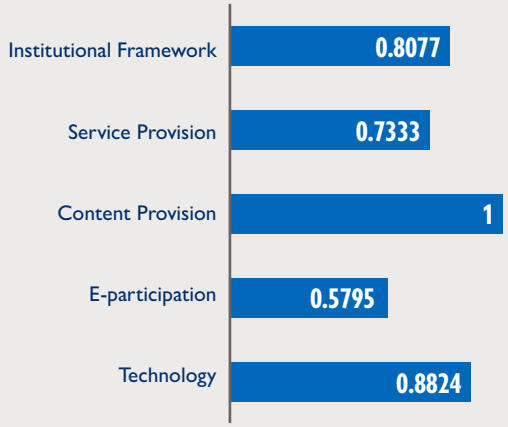
148 "Offices for Provision of State Services," List of public services provided by unified offices, accessed March 29,2024, https://www.moj.am/en/services/service_offices

149 "List of Unified Offices of Public Services of Armenia," Ministry of Justice of the Republic of Armenia, accessed March 29, 2024, https://www.moj.am/services/service_offices.

150 "UN E-Government Knowledgebase, Armenia," United Nations Department of Economic and Social Affairs, accessed March 29, 2024, https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/8-Armenia.

TABLE 2: Illustrative public e-services platforms





Online Service Index	2022	2020	2018	2016	2014	2012	2010	2008	2005	2004	2003
Armenia (value)	0.7221	0.7	0.5625	0.42754	0.61417	0.32679	0.1746	0.2709	0.11153	0.25096	0.13973

FINANCE	Online reporting filing system https://file-online.taxservice.am/ (2009)
	Electronic Procurement system www.armeps.am (2012)
	Electronic payment system www.e-payment.am (2012)
	The National Single Window for Foreign Trade Portal https://trade.gov.am/ (2013)
DIGITAL GOVERNMENT AND SERVICE DELIVERY	Electronic document management "Mulberry" system for state administrative bodies (2008)
	Unified portal for online requests www.e-request.am (2017)
	Online services of Ministry of Justice https://justice.e-gov.am (2019)
	Verification of official documents of RA https://verify.e-gov.am/am/ (2022)
	Electronic consular services https://consular.e-gov.am/am/ (2022)
	Migration and Citizenship Services Platform https://migration.e-gov.am/en/ (2023)
JUSTICE AND JUDICIARY	Database of legal acts www.arlis.am (2005)
	Judicial information system www.datalex.am (2006)
	Electronic register service www.e-register.am (2011)
	Unified electronic register for licenses https://e-license.am/am/ (2018)
HEALTHCARE	Unified health information management system https://www.armed.am/ (2016)
EDUCATION	Distance learning platform https://heravar.armedu.am/ (2020)
	School enrollment application system https://hayt.emis.am/ (2020)

2.3.4 DIGITAL HEALTH

Governance and multi-sector engagement

The Armenian government initiated the development of an electronic healthcare system in 2010, with the aim of introducing digital healthcare services. The development phase began in 2013, during which some medical institutions piloted its functionalities. In 2017, the government announced a tender to transfer the electronic healthcare system to a provider through a concession contract to the National Electronic Healthcare Operator (NEH Operator) Closed Joint-Stock Company (CJSC)[151] [152] to oversee and manage the electronic healthcare system in Armenia.[153] The NEH Operator is managing and maintaining the unified electronic health information system, as well as the "ARMED" e-health application. (See next section for details.) According to an interviewee, the operator's responsibilities also include data sorting, ensuring security, and providing data to various counterparts in compliance with national regulations and procedures.[154]

The primary regulatory institution overseeing the healthcare system is the Ministry of Health (MoH). Its core responsibilities include the development of health policies and regulations. The MoH is managing a National Institute of Health named after S. Avdalbekyan, CJSC (NIH), [155] which plays a key role in overseeing digitalization efforts within the healthcare sector.

The department of eHealth implementation is a part of the National Institute of Health (NIH). The department has a limited number of experts, but they work closely with the Ministry of Health (MOH) and the National Electronic Health Operator (NEH operator). This collaboration aims to ensure that digital health activities are effectively coordinated and aligned with the broader health objectives set by the Ministry of Health.[156]

Digital health services

Digital healthcare services in Armenia are accessible for the population and for medical institutions through the unified e-health system and the ARMED e-health mobile application. The e-health system functions as a unified platform that stores patient medical records which are accessible for healthcare professionals. As of 2024, there were 4,747 doctors registered and using the system. The system houses clinical, administrative, and financial data, offering a comprehensive and coordinated approach to managing healthcare information.[157]

According to interviewees,[158] all medical institutions in Armenia have implemented the ARMED e-health system. While some private organizations did not previously interact with the ARMED system, all now do as a result of the introduction of ePrescription. Medical centers that have Hospital Information Systems (HIS)—such as Erebuni, Nairi, and Arabkir—are integrated with the national e-health system through proprietary protocols. The emergency medicine system is also integrated with ARMED.

The healthcare system is integrated with other government databases, which facilitates access to patient data (e.g., disability status) and insurance data. Service delivery is not yet fully incorporated into the online service

151 "Providing comprehensive eHealth Solutions Tailored to National Healthcare systems," SYLEX, accessed March 29, 2024, https://www.sylextech.com/.

152 "National Electronic Healthcare Operator," CJSC, accessed March 29, 2024, https://corporate.armed.am/en/about-us.

153 " "E-health in Armenia," CJSC, accessed March 29,2024. https://corporate.armed.am/en/about-system/ehealth-in-armenia.

154 Public sector agency, interview by DECA team, February 2024, online.

155 "Health Buddy, "National Institutes of Health of Armenia (NIH), accessed March 29,2024. https://nih.am/am.

156 Public sector agency, interview by the DECA team, February 2024, online.

157 "The United Information System of Electronic Healthcare in the Republic of Armenia," CJSC, accessed March 29,2024, https://corporate.armed.am/en/about-system.

158 Two public sector agencies, interviews by DECA team, February 2024, online.

delivery chain. According to interviewees,[159] social payments cannot currently be made directly to patient accounts via online transactions. This is under discussion among stakeholders.

ARMED e-health mobile application

During the COVID-19 pandemic, adoption and use of the ARMED e-health mobile application increased, driven primarily by its role in vaccination and contact tracing. The NEH Operator utilized the application to monitor the spread of the virus and promptly alert the National Center for Disease Control and Prevention of Armenia (NCDC)[160] to ensure further preventive measures. The e-health application included multiple authentication mechanisms including eID, mID solutions, and facial authentication. According to an interviewee, approximately 720,000 patients downloaded the application, with around 250,000 people authenticated using facial recognition.[161]

National e-health system

The e-health system in Armenia offers various services including storage of medical records, drug prescriptions, and sick leave note management. Unemployment benefits and electronic prescriptions are handled through digital channels, with information transmitted between relevant authorities like the Ministry of Social Affairs.[162] Medical referrals, which previously required multiple in-person visits, can now be arranged with a phone call. Digital medical ambulatory cards were introduced to enhance the accessibility and security of important health data. Adoption of these initiatives is not yet widespread. The e-health system has seen significant uptake in Yerevan, but efforts to implement it in regional medical institutions and polyclinics are ongoing.[163]

Beginning March 1, 2024, 470 drugs will be incorporated into the electronic prescription system.[164] In 2025, a new electronic module for prescribing psychoactive drugs will be introduced.[165] Healthcare policymakers have already initiated an electronic prescription process for antibiotics, aiming for full integration with the ARMED system across all pharmacies.[166]

The e-health system also incorporates telemedicine services. A module for telemedicine was piloted in December 2023, but its usage has been limited due to a restricted number of subscribed medical experts and patient preference for in-person visits due to higher trust. Patients receive electronic prescriptions through telemedicine appointments, without the need for in-person appointments.[167]

Workforce and capacity-building

In recent years, the National Institute of Health has implemented training programs to enhance the skills of employees in the healthcare field. Using a Training-of-Trainers (ToT) model, specialists attended training in healthcare informatics and in turn provided training to more than 80 MoH employees. These capacity-building

159 Public sector agency, interview by DECA team, February 2024, online.

160 "Coronavirus disease," National Center For Disease Control and Prevention Of Republic of Armenia, accessed March 29,2024, https://ncdc.am/.

161 Public sector agency, interview by DECA team, February 2024, online.

162 Two public sector agencies, interviews by DECA team, February 2024, online.

163 Public sector representative, interview by the DECA team, February 2024, online.

164 "Electronic prescriptions will be issued for 470 medicines," Iravaban.net, announcement on electronic medical prescriptions, accessed March 29, 2024. https://iravaban.net/464185.html.

165 Public sector agency, interview by DECA team, February 2024, online.

166 Electronic prescriptions will be issued for 470 medicines. Iravaban.net.

167 Public sector representative, interview by DECA team, February 2024, online.

efforts focus on enhancing legal and technical knowledge. There is a need to identify resources to continue to effectively implement these types of training programs.[168]

The NEH Operator also facilitates training on digital technologies using the ToT approach.[169] A crucial aspect of the training program according to the NIH is to ensure that medical specialists who are registered in the ARMED system possess proper certification and training. This includes measures to prevent the sharing of personal page credentials and to implement appropriate privacy measures.[170] (See Box 2 for concerns on procurement procedures.)

BOX 2: Concerns about procurement procedures leading to unfair competitiveness.

In 2021, the Government of Armenia modified the types and sizes of qualification and contract guarantees in RA law on government procurements.[171] The criteria for bid and contract guarantee thresholds was also adjusted. In light of these changes, there is concern from private sector interviewees about the burden of the procedure. The interviewee emphasized the importance of making government procurement procedures more liberal and excluding burdens such as bid security measures (set at maximum 5% of the price quoted in the bid), which impedes the participation of willing private IT companies.[172] Private companies also highlighted the removal of qualification requirements in favor of price-based tender evaluations as a key issue with state procurement protocol.[173]

2.4 INTERNET FREEDOM

2.4.1 INTERNET GOVERNANCE FRAMEWORK OF ARMENIA: INITIATIVES AND PERSPECTIVES.

In August 2014, the GoA adopted a Decree on "Approval of the Internet Governance Principles" aimed at advancing internet development within the country. This decree was designed to foster balanced solutions for internet-related issues. It introduced the multi-stakeholder model of internet governance, representing a recognition by the government that internet development and accessibility matters should be addressed in cooperation with stakeholders.

The main objectives and principles of internet governance in Armenia include creating favorable conditions for widespread and affordable access to high-quality internet service, fostering public participation in the formation of the global information databases, and shaping a modern digital society, according to the decree. Armenia aims to establish its position in the global internet governance landscape, support cooperation with international and regional internet governance organizations, and ensure the active involvement of public, private, and state institutions in internet governance processes.[174]

168 Public sector representative, interview by DECA team, February 2024, online.

169 Public sector representative, interview by DECA team, February 2024, online.

170 Public sector representative, interview by DECA team, February 2024, online.

171 "On Approving the Procedure for Organizing the Procurement and Recognizing Decision N 168 of February 10, 2011 of The Government of The Republic of Armenia as Void," Armenian Legal Information System (ARLIS), May 4, 2017, https://www.arlis.am/documentview.aspx?docid=151146.

172 Private sector organization, interview by DECA team, December 2023, online.

173 Private sector organizations, interview by DECA team, January 2024, February 2024, online.

174 "On Approving the Principles of Internet Governance," IGC, August 14, 2014, https://igc.am/en/home/#:~:text=The%20IGC%20has%20been%20formed,of%20the%20Republic%20of%20Armenia%20.

The Internet Governance Council (IGC) of Armenia[175] is the primary government body responsible for shaping internet policies in Armenia, operating in accordance with the 2014 decree.[176] The IGC consists of representatives from the GoA, National Assembly, private sector, academia, media, and NGOs. The Deputy Minister of the Ministry of High-Tech Industry (MHTI) is the Head of the IGC. The Internet Society NGO[177] serves as the Council's secretariat.

The Internet Society NGO is a founding member of the Armenian Internet Exchange—a place where ISPs meet to exchange IP traffic—and a member of the Country Code Names Supporting Organization (ccNSO)[178] of The Internet Corporation for Assigned Names and Numbers (ICANN) and the Council of European National Top Level Domain Registries (CENTR).[179]

On February 23, 2012, the Internet Society NGO obtained At-Large Structure (ALS) certification from ICANN.[180] The ALS accreditation recognizes that the Internet Society NGO meets ICANN's criteria for involving individual internet users at the local or issue level in ICANN activities.[181] Armenia is also represented at the Government Advisory Committee of ICANN,[182] where Deputy Ministers of MHTI have primary and secondary mandates. Representatives from Internet Society NGO also have an advisor mandate in the Committee. Although Armenia is actively involved in various aspects of internet governance, it opted out of signing on to the Declaration of the Future of the Internet, which represents a political commitment among partners to promote a positive vision for the internet and digital technologies.[183]

Another key player within Armenia's internet governance realm is the Internet Society (ISOC) ISOC Armenia Chapter NGO.[184] The Internet Society NGO and ISOC Armenia Chapter NGO in Armenia operated as a unified organization until 2010. In accordance with guidelines from the Global Internet Society advocating for more detailed charters aligned with the chapter model, these two organizations separated to clarify roles and responsibilities between activities related to internet registry and other initiatives.[185] The Internet Society (ISOC) chapter in Armenia operates with its own board, comprised of representatives from both the chapter and Internet Society NGO, along with other experts in the field of internet governance and ICT. A broader group of 44 experts are members of the Chapter, contributing to its diverse perspectives and expertise.[186]

Collective Initiatives in Internet Governance and digital inclusion for local communities

The annual Internet Governance Forum in Armenia is an initiative of IGC, implemented in cooperation with the MHTI, the Internet Society NGO, and the ISOC Armenia Chapter. The event serves as a forum for dialogue and collaboration among representatives from the government, public, and business sectors. On November

175 "Our Mission," Internet Governance Council Of RA, accessed March 29, 2024.https://igc.am/en/home/.

176 "On Endorsement of Internet Governance Principles," IRTEK, accessed March 29, 2024, https://www.irtek.am/views/act.aspx?aid=77996.

177 "Internet Society," NGO, Armenia, accessed March 29.2024, https://www.isoc.am/.

178 The Internet Corporation for Assigned Names and Numbers, accessed March 29,2024. https://ccnso.icann.org/en

179 "Connecting European Dots," Council of European Top-Level Domain Registries, accessed March 29,2024, https://www.centr.org/.

180 " Yesim Nasar, "Internet Society NGO Armenia," ICANN, June 1, 2023, https://community.icann.org/display/APRALO/Internet+Society+NGO%2C+Armenia.

181 "How to join the At-Large Community?," ICANN At-Large, accessed May 14, 2024, https://atlarge.icann.org/get-involved/about-als , accessed May 14, 2024.

182 "About," ICANN, accessed March 29, 2024, https://gac.icann.org/about/members.

183 Declaration for the Future of the Internet, " U.S. Department of State, accessed March 29,2024,https://www.state.gov/declaration-for-the-future-of-the-internet.

184 "Welcome To Internet Society Armenia Chapter," Internet Society Armenia Chapter, Internet Society Armenia Chapter," accessed March 29,2024, https://www.isocchapter.am/en/welcome-to-internet-society-armenia-chapter/

185 Civil society organization, interview by DECA team, February 2024, online.

186 "Members," Internet Society Armenia Chapter, n.d., https://www.isocchapter.am/en/members/.

3, 2023, Armenia hosted the 18th National Internet Governance Forum (IGF), which focused on the World Summit on the Information Society (WSIS2020+), the Global Digital Compact, digital challenges and opportunities, and artificial intelligence (AI). The Armenian National IGF Forum is recognized and supported by leading stakeholders in the internet governance field such as ICANN, RIPE NCC (the Regional Internet Registry for Europe, Middle East and Central Asia), and the Internet Governance Forum Support Organization (IGFSA).

The ISOC Armenia Chapter also conducts projects aimed at enhancing digital access in local communities in Armenia. These initiatives include supporting regional libraries by facilitating access to essential hardware such as computers, Wi-Fi routers, and internet connectivity.[187] ISOC Armenia also provides practical and educational training on software security, cybersecurity, cyber hygiene, and digital literacy for different age and professional groups.[188] The ISOC Armenia Chapter collaborates with the House of Culture of the Blind to support technology development for visually impaired individuals.[189] The organization conducts activities through grant programs and support from various international organizations like UNICEF.[190] Collaborations with local actors such as the Union of Operators of Armenia and the Academy of Science of Armenia play a significant role in facilitating ISOC Armenia initiatives.[191]

Domain name management

The Internet Society NGO was delegated by ICANN to manage ".am" and ".հայ" Top Level Domains. The Armenia Network Information Centre (AMNIC), which operates as a subsidiary of ISOC, directly manages the process of Armenian domains. AMNIC is a member of the Council of European National TLD Registries[192] and RIPE NCC (Réseaux IP Européens Network Coordination Centre).[193]

Seventy-six registrars accredited by the Internet Society NGO register domain names in Armenia.[194] Local registrars have an option to have resellers and form agreements with international domain name registrars. A major Armenian registrar, ABC domain, has partnered with the GoDaddy.am international domain name register.[195]

As stipulated in the domain names registration policy,[196] the Internet Society NGO is responsible for the domain name registration process, which includes verifying the authenticity of data provided by domain name holders, receiving necessary registration information, and ensuring that registrars have agreements in place for transferring required data to the Internet Society NGO. The Internet Society NGO is responsible for addressing cases where website content or domain names conflict with laws or regulations. This includes situations where the proposed name is reserved for government use, or distributing materials, products, or services that are

187 "Online access at local libraries project," Internet Society Armenia Chapter, June 28, 2023, https://www.isocchapter.am/en/online-access-at-local-libraries/.

188 "Technical support to professional groups," Internet Society Armenia Chapter, December 19, 2022, https://www.isocchapter.am/en/technical-support-to-professional-groups/.

189 "Assistive technology for blind people: radio "Menk," June 23, 2023, https://www.isocchapter.am/en/assistive-technology-for-blind-people-radio-menk/.

190 "UNICEF-Armenia Chapter IoT program for 14–18-year-old teenagers," Chronicle, n.d., https://www.unicef.org/armenia/en/stories/nurturing-tomorrows-leaders-internet-things-program-shapes-60-teenage-innovators#:~:text=UNICEF%20organized%20the%20IoT%20course,Vanadzor%2C%20Gyumri%2C%20and%20Goris.

191 Civil society organizations, interviews by DECA team, December 2023, February 2024, online.

192 "Connecting European Dots," Council of European Top-Level Domain Registries, accessed March 29,2024, https://www.centr.org/.

193 "Welcome to the RIPE NCC," Regional Internet Registry for Europe, Middle East and Central Asia, accessed March 29,2024, https://www.ripe.net/.

194 " List of Registrars in Armenia," AMNIC, accessed March 29,2024. https://www.amnic.net/directory/registrars/

195 Civil society organization, interview by DECA team, February 2024, online.

196 "Policy Of Domain Names Registration In ".am" And ".հայ" Domain Zones," AMNIC, October 23, 2017, https://www.amnic.net/policy/en/Policy_EN.pdf.

prohibited by law. In such instances, the Internet Society NGO gives a warning and monitors the changes.[197] The Internet Society NGO does not bear responsibility for the content disseminated through registered domain names. A committee whose members include police, the National Security Service, and experts from the public sector assess cases where content goes against the rules of ISOC regulation, such as pornography, fake news, or propaganda of terrorism. The domain name can be blocked upon recommendation from this committee.[198]

Challenges related to the adoption of .am or . հայ domain names

The number of registered .am domains is 44,265 as of January 2024, and the number of registered .հայ domains is 945. (See Figure 10.) The number of registered domains is approximately three times less than in Baltic countries with a similar population.[199] An interviewee shared that many organizations do not see the importance of having a domain, often citing a Facebook page as sufficient. ISOC Armenia educates small and medium-sized enterprises (SMEs) on the benefits of having a website and is currently implementing a no-cost project to assist SMEs in creating websites, offering free hosting on domains.[200, 201]

The Internet Society NGO is also addressing challenges related to utilization of the .հայ domain and Armenian content on the internet. They are engaging with the GoA to advocate for the creation of Armenian-language websites for all ministries and for the adoption of a national .հայ domain to ensure that websites associated with government entities use .հայ domains or redirect to the Armenian domain version of their websites.[202]

FIGURE 10: Registration ratios of .am and .հայ domains

.am	
Total Domains	**44 265**
REGISTRATION RATIOS	
Demand (avg)	1.2
Growth (1Y)	7.70%
Avg. Renewal ratio	78.30%

.հայ	
Total Domains	**945**
REGISTRATION RATIOS	
Demand (avg)	0.8
Growth (1Y)	-1.5%
Avg. Renewal ratio	53.40%

Source: ISOC Armenia Chapter

2.4.2. GUARDING ARMENIA'S CYBERSPACE: CYBERSECURITY PERSPECTIVES

The Armenian Government has demonstrated a commitment to cybersecurity and has assigned specific cybersecurity responsibilities to key stakeholders and established national Computer Emergency Response Teams (CERTs). Cybersecurity legislation is in draft but central governance structures or policies related to cybersecurity are not yet in place.

197 Civil society organization, interview by DECA team, February 2024, online.

198 Civil society organization, interview by the DECA team, December 2023, online.

199 Civil society organization, interview by DECA team, February 2024, online.

200 Civil society organization, interview by DECA team, February 2024, online.

201 Internet Society Armenia, https://www.isoc.am/

202 Civil society organization, interview by the DECA team, February 2024, online.

The Ministry of High-Tech Industry (MHTI) is responsible for the development and implementation of cybersecurity policy, as stipulated by the Law "On the Structure and Activities of the Government."[203] The National Security Service of Armenia (NSSA)is mandated to coordinate information security activities and enforce state control. NSSA ensures the cybersecurity of official websites, electronic platforms, and state information systems, coordinating incident responses and guiding the development of security norms.[204] The Personal Data Protection Agency (PDP) of the Ministry of Justice safeguards personal data under the Law "On Personal Data Protection." Its responsibilities include protecting the rights of individuals related to personal data protection and overseeing the lawful processing of personal data within its competencies.[205]

There are no central governance bodies or policies for cybersecurity at present. Broader oversight responsibilities are not assigned to any specific state entity and the multiple Computer Emergency Response Teams (CERTs) operate independently: The Internet Society NGO oversees CERT AM, GoA manages the Government Computer Emergency Response Center,[206] and NSSA leads a CERT. In addition to the state CERTs, in 2019, Media Diversity Institute – Armenia (MDIA) NGO[207] launched a Digital Security Helpdesk and Threatlab[208] to assist civil activists, journalists, and independent media by providing audits and security assessments.

The GoA is currently developing the country's first cybersecurity legislation. The Ministry of High-Tech Industry of the Republic of Armenia (MHTI) and the Information Systems Agency of Armenia (ISAA) jointly developed the legislative package. As part of the adoption of the Law on Cybersecurity, changes are also envisaged in related legislation including in the Law on Personal Data Protection, the Law on Electronic Documents and Electronic Digital Signatures, the Law on National Security Bodies, and in the Code of Administrative Offenses of the Republic of Armenia. The initial version of the legislative package was released for public discussion on December 19, 2023, followed by publication of the second version on March 8, 2024.[209]

The draft law on cybersecurity aims to establish a comprehensive policy and action plan and to set standards for public and private agencies that provide critical infrastructure to the country.[210] This includes creating an inventory of cybersecurity challenges and risks, categorizing them, and defining systematic measures and principles for responding to cyber incidents. The legislation will include plans for the implementation of cybersecurity awareness-raising programs for the general public.[211] The legislation will deem the Ministry of High-Tech Industry of the Republic of Armenia responsible for developing and implementing state policy in cybersecurity and name it the body tasked with ensuring cybersecurity policy implementation.[212]

203 "On the Structure and Activities of the Government," Armenian Legal Information System (ARLIS), March 23, 2018, https://www.arlis.am/documentview.aspx?docID=143868.

204 "About National Security Bodies," Armenian Legal Information System (ARLIS), January 24, 2002, https://www.arlis.am/documentview.aspx?docid=189460.

205 "Statute of the Agency for Protection of Personal Data of The Ministry of Justice of The Republic of Armenia," Ministry of Justice of the Republic of Armenia, n.d., https://www.moj.am/en/structures/view/structure/32.

206 " "Government Computer Incident Response Center," CERT, accessed March 29,2024, https://cert.gov.am/en/.

207 "Media Diversity Institute – Armenia (MDIA)," accessed March 29,2024.https://mdi.am/en/projects-2.

208 "IT support to Armenian civil society," CyberHUB-AM, n.d., https://cyberhub.am.

209 "On Amending the Law "On Cyber Security," "On Personal Data Protection,", On Amending the Law "On Electronic Document And Electronic Signature," "National Security on Amendments and Additions to the Law "On Administrative Offenses" of Armenia on Amendments to the Republic Code, Unified Site for Publication of Draft Legal Acts, March 23, 2024, https://www.e-draft.am/projects/6970

210 Public sector representative, interview by DECA team, January 2024, online.

211 "Justification on Changes in the Law " On Cyber Security," " On Personal Data Protection ,""On Changes In The Law On Electronic Documents And Electronic Signatures, " "National "On Security Bodies" on Amendments and Amendments to the Law "On Administrative Offenses Of Armenia" on the Draft Laws to Amend the Republic Code," Unified Site for Publication of Draft Legal Acts, January 4, 2024, https://www.e-draft.am/projects/6656/justification.

212 "Justification on Changes in the Law " On Cyber Security," " On Personal Data Protection ,""On Changes In The Law On Electronic Documents And Electronic Signatures, " "National "On Security Bodies" on Amendments and Amendments to the Law "On Administrative Offenses Of Armenia" on the Draft Laws to Amend the Republic Code," Unified Site for Publication of Draft Legal Acts, January 4, 2024, https://www.e-draft.am/projects/6656/justification.

The draft cybersecurity legislation has received criticism for lack of clarity and specificity.[213] Critics highlight issues related to: the need for diverse standards to align with unique business needs;[214] mandated obligations for the private sector;[215] sections that conflict with existing legislation on personal data protection.[216] Public discussions on the draft law are ongoing between the GoA, CSOs, and the stakeholder community. The GoA is expected to adopt the law by mid-2024.[217]

The government faces cybersecurity challenges that, if remedied, will boost the technical and human capacity of the country's cybersecurity posture. Cyber hygiene levels among the government and the general public are lacking.[218] Cybersecurity risks also arise from the lack of clear standards for government systems and government data storage.[219]

2.5 CIVIL SOCIETY AND MEDIA

The media landscape in Armenia, and globally, is changing quickly due to the ever-increasing use of social media platforms.[220] Social media offers new avenues for the dissemination of and access to information that is easier to understand, faster to use, and visually appealing. It offers real-time information from a large variety of sources. The risks such as rapid spread of false information and the gradual loss of public trust and confidence in journalism are of concern in Armenia.[221]

Armenian CSOs and media outlets are tackling these challenges through media development initiatives, policy regulation efforts, and self-defense measures. Some CSOs and media outlets operate within their own capacities and others seek support from sources such as donor-funded programs. The current support offered to CSOs and media outlets is considered insufficient to meet their needs.

2.5.1. TRANSFORMATIONS IN THE MEDIA LANDSCAPE

Armenia's media landscape is marked by a dynamic interplay of political, economic, technological, and societal factors. According to interviews with media outlets, many media entities are politically aligned, compromising editorial independence and ability to serve the public interest. This has led to a decrease in public trust in the media.[222]

A survey conducted by the International Republican Institute among residents of Armenia during January and March 2023 suggests a sharp increase in recent years in the perception that media is not operating independently (see Figure 11).[223] In 2019, a large majority (75 percent) of respondents believed that media independence had improved, while only 3 percent thought it had regressed. By 2023, the proportion of respondents who perceived

213 Private sector organization, interview by DECA team, December 2023 and January 2024, online.

214 Civil society organization, interview by DECA team, January 2024, online.

215 "The draft Law on Cyber Security needs significant revision," Cyberhub, December 30, 2023, https://cyberhub.am/hy/blog/2023/12/30/opinion-on-draft-cybersecurity-law/.

216 The draft Law on Cyber Security needs significant revision. Cyberhub.

217 Public sector representative, interview by DECA team, January - February 2024, online.

218 Private sector organization, interview by DECA team, January 2024, online.

219 Private sector organization, interview by DECA team, February 2024, online.

220 Media organization, interview by DECA team, January 2024, online. Civil society organization, interview by DECA team, January 2024, online.

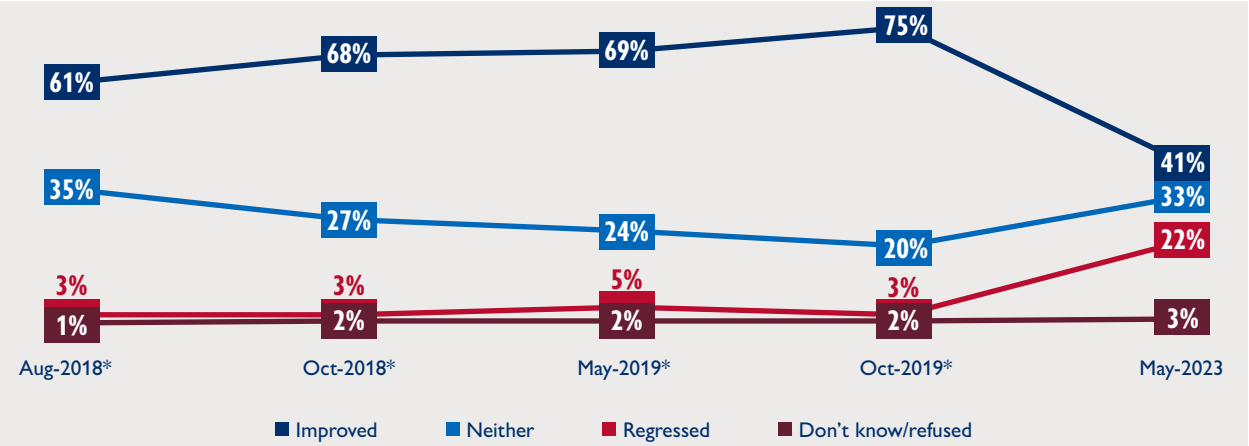
221 Media organization, interview by DECA team, January 2024, online.

222 Media organizations, interviews by DECA team, January 2024, online. Civil society organization, interview by DECA team, January 2024, online.

223 "Public Opinion Survey: Residents of Armenia January -March 2023, " International Republican Institute (IRI), accessed March 29,2024, https://www.iri.org/wp-content/uploads/2023/05/Armenia_Final-Presentation_01.05.2023_Eng.pdf.

an improvement in media independence had decreased significantly to 41 percent, while the percentage of those who perceived regression had increased to 22 percent.

FIGURE 11: Perceptions of media independence



Source: Public Opinion survey: Residents of Armenia, International Republican Institute(IRI), January-March 2023 [224]

Armenia's media landscape faces financial challenges due to a small advertising market and inconsistent revenue streams. Interviewees noted that this leads media organizations to seek support from political parties or donor-driven agendas for financial sustainability. Interviewees also observed that international organizations have limited enthusiasm for investing in Armenia's media sector due to its small size.[225]

Increased reliance on social networks—most notably Facebook, YouTube, and Instagram[226] —for access to news presents opportunities and challenges for media development. Social media platforms offer extensive reach and engagement opportunities, but they facilitate the spread of false information and intensify polarization, particularly as internet users serve as disseminators of information.[227] Interviewees were concerned that individuals do not always consider the source of information posted on social media, or do not have the critical skills to analyze the information (i.e., limited media literacy).[228]

A USAID Media Initiative report in 2021 found Facebook and YouTube to be the most used social media platforms, with growing use of Instagram in Armenia.[229] According to available data, 61 percent of the eligible audience (age 13+) in Armenia used Facebook in 2023; 44 percent used Instagram, and 3 percent used X (previously Twitter).[230] In 2021, the Media Initiative Center conducted research indicating that television is the second most prominent source of information. However, its consumption decreased from 82 percent in 2015 to 59 percent in 2021. In 2021, the daily usage of social networks and internet resources increased, with 67 percent of respondents reporting regular engagement with these platforms.[231]

224 Public Opinion Survey: Residents of Armenia January -March 2023 IRI.

225 Media organization, interview by DECA team, January 2024, online. Civil society organization, interview by DECA team, January 2024, online.

226 "Media Consumption and Media Coverage of Reforms in Armenia," USAID, Media Initiatives Center, CRRC Armenia, https://mediainitiatives.am/wp-content/uploads/2022/01/Media-Consumption-in-Armenia-Report.pdf.

227 Civil society organization, interview by DECA team, January 2024, online. Media organization, interview by DECA team, January 2024, online.

228 Civil society organization, interview by DECA team, January 2024, online. Media organization, interview by DECA team, January 2024, online. Media organization, interview by DECA team, January 2024, online.

229 " Media Consumption and Media Coverage of Reforms in Armenia," USAID, Media Initiatives Center, CRRC Armenia, https://mediainitiatives.am/wp-content/uploads/2022/01/Media-Consumption-in-Armenia-Report.pdf.

230 "Digital 2023: Armenia," Data Reportal, February 14, 2023, https://datareportal.com/reports/digital-2023-armenia.

231 Media Consumption and Media Coverage of Reforms In Armenia. USAID.

The news consumption habits and preferences of Armenians are shaped by social media platforms and the communities that use those platforms. Phenomena like the "Echo Chamber" where information that aligns with a user's existing beliefs is pushed to them via social media algorithms is very much present in Armenia.[232,233] Social media platform algorithms reward news that gets clicks, and that news is often fantastical or negative. There is a growing trend among contemporary news consumers toward shorter, more instantaneous, personalized news content, which is found on Facebook or Telegram.[234] These platforms provide convenient access to a wide range of information, allowing users to consume news quickly. This poses challenges for investigative journalism, as crafting comprehensive in-depth pieces within the constraints of social media platforms is difficult. News reporting is moving away from longer form, less frequent reporting to much shorter form, frequent reporting which is better suited to social media platforms.

These observations underscore how increased usage of social media and changing perceptions of traditional media form media consumption habits, affect journalistic practices, and change societal attitudes toward news. These trends are not unique to Armenia. The impact of social media on journalism has been evident for several years,[235] and is constantly changing as new platforms become widely used.

Changes to the law on mass media

The Law on Mass Media in Armenia has been in force since 2003. In November 2023, the Ministry of Justice of the Republic of Armenia introduced proposed amendments to this law for public discussion.[236] The draft law was developed with the participation of experts from the Ministry of Justice, as well as international human rights organization Freedom House and the Media Ethics Monitoring Body of Armenia.[237,238] The Law on Mass Media defines media self-regulation as a component of the media's social responsibility including that the quality of media activity should be ensured without State intervention. The Law also defines media self-regulation, and includes the establishment of a code of ethics and the presence of a self-regulatory body. It guarantees that media outlets with a self-regulation system in place have an unconditional right to accreditation by public institutions in alignment with best practices by entities such as the OSCE that advocate for media self-regulation.[239]

2.5.2 CHALLENGES FACED BY MEDIA OUTLETS

The absence of comprehensive policies regulating the media sector poses challenges to its governance and accountability. Efforts to modernize mass media legislation, including amendments addressing freedom of information and media ethics, are underway but are not yet adopted.

Other challenges faced by the media in the digital domain include limited resources, the unavailability of fact-checking tools, and insufficient technical capacity to address cybersecurity threats. Certain media outlets

232 "Facebook and the echo chamber: scientists examine how social media affects political views," Harvard University, August 9, 2023, https://sitn.hms.harvard.edu/flash/2023/facebook-and-the-echo-chamber-scientists-examine-how-social-media-affects-our-political-views/.

233 Media organization, interview by DECA team, January 2024, online. Civil society organization, interview by DECA team, January 2024, online.

234 Investigative journalist, interview by DECA team, February 2024, online.

235 Nicole Martin, "How Social Media Has Changed How We Consume News," December 10, 2021, https://www.forbes.com/sites/nicolemartin1/2018/11/30/how-social-media-has-changed-how-we-consume-news/.

236 "On Amendments and Amendments to the Law "On Mass Media" and Related Law," Unified Site for Publication of Draft Legal Acts, December 15, 2023, https://www.e-draft.am/projects/6552/about.

237 Media organization, interview by DECA Team, January 2024, online.

238 Media Ethics Monitoring Body of Armenia, accessed March 29,2024, https://mediaethics.am/.

239 " The Media Self-Regulation Guidebook," Organization for Security and Co-operation in Europe (OSCE), April 14, 2008, https://www.osce.org/fom/31497.

benefit from associations such as the International Fact-Checking Network (IFCN),[240] but many others are still in the process of seeking opportunities for international collaboration and support.

An interviewee emphasized that personnel with media organizations often take on numerous roles due to shortages of technical expertise and professional skills.[241] Smaller media entities often depend on technical support offered by external partners such as the Media Diversity Institute (MDIA), which provides hosting services and security maintenance. Interviewees noted that the media and journalists are subject to targeted harassment and threats online and offline. Investigative journalists face an increased risk of attack due to frequent lawsuits initiated in response to their investigative reports.[242] Interviewees emphasized that it is important that the GoA address these threats to the media and journalists.[243]

According to a report from the Committee to Protect Freedom of Expression, in the third quarter of 2023, there were 49 recorded cases of violations of the rights of journalists and media outlets. Throughout 2023, the recorded violations included three instances of physical violence against mass media, 47 cases involving pressure against mass media and their employees, and 105 cases of violations related to the right to receive and distribute information.[244] Media outlets have also experience increased cyber attacks. The 2023 Freedom House Report found that cyber attacks on media outlets were more severe compared to 2022.

2.5.3. DYNAMICS OF COLLABORATION

The Government of Armenia and CSOs are currently engaged in discussions regarding further amendments to the draft laws on Freedom of Information and Public Information (see also section 2.3). According to some interviewees, government provision of information on request is sometimes inconsistent, particularly when the requested information involves corruption risks or claims that the state seeks to bypass disclosure.[245] CSOs and media also note that State institutions sometimes refer to requested information as secure, hindering the ability of journalists to gain access to that information.[246] Valuable sources of open data information are available, [247] such as the state register of legal entities,[248] the electronic services platform of the Cadastre Committee,[249] the register of declarations,[250] and the electronic procurement system.[251] However, some interviewees noted challenges in gaining access to these resources due to high fees for access, poor accessibility, and lack of filtering options.[252]

The GoA hopes that adoption of the Law on Freedom of Information and Public Information and efforts to harmonize information databases will support modernization of the public information system. Media and

240 International Fact-Checking Network (IFCN), accessed March 29, 2024, https://ifcncodeofprinciples.poynter.org/profile/civilnet.

241 Civil society organization, interview by DECA team, January 2024, online.

242 Media organization, interview by DECA team, January 2024, online.

243 Two civil society organizations, interview by DECA team, January 2024, online. Media organization, interview by DECA team, January 2024, online.

244 " About the state of freedom of speech in Armenia and violations of the rights of journalists and mass media in 2023. third quarter report," Khosq, accessed March 29,2024, https://khosq.am/reports/հայաստանում-խոսքի-ազատության-վիճակի-35/ .

245 Two media organizations, interview by DECA team, January 2024, online. Civil society organization, interview by DECA team, January 2024, online;. Journalist, Interview by DECA team, February 2024, online.

246 Media organization, interview by DECA team, January 2024, online.

247 Two media organizations, interview by DECA team, January 2024, online. Civil society organization, interview by DECA team, January 2024, online.

248 "Electronic system of the State Register of the Legal Entities of the Ministry of Justice of the Republic of Armenia," Electronic Register, accessed March 29,202, .https://www.e-register.am/en/.

249 " E-Services Platform of the Cadastre Committee," Cadastre Committee, accessed March 29,2024, https://www.e-cadastre.am/en.

250 "Register of declarations," accessed March 29, 2024, http://cpcarmenia.am/en/declarations-registry/.

251 "ARMEPS," RA Ministry of Finance, accessed March 29,2024, https://armeps.am/epps/home.do.

252 Investigative journalist, Interview by DECA team, February 2024, online.

CSOs highlight the need for additional efforts on top of government initiatives aimed at enhancing public access to information.

2.5.4. THE SHADOW OF MISINFORMATION AND DISINFORMATION

KEY TERMS | BOX 8: Information integrity, misinformation, and disinformation

Information integrity refers to the accuracy, consistency, and reliability of information.

Misinformation is information that is false, but not intended to cause harm. Individuals who do not know that a piece of information is false may spread it on social media in an attempt to be helpful.

Disinformation is false information that is deliberately created or disseminated with the express purpose to cause harm. Producers of disinformation typically have political, financial, psychological, or social motivations.

Source: United Nations Information Integrity on Digital Platforms[253] and USAID Disinformation Primer[254]

The concept of addressing misinformation and disinformation (see Key Term Box 8) is relatively new in Armenia. In December 2023, Armenia introduced the Concept and Action Plan for Combating Disinformation covering the period 2024-2026.[255] The primary objective of the concept is to counter disinformation in Armenia and mitigate the risks associated with misinformation. It outlines objectives, strategies, and contemporary approaches and tools to combat disinformation. The concept was developed through collaborative efforts involving local and international CSOs, including the Freedom of Information Center of Armenia, Information and Public Relations Center, and the Center for International Private Enterprise. Experts from the Media Initiatives Center and the International Republican Institute (IRI) contributed to its development.[256] While the concept is new, the outlined measures are in the process of implementation.

The impact of social media on disinformation

Interviewees from media and civil society organizations emphasized the pivotal role played by social media influence in Armenia. Social media platforms have evolved into vital channels for free speech, expression of opinion, and widespread information-sharing. Facebook is accessible across age groups,[257] although younger demographics are increasingly turning to platforms like TikTok and Instagram[258] where content creators frequently discuss diverse topics including politics. Research from Freedom House shows that disinformation is spread through an "ecosystem" of social media accounts—especially Facebook pages and YouTube channels—and websites.[259] The spread of disinformation from various social media platforms presents significant challenges.

253 "Information Integrity on Digital Platforms ," United Nations, June 2023, https://www.un.org/en/civil-society/information-integrity-digital-platforms.

254 "USAID Disinformation Primer," The United States Agency for International Development (USAID), January 1, 2023, https://www.usaid.gov/democracy/documents/disinformation-primer.

255 "Concept for Combating Disinformation for 2024-2026," accessed March 29,2024, https://www.e-gov.am/u_files/file/decrees/varch/GV65-3FA5-9437-87B6/1319.1.pdf.

256 "National Concept of the Struggle against Disinformation 2024-2026," Freedom of Information Center, December 28,2023, https://foi.am/en/news-events/33149.

257 "Facebook users in Armenia," NapoleonCat, February 2024, https://napoleoncat.com/stats/facebook-users-in-armenia/2024/02.

258 " Instagram users in Armenia," NapoleonCat, February 2024, https://napoleoncat.com/stats/instagram-users-in-armenia/2024/02/.

259 "Freedom on the Net 2023: Armenia," Freedom House, 2023, https://freedomhouse.org/country/armenia/freedom-net/2023.

Political influence and censorship

Media independence lays the foundation for a free, open, unbiased information space. Some media outlets do not permit journalists to deviate from the editorial policies of their employers, who may be linked to political parties. According to Freedom House, the perception of undue political influence in Armenia's online information landscape is less prevalent than it had been under previous administrations.[260]

Some interviewees[261] asserted that government attempts to control misinformation and combat disinformation may resemble censorship and content moderation. One prominent example given was the proposed amendments to the RA Law "On the Legal Regime of Martial Law" in December 2022[262] which included provisions allowing the government to intervene in television and internet broadcasting to ensure that content aligned with military-patriotic themes. CSOs published an announcement voicing concerns and calling for the withdrawal of the draft legal act, emphasizing the importance of subjecting the proposed measures to international scrutiny while also advocating for the establishment of mechanisms for public oversight.[263]

Primary perpetrators of disinformation

Armenia faces constant border conflicts and is at risk of being targeted by foreign disinformation campaigns, making its population vulnerable to manipulation. According to Freedom House and the Media Initiatives Center, the main perpetrators of disinformation are media-affiliated with political and ideological groups, and Russian websites.[264] Much mis- and disinformation targeting the Armenian population is from Azerbaijani and Russian state propaganda.[265] Media outlets and public organizations that address controversial subjects are targeted by local disinformation campaigns.[266] Topics often focus on conflict-related issues or on the Second Nagorno-Karabakh War, social and cultural issues, and civil society and democracy.[267, 268]

260 Freedom on the Net 2023: Armenia. Freedom House.

261 Civil society organization, interview by DECA team, January 2024, online. Media organization, interview by DECA team, January 2024, online.

262 "On Amendments and Amendments to the Law on the Legal Regime of Martial Status, On Amendments To The Law On Defense, Amendments To The Law On Military Service And The Status Of Armed Servants And On "Making An Amendment To The Law On The Fundamentals Of Administration And Administrative Procedure" On" Draft Laws, "Unified site for the Publication of Draft Legal Acts, n.d., https://www.e-draft.am/projects/5186/digest

263 "About the state of freedom of speech in Armenia and violations of the rights of journalists and mass media in 2023. third quarter report," Khosq, accessed March 29,202, https://khosq.am/reports/հայաստանում-խոսքի-ազատության-վիճակի-35/ .https://khosq.am/en/2023/01/12/statement-100/.

264 About the state of freedom of speech in Armenia. Khosq.

265 Arshaluys Barseghyan, Lusine Grigoryan, Anna Pambukhchyan, et al, Freedom House 2021, Disinformation and Misinformation: Countering the Power of False Narratives, Freedom House, June 2021, https://freedomhouse.org/sites/default/files/2021-06/Disinformation-in-Armenia_En-v3.pdf.

266 Civil society organization, interview by DECA team, January 2024, online.

267 Disinformation and Misinformation. Freedom House.

268 "The Media Ethics Observatory expert opinion on the complaint filed by the "Pink" human rights organization against Aysor.am," Media Ethics, n.d., https://mediaethics.am/wp-content/uploads/2024/01/%D4%B4%D5%84-%D6%83%D5%B8%D6%80%D5%B1%D5%A1%D5%A3%D5%AB%D5%BF%D5%A1%D5%AF%D5%A1%D5%B6-%D5%AF%D5%A1%D6%80%D5%AE%D5%AB%D6%84-%D5%93%D4%BB%D5%86%D5%94-Aysor.am-%D5%B0%D5%B8%D6%82%D5%B6%D5%BE%D5%A1%D6%80%D5%AB-19-2024.pdf.

PILLAR 3: DIGITAL ECONOMY

Digital Economy explores the role digital technology plays in increasing economic opportunity and efficiency, trade and competitiveness, and global economic integration. Areas of inquiry include digital financial services (credit or debit cards, payment apps, mobile money, and digital savings and loan products), financial inclusion, regulation of digital finance, digital trade, e-commerce, and the financial technology (FinTech) enabling environment. This pillar also assesses strengths and weaknesses in the local digital talent pool and the tech startup environment. A healthy digital economy requires ICT skills that match the demand and an ecosystem that promotes technological innovation.

KEY TAKEAWAYS: DIGITAL ECONOMY

- Armenia's financial sector is undergoing significant modernization, with a focus on open banking to drive innovation and financial inclusion.
- The e-commerce sector holds untapped potential, but limited use of shared infrastructure practices and inadequate consumer protection hinder its growth.
- The startup ecosystem provides a solid foundation for early stage companies, but a crucial link is missing to support companies that are scaling and maturing.
- Armenia prioritizes tech education, but outdated curricula, limited focus on soft skills, and low professor pay create a skills gap, requiring graduates to seek additional training from non-formal programs.

RELEVANT RECOMMENDATIONS

- Support the modernization of Armenian payment infrastructure and related regulatory frameworks.
- Strengthen the protection and enforcement of consumer rights in the e-commerce sector.
- Explore opportunities for the development of shared infrastructure in e-commerce through partnerships.
- Boost the digital literacy of the general population and improve ICT education to support the development of the ICT workforce. [cross-cutting]
- Facilitate comprehensive cybersecurity governance and practices. [cross-cutting]

3.1 DIGITAL FINANCIAL SERVICES (DFS)

Armenia's financial sector is undergoing a rapid digital transformation. The Central Bank of Armenia (CBA) spearheads this shift, aiming to streamline business operations, improve user experiences, and achieve broader financial inclusion.[269] Financial institutions are expanding their digital offerings to include online lending, investment tools, and contactless payments. Remote onboarding, enabled by biometric identification, is becoming increasingly common across banks and payment service providers, eliminating the need for physical branch visits, offering a significant advantage for citizens in rural areas.

Legislative changes made in July 2022 to encourage the use of non-cash transactions, coupled with the COVID-19 pandemic and the entry of Google Pay and Apple Pay into the market, have fueled a surge in cashless payments. This shift has led the CBA to increase collaboration with banks and payment service providers to tackle outdated payment infrastructure, limited mobile wallet interoperability, and a lack of industry-wide standards (e.g. QR codes and ISO 20022). The CBA drives discussions on open banking to foster innovation with FinTech players and expand access to personalized financial services. One remaining hurdle is international transfers, which incur high costs, slow speeds, and limited options for recipients of foreign payments.

269 "Digital Transformation of Armenia's Financial System," Alliance for Financial Inclusion (AFI), January 25, 2022, https://www.afi-global.org/newsroom/blogs/digital-transformation-of-armenias-financial-system/.

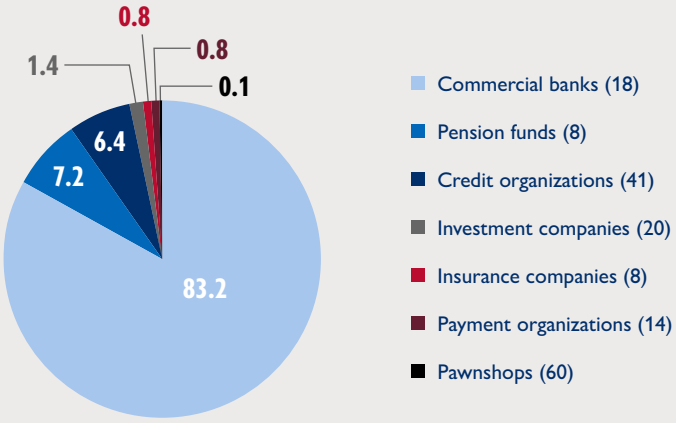
Armenia has experienced substantial progress in digital financial inclusion, with increased account ownership, use of digital payments, and mobile money adoption. Despite these gains, a significant urban-rural divide persists, as account ownership and digital transaction rates remain low in rural regions (see section 3.1.3). Several factors contribute to this gap, including a preference for cash transactions among rural populations and business practices that favor cash payments for tax avoidance. Limited digital financial literacy, a lack of suitable financial products for the economically disadvantaged, and lower trust in the financial system further exacerbate this digital divide.

The financial sector features robust consumer protection for DFS and maintains stringent cybersecurity measures. These measures include mandatory penetration tests, vulnerability assessments, and legal requirements for financial institutions, along with educational programs for end-users across diverse demographics. As digitalization expands, new types of consumer rights risks and cybersecurity threats emerge. Existing consumer protection frameworks and cybersecurity protocols could be strengthened to safeguard against evolving digital exposures.

3.1.1 DFS MARKET OVERVIEW

Armenia's financial sector is experiencing robust growth, with DFS playing a pivotal role. While the sector remains bank-centric (18 banks hold 83.2 percent of total assets as of 2023), the role of non-bank financial institutions is gradually expanding. Key non-bank players include pension funds, non-deposit taking credit organizations, payment service providers, and investment and insurance companies.[270] Other potential providers of DFS, including FinTech companies, are still emerging, holding promise for personalized financial services and products like innovative payment solutions and wealth management tools.[271]

FIGURE 12: Financial system structure (2023 Asset composition, percent) [272]



Source: Central Bank of Armenia

The banking sector is transitioning toward digital banking, a trend underscored by the rise in mobile and internet banking transactions. In 2022, the average adult conducted 45.6 transactions per year through mobile or internet banking, a tremendous increase from 0.6 in 2014. The volume of these transactions skyrocketed from

270 "Statistical Overview," CBA, December 2023, https://www.cba.am/AM/pperiodicals/Statistical_overview_XII.2023.pdf.

271 Private sector organization, interview by DECA team, January 2024, online.

272 "Statistical Overview," CBA, December 2023, https://www.cba.am/AM/pperiodicals/Statistical_overview_XII.2023.pdf.

29.3 percent of GDP in 2014 to 315.2 percent in 2022.[273] This digital shift is changing how customers interact with banks. As of 2023, half of Armenia's 18 banks offer remote onboarding systems using biometric identification.[274] This eliminates reliance on physical branch visits, removing a major barrier to access to financial services, especially for those in rural areas. The evolving landscape extends to other DFS such as online savings and digital loans, Buy Now and Pay Later (BNPL) products (e.g. Rocket Line by IDBank, Paylater by Inecobank), and automated customer flow management facilitated by the pioneering application EarlyOne. Contactless technologies like Quick Response (QR) codes and Near Field Communication (NFC) are widely used, with popular mobile payment platforms such as Google Pay and Apple Pay readily accepted in 14 banks.[275] Some banks have developed specialized tools for investments in local and international securities, such as Ameriabank's MyInvest, Araratbank's Trading Platform, and Unibank's Invest.

Payment organizations are at the forefront of digitalization, integrating FinTech solutions despite their smaller market share of 0.8 percent. (See Figure 12.)[276] Companies like Idram, TellCell, and Easy Pay, offer a diverse range of DFS through their payment terminals and wallets. Customers utilize these services for public payments, medical expenses, education fees, e-commerce purchases, and transfers between bank accounts, cards, or other wallets. These providers also enable customers to open accounts with partner banks, expanding their access to wider banking services like online loan applications, loan repayments, and deposit replenishments. To encourage non-cash transactions and reduce cash-related risks in this sector, the CBA enacted a regulation in May 2022, prohibiting cash withdrawals and deposits for digital wallets.[277] This regulation requires users to link bank accounts to their digital wallets in order to withdraw funds from those accounts, increasing transparency for authorities by routing transactions through the banking system. There is no comprehensive analysis of the effects of this regulation, but an industry interviewee observed that this move placed limitations on payment organizations.[278] Some started to collaborate with banks to offer alternative solutions to users through opening bank accounts directly through their wallets and topping up and cashing out those wallets through linked accounts. Payment organizations, like TellCell and Idram have partnered with Hayeconombank and IDbank respectively to issue joint digital cards, providing additional flexibility in financial transactions. Payment organizations in general struggle to convince banks to open their infrastructure to FinTech companies, as banks have concerns about customer identification issues and the potential loss of clients.[279]

DFS are reshaping Armenia's pension funds (accounting for 7.2 percent of the financial system's assets, Figure 12), offering participants greater convenience and control over their retirement savings. Individuals can actively manage their funds online through internet and mobile banking applications or the Central Depository's "My Account" platform, leveraging their electronic identification cards (eID) or mobile IDs (mID).[280] This functionality allows them to access account information, update personal data, switch funds or asset managers, and exchange pension fund units. The foundation for this change stems from the 2014 reform when Armenia transitioned from a Pay-As-You-Go (PAYG) system to a mandatory defined-contribution scheme. Unlike the previous

273 " Financial Access Survey," International Monetary Fund (IMF), 2014-2022. https://data.imf.org/?sk=e5dcab7e-a5ca-4892-a6ea-598b5463a34c&sid=1412015057755.

274 Authors' own research based on the installation and review of mobile bank applications in December 2023.

275 "Apple Pay participating banks in Africa, Europe, and the Middle East," Apple Support, accessed March 18, 2024. https://support.apple.com/en-am/109516. "Find supported payment methods," Google Wallet Help, accessed March 18, 2024, https://support.google.com/wallet/answer/12059326?hl=en-GB&co=GENIE.CountryCode%3DAM.

276 Konstantin Tserazov, "Evolution of Financial Technologies in Armenia," ArmInfo Financial Portal, January 26, 2024, https://finport.am/full_news.php?id=49716&lang=3.

277 "Decision No. 46-N," CBA, March 22, 2022, https://www.arlis.am/DocumentView.aspx?docID=161736.

278 Private sector organization, interview by DECA Team, January 2024, online.

279 Private sector organization, interview by DECA team, January 2024, online.

280 "My Account: Application access guide," Central Depository of Armenia (CDA), accessed March 18, 2024, https://cda.am/am/pages/my_account.

system, where current worker contributions funded retiree pensions, employees now contribute to their personal funds and enjoy a variety of options to manage these funds, including digital options. As a result, participants can strategically plan for their retirement and benefit from wider options to diversify investment portfolios.[281]

Other players in the financial system, such as non-deposit taking credit organizations, lag behind banks, payment service providers, and pension funds in adopting DFS. These organizations comprise 6.5 percent of the market (see Figure 12), and play a vital role in serving underbanked customers, particularly those perceived as a higher credit risk or with lower incomes. This support is especially evident in rural areas, where credit organizations maintain a strong physical presence with 70 percent of their branches located outside Yerevan.[282] Some credit organizations offer convenient loan repayment options through mobile apps, either their own (like Global Credit's CashMe) or through third-party payment providers, but access to digital loans themselves remains limited. Major players like Global Credit, Kamurj, and Aregak are currently the only few offering digital loans, with the vast majority (nearly three-quarters) still relying on traditional offline lending processes. The reasons for this include a preference for in-person interactions and lower financial and digital literacy among clients in rural areas, as well as credit organizations' financial constraints in pursuing digitalization due to limited access to low-cost funds.[283]

This uneven pace of digital adoption extends to other areas of the non-bank financial sector, including investment companies. Despite managing 1.4 percent of the financial system's assets (see Figure 12), only a few of these companies offer DFSs, such as online options for opening brokerage accounts and investing in securities. Those offering DFS tend to be more recently established (e.g., Sirius Capital, New Venture Brokerage, and Apricot Capital) and prioritize digitization in their strategies. For the sector overall, the level of digitization is still low, driven mainly by insufficient demand for such services due to local stock market under development and the lack of a widespread culture of investment activities.[284]

Non-life insurance companies exhibit limited adoption of DFSs. Following the 2011 introduction of Compulsory Motor Third Party Liability (CMTPL), which led to the market thriving and reaching 0.8 percent in assets (see Figure 12), online insurance services remain underutilized. CMTPL—the introduction of a mandatory insurance for vehicle owners—significantly expanded the non-life insurance market, leading to the development of other insurance categories like health, accident, and cargo. Many insurance companies offer online services, including the digital signing of CMTPL contracts through the CBA-created Armenian Single Window for Automotive (ASWA) platform.[285] Despite this, Armenians have not widely adopted online insurance services. As of December 2023, insurance companies had 900,000 active contracts (640,000 being CMTPL), but only 25 percent of those were signed online.[286]

281 "Comments and Recommendations on the White Paper on Pension System Reform Program," USAID, October 3, 2008, https://pdf.usaid.gov/pdf_docs/Pnadq723.pdf.

282 Retrieved from the official websites of credit organizations.

283 "Armenia's Microfinance Sector at a Glance," Asian Development Bank (ADB), January 2024, https://www.adb.org/sites/default/files/publication/939571/armenia-microfinance-sector-glance.pdf.

284 Vardan Aramyan, "Apricot Capital Gives Clients the Opportunity to Invest in Armenia from Around the Globe," Apricot Capital, April 19, 2023, https://apricotcapital.am/en/vardan-amaryan-apricot-capital-gives-clients-the-opportunity-to-invest-in-armenia-from-around-the-globe/.

285 ASWA, Accessed March 18, 2024, https://aswa.am/

286 Armenian Motor Insurance Bureau, accessed March 18, 2024, https://www.appa.am/index.php?al=appa_statistics.

3.1.2 PAYMENT LANDSCAPE

Armenia's digital payment landscape has improved vastly due to proactive regulation targeting non-cash transactions. The COVID-19 pandemic, the entry of Google Pay and Apple Pay, and immigration due to the Russia-Ukraine war have fueled this progress, shifting consumer preferences away from cash. Challenges remain, including outdated infrastructure, limited interoperability between digital wallets of payment organizations, and non-standardized QR codes. The shortage of thriving correspondent banking networks makes cross-border transfers expensive and time-consuming, limiting the growth potential of businesses involved in cross-border trade.

Armenia's payment system includes both banks and non-bank financial institutions. Banks are authorized to provide payment services within the scope of their banking licenses. Non-bank financial institutions must obtain specific licenses for payment and settlement services, which fall into two categories: i) licenses for money transfers without opening bank accounts, and ii) licenses for third-party processing and clearing services.[287] Organizations with money transfer licenses can also obtain permits for issuing e-money. Unlike many jurisdictions, Armenia does not have a discrete regulatory framework for mobile money, instead applying the same provisions that govern e-money issuers.

GSMA's Mobile Money Regulatory Index (2021),[288] which assesses the enabling regulatory framework for mobile money across countries, assigns Armenia a score of 66.8. (See Figure 13.) Armenia performs well in the accessibility of mobile money, with reasonable account balance and transaction limits and broad agent networks where users can deposit, withdraw cash, and have access to other financial services. On the regulation domain, sound authorization measures such as licensing criteria and capital requirements are in place, ensuring financial health for mobile money providers and secure experiences for users. Consumer protection regulations are also present, but there are gaps in implementing ring-fencing arrangements to safeguard funds against claims by mobile agent creditors. This, together with the lack of deposit insurance for mobile money accounts, can open users' funds to vulnerability in the event of a mobile money provider's financial troubles.

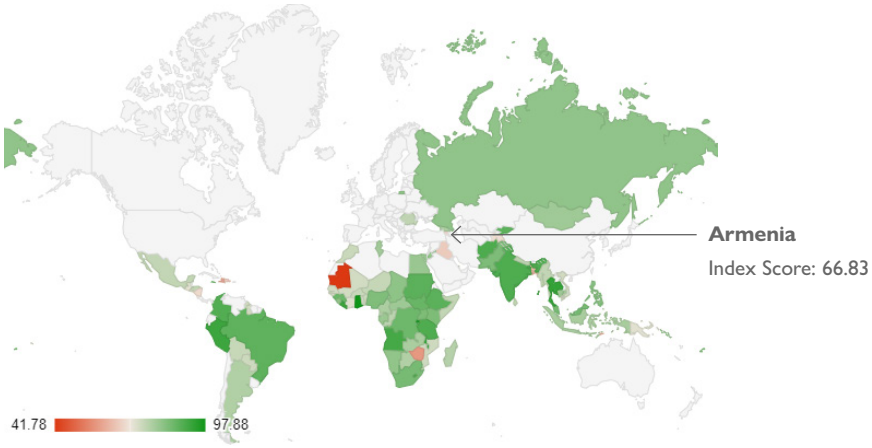
Armenia lags significantly behind the global average in Know Your Customer (KYC) requirements and infrastructure. These shortcomings include a lack of centralized KYC verification by the government, along with limited access to the country's retail settlement infrastructure for mobile money providers. Armenia's KYC procedures present a widespread challenge, as each financial institution develops its own system, leading to incompatibility with other financial institutions.[289] As a consequence, a customer might undergo redundant KYC procedures at both a bank and a collaborating payment service provider, even if the bank serves as the payment organization's account provider.

287 "About Accounting Systems and Accounting Organizations," Armenian Legal Information System (ARLIS), November 24, 2004, https://www.arlis.am/documentview.aspx?docid=21956.

288 "The Mobile Money Regulatory Index," GSMA, 2021, https://www.gsma.com/mobilefordevelopment/the-mobile-money-regulatory-index/.

289 Erik Vardanyan, "Central Bank Digital Currency: Case of Armenia," CBA, June 26, 2023, https://www.cba.am/EN/panalyticalmaterialsresearches/CBDC_26.06.2023.pdf.

FIGURE 13: GSMA Mobile Regulatory Index (2021)[290]



Source: GSMA

The payment infrastructure in Armenia is comprised of the CBA's Electronic Payment System (EPS), the ArCa national payment system, and international transfer systems.[291] See Box 3 for CBA's initiatives for enhancing payment infrastructure.

- The EPS operates under a real-time gross settlement (RTGS) regime, handling credit payments like interbank transfers, budget payments, business-to-business (B2B), and consumer-to-consumer (C2C) transfers.
- The ArCa national card system is a retail payment system that enables transactions with local ArCa cards as well as with international Visa and Mastercards.
- Individuals and businesses can use the SWIFT network, money transfer systems (e.g., MoneyGram, Ria, and Unistream), and more recently, payment platforms such as Wise, Skrill, and Payoneer for international transfers,.

The EPS is operational and has seen a significant rise in usage, but its architecture presents limitations. The number and volume of transactions processed through EPS have grown considerably over time. In 2023, the total number of transactions reached 7.0 million, doubling from 3.8 million pre-pandemic. The volume of transactions also saw a 45 percent increase over the same timeframe, reaching 30,065 billion Armenian drams in 2023.[292] The EPS boasts a high operational availability (99.6 percent), experiencing minimal downtime.[293] It was developed in the late 1990s and its architecture is outdated and requires modernization. Its core functionality remains adequate according to an interviewee from the public sector but there are limitations, including limited operating hours (9:30 AM to 4:00 PM), ad hoc liquidity management, and the absence of a transaction queue system, which means payment messages are processed in the order they arrive, regardless of size or priority.[294]

Armenia's retail sector has experienced substantial expansion in its payment infrastructure and non-cash transactions. As of early 2020, there were only 11,600 PoS terminals and 1,700 virtual PoS terminals in the country (see Figure 14). By the end of 2023, these figures had surged to 80,500 and 4,500 respectively, covering all types of economic entities. Within the same time frame, the volume of non-cash card transactions as a

290 " The Mobile Money Regulatory Index Report," GSMA, 2021, https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/gsma_resources/mobile-money-policy-and-regulatory-handbook-2/.

291 "International Money Transfer Systems," CBA, accessed March 18, 2024, https://www.cba.am/am/SitePages/pspsremittancesystems.aspx .

292 "Statistical Overview," CBA, December 2023, https://www.cba.am/AM/pperiodicals/Statistical_overview_XII.2023.pdf.

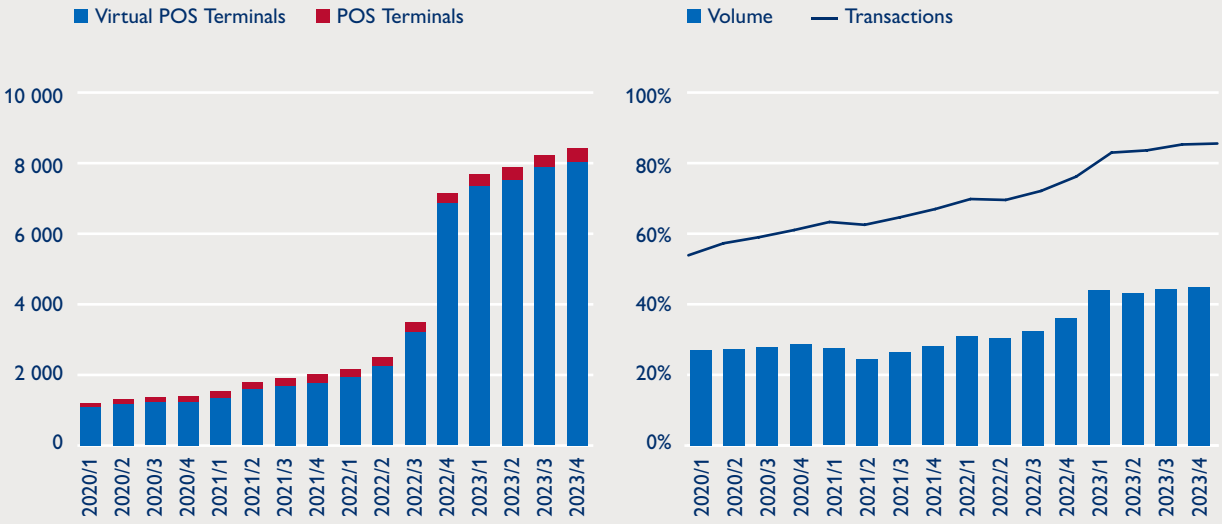
293 "Financial Stability Report 2022," Central Bank of Armenia (CBA), April 30, 2023. https://www.cba.am/EN/pperiodicals/Stability_Report_2022.pdf.

294 Public sector representative, interview by DECA team, January 2024, online.

percentage of total transaction volume increased from 28.1 percent in Q1 2020 to 46.1 percent by the end of Q4 2023. The number of non-cash transactions as a share of the total number rose from 55.5 percent to 86.6 percent.[295] The number of transactions has grown more rapidly than transaction volume, indicating increased accessibility to non-cash operations for consumers.

Several factors fueled this transition. In January 2022, Armenia enacted a law on non-cash transactions mandating non-cash payments for transactions exceeding 300,000 Armenian drams (approximately USD 770) between individuals, entrepreneurs, and organizations.[296] This law also requires non-cash transactions for salaries, government payments, education, medical services, insurance compensations, and scholarships. Entities using cash registers must provide the option for non-cash payments via payment cards and other payment instruments upon customer request. Another major regulation supporting this shift was the government's introduction of a cash-back program in July 2022. Citizens receiving pensions or benefits in non-cash form are reimbursed 10 percent when they make payments with payment cards and devices.[297] The November 2022 entry of Google Pay and Apple Pay into the Armenian market enhanced non-cash payment options and fostered a new culture of cashless transactions.[298] Russia's invasion of Ukraine in February 2022[299] and the COVID-19 pandemic[300] also acted as catalysts for Armenia's shift toward non-cash payments, driven by an influx of migrants accustomed to digital transactions and increased safety concerns when shopping online during shutdowns.

FIGURE 14: Number of PoS Terminals and Share of Non-Cash Transactions (percent) [301]



Source: Based on CBA Statistics

295 " Payment System Statistics and Reports," Central Bank of Armenia (CBA), n.d., https://www.cba.am/EN/SitePages/psstatisticaldatareports.aspx.

296 "Law of the Republic of Armenia on Non-Cash Operations," Armenian Legal Information System (ARLIS), February 8, 2022, https://www.arlis.am/documentView.aspx?docid=182293.

297 "Approval of Public-Private Social Cooperation Event to Provide Back Payments to Pensioners from Cash Payments," Armenian Legal Information System (ARLIS), May 19, 2022, https://www.arlis.am/documentview.aspx?docid=164691.

298 Three private sector organizations, interviews by DECA team, January 2024, online.

299 Civil society organization, interview by the team, January 2024, online.

300 Seyran Sargsyan, "Non-Cash Transactions Continue to Grow in Armenia," ArmBanks, May 19, 2021, http://www.armbanks.am/en/2021/05/19/133597/.

301 "Payment System," Central Bank of Armenia (CBA), n.d., https://www.cba.am/EN/SitePages/psstatisticaldatareports.aspx.

BOX 3: CBA initiatives for enhancing the payment infrastructure

RTGS: The CBA is considering a comprehensive rebuild or strategic upgrades to its Real-Time Gross Settlement (RTGS) system to enhance efficiency and meet evolving needs. An essential feature of the new RTGS system will be the modular design to facilitate future upgrades and integrations, potentially incorporating Central Bank Digital Currencies (CBDCs). The CBA plans to adopt the ISO 20022 messaging standard throughout the RTGS system and within the broader payment ecosystem in order to align with international practices. [302]

Instant Payments System: The ArCa processing center facilitates real-time transactions using both local ArCa cards and international cards like Visa and Mastercard. However, a gap exists for account-to-account transfers, with consumers facing delayed access to funds due to the limited operating hours of the CBA's RTGS system. To address this and ensure faster access to funds, ArCa is collaborating with the CBA and banks on introducing an instant payment system specifically designed for account-to-account transfers. Given the dynamic market demands, experts stress the significance of capacity-building and infrastructure upgrades in order for ArCa to lead these changes effectively.[303]

National QR Standard: Armenia does not have a unified national standard for QR codes. This results in a lack of communication between available QR interfaces, causing confusion for users navigating these systems. In response, the CBA plans to implement regulations for QR standardization.[304] This standardization aims to enable payments at POS terminals through universally accepted QR codes, promoting compatibility among payment service providers and encouraging wider adoption of QR-based payments.

Digital Wallet Interoperability: The absence of interoperability among digital wallets hinders consumers from easily transferring funds between various payment service providers. This creates inconvenience and slows the adoption of digital payments. The CBA is pursuing initiatives to mandate interoperability within the digital wallet ecosystem. By enforcing interoperability standards, the CBA aims to facilitate fund transfers between digital wallets, ensuring that consumers can effortlessly conduct transactions regardless of the provider they choose.[305]

STAK: The CBA is developing a national money transfer system (STAK), designed to facilitate cross-border and domestic transfers without requiring the opening of a bank account. This will enable recipients to make transfers through any Armenian bank, the ArCa system, and all international money transfer systems available in Armenia (e.g., MoneyGram, InteliExpress). The CBA also intends to link STAK with similar systems in other countries to create an international money transfer network for the future.[306]

Despite positive advancements in Armenia's domestic payment systems, international transfers remain a hurdle. High compliance costs of anti-money laundering (AML) and combating the financing of terrorism (CFT) regulations make it difficult for Armenian banks to establish direct correspondent relationships.[307] This results in funds passing through multiple intermediary bank accounts, leading to expensive and slow international transfers. Receiving foreign payments is another constraint, particularly for exporters and organizations anticipating overseas transfers.[308] PayPal only functions partially in Armenia, permitting outgoing transfers but not incoming transfers, while other popular platforms like Stripe are unavailable. Wise is also partially available in Armenia where it can only receive international transfers through the SWIFT network unlike in other

302 Public sector representative, interview by DECA team, January 2024, online.

303 Private sector representative, interview by DECA team, January 2024, online.

304 "2022 Annual Report," Central Bank of Armenia (CBA), April 28, 2023, https://www.cba.am/EN/pperiodicals/Annual_Report_2022.pdf.

305 Public sector representative, interview by DECA team, January 2024, online.

306 "A national money transfer system is being created in RA," PanARMENIAN Net, January 15, 2022, https://panarmenian.net/arm/news/297881.

307 Public sector agency, interview by DECA team, January 2024, online. Private sector organization, interview by DECA team, January 2024, online. Civil society organization, interview by DECA team, January 2024, online.

308 Private sector organization, interview by DECA team, January 2024, online. Public sector agency, interview by DECA team, January 2024, online.

countries. Some banks like Converse[309] and Ineco[310] have partnered with Payoneer, allowing users to easily withdraw funds from their Payoneer accounts to transfer to local bank accounts. The Skrill online payment system, launched in Armenia in September 2020, also offers full functionality for both receiving and transferring money using Visa cards.[311] Despite these solutions, receiving payments from abroad remains a significant challenge within the payment system due to the low operational reach of these alternatives, the high correspondent fees, and the time it takes for funds to travel across intermediaries.

3.1.3 DIGITAL FINANCIAL INCLUSION

Armenia has made notable progress in expanding financial inclusion, particularly through the use of digital financial services. This advancement stems from improved financial infrastructure, the rise of innovative DFS, and government regulations and initiatives promoting non-cash transactions and financial education. Despite these gains, a significant urban-rural digital gap persists, driven by strong cash preferences in rural areas and business incentives to evade taxes, alongside limited digital literacy, a scarcity of targeted products for rural populations, and a lack of trust in the financial system.

Enhanced financial inclusion is reflected in important metrics. In 2021, 55.4 percent of the population ages 15 and above had established accounts with formal financial institutions, a large increase from the 17.5 percent recorded in 2011.[312] Similar improvements were observed in the number of deposit and loan accounts. In 2014, the number of household sector deposit and loan accounts with banks stood at 1,238 and 366 per 1,000 adults, respectively. These numbers increased significantly by 2022, reaching 2,728 deposit accounts and 665 loan accounts per 1,000 adults. The number of debit cards in circulation expanded from 592 to 1,411 within the same time frame.[313]

This surge in financial engagement extended to significant improvement in digital financial inclusion. The percentage of the population ages 15 and above who made or received a digital payment nearly quadrupled from 12.3 percent to 47.5 percent. The use of accounts for receiving wages soared, with nearly 60 percent of wage recipients utilizing their financial accounts in 2021 compared to only 30.2 percent in 2014. Domestic remittances through accounts also grew substantially from 2.0 percent to 13.6 percent, as did the use of accounts for utility payments from 1.5 percent to 28 percent and government payments from 2.1 percent to 10.7 percent.[314]

The increasing adoption of mobile money has accelerated this shift. In 2012, active mobile money accounts and agent outlets per 1,000 adults were negligible. (See Figure 15.) By 2022, these figures had surged to 427 and 453, respectively. As a result, nearly half of Armenia's adult population now actively uses mobile accounts for daily transactions, including utility bills, mobile network and internet payments, state fees, road penalties, car parking, insurance, and loan repayments. In 2022, the number of mobile money transactions per 1,000 adults reached nearly 40,000, with their value comprising 6.3 percent of the GDP. [315]

309 Private sector organization, interview by DECA team, January 2024, online.

310 "Payoneer," Ineco, accessed March 18, 2024, https://www.inecobank.am/en/Individual/payoneer.

311 "Recommendations Proposed for E-Commerce Environment Harmonisation in the Eastern Partnership Countries: Republic of Armenia," EU4Digital, January 13, 2021, https://eufordigital.eu/wp-content/uploads/2021/04/eCommerce-report-%E2%80%93-Recommendations-proposed-for-eCommerce-environment-harmonisation-in-the-EaP-countries-Republic-of-Armenia.pdf.

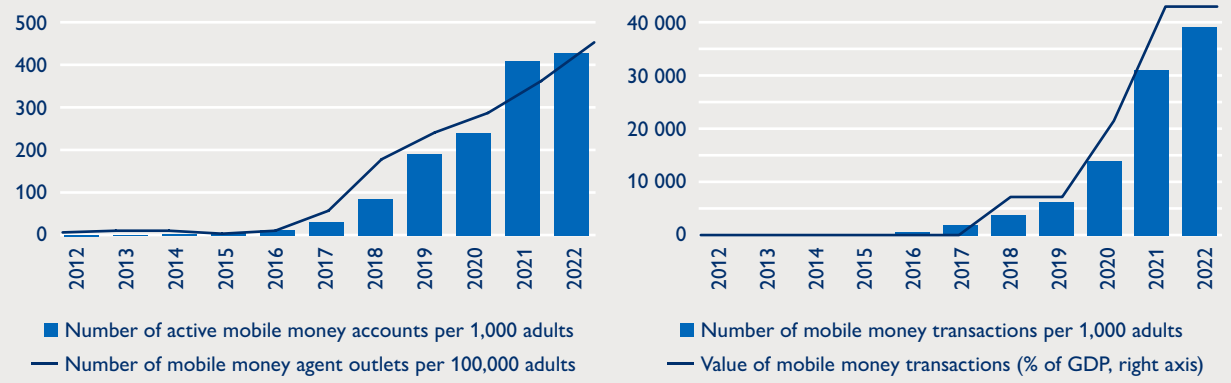
312 "The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19," The World Bank, 2021, https://www.worldbank.org/en/publication/globalfindex.

313 "Financial Access Survey," International Monetary Fund (IMF), n.d., https://data.imf.org/?sk=e5dcab7e-a5ca-4892-a6ea-598b5463a34c&sid=1412015057755.

314 "The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19," The World Bank, 2021, https://www.worldbank.org/en/publication/globalfindex.

315 "Financial Access Survey," International Monetary Fund (IMF), n.d., https://data.imf.org/?sk=e5dcab7e-a5ca-4892-a6ea-598b5463a34c&sid=1412015057755.

FIGURE 15: Mobile money accounts and transactions[316]



Source: Based on IMF Financial Access Survey

These positive trends stem from both supply-side factors, such as enhanced financial infrastructure and the emergence of new types of DFS, and demand-side factors, such as proactive policies for financial education and the promotion of non-cash transactions. On the supply side, greater financial service accessibility stands out as a key factor for general financial inclusion, as evidenced by the increased density of bank branches and ATMs. In 2010, 18 bank branches and 33 ATMs served 100,000 adults. Those numbers increased to 26 and 74 respectively by 2022.[317] Additional enhancements to digital financial inclusion infrastructure have been instrumental, including the expansion of PoS terminals, the introduction of innovative payment solutions (e.g. QR, NFC, Google Pay, and Apple Pay), and the emergence of new types of DFS.

On the demand side, the government has played a crucial role in promoting non-cash transactions, highlighted by the enactment of the law on non-cash transactions, the introduction of the pensioners cashback program, and the mandate that one must hold an account in order to replenish a digital wallet, as discussed earlier. Other demand-side factors include rising household incomes and reduced informality, alongside the CBA's efforts to enhance financial education.[318] In 2014, the CBA and the government introduced the National Strategy for Financial Education (NSFE), initiating educational programs for groups such as schoolchildren, students, rural populations, women, and families with migrant members.[319] To assess the impact of these programs, the CBA and the Alliance for Financial Inclusion (AFI) developed the Financial Capability Barometer to assess the impact of these programs. It measures the percentage of essential financial competencies present in the population. In 2014, this score stood at 44.5 percent, meaning that out of 100 capabilities, only 44.5 percent were present in the population.[320] After the first round of the NSFE (2014-2019), this score increased to 46.8 percent, with a target of 50 percent set for the 2021-2025 round.[321]

Despite these improvements, Armenia grapples with pronounced disparities in digital financial inclusion between urban and rural areas. (See Figure 16.) Sixty percent of the urban population has an account and 52 percent have made or received a digital payment, but these figures drop to 41 percent and 34 percent respectively in rural areas. The gap widens further when looking at mobile money accounts (19 percent urban vs. 10 percent

316 Financial Access Survey. IMF.

317 Financial Access Survey. IMF.

318 Armen Nurbekyan, Hovanessian Naneh, "Financial Inclusion, Regulation, Financial Literacy, and Financial Education in Armenia," ADB, May 2018. https://www.adb.org/sites/default/files/publication/421641/adbi-wp843.pdf.

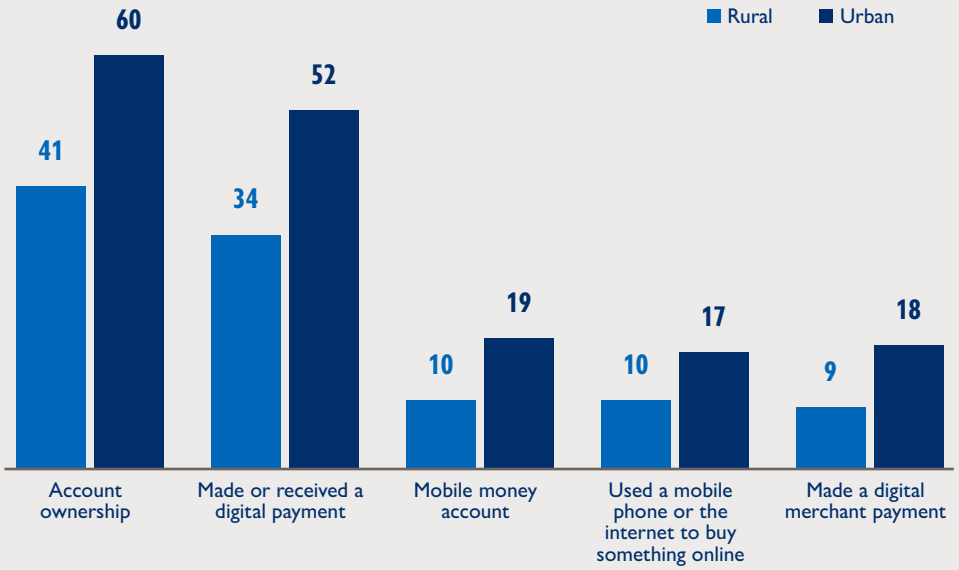
319 "National Strategy for Financial Education," NSFE, November 13, 2014, https://www.e-gov.am/u_files/file/decrees/arc_voroshum/2104/11/47-20ardz.pdf.

320 "Financial Capability Barometer: A New Methodology for Measuring the Financial Capability of a Country's Population," AFI, March 2017, https://www.afi-global.org/sites/default/files/publications/2017-03/2017-Financial%20Capability%20Barometer.pdf.

321 "On the Approval of the Financial Education Program of the Republic of Armenia and the Action Plan of the Financial Education Program of The Republic Of Armenia 2021-2025," IRTEK, July 23, 2021,. https://www.irtek.am/views/act.aspx?aid=111681.

rural), online purchases (17 percent urban vs. 10 percent rural), and digital merchant payments (18 percent urban vs. 9 percent rural). Armenia has significantly narrowed the gap in terms of gender equality in financial inclusion. In 2021, some 52.2 percent of women held bank accounts, slightly lower than the 59.4 percent rate for men. This progress can be attributed, in part, to targeted initiatives by authorities, such as the NSFE, which includes programs specifically designed to empower women.

FIGURE 16: Regional divide in digital financial inclusion (percent, age 15+ population)[322]



Source: The World Bank Global Findex Database

Several factors explain these regional disparities in digital financial inclusion. Rural residents often favor cash due to the perception that cash is cheaper. This stems from a lack of awareness about the hidden costs of cash such as security risks, transportation costs, and limited access to certain financial services. In contrast, DFS have transparent fees, which can make them seem more expensive even if the overall cost is lower. Rural areas tend to have weaker government oversight, so rural businesses are better able to evade taxes and may prefer cash payments to avoid the additional merchant fees (1.5-3 percent) associated with digital transactions. This practice is more prevalent in areas with weaker government oversight. Other contributing factors include limited digital financial literacy, a lack of financial products specifically designed for low-income individuals, and lower levels of trust in the financial system among rural populations. [323]

The digital divide in financial inclusion creates a double burden for both individuals and the economy. It forces rural residents to endure inconvenience and high transaction costs for essential financial activities due to their limited use of DFS and the necessity of visiting a physical bank branch. Beyond individual burdens, cash reliance fuels a shadow economy, reducing government tax revenue.[324] It forces the government and financial institutions to bear additional costs for cash maintenance, including banknote printing, cash-in-transit (CIT) services, and replacement of worn and counterfeit bills.[325]

322 "The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19," The World Bank, 2021, https://www.worldbank.org/en/publication/globalfindex.

323 One public agency, three private sector organizations, and one civil society organization, interviews by DECA team, January 2024, online.

324 One public agency, three private sector, and one civil society organization, interviews by DECA team, January 2024, online.

325 Erik Vardanyan, "Central Bank Digital Currency: Case of Armenia," CBA, June 26, 2023, https://www.cba.am/EN/panalyticalmaterialsresearches/CBDC_26.06.2023.pdf.

3.1.4 FINTECH AND CRYPTOCURRENCIES

Armenia's FinTech sector is in its early stages of development, marked by a burgeoning community of young startups. (See Box 4.)[326] According to Tracxn, a global platform for tracking financial innovations, Armenia hosts close to 50 Fintech startups.[327] Armenia's FinTech sector is dominated by young startups operating in the payments segment, much like other nascent FinTech ecosystems. Other FinTech segments represented include crowdfunding, corporate solutions, and artificial intelligence (AI)-based processing of financial information. One particularly fast-growing segment is cryptocurrency and blockchain, where a flurry of startups has emerged in recent years.

BOX 4: Armenia's FinTech sector: major segments and players[328]

- **Payment platforms:** Idram, TellCell, Easy Pay, PayX, Qsak, Text'nPayMe, Paydrom.
- **Crowdfunding:** Ayo, BoostBoom, InvestShin, Sprint Crowdfunders.
- **Corporate solutions:** Himnark, Payva, Breakeven, WebWork Time Tracker, My Online Invoice, Moons.
- **AI:** Cognaize, FinNow, Risksensor, 8nook, Crafteo.
- **Cryptocurrency and blockchain:** CoinStats, SkyTerminal, Ecos, Crypto Clubs, GrailPad, CryptoNDX, Cryptolab.

Payment-related FinTech activities lack a specific regulatory framework. As discussed earlier, the existing licensing framework only envisions two types of licenses: one for money transfers and one for third-party processing and clearing services. Consequently, payment-related FinTech activities are subject to discretionary oversight by the CBA. The lack of specific regulation limits FinTech growth, as an unstable foundation prevents investment and the cost of applying for existing licenses proves prohibitive for many.[329] The main risks for consumers arise from the absence of dedicated protection measures in areas like data privacy and security.[330] This regulatory void also means that FinTech companies are not subject to the same managerial qualification standards and robust AML/CFT compliance requirements, unlike traditional financial institutions.[331] Recognizing this limitation, the CBA highlighted the significance of potential regulatory reforms in its 2021 strategy to facilitate innovation and the entry of FinTech players into Armenia's DFS market.[332] The CBA is in early stages of exploring the possibility of modular licensing options for innovative product and service providers to alleviate the need for these companies to apply for the same licenses as traditional payment service providers.[333]

The CBA is leading discussions with the private sector regarding a potential shift toward open banking.[334] This initiative would allow customers to grant authorized third-party companies access to their financial information through Application Programming Interfaces (APIs), enabling the delivery of innovative and tailored financial

326 "COVID-19 Accelerates Digital Payment and Fintech Adoption in Armenia," FinTechNews, June 11, 2021, https://fintechnews.ch/covid19/fintech-armenia/45920/.

327 "FinTech startups in Armenia," Tracxn, accessed March 18, 2024. https://tracxn.com/d/explore/fintech-startups-in-armenia/__75cf4fbjdePCeE5STj0a6s5BYNwiT5_KysAw8MRcbks/companies.

328 FinTech startups in Armenia. Tracxn.

329 Two private sector organizations, interviews by DECA team, January 2024, online.

330 Private sector interview by DECA team, January 2024, online.

331 "We will share with the bank, and the bank with whom?" Fintech discussion and new draft regulation," Club of Economic Journalists (EJC), November 7, 2022, https://ejc.am/hy/article/5576

332 " CBA Strategy 2021," Central Bank of Armenia (CBA), November 18, 2021. https://www.cba.am/EN/panalyticalmaterialsresearches/Strategy%20CBA%202021.pdf

333 Public sector interview by DECA team, January 2024, online.

334 "Conference on Open Banking and Open Financial Services," Central Bank of Armenia (CBA), May 22, 2023. https://www.cba.am/AM/News/Pages/Speech_Open_Banking.aspx.

services. Some industry experts find these discussions premature, arguing that demand for open banking has yet to be established.[335] Others emphasize the absence of mature legislative conditions,[336] while certain banks with large customer bases resist this due to concerns about losing clients.[337] Despite these constraints, the CBA emphasizes the importance of open banking to empower customers with greater choice, improve user experience, and foster financial inclusion.[338] In 2022, the CBA and the government of Armenia founded a joint body—the Information Systems Agency of Armenia (ISAA) —to create a national digital identity system, develop a national cybersecurity framework, and ensure data interoperability between private and public entities. These efforts aim to support broader country digitalization initiatives and pave the way for the introduction of relevant regulatory frameworks for open banking.[339]

Virtual assets and related activities remain unregulated in Armenia, similar to payment-related FinTech activities. This lack of regulation presents a two-sided risk. For consumers, the absence of clear rules translates to insufficient protection, exposure to fraud risks, and a lack of transparency in pricing.[340] Companies in this space also face challenges due to the unregulated environment, opting to operate in other countries with established regulations, resulting in missed opportunities for innovative digital services in Armenia. [341] The lack of regulation also allows virtual asset services to compete unfairly with traditional financial service providers who are subject to stricter oversight.[342] The anonymity of transactions and their cross-border nature heighten the potential for money laundering, terrorist financing, and tax avoidance.[343] In response to these risks, the CBA issued a cautionary statement in 2018, highlighting the inherent dangers in transactions involving virtual assets.[344] In May 2023, the CBA announced its intention to develop a comprehensive regulatory model for virtual assets. The CBA is currently working on a draft law that will adopt the "same activity, same risk, same regulation" principle for regulation of virtual assets, meaning that companies offering services similar to traditional financial activities will be regulated in the same way.[345]

3.1.5 CONSUMER PROTECTION

Armenia's financial sector has a comprehensive consumer protection framework. In 2007, the CBA established the Consumer Rights Protection and Financial Literacy (CRPFL) center,[346]responsible for crafting and amending legislation to protect consumer interests, enhance business conduct, and raise consumer awareness and financial literacy. The CRPFL center has several supervisory tools at its disposal, including on-site examinations of

335 Private sector interview by DECA team, February 2024, online.

336 Private sector interview by DECA team, January 2024, online.

337 Civil society, interview by DECA team, January 2024, online.

338 Conference on Open Banking and Open Financial Services. CBA.

339 Conference on Open Banking and Open Financial Services. CBA.

340 "Approaches of the Central Bank of RA regarding the issuance, regulation and control of circulation of virtual assets (crypto-assets)," CBA, accessed March 18, 2024, https://www.cba.am/AM/News/Pages/news_03112023.aspx?fbclid=IwAR0Xm23We4llY9k9fqjJ4mlJ92bpj3BYZa16Zn6gh-8pu5v_LQekKntMC5E#sthash.c84o0LQu.TSKedJOk.dpbs.

341 "Regulation of cryptocurrencies will make Armenia one of the primary markets of the region," B24, June 22, 2023, https://b24.am/crypto/366357.html.

342 Approaches of the Central Bank of RA. CBA.

343 Seda Ghukasyan, "Rustam Badasyan sees money laundering risks in crypto-asset transactions," Hetq, June 1, 2022, https://hetq.am/hy/article/145106.

344 "Cryptocurrency warning," Central Bank of Armenia (CBA), accessed March 18, 2024, https://www.cba.am/Storage/AM/downloads/warnings/կրիպտոակտիվներ.pdf.

345 "Approaches of the Central Bank of RA regarding the issuance, regulation and control of circulation of virtual assets (crypto-assets)," Central Bank of Armenia (CBA), accessed March 18, 2024. https://www.cba.am/AM/News/Pages/news_03112023.aspx?fbclid=IwAR0Xm23We4llY9k9fqjJ4mlJ92bpj3BYZa16Zn6gh-8pu5v_LQekKntMC5E#sthash.c84o0LQu.TSKedJOk.dpbs.

346 "Market Conduct Supervision in Small Countries: The Case of Armenia," The World Bank, March 2013, https://documents1.worldbank.org/curated/en/705941482405080990/pdf/111266-BRI-MarketConductSupervisioninSmallCountriesArmenia-PUBLIC-ABSTRACT-SENT.pdf.

financial service providers, monitoring the content of their websites, and verifying disclosures of financial institutions. Some activities are formalized and conducted on a regular basis, while others are ad hoc, responding to requests from the CBA or to consumer feedback.[347] In 2022, the CBA took a major step to enhance disclosure practices for DFS. Working in close collaboration with the private sector (banks, insurance companies, and mobile network operators), the CBA adapted existing provisions to align with the specific needs of DFS. A code of conduct was developed for DFS providers, mandating clear communication practices and information disclosure, including verbal explanations prior to agreements, multi-channel communication strategies, and detailed descriptions of terms, conditions, prices, and policies for changes.[348]

In 2008, the Government of Armenia introduced the Institute of the Mediator of the Financial System (MFS). This body offers independent and alternative dispute resolution for citizen conflicts with financial organizations at no charge. The MFS operates in accordance with European Commission Directives and international best practices, following principles outlined by the International Network of Financial Ombudsman (INFO Network). Recognizing the importance of financial education in consumer protection, the MFS also implements the "Financial Education and Awareness Raising" program, aiming to foster competent and protected consumers in the financial market. Activities include courses for schoolchildren and students, summer camps with educational games and competitions, moot courts, and other engaging formats.[349]

These regulations and institutional arrangements have a growing impact on consumer protection. In the early 2010s, the FSM received nearly 1,500 complaints annually. In 2023, this number reached 23,000.[350] The complaints are primarily related to insurance, lending, and payment services, however, digitalization of the financial system introduces new risks like online fraud, identity theft, and cyber crime. Even though regulations and institutions exist, interviewed experts highlighted the importance of digital upskilling alongside these measures to enhance consumer protection in emerging DFS.[351] A representative from the Union of Banks highlighted the importance of non-governmental organizations (NGOs) leading consumer rights protection initiatives to encourage consumer engagement with existing institutions and ensure stronger rights protections.[352]

The rising number of complaints indicates a growing awareness among consumers. However, the emergence of new DFS poses new risks, highlighting the need for adaptation of protection measures and the upskilling of digital skills in this area.

3.1.6 CYBERSECURITY

The financial sector maintains a relatively strong level of cybersecurity compared to other industries.[353] The CBA implements robust cybersecurity measures, including mandatory penetration tests, vulnerability assessments, and IT audits. Its dedicated supervisory department ensures that financial institutions consistently comply with cybersecurity requirements. The CBA collaborates with the financial sector, telecom operators, and educational institutions on its annual CyberGEN conference. This event features world-renowned cybersecurity experts from companies such as Mandiant/Google, Chainalysis, SimSpace, and Group-IB, promoting knowledge-sharing

347 Market Conduct Supervision in Small Countries. The World Bank.

348 "Policy Model on Consumer Protection for Digital Financial Services," AFI, 2020, https://www.afi-global.org/sites/default/files/publications/2020-11/AFI_CEMC%2BDFS_PM_AW3_digital.pdf.

349 "Who We Are," Financial System Mediator, March 18, 2024. https://fsm.am/en/about-us.

350 "News and Reports," Financial System Mediator (FSM), n.d., https://fsm.am/en/news-reports#reports .

351 Private sector organization, interview by DECA team, January 2024, online. Public sector agency, interview by DECA team, January 2024, online.

352 Civil society, interview by DECA team, January 2024, online.

353 Public sector agency, interview by DECA team, January 2024, online. Three private sector representatives, interview by DECA team, January 2024, online. Civil society organization, interview by DECA team, January 2024, online.

and capacity-building within the financial system.[354] The CBA's "Financial Education Program" includes cybersecurity education for DFS users, aiming to enhance consumer awareness. It also has a specialized program addressing current cybersecurity concerns for target groups such as schoolchildren and career army officers. Financial institutions make cybersecurity a high priority with dedicated cybersecurity departments. Some employ internal teams that simulate attacks and defenses to proactively strengthen their systems.[355]

The financial sector has strong protections, but increased digitalization poses mounting threats. The Investigative Committee of Armenia reports that in 2022, the number of cyberattacks reached 674, with 67.2 percent targeting financial assets. Common cyber criminal acts include ATM jackpotting, carding, skimming, phishing, ransomware, and DDoS attacks. Compared to 348 cyber criminal acts in 2021 and 209 in 2020, this represents a significant rise, highlighting the critical need to review or introduce new data- and consumer-protection laws, and to continually strengthen cybersecurity systems.[356] ISAA's role becomes even more crucial in this context, as it works to mitigate these threats and ensure a secure digital environment for Armenia's growing digital economy.

3.2 E-COMMERCE AND DIGITAL TRADE

Armenia's e-commerce sector is experiencing strong growth, yet SME adoption of e-commerce remains low due to awareness gaps, limited digital skills, and logistical challenges. Armenia shows strong preparedness for cross-border digital trade, although consumers have limited access to global courier services due to high costs. Armenia's postal and courier sectors are growing, led by Haypost's role in e-commerce development. Challenges persist in global connectivity and a lack of shared resources among e-commerce platforms, causing high delivery costs and delays. Armenia also faces deficiencies in consumer rights protection and enforcement mechanisms, leaving consumers vulnerable to unfair business practices and undermining the full potential of e-commerce in Armenia.

3.2.1 MARKET OVERVIEW

E-commerce has experienced significant growth in recent years, driven by factors such as increased internet penetration, advancements in payment systems, and improved logistics and delivery services. (See Figure 17.)[357] The COVID-19 pandemic accelerated e-commerce adoption as more people turned to online shopping during widespread shutdowns. While official statistics on e-commerce are not available, proxy estimates from the CBA's data on transactions for buying goods and services through virtual PoS terminals suggest a substantial increase. In 2023, the total e-commerce market in Armenia reached 446.1 billion Armenian drams or 4.7 percent of GDP, a significant rise compared to 1.0 percent pre-pandemic.[358] The number of e-commerce transactions reached 76.8 million in 2023, up from 9.0 million in 2020.[359] These numbers may underestimate the current volume of e-commerce, given that a portion of payments occurs in cash or through bank account transfers.

354 "Armenia hosted the participants of the second international cyber security conference "CyberGEN 2023"," Central Bank of Armenia (CBA), accessed March 18, 2024, https://www.cba.am/am/news/Pages/Cybergen_2023.aspx#sthash.5nY7tKTH.dpbs.

355 Private sector organization, interview by DECA team, January 2024, online.

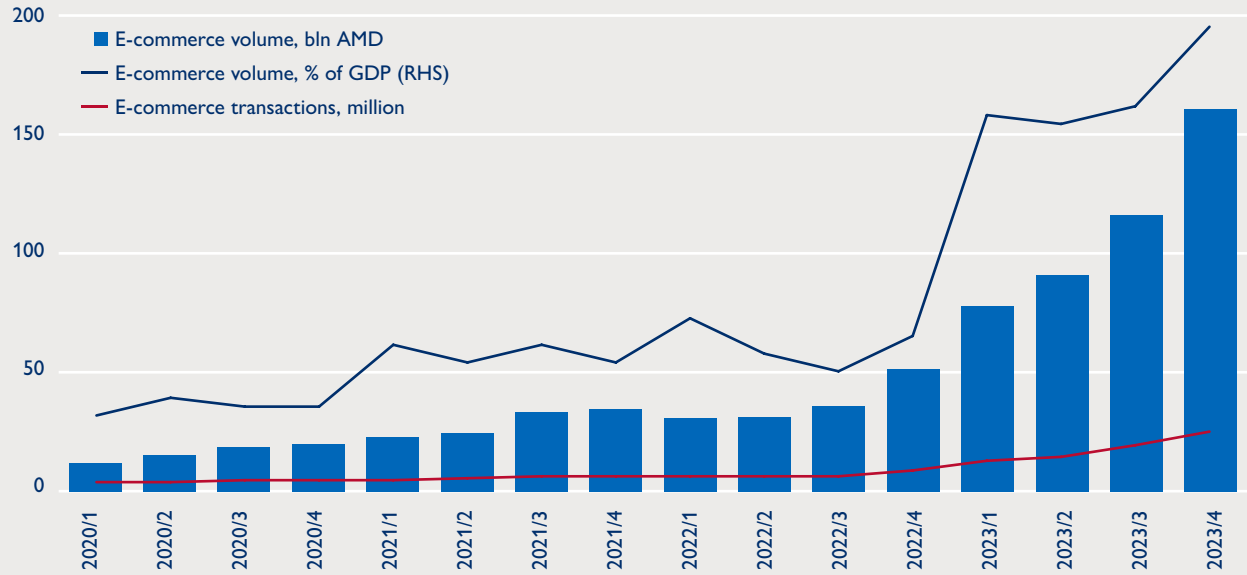
356 "Cyber crimes have increased in Armenia," Aliq Media, February 14, 2023, https://www.aliqmedia.am/2023/02/14/103477/.

357 "Recommendations of logistics support mechanism for SMEs in Armenia," EBRD, May 2023, https://drive.google.com/file/d/1c360XEMhgPKUzKmoq_eyLOU_qrRj7xyC/view.

358 "Payment System Statistical Data and Reports," Central Bank of Armenia (CBA), n.d., https://www.cba.am/EN/SitePages/psstatisticaldatareports.aspx.

359 Payment System Statistical Data. CBA.

FIGURE 17: E-Commerce trends in Armenia[360]



Source: Based on CBA Statistics

Armenia's e-commerce market is largely built on fashion, groceries, travel, electronics, and appliances, with purchases happening mainly on intermediary platforms and business websites. In 2022, the CBA and Visa collaborated on a survey of 1,000 e-commerce users to gain insights into their experiences. The survey revealed fashion (67.2 percent), groceries (28.9 percent), travel (22.5 percent), electronics (21.3 percent), and home appliances (18.7 percent) as the most popular product categories. Domestic e-commerce takes place primarily on online platforms (e.g. List, Menu, Glovo, Buy) that act as intermediaries between buyers and sellers. Online platforms are used by 31.5 percent of respondents. A significant portion of transactions occur through specialized business websites (e.g., Sas, Yerevan City, and Vega), designed for their specific offerings and used by 19.8 percent of respondents. Trade through social networks (e.g. Facebook, Instagram, and TikTok) is also evident, though their volumes remain relatively limited, with only 2.8 percent of respondents utilizing these networks for e-commerce.[361]

E-commerce in Armenia favors businesses in the capital, Yerevan, and larger companies, leaving regional areas and smaller firms behind. The market is heavily focused on business-to-consumer sales (B2C), while business-to-business (B2B) and business-to-government (B2G) sectors remain less developed. In 2023, the National Statistical Committee of Armenia (Armstat), in collaboration with the World Bank and Ecogeneration, surveyed 2,000 enterprises to assess e-commerce adoption. The findings of this survey are presented below in Table 3, showcasing low levels of e-commerce adoption among enterprises and a large disparity in adoption between regions and Yerevan. The results also show that adoption varies significantly by enterprise size.

360 Payment System Statistical Data. CBA.

361 "Results of Research in the Field of E-Commerce," Competition Protection Commission (CPC), 2022, https://competition.am/wp-content/uploads/2023/02/E-Trade.pdf.

TABLE 3: E-commerce adoption among Armenian enterprises (2022)

E-COMMERCE ADOPTION	12 percent
DISPARITY: YEREVAN VS. REGIONS	14 percent (Yerevan) vs. 7 percent (Regions)
REVENUE SHARE FROM ONLINE SALES	31 percent
SALES CHANNELS	67.5 percent (Own website/app) vs. 35.5 percent (Third-party platforms)
SALES BY REGION	80 percent (Domestic), 6 percent (EAEU), 3 percent (EU), 13 percent (Other)
E-COMMERCE TYPE	68 percent (B2C) vs. 32 percent (B2B/B2G)
ADOPTION BY ENTERPRISE SIZE	7 percent (1-9 employees), 10 percent (10-49 employees), 21 percent (50-249 employees), 23 percent (250+ employees)

Source: Statistical Committee of Armenia (Armstat), "Survey on ICT Usage and E-Commerce in Enterprises," 24 November, 2024.

Several factors contribute to low e-commerce adoption among SMEs[362]. Firstly, there is low awareness regarding the full potential of e-commerce-enabling technologies and services. Secondly, limited digital skills prevent many entrepreneurs from effectively building online stores, managing digital payments, and using marketing tools.[363] SMEs are also more vulnerable to logistical constraints, as they typically ship smaller quantities of goods than large enterprises and therefore cannot benefit from the economies of scale enjoyed by larger shippers when negotiating rates with logistics providers.[364] A significant network of support services is available to SMEs to address these issues. Companies such as Ucraft offer services to help SMEs establish an online presence by building websites, creating logos, and integrating e-commerce solutions. However, these efforts are often undermined by a lack of skills among owners when it comes to expanding market outreach and customer acquisition.[365]

3.2.2 E-COMMERCE INFRASTRUCTURE

The e-commerce sector is enhancing its infrastructure and logistics capacities, but limited collaboration among e-commerce platforms hinders efficient deliveries to outlying regions. Experts attribute this limited collaboration to a lack of awareness about shared infrastructure practices and coordination frictions among e-commerce platforms and other stakeholders.

Armenia's postal and courier service sectors are experiencing significant growth, as demonstrated by an increasing number of licensed companies operating in the field (from 24 in 2012 to 84 in 2023).[366] Haypost, the national postal operator, plays a pivotal role in the development of e-commerce infrastructure. In 2021, the company introduced the "Fulfillment Business" service, providing SMEs with a suite of e-commerce solutions,

362 "On State Support of Small and Medium Enterprises," Armenian Legal Information System (ARLIS), October 29, 2010, https://www.arlis.am/DocumentView.aspx?docid=61938. According to Armenian law, a small business is defined as having less than 50 employees and income or asset value not exceeding 500 million AMD. A medium business is defined as having less than 250 employees and an income of less than 1500 million AMD.

363 Private sector organization, interview by DECA team, January 2024, online.

364 "Analysis of Main Cargo and Logistics Routes of Armenia," EBRD, April 2023, https://mineconomy.am/en/news/3006

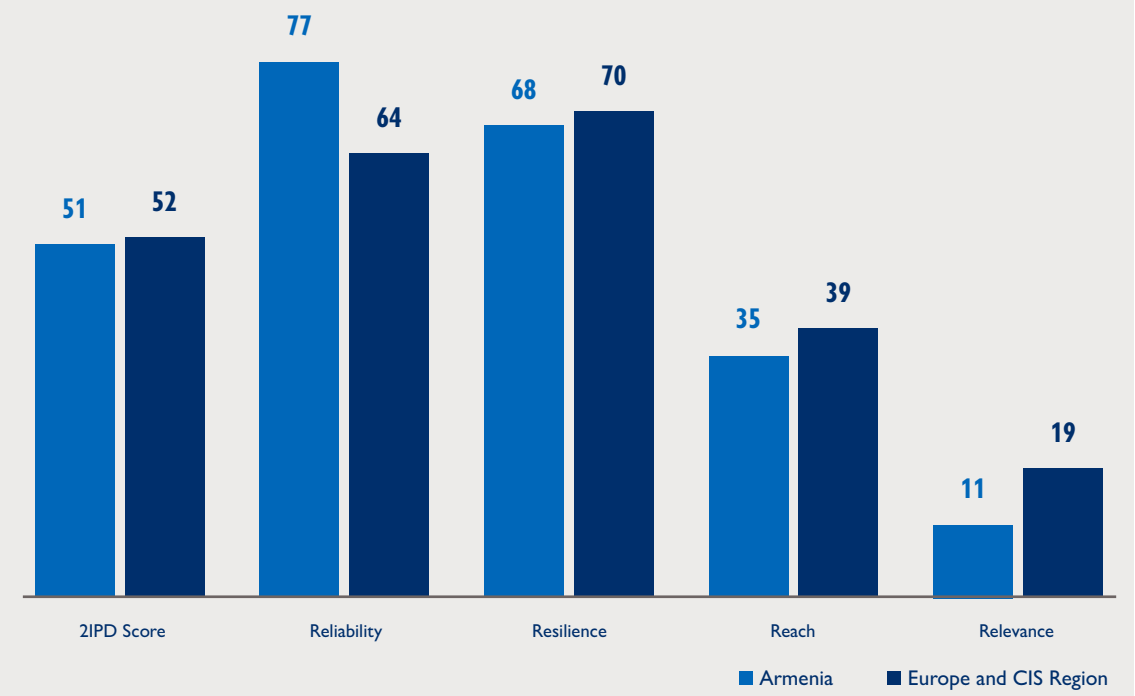
365 Private sector organization, interview by DECA team, January 2024, online.

366 "Postal communication activity license," Ministry of High-Tech Industry (MHTI), accessed March 18, 2024. https://hightech.gov.am/hy/services/license-for-postal-communication-activity

including storage, visual content creation, packaging, and shipping services.[367] Haypost expanded its reach in 2022 with PostMarket, an online platform offering delivery of more than 4,500 goods across Armenia.[368]

This progress is reflected in the Universal Postal Union's (UPU) 2022 report, showing that Armenia substantially advanced its postal development with an integrated index of 51.5. This places Armenia on par with European and CIS regional averages and marks an impressive climb from 80th to 48th in global rankings among 172 countries.[369] The evaluation of postal development is based on four dimensions: global outreach, reliability, relevance, and resilience. Armenia has demonstrated commendable performance in terms of reliability and resilience to economic, social, technological, and environmental shocks. Enhancing the country's postal connectivity worldwide (the "relevance" assessment, Figure 18) remains a challenge. The Ministry of High-Tech Industry (MHTI) is currently working on a draft concept with the goal of improving the accessibility, affordability, quality, and diversity of postal services.[370]

FIGURE 18: Integrated Index for Postal Development (2IPD)[371]



Source: Universal Postal Union (UPU), Postal Development Report 2022.

Despite advancements in postal infrastructure and Haypost's expansive network of more than 850 collection points, e-commerce platforms demonstrate limited use of these services. The independent operations of e-commerce platforms in Armenia pose a critical risk to the sector, as a lack of collaboration places limitations on delivery infrastructure. Some companies like Onex collaborate with Haypost for last-mile deliveries, but this practice is not widespread, impeding the potential for shared resources such as storage facilities, distribution

367 "Fulfillment business postal service," Haypost, accessed March 18, 2024. https://www.haypost.am/am/corporate-services/-Fulfillment-business-mail-service-.

368 "The largest e-commerce platform in Armenia," Haypost, accessed March 18, 2024. https://www.postmarket.am/what-is-postmarket.

369 "Postal Development Report 2022," Universal Postal Union (UPU), October 07, 2022, https://www.upu.int/en/Publications/2IPD/Postal-Development-Report-2022.

370 "On approving the concept of development of the postal sector and the schedule of implementation of measures arising from the concept," Website for the Publication of Legal Acts, April 14, 2022, #contact#concept#mail#postal: https://www.e-draft.am/ru/projects/4174.

371 "Postal Development Report," Universal Postal Union, October 7, 2022 https://www.upu.int/en/Publications/2IPD/Postal-Development-Report-2022.

centers, and transportation infrastructure.[372] Consequently, the delivery costs to regions are high, and delivery times extend to 3-5 business days. There is a lack of adoption of digital tools such as the Internet of Things (IoT) for real-time tracking, further complicating user experiences. The reasons for this missed potential are twofold. There is a limited understanding among businesses regarding the benefits of shared infrastructure models, such as cost reduction, expanded market reach, and logistical efficiency. Some experts stated that frictions that occur among collaborators are a major obstacle, stemming from differing priorities of potential partner companies. Nonetheless, interviewed representatives of the e-commerce sector expressed openness to engage in such projects if specific initiatives, such as collaboration platforms and incentive schemes, are implemented. [373]

In the payment landscape, consumers benefit from a wide range of options, including card payments (such as ArCa, Visa, and Mastercard), bank transfers, digital wallets, cash, and, since 2022, Apple Pay and Google Pay. According to the joint survey by CBA and Visa, 60 percent of respondents favor bank cards for payments, 17 percent choose cash on delivery, 13 percent opt for Apple Pay or Google Pay, and 10 percent explore other payment methods.[374] A main challenge in the payment landscape is the limited ability for exporters to receive payments from abroad. Due to PayPal's partial operation in Armenia (i.e. permitting outgoing transfers but not incoming transfers), businesses engaged in export must rely on alternative payment methods like wire transfers, Wise, and Payoneer, which can be less convenient and have lower acceptance in other countries.

3.2.3 CONSUMER PROTECTION IN E-COMMERCE

Armenia's current approach to e-commerce regulation emphasizes broad legal frameworks over a dedicated e-commerce law. The Parliament adopted a legal package on specific e-commerce regulations on June 17, 2016, including amendments and additions to core legal acts like the Civil Code,[375] the Law on Trade and Services,[376] and the Law on Consumer Rights Protection.[377] The government has since introduced several other measures addressing electronically signed contracts[378] and deceptive discount practices.[379] This fragmented approach creates significant gaps in the overall regulation of e-commerce, particularly in the area of online marketplaces. (See Box 5.) Consequently, consumer protection remains inadequate and weak enforcement mechanisms limit the effectiveness of existing regulations.[380]

372 Private sector interview by DECA team, January 2024, online.

373 Two private sector organizations, interviews by DECA team, January 2024, online.

374 "Results of Research in the Field of E-Commerce," Competition Protection Commission (CPC), 2022, https://competition.am/wp-content/uploads/2023/02/E-Trade.pdf.

375 "On Making Additions and Changes to the Civil Code of the Republic of Armenia Amendments and Additions to the Civil Code," Armenian Legal Information System (ARLIS), July 17, 2016, https://www.arlis.am/DocumentView.aspx?docid=107091.

376 "On Amendments to the Law of the Republic Of Armenia "On Trade and Services"," Armenian Legal Information System (ARLIS), July 17, 2016, https://www.arlis.am/DocumentView.aspx?docid=107095.

377 "On the Protection of Consumer Rights," Armenian Legal Information System (ARLIS), June 17, 2016, https://www.arlis.am/documentview.aspx?docID=67148.

378 On Trade and Services. ARLIS.

379 On Trade and Services, ARLIS.

380 "Recommendations Proposed for E-Commerce Environment Harmonisation in the Eastern Partnership Countries: Republic of Armenia," EU4Digital, January 13, 2021, https://eufordigital.eu/wp-content/uploads/2021/04/eCommerce-report-%E2%80%93-Recommendations-proposed-for-eCommerce-environment-harmonisation-in-the-EaP-countries-Republic-of-Armenia.pdf.

BOX 5: Major legal gaps in e-commerce consumer protection

Requirements for distance contracts: EU Directive 2011/83, Article 6, mandates specific information requirements for distance contracts between traders and consumers. These requirements include important details such as the trader's geographical address, the main characteristics of the goods or services, the cost of returning goods in case of withdrawal, and other pertinent information.[381] Armenian legislation lacks specific information requirements for online contracts, leaving consumers vulnerable to misleading information from online sellers.[382]

Misleading paid advertisement: EU Directive 2005/29/EC, Annex 1, prioritizes transparency in online search results. E-commerce platforms paying for higher product rankings must clearly disclose this to consumers, including both direct and indirect payments to search providers.[383] In contrast, Armenia's legislation lacks these protections, meaning that consumers can easily confuse paid advertisements with genuine search results, potentially leading to uninformed purchasing decisions.[384]

Delivery of purchased goods: EU Directive 2011/83, Article 18, establishes clear consumer protection regarding delivery timelines in distance contracts. It mandates delivery within 30 days from the conclusion of the contract, or within an additional reasonable time frame agreed upon with the consumer if there is a delay. Armenia's legislation lacks this specific time frame for online purchases. This absence of a guaranteed delivery window undermines consumer trust, as they have no assurance about how long they might wait to receive their goods.[385]

Omissions about consumer reviews: EU Directive 2019/2161, Article 6, requires online stores to disclose whether they have systems in place to verify if reviews originate from customers who have used the product.[386] This transparency includes details on how reviews are processed and whether all reviews, either positive or negative, are displayed. Armenian legislation lacks similar requirements, leaving local consumers vulnerable to misleading reviews, potentially influencing their purchasing decisions based on inaccurate information. [387]

Security of networks and information systems: EU Directive 2016/1148, Article 16, establishes security requirements for networks and information systems to protect the integrity of online services. This includes risk management measures and timely reporting of security incidents.[388] Armenia's legislation lacks comparable regulations for online marketplaces, meaning that providers are not legally obligated to implement specific technical safeguards for user data. Additionally, they are not required to notify the relevant authorities in cases of significant security breaches. This absence of requirements creates potential vulnerabilities within Armenia's online marketplaces, leaving user information exposed. [389]

In addition to these legal gaps, Armenia faces significant enforcement issues in e-commerce consumer protection. Firstly, the country lacks an independent alternative dispute resolution (ADR) procedure specifically tailored

381 "Directive 2011/83/EU," Official Journal of the European Union, October 25, 2011, https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:304:0064:0088:en:PDF.

382 "Recommendations Proposed for E-Commerce Environment Harmonisation in the Eastern Partnership Countries: Republic of Armenia," EU4Digital, January 13, 2021, https://eufordigital.eu/wp-content/uploads/2021/04/eCommerce-report-%E2%80%93-Recommendations-proposed-for-eCommerce-environment-harmonisation-in-the-EaP-countries-Republic-of-Armenia.pdf.

383 "Directive 2005/29/EC," Official Journal of the European Union, May 11, 2005, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02005L0029-20220528&from=EN.

384 "Recommendations Proposed for E-Commerce Environment Harmonisation in the Eastern Partnership Countries: Republic of Armenia," EU4Digital, January 13, 2021. https://eufordigital.eu/wp-content/uploads/2021/04/eCommerce-report-%E2%80%93-Recommendations-proposed-for-eCommerce-environment-harmonisation-in-the-EaP-countries-Republic-of-Armenia.pdf.

385 Recommendations Proposed for E-Commerce Environment Harmonisation. EU4Digital.

386 "Directive 2019/2161/EU," Official Journal of the European Union, October 27, 2019, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L2161.

387 Recommendations Proposed for E-Commerce Environment Harmonisation. EU4Digital.

388 "Directive 2016/1148/EU," Official Journal of the European Union, July 6, 2016, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016L1148.

389 Recommendations Proposed for E-Commerce Environment Harmonisation. Eu4Digital.

for e-commerce disputes. This means that consumers have limited options for resolving issues quickly and without resorting to costly and time-consuming court proceedings. Armenia lacks a designated body responsible for enforcing consumer rights protection in the field of e-commerce. While some government agencies are responsible for issues like food safety[390] and quality control of non-food products,[391] Armenia lacks a specific body responsible for addressing consumer rights violations within online marketplaces and e-commerce stores. Even if some legal aspects are in place, consumers may face difficulties in real life when it comes to applying these laws.[392]

3.2.4 CROSS-BORDER DIGITAL TRADE

Armenia is prepared for cross-border digital trade but could lower costs through full alignment with implementation of the World Trade Organization (WTO) Trade Facilitation Agreement (TFA). International shipping rates remain high, leading to reliance on local logistics companies for access to global e-commerce platforms and the growth of local offices of Russian e-commerce platforms. Exporters encounter challenges in using global marketplaces due to high costs and delivery delays.

Armenia has been a member of the EAEU since 2015, with all cross-border trade matters regulated by the Union's Customs Code.[393] In 2021, the EAEU Commission approved a roadmap designed to create favorable conditions for digital trade within EAEU countries. In 2023, additional amendments to the EAEU Customs Code related to cross-border digital trade were approved. These amendments aim to introduce e-commerce operators to manage customs procedures and provide customer support. They also aim to simplify online purchase declarations to expedite imports and enable the use of "bonded" warehouses (facilities where imported goods can be stored without immediate payment of duties) for individual sales.[394] Armenia also holds a Comprehensive and Enhanced Partnership Agreement (CEPA) with the EU, which establishes the legal framework for EU-Armenia trade relations, regardless of Armenia's membership in the EAEU.[395] CEPA has significant importance for Armenia's digital trade as it aims to streamline digital customs, among other goals, potentially reducing red tape for e-commerce. It also opens access to new markets by allowing local companies to participate in EU procurement markets, while envisioning a stronger emphasis on consumer protection issues such as product safety, supply chain security, intellectual property rights, and the fight against fraud.[396]

According to the UN Global Survey on Digital and Sustainable Trade Facilitation, Armenia demonstrates strong preparedness for digital trade, scoring 75.3 in 2023. (See Figure 19.)[397] This score is above the global average of 63.1, but it falls slightly below the regional average of 79.5 for Caucasus and Turkey. There are notable gaps in institutional arrangements and cooperation, particularly regarding issues such as cooperation among national border agencies, as well as alignment of working days and formalities at border crossings. Digital trade facilitation

390 The Food Safety Inspection Body, accessed March 18, 2024, https://www.snund.am/hy.

391 Market Surveillance Inspection Body, accessed March 18, 2024. https://www.gov.am/en/bodies-under-government/28/.

392 Private sector organization, interview by DECA team, January 2024, online.

393 "On the Customs Code of the Eurasian Economic Union Customs Code," Armenian Legal Information System (ARLIS), April 4, 2017, https://www.arlis.am/documentview.aspx?docid=120290.

394 "Amendments made to EAEU Customs Code with regard to foreign trade regulation," Eurasian Economic Council (EEC), December 25, 2023, https://eec.eaeunion.org/en/news/vneseny-izmeneniya-v-tamozhennyy-kodeks-eaes-v-chasti-regulirovaniya-vneshney-torgovli.

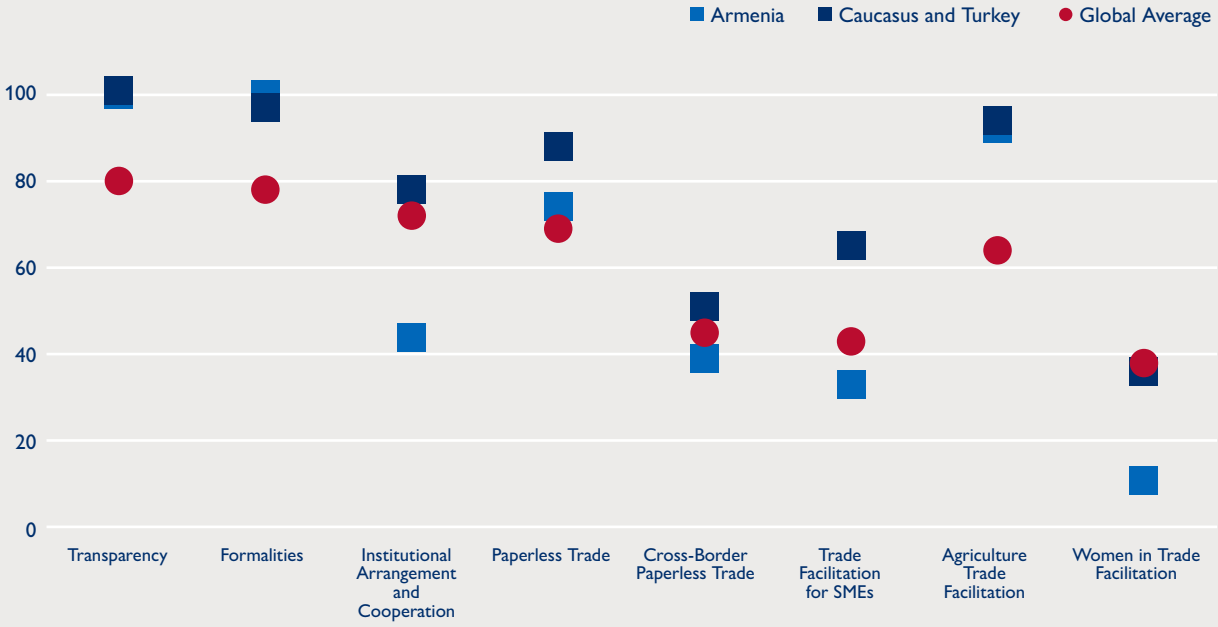
395 "Joint Proposal for a Council Decision on the conclusion, on behalf of the European Union, of the Comprehensive and Enhanced Partnership Agreement between the European Union and the European Atomic Energy Community and their Member States, of the one part and the Republic of Armenia, of the other part," Council of the European Union, September 25, 2017, https://www.eeas.europa.eu/sites/default/files/eu-armenia_comprehensive_and_enhanced_partnership_agreement_cepa.pdf.

396 "Comprehensive and enhanced Partnership Agreement between the European Union and the European Atomic Energy Community and their Member States, of the one part, and the Republic of Armenia, of the other part," EUR-Lex, January 1, 2018, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:22018A0126(01).

397 "Digital and Sustainable Trade Facilitation," UN Global Survey on Digital and Sustainable Trade Facilitation, 2021, https://www.untfsurvey.org/economy?id=ARM.

offers significant opportunities to reduce trade costs, according to various estimates. Full implementation of the WTO TFA, along with cross-border paperless trade initiatives, could lead to trade cost reductions of up to 28 percent, substantially higher than the 12 percent reduction achievable through basic TFA compliance.[398]

FIGURE 19: Digital and sustainable trade facilitation[399]



Source: UN Global Survey on Digital and Sustainable Trade Facilitation, 2023

Many international parcel delivery companies such as FedEx, DHL, and UPS have representation in Armenia. However, given the small market size and the logistical constraints, these companies charge higher rates in Armenia than in other countries, limiting their ability to reach a wider customer base.[400] Consequently, consumers in Armenia rely primarily on intermediary companies such as Globbing, Onex, and Shipex to bridge the gap between international giants like Amazon, Walmart, Ebay, and local consumers. These companies are actively investing in digital solutions, including "Buy for Me" services (where consumers can provide a product link online and the company will purchase it on their behalf) and the use of smart lockers for convenient pickup of orders.[401] An emerging trend involves reliance on local offices of Russian firms Wildberries and Ozon, which offer convenient delivery options to widespread locations throughout Armenia while simultaneously providing local businesses with the opportunity to export their products to different countries within the EAEU region. It is not common for exporters to use global marketplaces to sell cross-border due to higher logistics costs and longer delivery, cash-on-delivery preference, and poor awareness. Global marketplaces are not directly available in Armenia, due to the market size, and global logistics players that are in the market struggle to maintain high volumes, with implications for delivery time and cost.[402]

398 "Readiness Assessment for Cross-Border Paperless Trade: Armenia," UNESCAP, 2019, https://www.unescap.org/sites/default/files/ARM-CBPT%20Readiness-FINAL%204.0.pdf.

399 "Trade Facilitation and Paperless Trade in Armenia, UN Global Survey on Digital and Sustainable Trade Facilitation," 2023 https://www.untfsurvey.org/economy?id=ARM.

400 EU4Digital, "Recommendations Proposed for E-Commerce Environment Harmonisation in the Eastern Partnership Countries: Republic of Armenia," EU4Digital, January 13, 2021, https://eufordigital.eu/wp-content/uploads/2021/04/eCommerce-report-%E2%80%93-Recommendations-proposed-for-eCommerce-environment-harmonisation-in-the-EaP-countries-Republic-of-Armenia.pdf.

401 Private sector organization, interview by DECA team, January 2024, online.

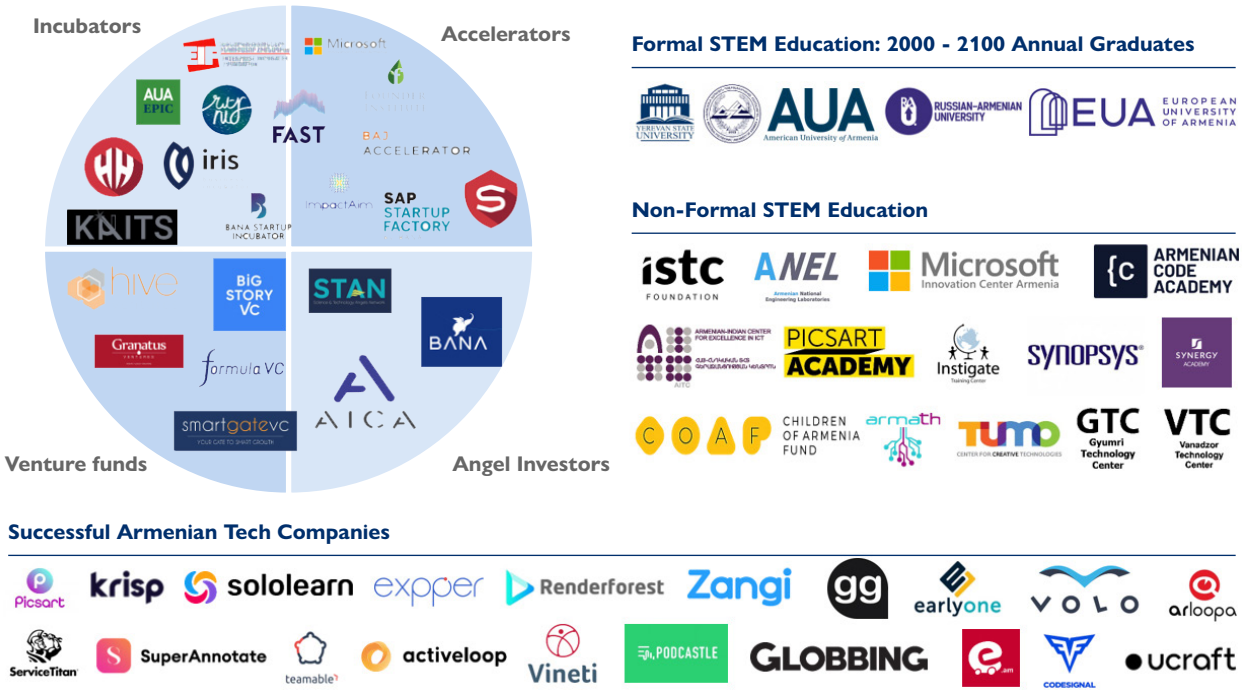
402 "Recommendations Proposed for E-Commerce Environment Harmonisation in the Eastern Partnership Countries: Republic of Armenia," EU4Digital, January 13, 2021, https://eufordigital.eu/wp-content/uploads/2021/04/eCommerce-report-%E2%80%93-Recommendations-proposed-for-eCommerce-environment-harmonisation-in-the-EaP-countries-Republic-of-Armenia.pdf.

3.3 TECH STARTUP ENVIRONMENT

Armenia's legacy of engineering talent, strong diaspora involvement, and government support powers a supportive enabling environment for startups. Two indices which measure the quality and capacity of startup ecosystems globally, StartupBlink and the Global Innovation Index, rank Armenia 57th out of 100 countries (quality) and 72nd out of 132 economies (capacity of startup ecosystems), respectively. Armenia's incubators and accelerators provide training, mentorship, and networking opportunities.

Many programs focus on participation numbers rather than on long-term business viability, leading to nonviable startups persisting in the ecosystem. Armenia's startup ecosystem also lacks strong collaboration with international accelerators, hindering the ability of startups to scale globally and enter new markets. Positive strides have been made through the establishment of venture capital funds and angel networks, but the scarcity of venture capital, especially for Series A and subsequent funding rounds, compels startups to seek investments abroad. Infrastructure support is more geared toward projects in their early stages, with limited opportunities available for those reaching maturity.

FIGURE 20: Armenian Technology Ecosystem



Source: DECA team's own research

3.3.1 ECOSYSTEM OVERVIEW

Armenia's tech startup environment has seen significant growth in recent years. This expansion is often attributed to the country's strong engineering and intellectual legacy dating from the Soviet era, active diaspora engagement, supportive government policies, and most recently, an influx of startup talent from Russia.[403] (See Armenia's startup ecosystem in Figure 20.)

The Armenian government is committed to building a vibrant startup ecosystem. In 2014, the government passed exemptions from profit tax and VAT on exports for HTI-accredited startups as well as a reduced

403 Nune Zadoyan, "The Armenian Venture Capital Landscape and Beyond," EVN Report, April 27, 2023, https://evnreport.com/creative-tech/the-armenian-venture-capital-landscape-and-beyond/.

personal income tax rate of 10 percent (compared to the standard 20 percent).[404] Some 1,633 companies and individual entrepreneurs received certificates of privilege in 2023, and a total of 4,133 beneficiaries have received these certificates since the law came into force.[405] Beyond tax breaks, the government has established two free economic zones—Alliance and ECOS—designed to attract startups in electronics, engineering, pharmaceuticals, biotechnologies, information technologies, alternative energy, artificial intelligence (AI), and industrial design. In 2018, the Engineering City was founded as a public-private partnership between the World Bank, the GoA, and private companies. This high-tech incubator provides resident companies—currently numbering 14—with access to land for building offices, advanced equipment, research and prototyping labs, and production facilities.[406]

Armenia has also received an influx of technology talent following Russia's invasion of Ukraine in February 2022. Between March 2022 and February 2023, Armenia registered around 1,040 non-resident companies and 3,900 individual entrepreneurs—primarily from Russia—in its thriving tech sector.[407] This influx of foreign professionals has further energized Armenia's tech environment, creating opportunities for higher productivity, knowledge-sharing, and specializations previously less common in the country (e.g., gaming).[408] (Refer to Box 6 for examples of Armenian tech success stories.)

BOX 6: Armenian tech success stories

Picsart is a photo and video editing platform. The company's user-friendly interface and wide range of features have propelled its massive global popularity, gaining it standing in the unicorn club in August 2021 after a substantial Series C funding round valued the company at over USD 1 billion.

ServiceTitan is a software platform designed to provide cloud-based solutions for home and commercial service businesses. The company's impressive growth trajectory led to its unicorn valuation in November 2018, following a Series D funding round that exceeded USD 165 million.

Krisp is an AI-based audio processing software company that provides real-time noise and voice suppression technology. Krisp earned a spot on TIME's list of the 100 best Inventions of 2020. In July 2020, Discord integrated Krisp's audio-filtering noise suppression technology into its mobile app.

SoloLearn is an interactive learning platform designed to make coding accessible and fun. The platform offers courses in various programming languages, breaking complex concepts into bite-sized lessons and gamified challenges.

The Armenian diaspora has been a catalyst in building Armenia's tech sector. Diaspora representatives have financed promising startups through various channels including angel investments[409,410]and have transferred knowledge in areas like business, sales, and marketing. This knowledge-sharing, coupled with global networking opportunities, has enabled many Armenian startups to commercialize their ideas and achieve international

404 "On State Support in the Sector of Information Technologies," Armenian Legal Information System (ARLIS), December 17, 2014, https://www.arlis.am/documentview.aspx?docid=130329.

405 "Activity Report 2023 of the Ministry of High-Tech Industry (MHTI)," The Prime Minister of the Republic of Armenia, December 7, 2023, https://www.primeminister.am/en/press-release/item/2023/12/07/Nikol-Pashinyan-meeting/.

406 Joseph Dagdigian, "An Engineering City in Armenia," Asbarez, March 23, 2023, https://asbarez.com/an-engineering-city-in-armenia/.

407 First Review Under the Stand-By Arrangement and Request for Modifications of Performance Criteria and Monetary Policy Consultation Clause-Press Release," International Monetary Fund (IMF), June 13, 2023. https://www.elibrary.imf.org/view/journals/002/2023/205/article-A001-en.xml.

408 Private sector organization, interview by DECA team, January 2024, online.

409 Private sector organization, interview by DECA team, January 2024, online.

410 "Assessment and Market Mapping of the Information and Communication Technology Sector in Armenia," ADB, November 2023, https://www.adb.org/sites/default/files/project-documents/54148/54148-001-tacr-en.pdf.

success.[411] The Armenian diaspora has raised Armenia's global profile through organizing major tech events. Despite these contributions, interviewees noted that the diaspora's potential may remain underutilized due to a lack of systematic policy support and "engagement infrastructure" such as mechanisms to connect diaspora experts with national stakeholders.[412]

Despite the private and public sector commitments described above, R&D investments have lagged behind infrastructure investments. In 2022, the country spent around 0.5 percent of its GDP on R&D activities. This represents a significant increase from Armenia's typical 0.2 percent spending during the past decade, but it still falls well below the global average of 2.7 percent. There is little information on private sector investment in R&D, though a UNECE (2023) report indicates that it comprises 16.7 percent of total R&D spending.[413] Most private sector R&D is conducted by foreign firms and a few large domestic companies. The industry has persuaded the government to introduce R&D-related tax incentives to address this gap, but concerns about tax administration and potential tax leakages due to misclassification of expenses as R&D continue to impede progress in this area.[414] R&D activities in Armenia are impeded by insufficient cooperation between tech companies and universities. There are examples of collaboration, but the overall scope remains limited, inhibiting the commercialization of R&D results in both local and international markets.[415]

3.3.2 INCUBATION AND ACCELERATION

Incubation and acceleration programs have shown promise in boosting the Armenian startup ecosystem. Since the 2010s, these programs have collectively supported more than 300 startups, engaging more than 1,000 entrepreneurs and researchers at various stages.[416] To assess their effectiveness, the United Nations Economic Commission for Europe (UNECE) conducted a survey of graduated startups in 2023. The findings suggest significant benefits: the average size of startup teams increased from 6 to 10 members after receiving support, and more than half of the startups reported increased sales with higher than expected revenues. The programs also improved investment readiness with 65 percent of startups indicating that they had not raised funds prior to enrollment but had secured investments afterward. Each startup had three or more investors, at least half of them foreign.[417] (See Table 6, Annex A for a list of incubation and acceleration programs.)

Two notable examples include the Enterprise Incubator Foundation (EIF) and the Microsoft Innovation Center (MIC). Established in 2002, EIF offers a variety of initiatives, including legal, business, and educational reforms, startup investment facilitation, individualized services, and workforce development.[418] In 2021, EIF launched the Science Incubation Program, aiming to bolster disruptive ideas by refining participants' concepts, providing up to $100,000 in funding, and offering non-financial resources for idea validation and prototype development. MIC, jointly established by USAID, Microsoft Corporation and EIF in 2011, offers not only training initiatives but also provides mentoring, networking opportunities, business and technology consulting, and financial and

411 Public sector organization, interview by DECA team, January 2024, online.

412 Aleksandr Gevorkyan, "Diaspora Networks?" Emerald Insight, August 5, 2022, https://www.emerald.com/insight/content/doi/10.1108/978-1-83982-878-220221007/full/html.

413 "Innovation for Sustainable Development: Review of Armenia," UNECE, 2023. https://unece.org/sites/default/files/2023-06/UNECE_Innovation_for_Sustainable_Development_Review_Armenia_2023.pdf.

414 Private sector organization, interview by the DECA team, February 2024, online.

415 "Innovation for Sustainable Development: Review of Armenia," UNECE, 2023, https://unece.org/sites/default/files/2023-06/UNECE_Innovation_for_Sustainable_Development_Review_Armenia_2023.pdf.

416 Innovation for Sustainable Development. UNECE.

417 Innovation for Sustainable Development. UNECE.

418 "What is AIDS?" Enterprise Incubator Foundation (EIF), accessed March 18, 2024, https://www.eif.am/arm/about/.

legal assistance. To date, MIC has supported 57 startups and facilitated USD 2 million in investment.[419] (Appendix A provides further details on the activities of main incubation and acceleration programs in Armenia and their key outcomes.)

Many programs focus primarily on the number of participating startups and entrepreneurs, neglecting metrics like follow-on funding, sales, and overall business viability. Consequently, unlike other countries where startups with questionable market viability typically spend no more than 4-6 months in an incubator, Armenia faces a scenario where nonviable startups persistently cycle through the incubator and accelerator programs. This cyclic process compromises the overall effectiveness of the ecosystem, hindering its ability to support viable ventures.[420]

Many programs target tech startups in their idea stage, neglecting growth-stage startups, particularly those aiming to enter foreign markets. As a result, while the number of startups is rapidly increasing, only a small portion reach maturity.[421] The limited pool of experts and mentors in Armenia further restricts opportunities to extend local support programs. Industry experts highlighted how international incubation and acceleration programs can address these limitations by providing growth-stage startups with the necessary guidance and network they need to enter and succeed in new markets.[422]

3.3.3 STARTUP FINANCING

Armenia's venture capital ecosystem has improved significantly in recent years. Beginning with Granatus Ventures in 2013, the landscape has expanded over the past decade to include Hive Ventures, SmartGate VC, BigStory VC, and Formula VC. The financing sectors encompass a wide range of industries, including AI, SaaS, data sciences, biotechnology, robotics, security, IoT, quantum computing, and blockchain. These venture funds have collectively invested in more than 100 companies, with a total investment portfolio estimated at approximately USD 85 million.[423] Prominent recipients of venture funding include ServiceTitan, Krisp, SoloLearn, SuperAnnotate, gg, menu.am, ActiveLoop, and Expper Technologies.

Several angel networks complement these venture funds, including the Science and Technology Angel Network (STAN), Business Angel Network of Armenia (BANA), and Angel Investor Club of Armenia (AICA). STAN, BANA, and AICA each provide capital, expertise, and networks for Armenia's growing number of science and technology startups. Together, these networks have invested more than USD 5 million in more than 39 startups across industries ranging from cutting-edge biotech, digital healthcare, blockchain, and AI, to more traditional sectors like manufacturing, banking, and real estate.[424]

Innovative projects in Armenia can have access to resources through various state-backed and international programs. EIF matching grant programs have distributed USD 2.5 million to more than 80 companies, generating 300 new job openings.[425] The EU4Business's "Support to SME Development in Armenia" (SMEDA) initiative

419 "Startup Acceleration Program," Microsoft Innovation Center Armenia (MIC), accessed March 18, 2024, https://www.mic.am/acceleration/.

420 "Realizing Armenia's High-Tech Potential," The World Bank, January 16, 2024, https://documents.worldbank.org/en/publication/documents-reports/documentdetail/855171575909144517/realizing-armenias-high-tech-potential#:~:text=Armenia's%20economy%20is%20heavily%20reliant,income%20to%20high%2Dincome%20status.

421 Public sector representative, interview by DECA team, January 2024, online.

422 Public sector representative, interview by DECA team, January 2024, online.

423 Investment portfolio data compiled from public sources including fund websites, Tracxn, and Crunchbase.

424 "UNECE Innovation for Sustainable Development Review of Armenia 2023", accessed April 15, 2024 https://unece.org/economic-cooperation-and-integration/publications/unece-innovation-sustainable-development-review-0

425 "Innovation for Sustainable Development: Review of Armenia," UNECE, 2023, https://unece.org/sites/default/files/2023-06/UNECE_Innovation_for_Sustainable_Development_Review_Armenia_2023.pdf.

has awarded 34 grants to Armenian startups, totaling EUR 866,000. SMEDA has also supported events for 2,359 startups, established 31 new financial services, and successfully transformed four innovative ideas into companies, products, and services.[426] Other grantmaking programs include the MHTI's "From Idea to Business" grants, the State Science Committee's thematic and goal-oriented research grants, and ImpactHub's VIA Fund, which emphasizes investing in early stage social enterprises.

Despite these positive developments, venture capital in the country remains scarce. Armenian startups raised USD 27 million in 2023; however, venture capital funds and angel networks collectively announced only USD 3 million in investments.[427] As a result, the number of new startups is booming, yet those that mature and secure substantial funding in Series A or later rounds remain rare.[428] This lack of financing forces many companies to seek investment abroad, often leading them to incorporate in other countries, even if their foreign headquarters are virtual or have minimal staff. This structure relegates the Armenian entity to a subsidiary, meaning that investment funds remain in the foreign account, with only operational costs, salaries, and overheads transferred back to Armenia.[429] To mitigate this gap in financing, the Armenian government approved the creation of a National Venture Fund in 2022 with USD 9 million in state participation. The current status of the fund is unclear.

3.4 DIGITAL TALENT POOL

Armenia prioritizes technical education, but faces a skills mismatch due to outdated university curricula, a lack of emphasis on soft skills, and low remuneration for professors, resulting in graduates needing significant additional training to meet industry needs. Non-formal education programs play a significant role in enhancing the tech workforce and ensuring that it meets industry needs.

Tech talent is concentrated in Yerevan, creating a regional divide. The GoA has established tech centers in other cities, but challenges remain in attracting skilled workers and improving infrastructure outside the capital. The gig economy has the potential to provide employment opportunities and help retain skilled workers, but this requires better recognition of these new forms of work and efforts to improve digital access and skills throughout the country.

3.4.1 FORMAL AND NON-FORMAL EDUCATION

Armenia's higher education system produces a growing number of tech-focused graduates. As of 2022, nearly half of Armenia's 54 higher educational institutions offered at least one ICT-related program. (See details in Appendix A.)[430] Leading universities collectively produce approximately 1,000 ICT and 2,000 STEM (Science, Technology, Engineering, and Math) graduates annually.[431] Between 2016 and 2022, the share of ICT and STEM graduates grew from 1.4 and 11.3 percent to 7.2 and 18.4 percent, respectively. (See Figure 22.) During the same time period, the number of overall graduates declined by 65 percent, a trend the UN projects may worsen

426 "Support to SME Development in Armenia," EU-SMEDA, July 2021, https://euneighbourseast.eu/wp-content/uploads/2021/07/final-report-smeda-2019-web.pdf.

427 "$216,000,000 of investments have been attracted by 24 start-ups in Armenia in 2023," Invest Business Platform, February 8, 2024, https://investin.am/news/216000000-of-investments-have-been-attracted-by-24-start-ups-in-armenia-in-2023/.

428 Civil society organization, interview by DECA team, December 2024, online.

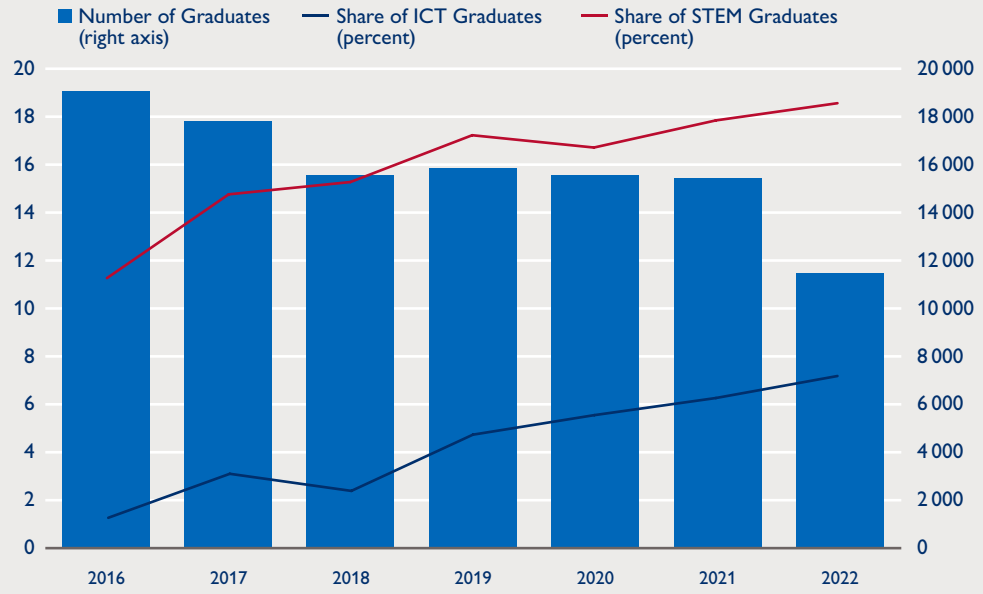
429 "Realizing Armenia's High-Tech Potential," The World Bank, January 16, 2024, https://elibrary.worldbank.org/doi/abs/10.1596/33027.

430 " Decision 1416-N, " September 16, 2022, Armenian Legal Information System (ARLIS), https://www.arlis.am/DocumentView.aspx?DocID=168535.

431 "RA Statistical Committee," ARMSTAT, n.d., https://statbank.armstat.am/pxweb/hy/ArmStatBank/?rxid=9ba7b0d1-2ff8-40fa-a309-fae01ea885bb. "Distribution of tertiary graduates by field of study," UNESCO, 2023, http://data.uis.unesco.org/index.aspx?queryid=3830#.

as Armenia's population ages.[432] This decline, attributed to low fertility rates and high migration, may pose a serious human resource challenge for tech companies.

FIGURE 21: ICT and STEM graduates in Armenia[433]



Source: Statistical Committee of Armenia and UNESCO.

Armenia faces a skills mismatch between the supply of and demand for highly qualified specialists in the tech sector. This stems from outdated university curricula, a limited focus on soft skills in the education system, and low professor remuneration. While universities conduct labor market needs assessments, weak coordination between the private sector and academia hinders effective curriculum design.[434] Most state universities lack access to recent professional literature, impeding their ability to adapt programs to current needs.[435] The education system emphasizes hard skills, neglecting crucial soft skills such as creativity, critical thinking, and communication.[436] This results in a workforce that often lacks expertise in these areas, forcing employers to invest heavily in vocational training before onboarding new hires. Low professor salaries create a disincentive for experienced professionals to pursue teaching careers. Many universities are government-funded, and their budgets limit their ability to offer competitive salaries.[437]

Collaborative efforts among formal educational institutions aim to improve the design and implementation of ICT-related education. Armenian Technology Future is a consortium of educational institutions collaborating on the design of cybersecurity, digital literacy, and ICT-related curricula, although with limited efficiency.[438] The consortium is coordinated by the Union of Advanced Technology Enterprises (UATE) and is comprised

432 "World Population Prospects 2022," United Nations Department of Economic and Social Affairs Population Division, 2022, https://population.un.org/wpp/Download/Standard/Population/.

433 "RA Statistical Committee," ARMSTAT, n.d., https://statbank.armstat.am/pxweb/hy/ArmStatBank/?rxid=9ba7b0d1-2ff8-40fa-a309-fae01ea885bb. "Distribution of tertiary graduates by field of study," UNESCO, 2023, http://data.uis.unesco.org/index.aspx?queryid=3830#.

434 "Innovation for Sustainable Development: Review of Armenia," UNECE, 2023, https://unece.org/sites/default/files/2023-06/UNECE_Innovation_for_Sustainable_Development_Review_Armenia_2023.pdf.

435 "Assessment and Market Mapping of the Information and Communication Technology Sector in Armenia," ADB, November 2023, https://www.adb.org/sites/default/files/project-documents/54148/54148-001-tacr-en.pdf

436 Private sector organization, interview by DECA team, December 2024, online. Civil society organization, interview by DECA team, December 2024, online.

437 Private sector organization, interview by DECA team, December 2023, online.

438 NGO representative, Interview by DECA team, December 2023, online.

of the American University of Armenia (AUA), the European University, the French University, Yerevan State University, and the Agrarian University.[439] (See Box 7 for information on the cybersecurity workforce in Armenia.)

BOX 7: The cybersecurity workforce in Armenia

Several collaborative efforts in the education ecosystem aim to address the skills mismatch in cybersecurity education. American University of Armenia (AUA) incorporates technical cybersecurity courses, such as Introduction to Cybersecurity and Advanced Cybersecurity and Cryptography in its CSE curriculum, as well as a comprehensive cybersecurity governance course titled Cybersecurity and Society. The latter is the only higher education course in Armenia offering a holistic approach encompassing technology, policy, law, and e-commerce to provide students with a well-rounded understanding of cybersecurity and its societal implications. No data is available on the number of graduates in cybersecurity.

In September 2022, a collaborative effort between four key educational, civil, and research entities—AUA, Yerevan State University Ijevan branch (YSU Ijevan), the Instigate Scientific Research Center (ISRC), and ArmSec Foundation—concluded a Memorandum of Understanding (MoU), establishing the Ijevan Educational CyberHub initiative.[440] The initiative enhances cybersecurity awareness, provides training, and builds response capacity among students from YSU Ijevan Branch, AUA, ISRC, and Real School.

Instigate, the ArmSec Foundation, the YSU Ijevan branch, and AUA also collaborated to develop a four-year bachelor's degree curriculum in applied mathematics with a specialization in cybersecurity. The program introduces technical cybersecurity education covering penetration testing, monitoring, and computer emergency response team (CERT) capacity. Around 10 students out of the annual average of 15 express interest in cyberspace, but the program lacks a formal qualification or certificate upon graduation. Plans are underway to finalize and share the curriculum for broader adoption by institutions seeking to integrate cyber awareness and incident response education. The program is in the early stages of collaboration with the government, and research outsourcing remains yet to be achieved.

This collaboration represents a concerted effort to address complex cyber challenges through a multifaceted approach involving academic institutions, research centers, and cybersecurity experts. These efforts are a step in the right direction, but there is a need for more comprehensive and integrated approaches, encompassing not only technical aspects but policy, law, and societal implications as well.

Numerous non-formal educational institutions in Armenia ("non-formal" is defined in this context as not within university programming) complement the formal ICT education system, helping to bridge the skills gap. Industry-academia partnership programs, like Synopsys Armenia Educational Department (SAED), provide universities with access to advanced software, industry tailored curricula, and the expertise of seasoned professionals, while students engage in course projects reflecting real-world design challenges. SAED has produced more than 1,592 graduates and fostered the development of 90 PhDs. Specialized centers such as the Innovative Solutions and Technology Centre (ISTC), Armenian-Indian Center for Excellence in ICT, and Armenian National Engineering Laboratories (ANEL) train thousands of students (see Appendix A), offering a diverse range of programs spanning programming, cybersecurity, UI/UX design, network administration, quality assurance, cloud computing, and machine building. Companies like Instigate, PicsArt, Synergy, Digitain, and DISQO are investing in internal training programs to address specific skill needs and foster talent development. PicsArt

439 NGO representative and university representative, interviews by DECA team. December 2023 - January 2024, online.

440 NGO representative, Interview by DECA team, December 2023. "AUA, YSU Ijevan, ISRC, ArmSec Collaboration Efforts Create a Pillar for Ijevan Educational CyberHub Launch," American University of Armenia Newsroom, November 20, 2023, https://newsroom.aua.am/2023/12/12/aua-ysu-ijevan-isrc-armsec-collaboration-efforts-pillar-ijevan-educational-cyberhub-launch/. Two sector experts, interviews by DECA team, December 2023, online.

Academy offers courses covering foundational computing skills, programming languages, and software development and design. These initiatives usually include the following three dimensions:[441]

I. Industry-academia partnership programs

Some tech companies are forging partnerships with universities to modernize their curricula, although these efforts are not widespread. A notable example is Synopsys, a leader in microelectronics, which established the Synopsys Armenia Educational Department (SAED) in collaboration with universities like the NPUA, YSU, RAU, and EUA. Through this partnership, universities gain access to advanced software, industry-tailored curricula, and the expertise of seasoned professionals, while students engage in course projects, diploma works, Master's degree theses, and Ph.D. dissertations reflecting real-world design challenges.[442] SAED has achieved remarkable results, producing more than 1,592 graduates and fostering the development of 90 PhDs. Not all companies pursue such initiatives, likely because they do not receive incentives while there is concern that trained graduates might be attracted to other tech companies, potentially diluting the return on investment.[443] The level of bureaucracy involved in updating university programs[444] can be time-consuming and complex, with updates often requiring approval from various university committees, faculty senates, and potentially even external accreditation bodies. This lengthy process discourages many tech companies from investing resources in curriculum development.

In 2020, the Union of Operators of Armenia, in cooperation with Arpinet LLC, initiated a collaboration with the State University of Economics of Armenia. This partnership established a Master's program to educate experts on the strategic integration of information technology in the business domain. The goal is to provide students with a comprehensive understanding of how IT can be utilized effectively in various business contexts. The Union of Operators extended its collaboration to the Academy of Public Administration in a parallel effort. This initiative aims to foster IT management specialists. The program incorporates a cybersecurity course, recognizing the critical importance of security considerations in the skill set of management professionals.[445]

II. Specialized educational centers

Another facet of education is driven by specialized educational centers such as the Innovative Solutions and Technology Centre (ISTC), Armenian-Indian Center for Excellence in ICT, Armenian National Engineering Laboratories (ANEL), Microsoft Innovation Center (MIC), and the Armenian Code Academy (ACA). These centers train thousands of students (see Appendix A), with offerings including programming, cybersecurity, UI/UX design, network administration, quality assurance, cloud computing, and machine building. Some centers, like ISTC and ANEL, prioritize research and development alongside training, while others like the Armenian-Indian Center emphasize a blend of IT, business, and design education. The Armenian Code Academy stands out with its dedicated focus on various programming languages and software development.

III. ICT company internal training

Companies like Instigate, PicsArt, Synergy, Digitain, and DISQO are investing in internal training programs to address specific skill needs and foster talent development. PicsArt Academy offers courses covering foundational computing skills, programming languages, and software development and design. Instigate Training Center

441 Information on non-formal education initiatives and performance outcomes is retrieved from public data.

442 "Cooperation with Universities," Synopsys, accessed March 12, 2024, https://www.synopsys.com/company/contact-synopsys/office-locations/armenia/educational-programs/cooperation-with-universities.html.

443 Private sector organization, interview by DECA team, February 2023, online.

444 Private sector organization, interview by DECA team, January 2023, online.

445 NGO representative, interview by DECA team, January 2024, online.

provides specialized programs for engineers, covering hardware design, embedded systems, signal processing, and algorithms. These initiatives address skill gaps and also provide valuable mentorship and real-world experience for participants, contributing to the overall growth and dynamism of Armenia's tech ecosystem.

3.4.2 TECH DIVIDE BETWEEN YEREVAN AND REGIONS

Armenia's digital talent pool is heavily concentrated in the capital city of Yerevan, creating a stark disparity with the rest of the country.[446] This uneven distribution of tech-savvy professionals means that the regions lack the human capital necessary to drive innovation. Tech companies are therefore less likely to establish operations outside the capital, hindering regional economic development and restricting the benefits of innovation to more remote areas.

To partially address the uneven distribution of digital talent, the Armenian government established the Gyumri Technology Center (GTC) in 2014 and the Vanadzor Technology Center (VTC) in 2016. Both offer IT courses, business skill development, thematic lectures, and events, and provide business development support to startups and established regional enterprises. The GTC has engaged more than 25 tech companies, served more than 150 international clients, and involved more than 200 professional trainers. The VTC has hosted 19 companies, provided training to more than 270 employees, and reached more than 5,000 schoolchildren.[447]

Limited human capital and persistent brain drain threaten the effectiveness of these centers. [448] Mid-level and senior specialists often relocate to Yerevan in search of better career opportunities and regions lack high-quality formal education. As a result, prospective tech workers leave to pursue their studies in Yerevan. In addition, lagging public infrastructure, such as hospitals and schools, around these centers influence employees' decisions to work in regional tech hubs. There is a pressing need for the government to address these infrastructure needs to maximize the benefits of these local initiatives.[449]

3.4.3 GIG ECONOMY

Platform work is an emerging trend in Armenia. According to the 2023 Network Readiness Index, which assesses the impact of ICT on economies, Armenia is ranked 58th out of 134 countries in terms of the prevalence of the gig economy. [450]

Web-based freelancing is one of the most prevalent activities among Armenian platform workers, and Armenia boasts one of the highest rates of online freelancers per capita globally, with 6,325 registered accounts (or 2.18 per 1,000 inhabitants).[451] Web-based work is primarily conducted through global platforms like Upwork, which hosts more than 3,000 registered users from Armenia, mostly specialized in tech-related fields. Other widely used platforms include Behance for designers, Toptal for high-skilled software engineers, and Fiverr, Freelancer.com, and Craigslist for professionals in software development and other highly skilled occupations.[452]

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446 Civil society organization, interview by DECA team, December 2023, online.

447 "Innovation for Sustainable Development: Review of Armenia," UNECE, 2023, https://unece.org/sites/default/files/2023-06/UNECE_Innovation_for_Sustainable_Development_Review_Armenia_2023.pdf.

448 Two private sector organizations, interviews by DECA team, January 2024, online.

449 Three private sector organizations, interviews by DECA team, January 2024, online.

450 "Network Readiness Index: Performance Overview," Portulans Institute, 2024, .https://networkreadinessindex.org/country/armenia/.

451 "Global Internet Freelance Market Overview for 2018," Analyticshelp, December 27, 2018. https://web.archive.org/web/20210202110855/https://analyticshelp.io/blog/global-internet-freelance-market-overview-2018/.

452 "New Forms of Employment in the Eastern Partnership Countries: Platform Work – Armenia," European Training Foundation (ETF), 2021, https://www.etf.europa.eu/sites/default/files/2021-06/platform_work_armenia_1.pdf.

Alongside this flourishing online freelance market, there's a growing trend in on-location service provision in Armenia, driven by platforms specializing in various areas. Ride-hailing, with companies like GG, Yandex, and Utaxi offers app-based taxi services, connecting users with drivers and often providing specialized features like driver preferences. Food delivery platforms like Glovo and Menu.am aggregate menus from local restaurants, facilitating online ordering and delivery. Logistics is also a growing area, with companies like Door2door and Passit specializing in on-demand delivery services, allowing users to arrange for the direct transport of goods. Companies are emerging in areas like home cleaning (Allclean), pet sitting (Petsbourg), and marketplaces for various on-site tasks (2do).[453]

Platform work in Armenia offers significant opportunities to address high unemployment, particularly among low-skilled workers, and combat brain drain among highly qualified professionals. Both unemployment and inactivity levels are high, especially for the low-skilled. The share of youth not in education, employment, or training (NEET is the World Bank acronym for this demographic) in Armenia is 23.5 percent, which is much higher than the 17.4 percent average for Europe and Central Asia (excluding high-income countries).[454] On-location work platforms can provide employment opportunities for the lower-skilled workforce in cities. International freelancing platforms can offer new open job markets for qualified workers. Armenia suffers from outward migration and brain drain. Emigration could be addressed with opportunities through platform work or outsourcing well-paid work for highly skilled workers .[455]

Further development of platform work in Armenia faces a number of challenges. New forms of employment are not yet fully recognized in public discourse and policy, hindering efforts to tackle existing challenges. Public services do not yet recognize workers engaged in these new forms of employment as a target group for support such as upskilling or career development measures.[456] Despite substantial improvements in connectivity and digital infrastructure, access to quality internet technologies remains uneven, with underperformance in rural areas.[457] The affordability of devices, broadband connection, and its quality are still far from optimal. A lack of digital skills is also a major obstacle, particularly in rural areas. Potential platform workers (both remote and on-location) must have at least the basic digital skills necessary to navigate online task search features and work organization environments. Competition in international marketplaces for the highest paid platform jobs requires a good command of English. A global comparative study conducted in 2023 placed Armenia in the moderate English proficiency group among 113 countries.[458]

453 "Gig Economy Startups in Armenia,"Tracxn, February 29, 2024, https://tracxn.com/d/explore/gig-economy-startups-in-armenia/__OYxuzmyrIFDJOtx69e6N6dNab1AypFhnGYG2hKF4riM/companies.

454 "Labour Force Statistics Database: Indicators and Data Tools," International Labour Organization (ILO), accessed March 12, 2024. https://ilostat.ilo.org/data/.

455 New Forms of Employment in the Eastern Partnership Countries. ETF.

456 "New Forms of Employment in the Eastern Partnership Countries: Platform Work – Armenia, European Training Foundation (ETF), 2021, https://www.etf.europa.eu/sites/default/files/2021-06/platform_work_armenia_1.pdf.

457 "EU4Digital Broadband Development in Easter Partnership Countries: Status Quo and Opportunities," EU4Digital, December 2018, https://prod5.assets-cdn.io/event/3461/assets/8454781759-2df2e81249.pdf.

458 "EF English Proficiency Index: A Ranking of 113 Countries and Regions by English Skills," Education First (EF), 2023, https://www.ef.com/assetscdn/WIBIwq6RdJvcD9bc8RMd/cefcom-epi-site/reports/2023/ef-epi-2023-english.pdf.

Recommendations for the International Development Community

Armenia's digital ecosystem can be supported and strengthened in many ways. This section outlines recommendations for specific actions and partnerships as well as general guidance for digitally-enabled programming. The list is organized by DECA pillar and cross-cutting themes. It is strongly encouraged to leverage networks and progress made by existing projects and in-country programs when possible.

Table 4 below summarizes each recommendation as follows:

- **What**: Links to the recommendation details
- **Why**: Provides the motivation or intended impact of the recommendation
- **How**: Summarizes the approach that can be used to implement the recommendation. These suggestions are based on DECA research; they do not constitute an exhaustive list of opportunities.

The **detailed recommendations section that follows** provides further explanation of how each recommendation can be implemented, including opportunities to address key issues, and how these opportunities align with the Principles for Digital Development and the SDGs.

When acting on any of these recommendations, information on best practices in digital development program design can also be helpful. The Principles for Digital Development[459] and the USAID Digital Investment Tool are important resources. The section below provides background and guidance on how to use these resources. For guidance or technical support on any of these recommendations, please contact digitaldevelopment@usaid.gov or request assistance through Unified Technical Request and Mission Support (UTRAMS).

459 These principles are nine living guidelines that provide best practices for every phase of the project life cycle. They were created in consultation with various international development organizations, including USAID.

TABLE 4: Summary of DECA recommendations

	WHAT?	WHY?	HOW?
CROSS-CUTTING			
1	Facilitate comprehensive cybersecurity governance and practices.	Armenia's cybersecurity framework faces a significant governance gap. It is characterized by a lack of centralized oversight and undefined roles among government entities, leaving the cybersecurity landscape fragmented and inconsistent.	Facilitate knowledge and experience exchanges for comprehensive cybersecurity governance within the cybersecurity agency. Assist Armenian stakeholders in localizing international cybersecurity standards through more affordable national certification mechanisms. Provide technical assistance to support the establishment of best practices for the operation and coordination of CERTS. Provide collaborative support to develop a cybersecurity talent pool. Establish a government communication concept for public awareness on cybersecurity and cyber incidents.
2	Boost the digital literacy of the general population and improve ICT education to support the development of the ICT workforce	The lack of quantitative data on digital literacy of the general population and the absence of initiatives to boost the digital literacy of Armenian society constitute fundamental gaps in the country's digital ecosystem. Awareness-raising and digital literacy efforts have thus far been concentrated in Yerevan. Formal education on digital literacy and cyber hygiene remains limited, while informal educational initiatives struggle with issuing nationally acknowledged qualifications.	Provide technical assistance to the GoA to fill data gaps in digital literacy. Support the GoA in developing a national digital literacy strategy. Facilitate coordination among key stakeholders in Armenia to advance formal digital literacy education. Support the establishment of nationally recognized qualification and certification mechanisms in digital literacy, cybersecurity, cyber hygiene, and other ICT-related fields. Improve local relevance of digital literacy and digital hygiene training content. Bridge the digital literacy gap for elderly citizens through targeted training and awareness-raising initiatives.
3	Improve accessibility standards and enhance accessibility of technology for better inclusion of persons with disabilities (PWDs).	PWDs are the most disadvantaged group in Armenian society in terms of device ownership, content accessibility, and adoption of digital services. Substantive gaps in accessibility regulation, AI regulation, and the availability and distribution of up-to-date assistive technology significantly hinder the digital inclusion of PWDs.	Support the integration of mandatory accessibility standards into technological production and the design of digital services. Provide support to civil society and the private sector in developing AI-powered and high-tech solutions for assistive technology to increase accessibility and content relevance for PWDs in Armenia. Provide support to the GoA to update legal frameworks governing digital accessibility and the utilization of AI. Provide support to boost digital literacy, digitalization awareness, and cyber hygiene skills for persons with disabilities (PWDs).

	WHAT?	WHY?	HOW?
PILLAR 1: DIGITAL INFRASTRUCTURE & ADOPTION			
4	Improve digital connectivity infrastructure and regulation to ensure a strong digital foundation.	The backhaul infrastructure in the telecommunications landscape is relatively advanced. Nevertheless, deficiencies persist, particularly in middle and last-mile connectivity infrastructure in rural and remote areas. The heavy dependence on Caucasus Online services for first mile connectivity poses risks and vulnerabilities.	Support the GoA in developing a regulatory framework for connectivity infrastructure. Diversify first mile connectivity by gaining and expanding access to submarine cable connection. Provide technical advisory and policy framework development to bridge the gaps in terrestrial infrastructure for middle mile development. Support the Government of Armenia with regulations concerning mandated infrastructure sharing.
PILLAR 2: DIGITAL SOCIETY, RIGHTS, AND GOVERNANCE			
5	Support the GoA in the implementation of digitalization strategies through technical assistance and capacity-building efforts.	Despite the development of a digitalization strategy and creation of responsible entities, many of the activities outlined in the digital strategy remain incomplete and subsequent processes remain unclear.	Provide technical assistance on the implementation of digital transformation strategies, grounded in best practices. Facilitate cross-functional training experiences to foster government agency collaboration, knowledge exchange, and organizational culture. Develop change management training and build awareness of digital tools to overcome change resistance and increase support for digitalization efforts. Support capacity-building focused on principles of data protection and privacy.
6	Bolster the information integrity and media literacy ecosystem.	Armenia experiences rampant mis- and disinformation, particularly in times of crisis. In this evolving ecosystem, media outlets and CSOs play pivotal roles in shaping public discourse, advocating for media literacy, and safeguarding the integrity of information. CSOs and media outlets often lack the human and technological capacities to fully respond to these challenges.	Facilitate international collaboration to combat disinformation campaigns. Support the development of crisis plans for provision of timely and accurate information. Facilitate media literacy for the general public with a focus on critical thinking and fact-checking. Encourage media outlets to collaborate and connect with fact-checking organizations.

	WHAT?	WHY?	HOW?
PILLAR 3: DIGITAL ECONOMY			
7	Support the modernization of Armenian payment infrastructure and related regulatory frameworks.	Despite progress in Armenian payment infrastructure, several challenges remain, including the outdated architecture of the RTGS system for wholesale payments, severe delays in account-to-account transfers, and significant challenges related to international transfers such as high compliance costs with foreign banks and the absence of alternatives such as PayPal and Stripe.	Facilitate knowledge transfer to accelerate Armenia's payment system modernization. Support the development of payment infrastructure. Address barriers to cross-border payments in Armenia.
8	Strengthen the protection and enforcement of consumer rights in the e-commerce sector.	Critical gaps in online marketplace governance include inadequate transparency in online contracts, insufficient protection against deceptive advertising practices, weak regulations on misleading customer reviews, poor security standards for online marketplaces, and a lack of clarity around guaranteed maximum delivery time frames. These inadequacies result in inadequate consumer protection and enforcement mechanisms and leave online shoppers vulnerable.	Address legal gaps in consumer protection, aligning consumer protection measures with best international practices. Support the GoA in creating the mechanisms for enforcing consumer protection. Conduct awareness campaigns to educate consumers about their rights and safe online practices.
9	Explore opportunities for the development of shared infrastructure in e-commerce through partnerships.	The logistics landscape is fragmented and collaboration with Haypost is not widespread, leading to e-commerce platforms' reliance on independent delivery services.[460] This fragmented approach results in limited resource sharing, higher delivery costs, and extended delivery times.	Foster collaboration on shared infrastructure projects between the government, national post office, and private sector entities. Foster collaboration on shared infrastructure projects between the government, national post office, and private sector entities.

460 Private sector organization, Interview by DECA Team, January 2024, online.

DETAILED RECOMMENDATIONS

1. FACILITATE COMPREHENSIVE CYBERSECURITY GOVERNANCE AND PRACTICES

Governance of cybersecurity in Armenia faces challenges with centralized oversight and the definition of roles among government entities. Addressing these challenges and fostering collaboration among stakeholders is vital to strengthening the country's cybersecurity posture and countering cyber threats. The education system has a growing focus on ICT, with more than 1,000 graduates in ICT subjects per year, but a shrinking workforce and a mismatch between ICT sector needs—including cybersecurity—and supply of expertise has led to a dearth of cybersecurity expertise. Public awareness of cybersecurity is low, exposing individuals and national security to risks. The international development community could consider supporting the growth and resilience of the Armenian cybersecurity sector by considering an ecosystem approach that focuses on three pillars: policy and governance, workforce development, and cybersecurity market growth.

A. Facilitate knowledge and experience exchange for comprehensive cybersecurity governance. As of April 2024, Armenia's first cybersecurity law is still a working draft, with support provided by the international development community. Going forward, the international development community could support the GoA in defining the envisioned agency's role in coordinating state entities, stakeholders, and (sub)sectoral policies of cybersecurity and in implementing these changes. The international development community could facilitate exchanges between the GoA and experts in cybersecurity governance, including other country governments and international experts. Knowledge and experience sharing among stakeholders may help in defining clear tasks and responsibilities within the agency, and can ensure that oversight is transparent and allocated effectively. The international development community could also facilitate collaboration between the government and the private sector, civil society, and academia in cybersecurity policymaking. This could include support to establish reliable and stable mechanisms for involving private sector professionals in policy and standard development, fostering collaboration and enhancing the effectiveness of cybersecurity initiatives.

B. Assist Armenian stakeholders in localizing international cybersecurity standards through more affordable national certification mechanisms. Provisions on minimum cybersecurity requirements and standards in the interim draft of Armenia's first cybersecurity law prioritize international certification, with insufficient attention paid to establishing national certification mechanisms. International accreditation is cost-prohibitive for medium and small businesses, as addressed in Section 2.4.2. Through targeted technical assistance, exposure to international standards, and experience sharing with other governments, the international development community can support adaptation of international cybersecurity standards into national certification mechanisms which are effective, equitable, and practically applicable, and attuned to Armenia's digital ecosystem.

C. Provide technical assistance to support the establishment of best practices for the operation and coordination of CERTS, complementing ongoing efforts. Armenia has multiple independent state CERTs at present, alongside active participation from civil society organizations (CSOs) in the cybersecurity domain. Recognizing the importance of enhancing collective awareness of cybersecurity threats, the international development community could play a role in facilitating coordination among these CERTs. Organizing capacity-building workshops and training for CERT members could support CERTs in refining incident response capabilities and establishing effective coordination methods. In addition to CERT coordination, the international development community could support the GoA in conducting risk assessments for critical infrastructure. This could include offering technical expertise and resources to develop and implement risk assessment methodologies tailored to the specific needs of critical infrastructure sectors.

D. Provide collaborative support to develop a cybersecurity talent pool. There is a skills mismatch in Armenia between the needs of the private sector and the supply of ICT expertise. There are few courses on cybersecurity and only one holistic course on cybersecurity, yet some efforts have been made to support collaboration among educational and research institutions in the field of cybersecurity. These efforts are a step in the right direction, but there is a need for more comprehensive and integrated approaches, encompassing not only technical aspects but also policy, law, and societal implications. Collaboration with the private sector is vital to bridging the supply-demand gap. The international development community could support the development of a cybersecurity talent pool by collaborating with existing groups, providing technical assistance, and supporting connections between the education sector and the private sector. Collaboration could focus on sharing international best practices on curriculum design, integrating the broad spectrum of cybersecurity. Providing technical assistance to such initiatives and working with other formal educational institutions to design cybersecurity curricula and explore opportunities for establishing state-of-the-art facilities such as cyber ranges, stress-testing labs, and forensic labs will build student skills. To address the mismatch between skills in terms of supply and demand, the international development community could work with the private sector to develop an internship program that places recent graduates in the private sector as cybersecurity specialists. The international development community may also consider supporting organizations which aim to provide remote learning options to better reach rural populations. Considering the regional divide with most of the ICT workforce and most opportunities based in Yerevan, this work could be extended to regional universities and private sector based outside of Yerevan.

E. Establish a government communication concept for public awareness on cybersecurity and cyber incidents. Public awareness plays a vital role in cybersecurity. Consideration should be given to strategic communications approaches targeting a variety of stakeholders. The international development community could play a crucial role in supporting the establishment of a communication concept for public awareness which maintains the necessary balance between public awareness and confidentiality. Informative and engaging content should be accessible and relevant to diverse audiences and targeted groups, with customized content for specific populations such as the elderly and other vulnerable groups. The GoA can draw from best practices from countries like Switzerland[461] which has established successful communication concepts for situational awareness and risk-based skills instructions to the public while maintaining a balance between confidentiality and the public's need for information. Estonia's[462] cybersecurity awareness measures involve nationwide campaigns to enhance the cyber hygiene of its residents and educate public sector employees about the risks related to cyber space. Estonia has developed an e-learning platform allowing individuals to update and assess their knowledge in cybersecurity.

> *This recommendation emphasizes cybersecurity, drawing from The Principles of Digital Development, particularly Anticipate and Mitigate Harms. Further, this recommendation is most relevant to SDGs 11 Sustainable Cities and Communities and 12 Responsible Consumption and Production. The focus on building a workforce also requires a deep Understanding of the Existing Ecosystem, a Principle for Digital Development and relates to SDG 8, Decent Work and Economic Growth.*

461 "National strategy for Switzerland's protection against cyber risks," The Federal Council, February 18, 2018, https://www.bk.admin.ch/bk/en/home/digitale-transformation-ikt-lenkung/ikt-vorgaben/strategien-teilstrategien/sn002-nationale_strategie_schutz_schweiz_cyber-risiken_ncs.html.

462 "Cyber security studies, analyses, overviews," Republic of Estonia Information System Authority, n.d., https://www.ria.ee/en/authority-news-and-contact/news-media-contact/studies-analyses-overviews?view_instance=2&current_page=1#yearly-assessments:~:text=Cyber%20Security%20in%20Estonia%202023%20%7C%2011.2%20MB%20%7C%20pdf.

2. BOOST THE DIGITAL LITERACY OF THE GENERAL POPULATION AND IMPROVE ICT EDUCATION TO SUPPORT THE DEVELOPMENT OF THE ICT WORKFORCE

Elevating digital literacy and promoting cyber hygiene are imperatives for Armenia. The lack of quantitative data reflecting digital literacy levels among the general population and the absence of national or civic initiatives to boost the digital literacy of Armenian society constitute gaps in the country's digital ecosystem. Awareness-raising and digital literacy efforts have been concentrated in Yerevan, providing opportunities for a broader nationwide outreach. Formal education on digital literacy and cyber hygiene remains limited, while informal educational initiatives struggle with issuing nationally acknowledged qualifications to their graduates.

A. Provide technical assistance to the GoA to fill data gaps in digital literacy. A collaboration between the international development community, the GoA, and Armenian civil society to administer digital literacy assessments of the general population could address the gap in tangible data to inform policy-making. Models can be drawn from international practices emphasizing localized surveying to address gaps in data collection, such as Australia's Digital Inclusion Index, a collaborative effort between government, civil society, and academia that regularly assesses digital literacy and inclusion levels nationwide, providing valuable insights for policy formulation.

B. Support the GoA in developing a national digital literacy strategy. Informed by comprehensive data on digital literacy in Armenia, the international development community could support the GoA in drafting and implementing a national digital literacy strategy tailored to improving the general population's digital literacy. The strategy could consider diverse needs across the population of Armenia, including vulnerable groups such as PWDs and linguistic and ethnic minorities. Strategy developers could include stakeholders from across the digital ecosystem in the design process to inform a well-rounded, long-term vision that takes into account diverse needs and skill levels.

C. Facilitate coordination among key stakeholders in Armenia to advance formal digital literacy education. Coordination between stakeholders in Armenia on the issue of digital literacy in the formal education sector is lacking. Acting as a facilitator, the international development community could work with public and private sector stakeholders—including the MHTI and Ministry of Education—to develop age-appropriate curricula in schools incorporating digital literacy, cyber hygiene, and child protection online. Google's "Be Internet Awesome" Program uses interactive and age-appropriate content to educate children about online safety and digital literacy. Joint efforts of the international development community and the Armenian Technology Frontiers—a consortium of five universities: AUA, the European University, the French University, YSU, and the Agrarian University, aimed at advancing digital literacy and cybersecurity education —could offer a promising direction for modernizing and scaling higher education curricula for digital literacy and cyber hygiene.

D. Support the establishment of nationally recognized qualification and certification mechanisms in digital literacy, cybersecurity, cyber hygiene, and other ICT-related fields. There is limited human and technical capacity for comprehensive testing and certification in the organizations that provide informal education. Recognized certifications for ICT professionals would support development of the ICT workforce, as well as support organizations in standardizing their testing. One model for reference is the European e-Competence Framework (e-CF), which offers a standardized approach to qualifications of ICT skills, ensuring universal recognition. Armenia could draw from existing models to establish mechanisms for recognizing qualifications in digital literacy, technology, and cybersecurity gained through informal education.

E. Improve local relevance of digital literacy and digital hygiene training content. Development of Armenian language content is essential to enhance comprehensibility for digital literacy, which includes digital hygiene content. The international development community could assist in identifying content to localize in the Armenian language and share best practices in practical tools for boosting content relevance.

F. Provide support for elderly citizens in bridging the digital literacy gap through targeted training and awareness-raising initiatives. The elderly in Armenia are less experienced with technology, with only 20 to 30 percent using a computer.[463]By building their confidence and abilities in using digital tools, the elderly population can better draw benefits from meaningful access, such as increased social and economic opportunities, and access to information. They will be able to better protect themselves online and be less vulnerable to false narratives and cyber attacks. Neither the public sector nor civil society has undertaken any such endeavor thus far, so the international development community could provide essential knowledge and technical assistance in drafting effective strategies to address digital literacy for elderly citizens. Japan's Senior Citizen Cyber College initiative provides specialized digital literacy courses for senior citizens. Designing similar programs in collaboration with relevant stakeholders can address the unique needs of Armenia's elderly population.

> *This recommendation reinforces the following Principles for Digital Development: Design With People, Understand the Existing Ecosystem, Build for Sustainability, and Anticipate and Mitigate Harms. It is most closely aligned with SDGs Quality Education) and 8 Decent Work and Economic Growth.*

3. IMPROVE ACCESSIBILITY STANDARDS AND ENHANCE ACCESSIBILITY OF TECHNOLOGY FOR BETTER INCLUSION OF PERSONS WITH DISABILITIES (PWDS)

PWDs are the most disadvantaged group in Armenian society in terms of device ownership, content accessibility, and adoption of digital services. Substantive gaps in accessibility regulation, AI regulation, and the availability and distribution of up-to-date assistive technology hinder the digital inclusion of PWDs.

A. Integrate mandatory accessibility standards into technological production and the design of digital services. The World Wide Web Consortium (W3C) Web Content Accessibility Guidelines (WCAG) could form an integral and mandatory component of technological production and the design of digital services in Armenia, including e-government services and websites. To facilitate the integration of W3C accessibility standards, the international development community could provide capacity-building and awareness-raising activities among key stakeholders, including policymakers, civil society representatives, web developers, and IT specialists. These activities would instill an understanding of universal design principles and accessibility standards, fostering a collective commitment to inclusivity in the digital ecosystem. Drawing inspiration from international best practices in promoting digital accessibility can provide valuable insights into establishing balanced and equitable legal frameworks and awareness-raising campaigns to foster digital inclusion for PWDs in Armenia.

B. Support civil society and the private sector in developing AI-powered and high-tech solutions for assistive technology to increase accessibility and content relevance for PWDs in Armenia. The international development community could provide support to organizations making investments in technologies such as speech-to-text and text-to-speech engines, screen readers, and enhanced robotic voice outputs tailored to the Armenian language. Current projects in this domain stem from civil society organizations only and are limited in scope, thus necessitating substantial scaling to adequately address the diverse needs of PWDs.

463 "Household's Integrated Living Conditions Survey anonymised microdata database," ARMSTAT, 2022, <https://armstat.am/en/?nid=205>.

C. Support the GoA in updating legal frameworks governing digital accessibility and the utilization of AI. To support advancements in assistive technologies, the international development community could work with the GoA to ensure the effective implementation of legal provisions to safeguard and enhance the accessibility of digital content and services for PwDs. The international development community could assist the GoA and civil society organizations in drafting appropriate accessibility regulations, including policies on deploying AI-powered assistive technology and PWD-focused automated decision-making aids for the public and private sectors. Resources and international best practice such as the US Department of Labor AI & Disability Inclusion Toolkit will be valuable in this assistance.[464]

D. Provide support to boost digital literacy, digitalization awareness, and cyber hygiene skills for persons with disabilities (PWDs). The international development community could collaborate with key stakeholders, such as the Ministry of HTI, the Coalition for Inclusive Legal Reform, and civil society organizations that represent PWDs in Armenia. This collaboration could include curricula development, program design, and technical assistance to civil society. Interventions can draw from international experience such as Microsoft's "Be You" campaign on technology for people with learning differences[465] and the United Kingdom's "Every Child Online" campaign, which emphasizes inclusive online learning for children, including those with disabilities. Regional knowledge forums such as the ITU regional knowledge-development forums on Accessible ICT for ALL will also be a vital resource.[466] Scaling the experience and efforts of Armenian civil society organizations can help integrate technological solutions into formal and informal education for children and young adults with disabilities.

> *This recommendation supports the Principles for Digital Development on Design With People and Anticipate and Mitigate Harms. It also relates to SDG 10 Reduced Inequalities.*

4. IMPROVE DIGITAL CONNECTIVITY INFRASTRUCTURE AND REGULATION TO ENSURE A STRONG DIGITAL FOUNDATION

As a landlocked country with infrastructure closely linked to that of its neighbors, Armenia's first-mile infrastructure may be subject to risks related to shifting geopolitical relations. Several major telecommunication companies in Armenia undertake initiatives to diversify their first mile solutions, although approaches are not coordinated. The backhaul infrastructure in the Armenian telecommunications landscape is relatively advanced. Nevertheless, deficiencies persist, particularly in middle mile and last-mile connectivity infrastructure in rural and remote areas. The GoA's commitment to expanding fixed broadband to 100% of settlements by 2026 presents an opportunity for collaboration with international development organizations.

A. Support the GoA in developing a regulatory framework for connectivity infrastructure. A regulatory framework is indispensable for the sustainable development of Armenia's digital ecosystem, encompassing both the construction and operationalization phases of infrastructure deployment. Armenia's national standards governing infrastructure construction and operationalization require improvement and its regulation of critical infrastructure such as communications, energy, healthcare, and transportation, is limited. The international development community could provide support for localizing international standards, including cybersecurity

464 "Accessible & Inclusive Technology," U.S. Department of Labor, Office of Disability Employment Policy, n.d., https://www.dol.gov/agencies/odep/program-areas/employment-supports/technology.

465 "Be You" Campaign aims to raise awareness of how technology can help people with Dyslexia and other learning differences," Microsoft News Centre UK, September 29, 2022, https://news.microsoft.com/en-gb/2022/09/29/be-you-campaign-aims-to-raise-awareness-of-how-technology-can-help-people-with-dyslexia-and-other-learning-differences/.

466 Roxana Widmer-Iliescu, "Technologies and strategies for inclusion and accessibility," The UN Agency for digital technologies (ITU), December 2, 2022, https://www.itu.int/hub/2022/12/technologies-and-strategies-for-inclusion-and-accessibility/.

standardization for MNOs and ISPs through more affordable national level certification mechanisms. This could help address cost constraints associated with international accreditation for medium and small businesses in the telecommunication sector and thus improve diversification. The ISO 9001 certification approach[467] taken by Brazil offers a helpful model for localizing international standards. (See Box 8 for additional consideration for boosting last-mile broadband adoption.)

B. Diversify first mile connectivity by gaining and expanding access to submarine cable connection. Armenia needs diverse and trusted ICT infrastructure to ensure a reliable, secure, and interoperable foundation for the country's digital ecosystem. Several major telecommunication companies in Armenia undertake limited initiatives to diversify their first mile solutions, but a more comprehensive approach could coordinate and maximize positive impact on the telecom sector overall. The international development community could support Armenia at a policy level to negotiate access contracts with neighboring countries, modeling engagement with other landlocked countries to increase the country's resilience in first mile connectivity. Modeling the World Bank's work in Rwanda,[468] the international development community could support Armenia in gaining access to submarine cable connection through Georgia. Enhancing Armenia's capacity as a first mile connectivity hub for the Middle East, especially in the context of satellite connectivity prospects, is another consideration. These opportunities provide the potential for joint Armenian-Georgian projects to attract increased investments and elevate the South Caucasus's regional significance as a first mile connectivity hub for neighboring regions.

C. Bridge the gaps in terrestrial infrastructure for middle mile development. The GoA's commitment to expanding fixed broadband to 100 percent of settlements by 2026 presents an opportunity for collaboration with international development organizations. The international development community could support the GoA on policy framework development for middle mile initiatives in support of the strategic goal of improved national broadband infrastructure. Additional support could be provided in infrastructure development, including implementation oversight, quality assurance, systemic and accurate mapping, and climate-resilient infrastructure construction. Ensuring that the middle mile infrastructure is 5G and OpenRAN compatible is a promising direction for meaningful last-mile connectivity improvements. Regional programs such as the World Bank's project on middle mile expansion in rural Georgia could generate useful case studies. [469]

D. Support the Government of Armenia with regulations concerning mandated infrastructure sharing. Mandating infrastructure sharing could significantly boost interoperability and prevent geographic redundancy. The GoA has assumed responsibilities for facilitating mandated infrastructure sharing as part of the CEPA, signifying its commitment to improving infrastructure regulation in Armenia. [470] The international development community could provide technical and regulatory assistance to the GoA in localizing the EU experience in mandated sharing, by exchanging knowledge and expertise regarding regulations of the European Electronic Communications Code (EECC). Support could also be provided in implementing systemic infrastructure mapping, accompanied by a strategic approach to identifying the best suited geographic locations for constructing new infrastructure. These efforts could serve as the first steps in pursuing a comprehensive regulatory framework for connectivity infrastructure and boosting resilience of Armenia's infrastructure.

467 "ISO 9001, Relevance and Impact in Brazil, 2016," United Nations Industrial Development Organization (UNIDO), https://www.unido.org/sites/default/files/2016-09/ISO_9001_Brazil_1.11_pages_0.pdf.

468 "Project Appraisal Document on a Proposed Grant to the Republic of Rwanda for a Regional Communications Infrastructure Program (Phase 2)," The World Bank, September 15, 2008, https://documents1.worldbank.org/curated/ru/653571468194653665/pdf/452990PAD0P1061Y10IDA1SecM200810592.pdf.

469 "Project Information Document," The World Bank, July Georgia, https://documents1.worldbank.org/curated/en/902091595517787639/pdf/Project-Information-Document-Log-In-Georgia-P169698.pdf, July 23, 2020,

470 Public Sector organization, interview by DECA team, January 2024, online.

This recommendation supports the Digital Principles Understand the Existing Ecosystem, Share, Reuse and Improve, and Build for Sustainability. It is also related to SDGs 9 Industry, Innovation, and Infrastructure and 11 Sustainable Cities and Communities.

BOX 8: Additional considerations for boosting last-mile broadband adoption

As noted in Section 1.2.1, income disparities and discrepancies in broadband connectivity and affordability between urban and rural communities pose a barrier to the equitable adoption of digital services in Armenia. It would be beneficial to address these issues with improvements to first mile and middle mile infrastructure and with extending backhaul to underserved regions. Once these challenges are addressed, the international development community could consider the following interventions to address last-mile challenges:

- **Explore alternative last-mile solutions for rural infrastructure development.** Existing models of constructing hard and soft infrastructure, including high-speed internet, in rural Armenian communities could be considered. The USAID/Microsoft Airband Initiative,[471] has piloted different solutions for rural connectivity, including solar-powered community centers and TV white space.
- **Support the GoA in conducting regular speed and quality tests to identify and assess QoS disparities.** The GoA faces technical and capacity challenges for conducting regular internet speed and quality tests.[472] The international development community could provide support to the GoA in executing speed and quality tests and establishing an ongoing internet quality measurement system.
- **Provide technical assistance to create equitable affordability policies and tools.** The World Bank reports a significant disparity in connection speeds between rural and urban areas.[473] Formulation of national policies to achieve an equitable balance between quality and price for rural communities, particularly in light of income disparities, is required to rectify this disparity. New Zealand's Rural Broadband Initiative could serve as a reference point as it focuses on improving broadband connectivity in rural areas by collaborating with local internet service providers and leveraging public-private partnerships. Models such as this could help in addressing affordability issues in remote regions.
- **Support broadband fiber backbone network development in underserved areas of the country through exploration of a Universal Service and Access Fund (USAF).** Universal Service Access Funds could be a means to provide incentives to the private sector to invest in the connectivity of under-developed and rural areas of Armenia. The international development community could work with the GoA to explore the options and mechanisms for a USAF, including development of policies and legislation, and the resultant USAF framework.

5. SUPPORT THE GOA IN THE IMPLEMENTATION OF DIGITALIZATION STRATEGIES THROUGH TECHNICAL ASSISTANCE AND CAPACITY-BUILDING EFFORTS

Armenia's Digitization Strategy envisions the country's digital transformation efforts and lays out objectives and deadlines by which set activities must be implemented. In recent years, the GoA has taken steps to improve coordination and ownership of government digitalization efforts, including the creation of new bodies and delineation of responsibilities. Many of the activities outlined in the digital strategy appear to be incomplete and subsequent processes remain unclear, despite these steps. The GoA's efforts clearly demonstrate a move toward improved collaboration and coordination, but the new structure is still in early stages.

471 "Project Information Document," The World Bank, July 23, 2020, https://www.usaid.gov/digital-development/usaid-microsoft-airband-initiative.

472 Public Sector organization, interview by DECA team, January 2024, online.

473 International Development Organization, interview by the DECA team, December 2023, online.

A. Provide technical assistance on the implementation of digital transformation strategies, grounded in best practices. The international development community could address challenges in implementation and monitoring of progress on digitalization by assisting Armenia in actively monitoring and evaluating the impact of its digital transformation initiatives, ensuring compliance with legal frameworks, and measuring the effectiveness of objectives. The international development community could help with conducting impact assessments using monitoring and evaluation approaches.

B. Facilitate cross-functional training experiences to foster inter- and intra- government agency collaboration, knowledge exchange, and organizational culture. By providing capacity-building and training for different public institutions, the international development community could facilitate knowledge exchange, collaboration, and organizational improvement among state institutions. This could help to break down silos. The international development community could assist through comprehensive needs assessments and the development of tailored training programs, including learning from like-minded international partners. These initiatives could include workshops and seminars facilitating collaboration among employees from diverse agencies and enabling the exchange of best practices. The establishment of mentorship programs could foster collaboration and inclusivity within government entities.

C. Develop change management training and build awareness of digital tools to overcome resistance to change and increase support for digitalization efforts. Digital transformation projects in the public sector offer significant opportunities to enhance service delivery and boost transparency and efficiency. These efforts may encounter resistance to change due to a preference for traditional methods and a desire for predictability and could pose a significant barrier to the progress and effectiveness of digital transformation programs. The international development community could support the organization of training sessions and workshops to facilitate the implementation of education campaigns on change management and digitalization. Gaining insights from successful initiatives in other countries—such as the change management training programs offered by the Australian Public Service Commission—[474] the international development community could tailor training modules to suit the needs of the target audience.

D. Support capacity-building focused on principles of data protection and privacy. Challenges in the public sector on privacy protection and the absence of policies concerning the use of government tools and systems pose a potential cybersecurity risk, raise concerns about personal data protection, and open the public sector to the risk of data breaches. The international development community could help the GoA overcome these challenges by initiating an assessment of current data protection and privacy policies and standards and providing expertise to enhance capacity and implement principles. Workshops on confidentiality, data protection principles, and ethical decision-making could help ensure that government employees are equipped with the knowledge and skills to handle sensitive information responsibly. Drawing on examples like the development of guidance and tools by New Zealand[475] for government agencies and USAID cybersecurity training videos and data governance materials, the international development community could support the GoA in establishing similar frameworks with oversight from relevant authorities such as the MHTI and the Personal Data Protection Agency of Armenia. (Refer to Box 9 for details on GoA capacity building in AI technologies.)

474 "Change Management Foundation," Australian Public Service Academy, n.d., https://www.apsacademy.gov.au/change-management-foundation.

475 "Privacy: Advice, guidance and tools to help government agencies improve their privacy capability and maturity," Digital Government New Zealand, n.d., "https://www.digital.govt.nz/standards-and-guidance/privacy-security-and-risk/privacy/.

This recommendation supports the Digital Principles Understand the Existing Ecosystem and Build for Sustainability. SDG 8 Decent Work and Economic Growth, SDG 9 Industry, Innovation, and Infrastructure, and SDG 17 Partnerships for the Goals are most relevant to this recommendation.

BOX 9: Capacity-building for the GoA in AI technologies.

The Government of Armenia has demonstrated interest in adopting emerging digital solutions such as AI technologies, including plans to launch the country's first artificial intelligence (AI) supercomputing center.[476] The State Revenue Committee shows a keen interest in adopting AI solutions, with ongoing implementation in tax services, and the Cadastre Committee is interested in building a national spatial data infrastructure, potentially enhancing online service delivery.

Given its low capacity in digital tools, the GoA could benefit from support in navigating the emerging AI landscape, aligned with international ethical, practical, and legal standards. This presents an opportunity for USAID to offer capacity-building and expertise sharing to Armenian state institutions.

6. BOLSTER THE INFORMATION INTEGRITY AND MEDIA LITERACY ECOSYSTEM

Armenia's media sector has undergone rapid transformation, with the rise of social media platforms as key channels for sharing information and a cause for decrease in trust of traditional media. Armenia experiences mis- and disinformation, particularly at times of crisis. In this evolving ecosystem, media outlets and civil society organizations (CSOs) play pivotal roles in shaping public discourse, advocating for media literacy, and safeguarding the integrity of information. However, CSOs and media outlets often lack the human and technological capacities to fully respond to these challenges, with many seeking support from diverse sources such as donors. The current state of collaboration and support offered to CSOs and media outlets is considered insufficient to meet needs.

A. Facilitate international collaboration to combat disinformation campaigns. Disinformation is rampant in Armenia, particularly around COVID-19, Russia's invasion of Ukraine, and during border conflicts such as the Nagorno-Karabakh War. The international development community can play a pivotal role in assisting the GoA in combating disinformation campaigns. International development actors could advocate for the government to allocate resources to research and innovation initiatives aimed at developing tools and strategies for identifying, analyzing, and mitigating disinformation. The international development community could work with the GoA to increase its understanding of the challenges related to mis- and disinformation and how social media is used to spread information. This could involve funding research projects, fostering academic collaborations, and promoting private sector involvement in innovation efforts. Strengthening legal and regulatory frameworks aimed at addressing disinformation on an international scale could be beneficial, including harmonization of relevant areas of law such as data privacy, cybersecurity, and online content moderation.

B. Support the development of crisis plans for provision of timely and accurate information. In Armenia's media landscape, fluctuating mis- and disinformation is primarily connected to events such as the Covid-19 pandemic, cross-border conflicts, and political events.[477] The government struggles with communication challenges, such as delays in providing timely and accurate information to the public. This contributes to the spread of

476 "Armenia's first AI supercomputing centre expected to boost technological advances," EU4Digital, April 12, 2023, https://eufordigital.eu/armenias-first-ai-supercomputing-centre-expected-to-boost-technological-advances/.

477 Two civil society organizations, interviews by DECA Team, January 2024, online. Media organization, interview by DECA Team, January 2024, online.

misinformation, as incomplete or inaccurate information is circulated and discussed among the population. The international development community could support the GoA in enhancing its communication capabilities, particularly during crises through training and technical assistance to government agencies responsible for disseminating information to the public. The EU crisis response mechanism[478] that supports rapid and coordinated decision-making for political crises, natural disasters, manmade emergencies, health crises, and complex crises such as acts of terrorism is a strong model to draw from. This mechanism employs various tools to respond to crises, including stakeholder information meetings, analytical reports for decision-makers, a dedicated platform for information sharing, and collection of data on misinformation and disinformation. This comprehensive approach helps in developing crisis plans that could be used as a model and customized to fit Armenia's specific needs and circumstances.

C. Facilitate media literacy for the general public with a focus on critical thinking and fact-checking. Armenia is experiencing high levels of misinformation and disinformation, particularly through online platforms such as Facebook, Telegram, TikTok, and blogs, which are increasingly popular, particularly among the younger generation. Given these consumption habits and the decrease of trust in traditional news sources and institutions, there is a pressing need for media literacy education. The international development community could support initiatives aimed at enhancing media literacy, focusing on programs that promote critical thinking and fact-checking. By fostering a more informed and engaged public, such initiatives could contribute to combating misinformation and strengthening democratic processes. A national edutainment platform in Ukraine[479] offers educational series on various topics including combating misinformation, digital literacy, and cybersecurity. The international development community could develop similar initiatives tailored to Armenia's context.

D. Encourage media outlets to collaborate and connect with fact-checking organizations. Media outlets in Armenia often lack the capacity to establish fact-checking mechanisms and collaborate with local and international organizations. The international development community can support media outlets and local fact-checking organizations in expanding their operations and investing in technology and infrastructure for verifying information. International development actors could promote international cooperation and knowledge-sharing among fact-checking organizations and media outlets with several initiatives:

» Organize workshops and training sessions for Armenian media professionals to enhance their understanding of fact-checking methodologies, tools, and best practices. Offer training and mentoring programs for fact-checkers and journalists to build their skills in investigative reporting.

» Facilitate the creation of networks offering Armenian media outlets opportunities to collaborate with reputable international fact-checking organizations. Facilitate collaboration between FactCheck.org,[480] a project of the Annenberg Public Policy Center, and various Armenian media organizations.

» Assist Armenian media outlets in getting access to resources and guidance from the Poynter Institute's International Fact-Checking Network (IFCN),[481] which promotes best practices and standards in fact-checking globally. Partnerships with foreign organizations could help Armenian news outlets improve their fact-checking skills and push for more transparency and accountability in reporting.

478 "How the EU responds to crises and builds resilience," Council of the European Union, n.d., https://www.consilium.europa.eu/en/policies/eu-crisis-response-resilience/#emergencies.

479 "How to protect yourself from fakes and misinformation," Osvita, n.d., https://osvita.diia.gov.ua/courses/how-to-protect-yourself-from-fakes-and-disinformation.

480 FactCheck.org, https://www.factcheck.org/.

481 "Empowering fact-checkers worldwide," International Fact-Checking Network (IFCN), n.d., https://www.poynter.org/ifcn/.

This recommendation is highly relevant to the Principles for Digital Development including Establish people-first data practices, Create open and transparent practices, Anticipate and mitigate harms. It most closely relates to SDG 16 Peace, Justice, and Strong Institutions.

7. SUPPORT THE MODERNIZATION OF ARMENIAN PAYMENT INFRASTRUCTURE AND RELATED REGULATORY FRAMEWORKS

The Armenian payment infrastructure has experienced significant improvement over the last years, spurred by legislative changes in January 2022,[482] the impact of the COVID-19 pandemic, and the entry of Google Pay and Apple Pay into the market.[483] Despite this progress, several challenges remain, including the outdated architecture of the RTGS system for wholesale payments,[484] severe delays in account-to-account transfers, and significant challenges related to international transfers such as high compliance costs with foreign banks and the absence of alternatives such as PayPal and Stripe.[485] The international community could play a pivotal role in supporting Armenia's modernization of its payment systems.

A. Facilitate knowledge transfer to accelerate Armenia's payment system modernization: The international development community could support payment system stakeholders in fora for collaboration and sharing of best practices related to instant payments. By creating mechanisms through which stakeholders can regularly collaborate, specific concerns around changes to the ecosystem can be addressed and buy-in can be built. This could include organizing a conference on instant payments, featuring experiences from countries such as lessons learned, insights into overcoming challenges, and potential models suitable for adaptation to the local context. Facilitating study tours for Armenian regulators, banking representatives, and payment service providers to countries with advanced instant payment systems could provide firsthand exposure to the operational aspects and technology solutions employed in payment systems.

B. Support the development of payments infrastructure. International organizations and development agencies could provide technical assistance to upgrade the CBA's RTGS architecture. This could involve the development of a modular system that allows for future integrations and expansion with minimal disruption, as well as compliance to ISO 20022 for data-rich transaction messages. International support could be offered to ensure the successful modernization of the ARCA retail payment system, including investment in robust technology infrastructure for instant payments. Development of a standardized API architecture is crucial, facilitating secure and efficient data exchange among payment service providers. This would promote interoperability across different financial institutions and innovation within the Armenian payments ecosystem.

C. Help address barriers to cross-border payments in Armenia. Addressing the challenges of international transfers is crucial for Armenia's integration into the global economy. One key area in which the international development community could assist is in negotiations with international payment service providers, initiating discussions with international payment providers to explore the possibility of them entering the Armenian market. Verifone[486] operates in Azerbaijan and could be explored as a potential entrant to the market.

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482 "Law on Non-cash Operations," Armenian Legal Information System (ARLIS), July 1, 2022, https://www.arlis.am/documentView.aspx?docid=182293.

483 "Apple Pay participating banks in Africa, Europe, and the Middle East," Apple Pay, n.d., https://support.apple.com/en-am/109516. "Find supported payment methods," Google Wallet Help, n.d., https://support.google.com/wallet/answer/12059326?hl=en-GB&co=GENIE.CountryCode%3DAM.

484 Private sector organization, interview by DECA Team, January 2024, online.

485 Erik Vardanya, "Central Bank Digital Currency Case of Armenia," Central Bank of Armenia (CBA), June 26, 2023, https://www.cba.am/EN/panalyticalmaterialsresearches/CBDC_26.06.2023.pdf.

486 "Omni-Commerce Solutions that Shape Powerful Customer Experiences," Verifone, n.d., .https://www.verifone.com/en/us.

Conversations with Wise[487] could explore challenges to their operation in Armenia, such as the use of SWIFT and the implications for payments. (See page 84.) The international development community could connect the Armenian payment system with global payment systems such as TARGET2 in Europe, which will help ease the problems of correspondent banking relationships and reduce costs. Such a move would significantly improve the ease and accessibility of receiving international payments, especially for e-commerce businesses. The increased compliance costs for having direct access to correspondent banking, often linked to enhanced anti-money laundering (AML) and Countering Finance of Terrorism (CFT) compliance, are often prohibitive for local banks, leading to significant bottlenecks in international payments. The international community could help address these challenges in several ways, such as providing technical assistance and training to Armenian banks to strengthen their compliance practices and meet international AML/CFT standards, and by engaging in advocacy efforts to highlight the disproportionate impact of compliance costs on Armenian banks.

This recommendation is related to the Principles for Digital Development, including Share, reuse and improve, and Build for Sustainability. It is highly relevant to SDG Goal 8 (Decent Work and Economic Growth and SDG 9 Industry, Innovation and Infrastructure.

8. STRENGTHEN THE PROTECTION AND ENFORCEMENT OF CONSUMER RIGHTS IN THE E-COMMERCE SECTOR

E-commerce in Armenia has experienced significant growth in recent years,[488] yet the country lacks a dedicated e-commerce law. Gaps remain in online marketplace governance, including inadequate transparency in online contracts, insufficient protection against deceptive advertising practices, weak regulations on misleading customer reviews, poor security standards for online marketplaces,[489] and lack of clarity around guaranteed maximum delivery timeframes. These inadequacies result in inadequate consumer protection and enforcement mechanisms and expose online shoppers to risks.[490] Armenia also lacks a dedicated alternative dispute resolution (ADR) mechanism for resolving e-commerce disputes efficiently and affordably outside of the traditional court system.[491] There is no specific government agency designated to enforce consumer rights in the e-commerce sector.[492] Action on several fronts, including addressing legal gaps, establishing stronger enforcement mechanisms, and raising general public awareness about consumer rights in e-commerce is needed. Possible measures could include:

A. Addressing legal gaps in consumer protection, aligning consumer protection measures with the best international practices. The international development community could support the integration of robust consumer protection regulations into e-commerce legislation. International organizations and experts could provide technical assistance and share best practices from other countries that have successfully addressed similar challenges in e-commerce regulation. Assistance could be provided to ensure alignment with global consumer protection standards, such as the EU directives on commercial practices. This comprehensive

487 "Save When You Send Worldwide," Wise, n.d., https://wise.com/.

488 "Analysis of Armenia's cargo transportation routes and development of export promotion support mechanisms," Ministry of Economy of the Republic of Armenia, August 30, 2023, https://mineconomy.am/en/news/3006.

489 "Recommendations Proposed for E-Commerce Environment Harmonisation in the Eastern Partnership Countries: Republic of Armenia,"- EU4Digital, 13 January, 2021. https://eufordigital.eu/wp-content/uploads/2021/04/eCommerce-report-%E2%80%93-Recommendations-proposed-for-eCommerce-environment-harmonisation-in-the-EaP-countries-Republic-of-Armenia.pdf

490 ibid

491 ibid.

492 Two private sector organizations, interview by the DECA Team, January 2024, online.

approach—combining international expertise and lessons learned elsewhere—could strengthen Armenia's consumer protection framework.

B. Supporting GoA in creating the mechanisms for enforcing consumer protection. Armenia's e-commerce sector lacks the necessary dispute and reporting mechanisms to protect consumers in the online space. The international development community could work in collaboration with the GoA to review international best practices and explore options for the formation of reporting and dispute mechanisms along those lines, such as a dedicated regulatory body responsible for enforcing consumer protection or a centralized online platform for reporting consumer protection violations. An alternative dispute resolution (ADR) mechanism would provide consumers with faster and more affordable options compared to traditional court proceedings. Examples from other countries offer options, such as the Austrian Internet Ombudsman, a project run by the Austrian Institute for Applied Telecommunications that offers mediation and alternative dispute resolution for e-commerce consumers.

A platform for reporting e-commerce violations could be integrated into such a body, allowing for seamless reporting and investigation. Such platforms already exist in countries like the UK, where the Citizens Advice[493] consumer service offers an online reporting tool, and in Australia, where the ACCC's Scamwatch[494] focuses on reporting fraudulent online practices. In Armenia, consumers can report complaints against financial institutions to the Institute of Financial Mediator.

C. Conduct awareness campaigns to educate consumers about their rights and safe online practices. The international community could play a vital role in bolstering consumer awareness about rights and safe online practices in Armenia's e-commerce sector.[495] Collaborative efforts could involve partnerships among international NGOs, online marketplaces, and local media outlets to facilitate the development of targeted campaigns utilizing various channels. Working together, these stakeholders could empower Armenian consumers to navigate the e-commerce landscape confidently and protect themselves from potential online risks. (See Box 10 for additional considerations on financial inclusion and bridging the urban-rural divide.)

> *This recommendation is closely related to the following Principles for Digital Development: Design with people, Establish people-first data practices, and Anticipate and mitigate harms.*

9. EXPLORE OPPORTUNITIES FOR THE DEVELOPMENT OF SHARED INFRASTRUCTURE IN E-COMMERCE THROUGH PARTNERSHIPS

Armenia's postal and courier services have witnessed significant growth, with a mounting number of licensed companies[496] and a key role for Haypost, the national postal operator, in the development of e-commerce infrastructure.[497] However, the logistics landscape is fragmented and collaboration with Haypost is not widespread, leading e-commerce platforms to rely on independent delivery services.[498] This fragmented approach results

493 "Welcome to Citizens Advice," Citizens Advice, n.d., https://www.citizensadvice.org.uk/.

494 "We're making Australia a harder target for scammers," Australian Government National Anti-Scam Centre, n.d., https://www.scamwatch.gov.au/.

495 Private sector organization, interview by DECA Team, January 2024, online.

496 "Postal communication activity license," Ministry of High-tech Industry of the Republic of Armenia (MHTI), n.d., https://hightech.gov.am/hy/services/license-for-postal-communication-activity.

497 "Postal Development Report 2022," Universal Postal Union, 2022, https://www.upu.int/en/Publications/2IPD/Postal-Development-Report-2022.

498 Private sector organization, interview by DECA Team, January 2024, online.

in limited resource sharing, higher delivery costs, and extended delivery times. The limited adoption of digital tools such as the Internet of Things (IoT) for real-time tracking further complicates user experiences. This opens opportunities for the international community to facilitate the development of shared e-commerce infrastructure in Armenia.

A. Foster collaboration on shared infrastructure projects between the government, the national post office, and private sector entities. Establishing dedicated forums for collaboration among industry associations could be a pivotal step in fostering discussions about shared infrastructure practices within Armenia's e-commerce sector. International organizations and development agencies can act as facilitators, bringing key stakeholders together and providing guidance on structuring successful public-private partnerships (PPPs).

B. Support the GoA in designing incentives schemes for businesses engaging in shared infrastructure initiatives. The international community could assist the Armenian government in designing effective incentive schemes to encourage businesses to participate in shared e-commerce infrastructure initiatives. International guidance could help promote co-investment models, as seen in some advanced economies. These include requiring operators to share deployment plans and facilitating the use of rights of way. While evidence from emerging markets is limited, studies from advanced economies suggest that co-investment strategies can significantly increase the availability of such services for end-users.[499]

> *The recommendation covers the Principle for Digital Development: Build for sustainability. It is highly relevant to SDG Goal 9 Industry, Innovation, and Infrastructure and SDG Goal 17 Partnerships for the Goals.*

499 Davide Strusani, Georges V. Houngbonon, "Accelerating Digital Connectivity Through Infrastructure Sharing," The World Bank, February 2020, https://documents1.worldbank.org/curated/en/393751587022505573/pdf/Accelerating-Digital-Connectivity-Through-Infrastructure-Sharing.pdf.

BOX 10: Additional considerations for bridging the financial inclusion gap between rural and urban regions

Armenia has made significant strides in digital financial inclusion, but a stark digital divide persists between urban and rural areas.[500] Several factors contribute to the lower adoption of DFS in rural areas, including a preference for cash, limited financial literacy, a lack of financial products tailored to rural needs, and a general distrust of financial institutions.[501] International organizations and development agencies could partner with the Armenian government to support initiatives aimed at increasing DFS uptake in rural areas and bridging the digital financial inclusion gap, such as reaching rural populations with tailored information on the benefits of DFS. Models could include:

- An awareness campaign focusing on security, convenience, and efficiency could address perceptions and understanding of DFS among rural populations[502] This could include information on common risks and how to combat vulnerabilities to increase confidence. To maximize impact, these campaigns could be built around relatable local influencers or success stories, sharing real-life testimonials from community members and building trust in the financial system.
- Interactive workshops created in collaboration with banks could demonstrate to residents in rural areas how to use mobile banking applications for digital transactions. These workshops could include hands-on demonstrations of mobile banking applications to build practical skills and overcome confidence barriers. This could include basic digital hygiene and understanding of the risks of DFS and how to combat them[503]
- Work with CSOs or DFS providers to create a simulation game to make virtual transactions, manage budgets, and experience the benefits of digital finance. Inspired by successful examples like Visa's Financial Football,[504] the game could immerse players in realistic financial scenarios. Through gamification, residents in rural regions could develop practical skills, become comfortable with digital finance, and feel empowered to make the transition to real-world DFS usage.[505]

500 "The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19," The World Bank, 2021, https://www.worldbank.org/en/publication/globalfindex.

501 Four private sector organizations, interviews by DECA Team, January - February 2024, online.

502 Private sector organization, interview by DECA Team, January 2024, online.

503 Private sector organization, interview by DECA Team, January 2024, online.

504 "Play. Learn. Power Up," Financial Football, n.d., https://www.financialfootball.com/.

505 Private sector organization, interview by DECA Team, January 2024, online.

Appendices

A. SUPPLEMENTARY INFORMATION

TABLE 5: Legislative acts and policies related to digital governance

DOMAIN	LEGISLATION	DESCRIPTION
DIGITAL TRANSFORMATION	RA Government Decision No. 183-L "On approval of Armenia's digitalization strategy, its activities' program and results indicators" («Հայաստանի թվայնացման ռազմավարությանը, ռազմավարության միջոցառումների ծրագրին և արդյունքային ցուցանիշներին հավանություն տալու մասին» N 183-L ՀՀ կառավարության որոշում), February 11, 2021.	The GoA adopted Armenia's Digitalization Strategy and Action Plan for 2021-2025 with this decision. The strategy envisages the digital transformation of the government, the economy, and society through the introduction and development of innovative technologies, cyber security, data policy, digital services, and digital government systems.
ACCESS TO INFORMATION	RA Law "On Freedom of Information" (Տեղեկատվության ազատության մասին ՀՀ օրենք), September 23, 2003.	The law sets out rules regarding freedom of information, establishes the responsibilities of information holders regarding the dissemination of information, and specifies the processes, documentation, and requirements for acquiring information. The law states basic principles that ensure freedom of information such as the unified procedure for registering, classifying, and maintaining information, and protecting the freedom to seek and receive information.
	RA Government's decision N 1204-N on "Establishing the order for registration, classification and storing of the information processed by the owner of the information or of the information delivered to him, as well as for provision of information or its duplicate (copy) by bodies of State and local self- government, State institutions and organizations ", (Տեղեկատվություն տնօրինողի կողմից մշակված կամ նրան առաքված տեղեկությունների գրանցման, դասակարգման եվ պահպանման, ինչպես նաեվ պետական եվ տեղական ինքնակառավարման մարմինների, պետական հիմնարկների ու կազմակերպությունների կողմից տեղեկության կամ դրա կրկնօրինակի (պատճենի) տրամադրման կարգը սահմանելու մասին ՀՀ կառավարության N 1204-Ն որոշում), October 15, 2015.	This decision covers the "registration, classification, and storage of information" to or by the State or local self- government bodies. It was implemented to provide further assurances regarding the proactive dissemination of information and to govern relations regarding the registration, classification, and storage of data handled by or provided to the information holder.

DOMAIN	LEGISLATION	DESCRIPTION
INFORMATION PUBLICITY	RA Government Decision N 1521-N "On the approval of the minimum requirements for the official websites of the state bodies on the internet network" (Ինտերնետ ցանցում պետական մարմինների պաշտոնական կայքերին ներկայացվող նվազագույն պահանջները հաստատելու մասին ՀՀ կառավարության N 1521-Ն որոշում), December 26, 2013.	The decision defines the minimum technical and organizational requirements for the official websites of state bodies on the internet, including security mechanisms, content allowances, and requirements for ensuring freedom of information.
	RA Government Decision N. 1204-N "On information registration, classification and storage of information processed by or delivered by the information holder as well as on determining the procedure for providing information or its duplicate (copy) by state and local self-government bodies, state foundations and organizations" (Տեղեկատվություն տնօրինողի կողմից մշակված կամ նրան առաքված տեղեկությունների գրանցման, դասակարգման և պահպանման, ինչպես նաև պետական եվ տեղական ինքնակառավարման մարմինների, պետական հիմնարկների ու կազմակերպությունների կողմից տեղեկության կամ դրա կրկնօրինակի (պատճենի) տրամադրման կարգը սահմանելու մասին ՀՀ կառավարության N 1204-Ն որոշում) October 15, 2015.	This decision requires state and local self-government bodies to provide online submission options for applications, complaints, and requests through the "Unified Platform for Electronic Requests"[506] on their official websites.
PERSONAL DATA PROTECTION	The Law on Personal Data Protection (Անձնական տվյալների պաշտպանության մասին ՀՀ օրենք), July 1, 2015.	This law outlines the rights and responsibilities of individuals providing personal data and those processing it. It establishes guidelines, procedures, and conditions for how personal data can be processed by various entities, including governmental bodies, organizations, and individuals.
	The RA Government decision N. 1849-N "On Approval of personal data exchange procedure through electronic information system" (Էլեկտրոնային տեղեկատվական համակարգի միջոցով անձնական տվյալների փոխանցման կարգը հաստատելու մասին ՀՀ կառավարության որոշում), December 19, 2019.	Building on the Law on Personal Data Protection, this decision establishes rules and processes concerning the transfer of personal data stored and processed electronically by local and state self-government entities through the electronic information system and the interconnection of databases.

506 Unified Portal For Online Requests, accessed March 29, 2024, https://e-request.am/en.

DOMAIN	LEGISLATION	DESCRIPTION
INTEROPERABILITY	The RA Government decision N 1093-N "On determining the security, interoperability and general technical requirements of electronic systems used for providing electronic services or performing operations by state and local self-government bodies" (Պետական և տեղական ինքնակառավարման մարմինների կողմից էլեկտրոնային ծառայությունների մատուցման կամ գործողությունների կատարման համար օգտագործվող էլեկտրոնային համակարգերի անվտանգության, փոխգործելիության և տեխնիկական ընդհանուր պահանջները սահմանելու մասին ՀՀ կառավարության որոշում) August 31, 2015.	This decision sets forth the security, interoperability, and general technical standards for electronic systems utilized in offering electronic services or conducting activities by state and local self-government entities.
DIGITAL SIGNATURE AND IDENTIFICATION	RA Law "On electronic document and electronic digital signature"(Էլեկտրոնային փաստաթղթի ևէլեկտրոնային թվային ստորագրության մասին ՀՀ օրենք),December 14, 2004	This law establishes a legal framework that recognizes electronic documents and electronic digital signatures. It defines an electronic document, including the forms (original, copy) of electronic documents. It also defines the application of electronic digital signature.
	The Law of the Republic of Armenia "On Identification Card" (Նույնականացման քարտերի մասինՀՀ օրենք) November 30, 2011	This law defines the concept of identification cards for Armenian citizens, incorporating electronic data storage as a crucial component. This storage contains citizen data as required by law, along with individual cryptographic keys for data protection. It includes certificates for electronic signatures and identification, alongside provisions for email correspondence.
	RA Government Resolution N. 572-N (ՀՀ կառավարության N 572-ն որոշում), May 25, 2017.	This resolution establishes the procedure for the application of electronic documents and electronic digital signatures in state bodies, as well as the general technical requirements for electronic systems used by state and local self-government bodies when providing services or actions that utilize electronic digital signatures.
	The Government of Armenia's decision N 285-N "On determining the procedure for issuing and providing electronic digital signature certificates on other types of material carriers except for issuing electronic digital signature certificates on identification cards"(Նույնականացման քարտում զետեղվող էլեկտրոնային թվային ստորագրության հավաստագրերի թողարկումից բացի այլ տեսակի նյութական կրիչներում զետեղված էլեկտրոնային թվային ստորագրության հավաստագրերի թողարկման և տրամադրման կարգը սահմանելու մասին ՀՀ կառավարության որոշում), March 1, 2018	This decision outlines the procedure for issuing and providing electronic digital signature certificates on physical carriers, other than issuing such certificates on identification cards. It governs the procedures on the issuance of electronic digital signature certificates for citizens of the Republic of Armenia, refugees, stateless individuals, and foreign nationals.

DOMAIN	LEGISLATION	DESCRIPTION
CYBERSECURITY	Armenia's National Security Strategy(Հայաստանի Հանրապետության Ազգային անվտանգության ռազմավարություն), 2020	This strategy covers a five-year period and emphasizes challenges in information security and cybersecurity and sets priorities regarding the establishment of comprehensive state policies, legislation to protect critical information infrastructure, and measures to strengthen institutional capacity. It underscores the need to improve efficiency within information technology and cybersecurity institutions, alongside a focus on infrastructure advancement.
PUBLIC DISCUSSION	The RA Government's Decision N. 1146-N,"On determining the procedure for organizing and conducting public discussions " (Հանրային քննարկումների կազմակերպման և անցկացման կարգը սահմանելու մասին ՀՀ կառավարության որոշում) October 10, 2018.	This decision outlines the procedure for organizing and conducting public discussions. It makes it mandatory to conduct a public consultation of a draft normative legal act through publication of the act on the official website of the agency, as well as on the Unified Website for Publication of Draft Legal Acts maintained by the RA Ministry of Justice e-draft.am.
MEDIA	The RA Law "On Mass Media"(Զանգվածային լրատվության մասին ՀՀ օրենք), December 13,2003.	This law establishes fundamental principles governing the operation of the media and general standards of media legislation. It establishes criteria for journalist accreditation, safeguards for the right to free speech in the media domain, requirements for the denial of disseminated information and the exercise of the right to a response, and the circumstances under which individuals engaged in media activities are safeguarded from liability. In November 2023, the Ministry of Justice of the Republic of Armenia introduced amendments to this law for public discussion. An expert from the media sector said that the draft law was developed with the participation of experts from the Ministry of Justice, and from international human rights organization Freedom House and the Media Ethics Monitoring Body of Armenia. The Law on Mass Media aims to define media self-regulation as a component of the media's social responsibility, including that the quality of media activity should be ensured without State intervention. The Law also defines media self-regulation, which includes the establishment of a code of ethics and the presence of a self-regulatory body. It guarantees that media outlets with a self-regulation system in place have an unconditional right to accreditation in public institutions.

DOMAIN	LEGISLATION	DESCRIPTION
	The Law "On Audiovisual Media" (Տեսալսողական մեդիայի մասին ՀՀ օրենք), July 16,2020.	This law regulates relevant activities for operators and audiovisual service providers. It defines the procedure for determining the rights and obligations of audiovisual media service providers and operators, and for issues related to authorization, licensing, and submission of notices.
DISINFORMATION	The decision, No. 1319-L "On Approval of the 2024-2026 Concept of the Fight Against Disinformation of the Republic of Armenia and the Plan of Action Arising from it".(Հայաստանի Հանրապետության ապատեղեկատվության դեմ պայքարի 2024-2026 թվականների հայեցակարգը և դրանից բխող գործողությունների ծրագիրը հաստատելու մասին ՀՀ կառավարության որոշում)	This decision approves the 2024-2026 agenda for combating disinformation in the Republic of Armenia. The decision also includes the action plan resulting from the agenda.[507]
INTERNET GOVERNANCE	Protocol Decision N34 on "Approval of Internet Governance Principles."	The GoA established the main internet governance principles in accordance with this decision. Additionally, it formed the Internet Governance Council of the Republic of Armenia (IGC) to regulate internet governance functions.

TABLE 6: Incubation and Acceleration Programs in Armenia

PROGRAM	DESCRIPTION	OUTCOMES
ENTERPRISE INCUBATOR FOUNDATION (EIF)	**WB IMG.** Financial assistance (with grants ranging from $10,000 to $50,000) to teams, tech startups, and existing companies (up to 3 years old) to support the development and marketing of innovative products or services, requiring a 50 percent funding match from the applicant **WB RMG**. Financial assistance (with grants ranging from $10,000 to $50,000) to tech startups and companies for the development, marketing, and regional expansion of innovative technology products or services, requiring a 15 percent funding match from the applicant **EU-GIZ IMG**. Financial and technical assistance to tech startups and existing SMEs to develop innovative products for global and domestic markets **EU4Business Science and Technology Entrepreneurship (EU4Business STEP) program.** Grants and mentorship to help startups, scientists, and researchers develop innovative and commercially viable technology products	More than 80 funded startups $2.5 million funding More than 300 new job openings

507 "Government decree N 1319-L," E-government Armenia, accessed March 29, 2024. https://www.e-gov.am/u_files/file/decrees/varch/GV65-3FA5-9437-87B6/1319.1.pdf.

PROGRAM	DESCRIPTION	OUTCOMES
AMERICAN UNIVERSITY OF ARMENIA ENTREPRENEURSHIP AND PRODUCT INNOVATION CENTER (EPIC)	**STRIVE pre-incubation.** A 10-week educational program to develop entrepreneurial skills in individuals **EPIC Incubation.** A 15-week program during which idea-stage startups learn proven tools to validate startup ideas, discover customers (and competitors), test their ideas, are introduced to local and international markets, and enter the startup ecosystem	10 generations of graduates, including 120 startups and 300 entrepreneurs
BANA STARTUP INCUBATOR	Aims to create B2B startups ready to enter the SAP Startup Factory acceleration program, through three components: A three-day boot camp of workshops and assignments, preparing for upcoming incubation A 32-week educational program of training, workshops, and one-on-one meetings based on assessed needs of the startups selected Demo Day. A pitch opportunity for investors, experts and potential customers	37 applicants (1 startup and 36 individuals) 11 startups in the bootcamp 5 startups selected for the demo day
IRIS BUSINESS INCUBATOR	Supports Syrian-Armenian and local entrepreneurs in establishing successful businesses by providing a unique full cycle of business support services, including coaching, mentoring, training, and access to finance with grant and loan funds.	44 companies from Yerevan and the regions have received grants in a total amount of about €275,000 Loans of in a total amount €137,000
NERUJ	A program that offers financial support to diaspora entrepreneurs to base their startups in Armenia. The 6-day event has a full agenda, which includes individual courses and master classes by leading experts in the field. Winning teams in the idea stage receive 15, 10, 5 million AMD, and winning teams with a product receive support of up to 30, 20, 10 million AMD.	148 startups, with 269 representatives, participated in Neruj 1-3 programs 9 startups received grants
HEROHOUSE	**Entrepreneurial Assistants School.** An educational program that inculcates a set of applicable entrepreneurial skills (e.g. business intelligence and customer development, growth marketing, venture capital, product management and analytics)	Over 500 mentorship hours 90 percent of graduates employed in the tech industry
	AI Incubator: Two-week personalized learning, followed by 18 weeks of continuous meetings with startups, research groups, and companies to create scalable business solutions in the area of AI.	19 company graduates with 35 researchers 2 patentable technologies

PROGRAM	DESCRIPTION	OUTCOMES
ARMENIA STARTUP ACADEMY	**Pre-acceleration program.** Guides prototype-stage startups through idea validation, customer development, go-to-market strategy development, and pitching. **Traction program.** An intensive mentorship-based growth program designed for companies that have managed to gain initial traction, and need help to expand it.	More than EUR 10 million raised More than 100 experts and mentors enrolled More than 190 sessions and workshops 121 startups involved and 91 startups graduated
IMPACTAIM THEMATIC ACCELERATORS	**Accelerator #5**. A program to enhance digital and entrepreneurial skills of Armenian children (7–14 years old) and youth and women (15+ years old).	About USD 600,000 invested More than 700 individuals enrolled in mentorship and training 36 alumni startups
	AgriTech Accelerator. A 10-week incubation and 12-week acceleration program—jointly with the Agrarian University of Armenia—offering training, product testing, and pitching.	
	Climate Change Technology Accelerator. A 16–20-week program in cooperation with EIF that offers both monetary (up to USD 10,000) and non-monetary incentives (introduction to an international network of potential stakeholders).	
	GovTech Accelerator. Executed in cooperation with the Ministry of HTI and designed for pre-seed/seed-stage startup projects	
ASCENT AND INVENT BY FAST FOUNDATION	**ASCENT.** A 4-stage initiative, focusing on: Exploration: Works on AI and biotech solutions in research groups ProtoCo: Conducts feasibility studies and product testing, and develops and patents a prototype NewCo: Establishes a startup company and assists in raising investment GrowthCo: Helps the newly launched companies expand sales and enter new markets	150 venture ideas generated 8 ideas shortlisted 1 idea prototyped
	InVent. A 15-week program implemented in cooperation with Aston University. Enrolled teams form startup companies based on the AI or biotech solutions developed during ASCENT receiving a USD 5,000 seed-funding prize and an opportunity to do an early-stage pitch to the Science and Technology Angel Network.	100 venture ideas generated 2 ideas shortlisted

PROGRAM	DESCRIPTION	OUTCOMES
SAP STARTUP FACTORY BY BANA	An acceleration program building startups on the basis of the needs of SAP clients in three main stages: Selection of startups to participate in the acceleration program Program: A 16-week mentorship in and technical support from the SAP Learning Hub Graduation: An opportunity to pitch to potential investors, clients, and partners	10 mature startups engaged 8 startups graduated

TABLE 7: Formal and Non-Formal Technological Education Initiatives in Armenia

FORMAL EDUCATION PROGRAMS				
YSU	**NPUA**	**AUA**	**RAU**	**EUA**
• Informatics and Applied Mathematics • Information Security • Applied Statistics and Data Science • Nanophysics and Advanced Technologies • Semiconductor Physics and Microelectronics • Telecommunications and Signal Processing • Data Processing in Physics and Artificial Intelligence	• Informatics and Applied Mathematics • Software engineering • Computer engineering • Information systems • Systems with artificial intelligence • Information technologies • Information security • Semiconductor Physics and Microelectronics • Automation • Telecommunications and Signal Processing • Robotics and mechatronics	• Informatics and Applied Mathematics • Data Science • Mechatronics	• Informatics and Applied Mathematics • Electronics and Nanoelectronics • Information Communication Technologies and Systems • Bioengineering and Bioinformatics	• Information Systems • Information Technologies • Computer Science

NON-FORMAL EDUCATION PROGRAMS

Industry-Academia Partnerships

Synopsys Armenia Educational Department (SAED)

- Partners with five universities, offering them advanced software, labs, industry-tailored curricula, and expert guidance.
- 1,592 graduates and 90 PhDs

Specialized Educational Centers

Innovative Solutions and Technology Centre (ISTC)

- Tech hub at YSU for delivering educational programs and facilitating R&D in the IT sector
- More than 2,000 students trained

Armenian National Engineering Laboratories (ANEL)

- Courses covering specializations ranging from cybernetics to power energy and machine building
- About 2,500 students enrolled in training programs annually

Microsoft Innovation Centre (MIC)

- Diverse courses in programming, cybersecurity, UI/UX design, network administration, quality assurance, and project management.
- More than 12,500 students trained, of which 84 percent employed

Armenian-Indian Center for Excellence in ICT

- Located at YSU, delivers short-term and long-term training in IT, business, and design
- More than 500 researchers, students and entrepreneurs involved in training programs annually

Armenian Code Academy (ACA)

- Programming courses covering Java, C++, Python, R, cybersecurity, UX/UI design, cloud computing, and more.
- More than 10,000 alumni and 50 internships

Tech Companies Offering Training

- PicsArt
- Digital
- Synergy
- Instigate
- DISQO

B. DEFINITIONS

Definitions from the USAID DECA Toolkit unless otherwise mentioned.

Affordability: Whether a person can afford the cost of data relative to their income, measured as gigabytes (GBs) of data per percentage of monthly income. The Alliance for Affordable Internet (A4AI) uses a "1 for 2" measure for affordable internet. Affordable internet is where 1GB of mobile broadband data is priced at 2 percent or less of average monthly income.

Artificial Intelligence (AI): The science and technology of machines that perform activities normally thought to require human intelligence. One subset of AI is Machine Learning (ML), a technique in which computers "learn" to recognize patterns in existing data, creating systems that can be more flexible, responsive, and adaptable than previously possible. Some AI systems use computers to automatically make decisions, while others develop recommendations for human decision-makers.

Blockchain: An example of a distributed ledger technology (DLT), which is a type of shared, peer-to-peer computer database that enables all network participants to agree on a set of facts or events without needing to rely on a single, centralized, or fully trusted intermediary party. Blockchains are the most common form of DLT, and require data on the "chain" to be structured in linked, sequential "blocks."

Civil Society Organization (CSO): Organizations including formal non-government organizations (NGOs) as well as formal and informal membership associations (labor unions, business and professional associations, farmers' organizations and cooperatives, and women's groups). CSOs articulate and represent the interests of their members, engage in analysis and advocacy, and conduct oversight of government actions and policies.

Cyber Hygiene: The practices and steps that users of computers and other devices take to maintain system health and improve online security. These practices are often part of a routine to ensure the safety of identity and other sensitive details that could be stolen or corrupted.

Cybersecurity: The prevention of damage to, protection of, and restoration of computers, electronic communications systems, electronic communications services, wire communication, and electronic communication, including information contained therein, to ensure its availability, integrity, authentication, confidentiality, and non-repudiation.

Data Governance: Policies, strategies, frameworks, and practices that governments implement to regulate data collection, management, use, and sharing in the public and private sectors. This broad topic can include data privacy practices, data sovereignty, data stewardship roles and authorities, cross-border data flows, regulations on AI, and data infrastructure (e.g., open data portals and interoperability layers).

Data Privacy: The right of an individual or group to maintain control over and confidentiality of information about themselves. Data privacy can be at risk both from unintentional sharing and from undue or illegal gathering and use of data about an individual or a group.

Data Protection: The practice of ensuring the protection of data from unauthorized access, use, disclosure, disruption, modification, or destruction, to provide confidentiality, integrity, and availability.

Digital Divide: The distinction between those who have access to the internet and can make use of digital communications services, and those who are excluded from these services. Multiple and overlapping digital divides stem from inequities in access, literacy, cost, or the relevance of services. Factors such as high cost and limited infrastructure often exacerbate digital divides.

Digital Economy: The use of digital and internet infrastructure by individuals, businesses, and government to interact with one another, engage in economic activity, and obtain access to both digital and non-digital goods and services. As the ecosystem supporting it matures, the digital economy might grow to encompass all sectors of the economy, a transformation driven by the rise of new services and entrants, as well as backward linkages with the traditional, pre-digital economy. A diverse array of technologies and platforms facilitate activity in the digital economy; however, much activity relies in some measure on the internet, mobile phones, digital data, and digital payments.

Digital Financial Inclusion: The use of digital technology to reach financially excluded and underserved populations with a range of formal financial services suited to their needs, responsibly delivered to customers, and sustainable for providers.

Digital Financial Services (DFS)/FinTech: Financial services enabled by or delivered through digital technology (e.g., mobile phones, cards, the internet). DFS (e.g., payments, credit, insurance, savings, advisory) can be offered by a range of providers, from banks to a host of non-bank financial institutions, such as microfinance institutions, digital credit providers, payment providers, technology vendors, and electronic money issuers.

Digital Government: The use of digital technologies as an integrated part of government modernization strategies to create public value. Successfully navigating digital transformation requires more than adopting new applications; it requires a shift in processes and attitudes toward agile and collaborative decision-making. USAID's digital government framework is built around three core functions: deliver, manage, and engage. The performance of digital government services depends on foundational elements such as change management, human capacity, legislation, policy, regulation, and infrastructure. Investment in these core components and foundational elements helps government bodies become more coordinated, efficient, resilient, proactive, and accountable.

Digital Identity: **A set of attributes** that uniquely describe an individual or entity. Digital identification (ID) systems often require registering individuals into a computerized database and providing certain credentials associated with each individual (e.g., birth certificates, identifying numbers, cards, digital certificates) as proof of identity. Digital ID systems sometimes use biometrics (fingerprints, iris scans, etc.) to identify individuals, but many advanced systems do not. Government actors can set up these systems to create foundational, national ID programs, and donors and NGOs can set them up to identify beneficiaries, for humanitarian assistance and service delivery, for example.

Digital Literacy: The ability to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital devices and networked technologies for participation in economic, social, and political life. This may include competencies that are variously referred to as computer literacy, ICT literacy, information literacy, and media literacy.

Digital Payments: Payments initiated or received by electronic means. For an end user, these payments might be made through a text message, mobile application, website, or merchant-level point-of-sale device, such as a dongle or QR code. A financial institution—bank, switch, MFI, or payment service provider—might facilitate these payments to or from a range of instruments that might include prepaid wallets (i.e., electronic money accounts), cards, transaction or bank accounts, and other instruments that serve as stores of value and permit payments.

Digital Repression: The use of digital tools and technology to suppress internet freedoms using five techniques: surveillance, censorship, social manipulation and harassment, internet shutdowns, and targeted persecution of online users. This term can include offline actions taken to penalize online speech (e.g., arrests, physical violence), as well as online actions that aim to suppress freedoms in online and offline spaces.

Digital Rights: The fundamental rights and freedoms that individuals can exercise online,[508] as well as a respect for privacy and ownership of data.[509]

Digital Trade: The delivery of products and services over the internet by firms in any industry sector, and of associated products such as smartphones and Internet-connected sensors.

Disinformation: False information that is deliberately created or disseminated with the express purpose of causing harm. Producers of disinformation typically have political, financial, psychological, or social motivations.

E-Commerce: The sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing orders.

Information and Communications Technology (ICT): Diverse set of technological tools and resources used to transmit, store, create, share, or exchange information. These technological tools and resources include computers, the internet (websites, blogs and emails), live broadcasting technologies (radio, television and webcasting), recorded broadcasting technologies (podcasting, audio and video players, and storage devices), and telephony (fixed or mobile, satellite, video-conferencing).

Internet Freedom: The online exercise of human rights and fundamental freedoms regardless of frontiers or medium. Where internet freedom is respected, the same rights that people have offline are also protected online.

Internet Service Provider (ISP): An organization that delivers access to end-users using both fixed-line and wireless technologies. Wireless ISPs (especially those in rural areas) often take advantage of low licensing and equipment costs by delivering service using unlicensed spectrum. ISPs range in size and scope from small local providers to providers with international and even global reach.

Interoperability: The ability of computer systems or software to exchange and make use of information from other systems. Interoperable data systems allow for data-sharing and reuse with common formats and definitions, and interoperable payment systems allow digital transfers of money between different financial service providers.

Internet Governance: The development and application by governments, the private sector, and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the internet.

Last-Mile Connectivity: Where end users gain access to the internet using devices (mobile phones, laptops, tablets, computers) through local access networks.

508 "International Covenant on Civil and Political Rights," United Nations Human Rights Office of the High Commissioner, March 23, 1976, https://www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-civil-and-political-rights.

509 International Covenant on Civil and Political Rights. United Nations Human Rights Office of the High Commissioner.

Malinformation: The deliberate publication of private information for personal or private interest, as well as the deliberate manipulation of genuine content. Malinformation is based on reality but is used and disseminated to cause harm. An example is a report that reveals a person's sexual orientation absent public interest or justification.

Media Literacy: The ability to gain access to, analyze, evaluate, create, and participate with messages in a variety of forms, from print to video to the internet. Media literacy builds an understanding of the role of media in society as well as essential skills of inquiry and self-expression needed for citizens of a democracy.

Misinformation: Information that is false, but not intended to cause harm. Individuals who do not know a piece of information is false may spread it on social media in an attempt to be helpful. Disinformation, a type of misinformation, refers to misinformation that is spread with malicious intent.

Mobile Money: A technology that enables people to receive, store, and spend money using a mobile phone. Can also be referred to as a mobile wallet or e-money.

Mobile Network Operator (MNO): An entity that provides voice and data services primarily via wireless terrestrial networks. MNOs typically use licensed spectrum bands, which tend to deliver a higher quality, more reliable (and more cost-intensive) service because they are not shared.

Open Government Data: A philosophy—and increasingly a set of policies—that promotes transparency, accountability, and value creation by making government data available to all.

Radio Spectrum: Refers to the range of frequencies of electromagnetic radiation that are used to deliver radio transmissions. A critical function of telecommunications sector regulatory authorities is designation of specific frequency ranges (or bands) for different purposes, including telecommunications (but also for applications such as radio astronomy or other industrial uses). Some bands (e.g., WiFi) are unlicensed, meaning that anyone can use them without seeking explicit prior permission.[510] Licensed spectrum requires users (e.g., commercial cellular networks or FM radio broadcasters) to secure a regulator's approval prior to use. Licenses are typically assigned through spectrum auctions, which aim to establish the economic value of spectrum which is a finite natural resource.

Universal Service Funds (USF): A mechanism designed to promote network infrastructure development in areas that commercial access providers deem uneconomical. Essentially established as subsidy programs, USFs are resourced through contributions drawn from the revenues of telecommunications operators. USF funds are often applied to help de-risk or otherwise complement network investments in underserved or unserved areas. In many cases, USFs target projects that serve schools, hospitals, and other anchor institutions where demand for services can be aggregated.

510 Permissions are not required for unlicensed spectrum use, but users are typically limited to technical parameters such as transmission power or antenna specifications.

C. METHODOLOGY

The Armenia DECA included three components:

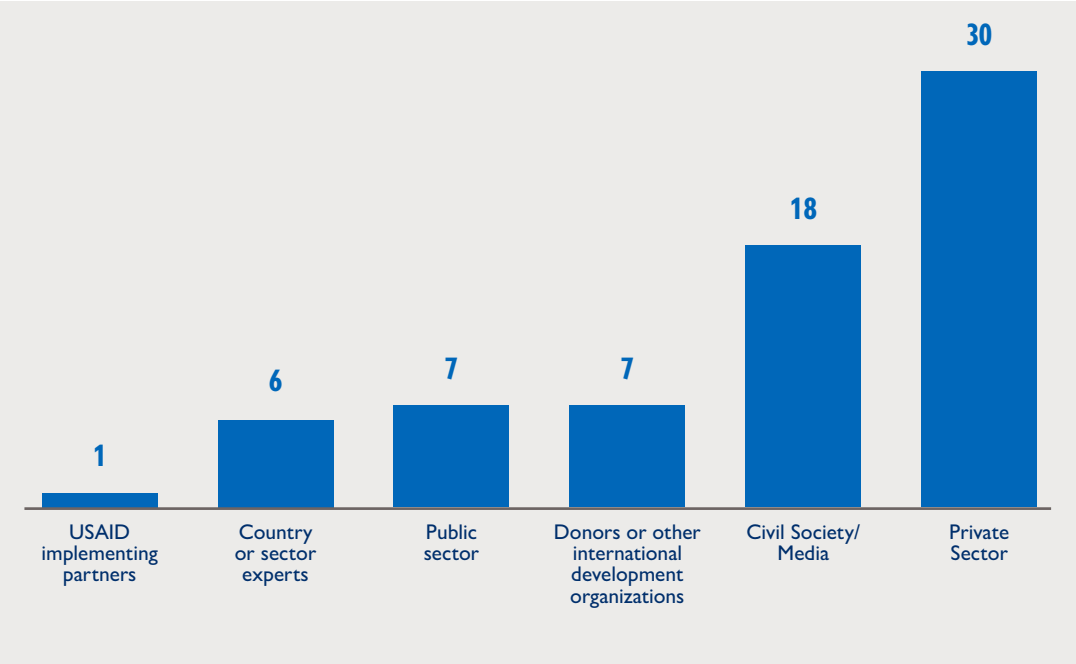
A. **USG engagement:** The USG designated key points of contact (P0Cs) who helped identify stakeholders; reviewed relevant documents during planning, interviews, and the analysis and report-writing stages; attended select interviews during the interview phase; and helped organize three DECA presentations to socialize the DECA across various USG offices. This engagement was important for ensuring an appropriate mix of interviewees and for building the Research Team's understanding of USG priorities.

B. **Desk research:** The desk research used a standardized template organized around the three DECA pillars and included: (1) review of USG priority documents (e.g., strategic frameworks) and digitally relevant programming; (2) quantitative analysis of open-source data and indices to produce regional comparisons; and (3) internet research guided by high level questions under each pillar. The Research Team shared the desk research with USG PoCs before interviews and used it to inform interview guides.

C. **Interviews:** The Research Team collaborated with the USG to compile a list of target stakeholders across civil society, academia, international organizations, and the public and private sectors. The Research Team and USG networks secured initial interviews. Additional interviewees were added throughout the research process through referrals from completed interviews.

The Research Team conducted anywhere from 2 to 4 interviews per day online. Most interviews were attended by at least two team members, with a lead interviewer and a notetaker. To best triangulate findings and test different interview styles, team members rotated with whom they paired on interviews. Each interviewee was asked a general set of questions which were developed before the interview phase, tailored for interviewees, and based on learnings from previous interviews. To ensure a diverse mix of interviewees and information sources, the Research Team evaluated the list of scheduled interviews and conducted additional outreach in an attempt to fill identified gaps. Figure 23 and Appendix D show the Research Team's 69 interviews by sector (20 female interviewees and 53 male interviewees attended the 69 interview sessions).

FIGURE 23: Armenia DECA Interviews, by Sector



ANALYSIS

The Research Team conducted its preliminary analysis during the virtual interview phase. The team conducted weekly debriefs, which ensured that all team members were briefed on each interview and facilitated triangulation of emerging themes to be tested in subsequent interviews. Midway through the interview phase, the team identified emerging themes based on their findings up to that point. Upon completing the interviews, the team convened to revisit these themes, confirmed their validity against interview notes, and organized the findings around the three DECA pillars outlined in this report.

LIMITATIONS

Research Team members were limited, to an extent, by their technical expertise. Team members were selected to provide coverage of key technical areas given the context and USG priorities, particularly around digital government, internet governance, cybersecurity, and digital finance. This may have introduced a level of bias—weighting the specializations of team members more heavily than areas such as digital government and digital financial services, for example. Many interviewees were selected through Research Team and USG networks, which may have excluded stakeholders who were less comfortable engaging with USG representatives. Not all regions of Armenia were equally represented by interviewees due to factors including smaller interviewee pools in secondary and tertiary cities, Research Team time constraints, and interviewee response rates. Rather than rigorous qualitative methods (e.g., thematic coding), the process of analyzing interview notes involved Research Team members triangulating findings and attempting to balance thematic gaps by consulting technical experts and seeking additional interviewees.

RESEARCH TEAM

The Research Team was composed of digital development generalists and specialists with technical expertise in digital government, cybersecurity, internet governance, and digital finance. Team members who were technical experts often attended interviews that were relevant to their expertise.

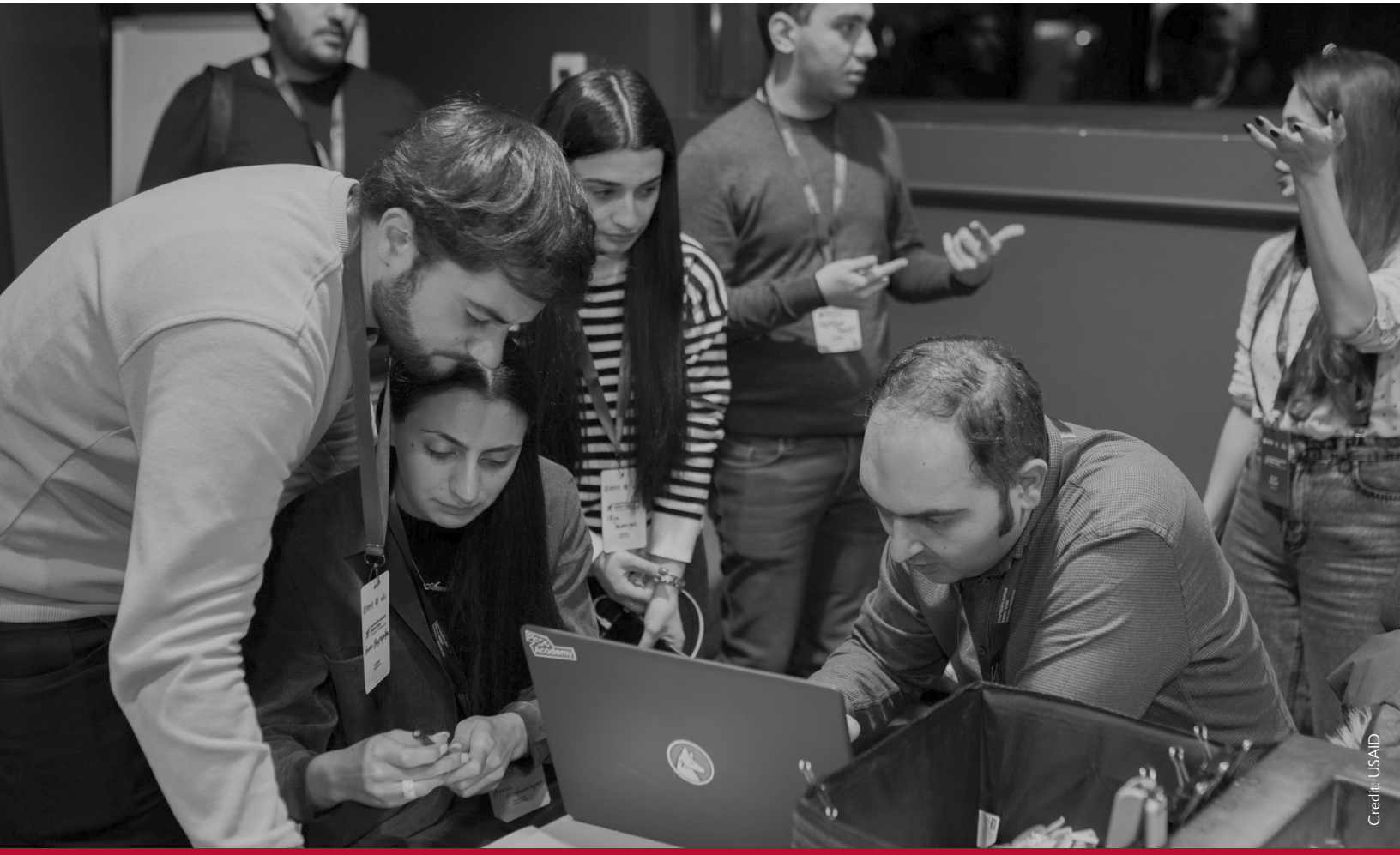
D. INTERVIEWEE LIST

COUNTRY OR SECTOR EXPERTS (ACADEMICS/THINK TANKS)	
1	Independent Expert on Cybersecurity.
2	Independent Expert on Digitalization in Armenia
3	Instigate Robotics and American University of Armenia
4	Armenian Union of Operators
PUBLIC SECTOR (NATIONAL AND LOCAL)	
5	Office of the Deputy Prime Minister
6	ArMed
7	Information Systems Agency of Armenia
8	National Institute of Health

9	Public Services Regulating Commission
DONORS, INTERNATIONAL NGOS, INTERNATIONAL DEVELOPMENT ORGANIZATIONS	
10	GIZ
11	UNDP
CIVIL SOCIETY/MEDIA	
12	Union of Advanced Technology Enterprises
13	Disability Rights Agenda NGO
14	Women in Business: Invest4Future
15	Zinapah Foundation
16	MDI Armenia
17	Media Max
18	CivilNet
19	Freedom of Information Center
20	ISOC Armenia and the Internet Society Armenia Chapter
21	Ampop Media
22	Media Initiatives
23	HETQ
PRIVATE SECTOR [in this section, feel free to call out a specific subgroup if it was a significant part of the interviews or the ecosystem; e.g., see Startups/Accelerators below]	
24	CaseLens
25	Synergy
26	Instigate
27	Union of Banks of Armenia
28	Jio Estonia (Proud Engineers)
29	UCraft
30	TeamPay

31	Converse Bank
32	Synopsys
33	Enterprise Incubator Foundation
34	Fnet
35	Buy.am
36	Vx Soft
37	Central Bank of Armenia
38	Gyumri Technological Center
39	Angel Investor Club of Armenia (AICA)
40	ACBA Bank
41	Vanadzor Technological Center
42	Ameria Bank Management Advisory
43	4u.am
44	Hachn ISP
45	Helix
46	Onex
USAID IMPLEMENTING PARTNERS	
47	USAID Justice Sector Support Project
48	USAID Media Program

NOTE: 11 interviewees did not consent to be included in this list.



Credit: USAID

U.S. DEPARTMENT OF STATE
BUREAU OF CYBERSPACE AND
DIGITAL POLICY (CDP)
state.gov/cyber

USAID
BUREAU FOR INCLUSIVE GROWTH, PARTNERSHIPS, AND INNOVATION (IPI)
INNOVATION, TECHNOLOGY AND RESEARCH HUB (ITR)
usaid.gov/usaid-digital-strategy