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AZERBAIJAN RURAL DIGITAL NEEDS ASSESSMENT

AZTAF
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Abbreviations

ASAN	Azerbaijan Service and Assessment Network
EU	European Union
EU4Digital	European Union for Digital
FGD	Focus Group Discussion
IDDA	Innovation and Digital Development Agency
ISP	Internet Service Provider
KII	Key Informant Interview
MDDT	Ministry of Digital Development and Transport
SVRI	Smart Village Readiness Index

Glossary

Rayon	An administrative division equivalent to a district; the primary level of local government below the national.
Community	In the context of this report, a community is defined as the locality where the data collection was conducted. Based on the type of locality, it is as follows: • Rural rayons – village • Urban areas – localities within the rayons of Nesimi and Khazar from where households and other stakeholders were selected
Digital infrastructure	The interconnected network of technology that enables Internet access, digital services, and devices, ultimately providing residents with improved communication, education, healthcare, and economic prospects.
Household digital connectivity	Ability to access and use the Internet through various devices and networks. This access enables communication, information gathering, education, entertainment, and various online services, significantly impacting the household's lifestyle and opportunities.
Fixed broadband	A high-speed Internet connection delivered through physical lines (e.g., cable, digital subscriber line (DSL), or fiber optic) to a fixed location, such as a home or business.
Mobile broadband	Often used interchangeably with mobile data, mobile broadband is wireless Internet access, delivered through cellular networks typically using 3G, 4G, or 5G technologies.
Digital government services (or government e-services)	Online platforms and tools provided by the government to deliver public information on services and resources to citizens and businesses efficiently and conveniently.
Training and capacity-building needs	Covers topics related to past participation in digital training, the perceived need for digital training, in-demand digital skills, and the mode of preferred digital training.

Executive Summary

This report identifies the unique technological challenges and opportunities that are being faced by various Azerbaijani communities when using digital tools and services, particularly with regard to rural areas. The findings will support the Government of Azerbaijan in its design of the interventions necessary to create a more equitable digital landscape for all, as well as to bridge the gap that exists between the urban and rural areas. The assessment is comprehensive, the threefold data collection of which included (a) a survey of household and village needs, (b) focus group discussions (FGD), and (c) semi-structured interviews. To comprehend the current existing digital landscape, the survey established the current digital skills and needs of village households; the FGDs included a diverse population segment that provided qualitative insight into community digital access and usage; and the interviews were held with local stakeholders (i.e., Internet service providers (ISP), small businesses, and local government officials). These three approaches helped to identify the various challenges relating to rural and urban communities, as well as the opportunities available to them, thus informing the strategies by which to establish Azerbaijan's digital future more inclusively. The assessment was conducted under the Azerbaijan Rapid Technical Assistance Facility (AZTAF), financed by the European Union (EU) and implemented by the World Bank.

a) Community Digital Infrastructure

While Azerbaijan has made progress in expanding its digital infrastructure and offering diverse Internet services, there are significant disparities between urban and rural areas, as suggested by the data. Some areas, such as the administrative districts (from hereon, rayons) of Oghuz and Hajigabul, already have in place advanced fiber-optic networks, while in others (e.g., certain areas in the rayon of Sharur) have no home broadband access whatsoever. Those households that do have broadband access, however, typically rely on Wi-Fi Internet connection. Despite efforts to meet the needs of their various customers, ISPs often face challenges in expanding their services, the result of several factors. These include the difficulty of installing cables in certain buildings due to the saline soil and the lack of facilities during construction; the higher cost of broadband connection in rural areas, thus deterring adoption; the to modify the telecommunication legal and regulatory environment in order to overcome network installation challenges (e.g., sharing of infrastructure, streamlining permits, and process authorization, among others) so as to reduce costs and facilitate broadband network construction in rural areas.

Azerbaijan has embarked on a comprehensive journey to enhance its digital governance, improve service delivery, foster innovation, and ensure that its digitalization is climate- positive. One of the country's key initiatives has been the establishment of service and assessment (ASAN) centers, which is a network that not only prevents corruption and increases customer satisfaction but also makes public services more easily accessible and less bureaucratic. In addition, under the government's Innovation and Digital Development Agency, an online government (gov.az) portal offers a centralized portal for public access to various government services. Another portal, my.gov.az, provides a personalized space in which to manage interaction with government entities. In terms of its education sector, Azerbaijan has dopted digitalization to enhance the learning experience of its students. Furthermore, there has been a signif-

icant amount of investment in its e-healthcare initiatives (e.g., electronic health records, telemedicine, appointments, and health information) to improve the delivery of healthcare and monitor patient outcomes. Azerbaijan also has committed to the COP29 Green Digital Action Declaration as part of its commitment not only to slow the pace of climate change but also to enhance accessibility of green digital technologies.

Azerbaijan is actively enhancing its digital infrastructure and regulatory framework to further strengthen its overall digital landscape for the future. One of its principal strategies is to collaborate with the World Bank and the European Union's EU4Digital Initiative through the AZTAF program, an initiative that will align the European Union's norms and practices in digital transformation. Azerbaijan has taken significant stride in its digital development, particularly in expanding its broadband Internet access through the Online Azerbaijan project implemented by a public-private partnership, which has signed a Memorandum of Understanding with the United Arab Emirates Government to strengthen Azerbaijan's digital infrastructure by developing its data centers.

b) Household Digital Connectivity

Most households in Azerbaijan have Internet access via Wi-Fi connection to a fixed broadband service—more so used to access a smartphone in comparison to the use of laptops, desktops, and tablets. This is provided by local ISPs to the home. There are nevertheless variations in the quality and speed of Internet connection, forcing some users to access mobile data only when outside the home. Various data collected show that (a) the usage of computers is not determined by gender; (b) it is far easier to set up a mobile Internet connection than a fixed broadband connection; (c) broadband penetration is relatively high; and (d) while there is a significant gap between urban (99 percent) and rural (87 percent) households, most nevertheless have access to the Internet, either through only fixed broadband or fixed broadband and mobile Internet combined. The quality of the connection, however, varies, which calls for significant improvement. On the one hand, speed and reliability across rayons are reasons one would prefer to have a combined mobile and fixed broadband connection in the home if able to do so; on the other hand, however, the most common complaint is the inability to do so, with more than 90 percent of households access their Internet connection only with their mobile phone.

c) Digital Literacy

In general, reaction from the research regarding the use of a smart device and the Internet is positive. It is well recognized that the Internet has tremendous potential in terms of education, entertainment, banking and payment services, and retail shopping, among other offers. Nevertheless, reservation exists around the negative impacts of digital technology and Internet access, a major concern being that of the health effects relating to excessive screen time, particularly on vision and sleep patterns. Also, while there is a fascination with artificial intelligence (AI), it nevertheless is apprehensive to many.

The share of respondents in the overall sample who use the Internet is 98.9 percent, broken down to 98.6 percent in rural areas and 100 percent in urban. This is much higher than the share of individuals who used the Internet in Europe and in Central Asia in 2021 (88 percent).[1] The use of the Internet is primarily facilitated by smartphone (98 percent), the predominant method for communication, in addition to telephone/video connection (89 percent), instant messag-

[1] Ritchie, H., E. Mathieu, M. Roser, and E. Ortiz-Ospina. 2023. "Internet." OurWorldInData.org. https://ourworldindata.org/Internet.

ing (86 percent), and social network participation (75 percent).

In rural Azerbaijan, digital government services appear underutilized and poorly comprehended by the general public. Insight from FGDs reveals that while some individuals use basic digital payment platforms and educational portals, the broader spectrum of government e-services remains largely untapped. Surveys reflect that registration on gov.az and my.gov.az portals remains somewhat low, at 13 percent and 12 percent, respectively. Survey data also indicate that the most common use of a government e-service is for education (43 percent) and payment transfers (42 percent). Overall, a significant 37 percent of respondents rated education e-services as useful, followed by the payment services (25 percent). The vast majority of respondents (69 percent) reported that they do not engage in regular digital security practices. The most common security practice is a strong password with regard to Wi- Fi, at 43 percent, with a significant majority, at 37 percent, never having critically evaluated the security information. This indicates a potential vulnerability to misinformation, most likely due to limited digital threat awareness.

Access to a comprehensive variety of digital services is typical among micro-size enterprises, despite the limit in their digital technology skills. Insight from key interviews with micro-size businesses that are owned by women reveals that the need for digital skills for their work, particularly in rural areas, is indeed high. The most critical needs, according to the interviewees are training (i) to enhance digital literacy (e.g., computer usage, Internet navigation, software application); (ii) in e-commerce skills and online financial management; (iii) in digital marketing and business development; (iv) for government support and resources (e.g., government programs, financial resources). To address these training needs across rural regions, government interventions must be able to enable individuals and businesses to thrive within the digital economy. Furthermore, the agriculture sector would benefit from the adoption of smart farming methods, including new techniques, precision farming, digital marketing, and e-commerce, all by way of the Internet.

d) Training and Capacity Building

There is a high demand for digital skills training in rural areas, reflected by 66 percent of survey respondents, preferably with face-to-face or online courses. This finding highlights the fact that most of the respondents have had no opportunities to access any such programs. The demand in training is highest for online banking, buying/selling, and access to health-related information. The need to invest in rural communities is high, not only to increase the digital connectivity infrastructure and establish training centers, but also to empower people with the necessary skills to thrive in a digital age.

Communities in Azerbaijan have varying degrees of digital literacy needs, each of which requires practical training to its own specific needs, particularly in the rural areas where residents seek economic advancement. Older individuals, in contrast to younger generations, primarily seek basic Internet navigation skills and information on health issues. Young people are more interested in coding, data management, and online entrepreneurship. Rural residents in Barda Rayon, for instance, have expressed a strong desire for practical training, such as e-commerce and digital marketing, in relation to their agricultural products, while in the rayons of Gakh and Aghdash, the priority is for basic computer and online banking training. Therefore, basic and advanced digital literacy training programs must be personalized for each community and focus on improving the livelihoods and economic opportunities of its residents.

Recommendations

Despite the demonstrated willingness of Azerbaijanis to learn digital literacy skills for individual, household, and business development needs, the country continues to lack the necessary infrastructure for improvement and affordable broadband access, compounded by a low awareness of digital services by many in the general population. What infrastructure and digital services already exist vary in quality and affordability, thus limiting the extent to which digital tools can be used reliably. Recommendations to address the challenges are as follows:

- Adopt a national standard for the development of digital literacy and skills
- Provide awareness campaigns and outreach events
- Invest in the expanded use of digital technology by rural public service providers
- Develop a digital skills training program for rural micro-size, women-owned enterprises
- Implement smart agriculture initiatives
- Enable affordability and quality of service improvements of broadband services and private sector participation to expand digital access
- Establish innovation and digital community centers
- Improve mobile Internet accessibility
- Integrate computer science and STEAM[2] in schools

Detailed recommendations can be found in section 6 of the report.

[2] STEAM education is an approach to learning that uses Science, Technology, Engineering, the Arts and Mathematics.

1. INTRODUCTION

By identifying the unique challenges and opportunities faced by rural communities in Azerbaijan in their efforts to effectively make use of digital tools and services, this report aims to contribute to a more equitable digital landscape for all. Post-COVID-19, transition to digital modalities has become a critical necessity for the delivery of various types of services, including distance education, healthcare, and financial literacy. Access to a comprehensive set of digital services is also essential for farmers, agricultural enterprises, and micro-, small-, and medium-size enterprises. Identification of the specific digital skill gaps and training needs across the various regions and demographics will enable the tailoring of interventions specific to each individual and business so they can thrive in a digital economy.

By assessing the digital needs and skills of individuals and stakeholder groups in specific Azerbaijani districts (rayons), this report aims to build on the research conducted by Azerbaijan's Ministry of Digital Development and Transport (MDDT) in 2023 and that of the International Telecommunications Union, particularly in relation to the digital skills of the individual. This report evaluates the digital needs and skills within nine rayons (i.e., Aghdash, Barda, Gakh, Hajigabul, Kangharli, Khazar, Nesimi, Oghuz, and Sharur) but will also include the broader aspects of digital connectivity (e.g., types of devices, access to the Internet, and security practices), in order to identify the barriers against and opportunities for digital inclusion. The comprehensive set of data that was gathered from households, service providers, and telecommunication companies for this study serves to not only assess Azerbaijan's digital landscape but also to inform policy recommendations for the country's ongoing digital development.

The study, which is broad in scope, takes into account the digital needs and skill gaps that exist, mainly in rural areas and in a select number of urban communities in Azerbaijan. A survey of 1,048 households was conducted, of which 1,000 were considered complete. Eight focus group discussions (FGD) took place with various population subgroups. In order to understand the existing digital landscape and the needs of service providers and businesses, 32 semi-structured interviews were held with key stakeholders. The sample included Internet and telecom service providers, women-owned small businesses, schools, health centers, and local government representatives across the nine rayons. The outputs of these exercises serve to inform the specific interventions and investments required to implement a Smart Village program at the national level in Azerbaijan. They also will contribute to the development of strategies that will address the digital divide by promoting digital inclusion, particularly among women and vulnerable groups.

The report has seven sections, including the Introduction and an Annex. Section 2 outlines the research methodology applied to assess the digital skills and needs among the various Azerbaijani groups. It provides a discussion on the data collection strategy, sampling frame, and the signing up of respondents. Section 3 details the community-level digital infrastructure and landscape, such as the current state, the challenges faced in terms of digital expansion, and forthcoming interventions in nine rayons. Section 4 provides the profiles of individuals surveyed in the exercise. Section 5 discusses the digital skills and their usage by individual Azerbaijanis, including the digital infrastructure of households and their related literacy. Section 6 provides a number of recommendations to address those challenges identified in the study. Lastly, the Annex complements this report with additional data.

2. METHODOLOGY

2.1 Overview

The Digital Skill Needs Assessment relating to Azerbaijan evaluates the various digital requirements and the extent to which digital skills have advanced among individuals and stakeholder groups in select communities. The study included a household survey and FDGs with various population subgroups to gain qualitative insight into digital access and usage. Semistructured interviews were conducted with service providers, small enterprises, and local governments in nine sample rayons so as to comprehend the existing digital landscape.

The study includes numerous individual citizens and various stakeholder groups in 9 rayons. Data was collected from respondents across a wide range of demographic characteristics (i.e., gender, age, disability, internally displaced persons, and level of education in urban and rural areas, among others). By using the Computer-Assisted Personal Interviews system, 1,048 surveys were conducted, of which 1,000 were considered complete. Household surveys were split between rural (80 percent) and urban (20 percent) so as to gain not only an insight into the rural situation, but also a clear comparison of the two. The selection of rural rayons was based on the World Bank's Smart Village Readiness Index (SVRI) relating to Azerbaijan's rural areas.[3] To obtain information from key stakeholders, such as public officials, service providers, schools, health centers, Internet service providers (ISP), telecom providers, and women-owned businesses, the key informant interview method (KII) was applied.

Instead of seeking self-reported data, survey respondents were provided a set of questions to establish the level of their digital skills. While self-reporting may provide a better understanding of individual needs and perceptions, particularly when combining quantitative with qualitative data, it tends to limit the ability to clearly determine the competency levels.

2.2 Community and Household Survey Samples

Community and household samples were based on a multistage sampling methodology, the first of which included 9 rayons that were randomly selected from various levels of the SVRI. In each of the selected rayons, two to eight settlements—depending on population size—were randomly selected as having the same SVRI value as the overall rayon value. The second stage included 100 households within each rayon that were randomly sampled by way of statistical lists. A random walk methodology was adopted for those communities where the list of households was not available. The final selection of respondents was carried out by using a quota sampling technique to control indicators such as age and gender. The survey sample was broken down by rayon, as follows:

- **Baku:** 200 respondents (approximately 0.04 percent of a total population of 419,900 within the Nesimi and Khazar rayons). Since Baku is the capital of Azerbaijan, its urban rayons offer ample job, study, cultural, and

[3] For more information on the Smart Village Readiness Framework, see World Bank. 2021. Smart Villages in Azerbaijan: A Framework for Analysis and Roadmap. Washington, DC: World Bank. https://openknowledge.worldbank.org/entities/publication/62450b9c-b3a9-5827-bb67-4f7d39212c6b

social opportunities that attract people from not only other regions of Azerbaijan but also from other countries.

- **Sharur and Kangharli:** 100 respondents in each (approximately 0.08 percent of a total population of 117,400 and around 0.3 percent of a total population of 32,700, respectively). Both rayons are located in the Nakhchivan, a landlocked exclave of Azerbaijan that is bordered by Armenia, Iran, and Türkiye. The two rayons are known for their historical sites, traditional crafts, and agricultural activities, with both sharing many cultural and demographic characteristics held by a strong sense of community and close-knit social fabric.

- **Barda:** 100 respondents (approximately 0.06 percent of a total population of 153,100). The city historically has been a regional hub and remains so. It is located in the Karabakh economic region of the country and hosts numerous internally displaced persons. Barda rayon's economy relies heavily on cattle breeding, vegetable farming, and the cultivation of cotton.

- **Aghdash:** 100 respondents (approximately 0.09 percent of a total population of 103,700). As part of the Central Aran economic region, the population is primarily engaged in agriculture.

- **Hajigabul:** 100 respondents (approximately 0.1 percent of a total population of 73,300). As a part of the Shirvan-Salyan economic region, the population is primarily engaged in agriculture.

- **Gakh:** 100 respondents (approximately 0.2 percent of a total population of 57,300). Gakh is in northern Azerbaijan, bordering the Kakheti region of the Republic of Georgia and the Republic of Dagestan, Russia. Gakh has a diverse population, including significant minority groups represented by Georgians and Tsakhurs. The rayon is known for its mountainous terrain and lush forests, with agriculture as a major economic activity.

- **Oghuz:** 200 respondents (approximately 0.4 percent of a total population of 43,200). Oghuz is located on the southern slopes of the Greater Caucasus, bordering the Republic of Dagestan, Russia. The population is primarily engaged in agriculture.

The selection of respondents included representative groups based on age. The age of respondents was restricted to a range between 14 and 65, with the view that those who are younger than or beyond the range would prejudice the results, given their assumed lack of exposure to digital technology or their ignorance of household dynamics. To consider those beyond the age of 65 would render conflicting results in terms of their digital needs. While Azerbaijan does not have a set definition of its elderly in terms of age, it does for its young, based on the Law on Youth Policy of the Republic of Azerbaijan (2002), which establishes them as being within the range of 14 and 29, the minimum of which was taken into account in the study. With regard to its elderly, Azerbaijan follows the definition set by the Organization for Economic Co-operation and Development (OECD), which is 65 and above.

Seven rural rayons were selected from the SVRI. This analytical tool was developed by the World Bank to evaluate the readiness of rural areas for "smart village" initiatives; it takes into account global and national data from various sources on matters such as economic development, human capital, and infrastructure. Regions are prioritized based on their capacity to support the use of digital infrastructure while emphasis is placed on enhancing digital literacy, particularly among vulnerable populations. The random selection of rayons was based on the value placed by the SVRI on the majority of territories within each rayon. Rayons were selected with an SVRI value of 5 (i.e., most ready for a Smart Village program); 3 (more or less ready for such a program); and 1 (least ready for such a program) (Box 1).

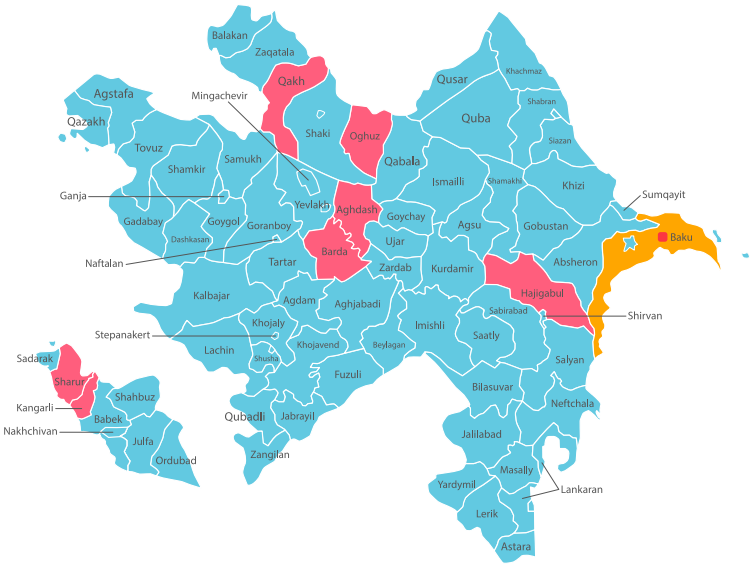
Within each community, the field team randomly selected the number of households required. For the sampling, the fieldwork team obtained a list of households so as to be able to randomly sample the individuals with accuracy within a set of demographic quotas. The quotas were determined at the rayon level to ensure that the gender and age of residents would reflect the district's population composition.

Box 1: Selected Levels of Smart Village Readiness Index (SVRI)

Smart Villages are defined as villages with existing assets and potential for economic development that use technology and innovation to improve services, income and governance. SVRI enables the identification of potential smart village clusters across Azerbaijan, ranking villages based on objective criteria to prioritize clusters for support and allowing for comparison between clusters. The Index is structured around five broad parameters with 36 indicators.

- **Amplify (Level 5):** Most equipped for accelerating or improving the application of digital technology and smart approaches for local development
- **Accelerate (Level 3):** Moderately well equipped for the application of smart approaches
- **Activate (Level 1):** Least prepared for the application of smart approaches.

Figure 1: Selected Rayons Source: World Bank



A random walk was adopted for those communities where the list of households was not available. The initial start of the walk was based on the community boundary. Where boundary maps were not available, the Essential Programme on Immunization methodology was adopted.[4] This involved selecting a point from where to start, such as the local central market, and then heading in any direction to survey the required number of households. If the household agreed to participate in the survey, household members were classified by gender and age and checked against the demographic breakdown in the district to ensure that the sample would match the population composition as much as possible. The quota for each gender/age population subgroup was determined at the rayon level, based on demographic composition. Figure 1 illustrates the selected rural rayons (highlighted in red) that were sampled, wherein 100 households were surveyed in each, with the exception of Oghuz (highlighted in brown), wherein 200 households were surveyed. Within the Nesimi and Khazar rayons, 100 households were surveyed in each.

2.3 Selection of Respondents for Focus Group Discussions

Eight FGDs were conducted to collect qualitative insight into the digital needs of a select group of Azerbaijani rayons. Discussions were held in the rayons with various population subgroups based on age and gender. For Baku, two FDGs were held, given its size. Candidates for the FGDs were recruited by the fieldwork team during their household survey exercise. In rural settlements, the team worked with local public community officials to identify venues for their discussions, such as community centers and schools. In the case of Baku national minorities, the team occupied one of its facilities for the discussions, while for persons with disabilities, the venue was easily accessible and nearby.

[4] The Essential Programme on Immunization is a cluster sampling methodology developed by the World Health Organization to estimate immunization coverage among children in developing countries where complete sampling frames are often unavailable.

Table 1: Focus Group Discussions by Rayon

Rayon	Focus Group
Sharur	Adult women from age 19 to 60
Oghuz	Internally displaced persons (men and women from age 18 to 60, with men from age 19 to 60)
Hajigabul	Male youth from age 16 to 18
Barda	Female youth from age 16 to 18
Gakh	Elderly men and women from 61 and above
Baku City	National minorities (men and women from age 18-60); persons with disabilities (men and women from 18 to 60)

Source: World Bank

2.4 Selection of Respondents for Key Informant Interviews

In each sampled community, three to four KIIs were conducted in order to comprehend the supply-side of digital services. Stakeholder groups comprised local public officials, ISPs, digital skill training providers, local schools, health service providers, and small businesses.

In addition, the team conducted interviews with women-owned small enterprises to understand how the digital infrastructure impacted their business growth. Recruitment of women-owned businesses was managed by a twofold strategy, whereby for urban areas, women's business associations were tapped into for a list of businesses from which to recruit, while in rural areas, the relevant information was obtained by the team while conducting the survey.

3. COMMUNITY DIGITAL INFRASTRUCTURE

3.1 Current State

Azerbaijan's digital infrastructure is currently undergoing a transformative phase, marked by its significant progress despite persistent challenges. The study discovered that while the country has made strides in expanding its Internet coverage, particularly as a result of the rollout of fiber optic networks, certain rural areas nevertheless continue to lack broadband infrastructure. Urban centers, in general, enjoy better connectivity and faster speeds, while rural communities often face limited access and poor quality of service. Mobile Internet usage is widespread, especially among the younger population; however, affordability remains a concern, especially in rural areas. The government's commitment to government e-services has led to the development of various digital platforms and portals, although adoption rates vary across various segments of the population, with older generations and the rural population particularly lagging behind. Moreover, there is deep digital skill gap, highlighting the need for specific training programs to empower individuals and businesses to fully leverage the benefits of digital technologies. Despite the challenges, Azerbaijan's ongoing efforts to invest in infrastructure, promote digital literacy, and expand e-services nevertheless demonstrate a strong commitment to build a more inclusive and connected digital society.

3.1.1 Policy and Institutional Context for the Development of Broadband

Azerbaijan's government has made broadband development a central pillar of its socioeconomic strategy. The Azerbaijan 2030 agenda and the 2022–2026 Social and Economic Development Strategy 2022–26 categorize broadband access as essential for achieving a competitive economy, an inclusive society, and an innovative workforce. Various actions undertaken by the Government of Azerbaijan have demonstrated its commitment to leverage broadband technology to achieve its broader socioeconomic goals. The focus on infrastructure, innovation, and institutional support is expected to drive digital transformation toward a more technologically advanced society. Actions will include the following:

- **Institutional reform:** The country has renamed the Ministry of Transport, Communications, and High Technologies to that of the MDDT, defined above, thus reflecting an emphasis on digital transformation. Also newly established is the Innovation and Digital Development Agency (IDDA) to coordinate and implement digitalization efforts, including supporting innovative projects and providing financial expertise. In addition, the State Commission on Radio Frequencies was formed to ensure the efficient use and coordination of radio communications. President Ilham Aliyev, furthermore, issued an order on April 19, 2021, to establish a working group to accelerate the implementation of "Smart City" and "Smart Village" concepts in Azerbaijan. The working group is led by the Minister of Digital Development and Transport.

- **Policy Measures:** The country identified the telecom sector for private sector investment and privatization to stimulate economic recovery after the COVID-19 pandemic. National broadband development aligns with the World Bank Group's Country Partnership Framework objectives, such as improving access to public services, strengthening connectivity, and enhancing competitiveness in various sectors. The MDDT has also established minimum quality of service requirements for broadband access to all individuals, aiming to connect all settlements to minimum 25 Mbps broadband services by 2025. In support of that objective and overall market development, the Ministry is preparing a new legal framework for the sector aligned with the European Commission's new communication code as well as a new law on infrastructure sharing. The establishment of ICTA is a significant step in developing the technical resources to implement such legal frameworks and the agency's strengthening (of mandate and capacity) will be critical to successful implementation.

3.1.2 Fixed Broadband Service Providers

Azerbaijan's fixed broadband market is dominated by two state-owned enterprises. This holds back competition and creates a significant digital divide between urban and rural areas. Azerbaijan's fixed broadband market is dominated by two state-owned enterprises, Aztelekom and Baktelecom, both of which account for approximately 85 percent of the market share. This duopoly, along with ambiguous regulations for smaller providers—particularly in rural areas— has stifled sector competition and innovation. The lack of distinction between the regulatory and operational roles of the MDDT further raises concern among investors. Although the market did, in fact, experience significant growth from 2010 to 2016, primarily in urban centers, it has stagnated since. This is partly due to market saturation in urban areas and the slow adoption of broadband services in rural areas, where Aztelekom, the main provider, continues to rely on outdated technology. While the digital divide between urban and rural areas poses a significant challenge for Azerbaijan, the rollout nevertheless has begun in certain areas. For instance, the KIIs with ISPs in Baku (Baktelecom) and the rayons of Aghdash (Aztelecom), Hajigabul, and Oghuz have revealed that in certain areas, they provide several high-speed Internet options, including fiber optic and gigabit connections. However, the type of connectivity services offered is limited. In addition, the lack of content filtering, parental controls, and other advanced technologies that manage access to online content and devices highlights that the entire ecosystem is at a nascent stage.

3.1.3 Mobile Internet Usage

Due to barriers of affordability and the insufficient infrastructure in rural areas, it is a challenge to develop widespread mobile connectivity, as well as adopt mobile broadband. Since 2008, mobile connectivity has driven the growth of Azerbaijan's information and communications technology (ICT) market, becoming the dominant method for digital communication. The country's mobile penetration reached approximately 115 percent in 2021, with widespread coverage of 2G networks and over 95 percent coverage of 3G and 4G networks.[5] Despite this, only 66 percent of the population currently owns a unique mobile device, and only 41 percent uses mobile broadband.[6] In rural areas, bereft of fixed broadband infrastructure, mobile broadband is the primary means of Internet access, thus limiting the capacity of mobile broadband networks to meet growing demand. A comparison of similar countries shows Azerbaijan to

[5] GSMA Intelligence database for 2022 at https://www.gsmaintelligence.com/data/ (accessed xxxx).
[6] Ibid.

have been slower in adopting the newer 3G and 4G mobile technologies, with the overall usage rate as low. Nevertheless, there is evidence of a positive trend in users now upgrading to newer mobile broadband technologies which, in Azerbaijan in particular, is comparatively expensive when taking other developing nations into consideration. For instance, in terms of USD/GNI per capita, users in Azerbaijan spend a higher proportion of their income, on average, for 1GB of mobile data.[7]

3.1.4 Efforts to Improve the Digital Landscape

Azerbaijan has been actively pursuing various digital initiatives to enhance governance, improve service delivery, and promote innovation. Initiatives include the following:

- **Service and assessment network:** Azerbaijan has established various Azerbaijan Service and Assessment Network (ASAN) centers, a "one-stop" shop providing citizens with a wide range of services. The aim is to streamline bureaucratic processes, reduce corruption, and enhance customer satisfaction. The services offered include, among others, the issuance of passports, drivers' licenses, birth certificates, marriage certificates, and various permits. Notable features of the ASAN centers are the emphasis placed on efficiency, transparency, customer service, minimal wait time, and streamlining of procedures, all of which are based on the technology used and process standardization.[8]

- **Digital payments initiative:** The objective of this initiative is to modernize the financial sector and drive economic growth by promoting the adoption of electronic payment solutions.[9] This involves development and implementation of electronic payment systems, including the digital wallet, mobile payments, and payment cards so as to enable individuals and businesses to make secure and convenient transactions. Azerbaijan also is fostering the growth of online and e-commerce payments, supporting financial inclusion efforts, and implementing regulations to ensure consumer protection and data privacy. Through collaborating partnerships, the Government of Azerbaijan aims to expand access to electronic payment services, drive innovation, and enhance the overall payment experience for citizens and businesses, thus contributing to the country's digital transformation agenda.

- Azerbaijan's Ministry of Labor and Social Protection of the Population has been actively digitalizing its services through initiatives such as e-sosial, a unified platform for social services, as has the Agency for Sustainable and Operational Social Security which provides integrated public services. The ministry is proactively focusing on its service delivery and migrating its systems to the government cloud, as well as developing mobile applications to enhance accessibility and convenience for citizens. Such efforts are intended to streamline access to social benefits, improve transparency, and reduce administrative burden.

- Significant efforts have been undertaken by the Government of Azerbaijan in digitalizing its education system to improve accessibility and the learning experience.[10] Existing initia-

[7] Cable.co.uk database for 2022 at https://www.cable.co.uk/mobiles/worldwide-data-pricing/ (accessed xxxx).
[8] Mammadov, S. 2024. "Azerbaijan's Revolutionary ASAN Public Services." BNE Intellinews, January 22. https://www.intellinews.com/azerbaijan-s-revolutionary-asan-public-services-308823.
[9] Government of Azerbaijan. n.d. Digital Payments Strategy of the Central Bank of the Republic of Azerbaijan for 2021-2023. Baku: Central Bank of Azerbaijan. https://uploads.cbar.az/assets/Digital_Payment_Strategy_public_final_08.06_v02_ENG_final.pdf.

tives involve integrating technology into the various aspects of education from the level of schools to that of universities. The country's universities and higher education institutions, in particular, are increasingly adopting online learning platforms and digital tools that allow students to access resources, participate in virtual classrooms, and collaborate on projects online. Furthermore, AI-driven educational platforms are being used to personalize the learning experience of individual students by tailoring lessons and exercises to their specific needs. AI also assists with grading and assessment exercises, making the education process more efficient. These efforts collectively aim to modernize and enhance Azerbaijan's quality of education. Digitalization efforts could further involve the training of teachers to effectively use the technology for educational purposes, essential for successful classroom integration of digital tools.[11]

The following are a few of the more significant initiatives under the IDDA:

- **Technest scholarship program:** This was established in October 2021 to create a skilled ICT workforce for the country. Open to only citizens from ages 13 to 65, scholarships are offered for ICT courses in leading educational centers. The selection process includes an online application, a competitive examination, and an interview. Successful candidates receive either 70 percent-, 90 percent-, or 100 percent-funded scholarships.

- **Online Azerbaijan project:** This aims to enhance digital literacy and ICT skills across the regions of Azerbaijan. It involves educational training, informative sessions, and bilateral meetings with relevant organizations. One of its key goals is to nurture ICT specialists and facilitate their employment within the regions. To achieve this, the project operates in tandem with the Technest Scholarship Program, and provides training in innovative professions as well as interactive discussions with mentors and leading educational centers. Participants are selected by way of on-the-spot testing.

- **e-Healthcare Initiatives:** Azerbaijan has been investing in improving its healthcare delivery and patient outcomes. It is developing electronic health record systems, telemedicine services, and online platforms for scheduling appointments and accessing medical information. With regard to the electronic health record system, e-Təbib offers a centralized environment that is already in operation, primarily in Baku clinics. Healthcare providers are able to manage patient information digitally, including medical histories, test results, prescriptions, and referrals. The portal is designed to streamline healthcare processes, improve efficiency, and enhance patient care. The application of e-Təbib has been corroborated by the team in an interview with a health clinic in Baku. Another national telehealth initiative is the Salam Doktor platform, particularly of value in remote areas, whereby the patient is able to connect to her/his doctors via video link for consultations and other medical services. It is a key initiative in expanding access to healthcare and is even used by Azerbaijani doctors living abroad to support healthcare initiatives within their country.

[10] "Digitalization of Education in Azerbaijan." Xalq qazeti, April 1, 2023. https://xalqqazeti.az/en/tehsil/151630- digitalization-of-education-in- azerbaijan#:~:text=Universities%20and%20higher%20education%20institutions,engage%20in%20collaborative%20 online%20projects

[11] Participants in one of the focus groups shared the fact that some of the school teachers are ill-equipped to teach digital technology. With the growing practice of online teaching, among other digital activities, the need for adequately preparing teachers becomes even more essential.

3.1.5 Broadband Expansion: The Challenges

Within its regulatory framework, Azerbaijan's broadband market faces a number of challenges that include the need for infrastructure investment and meeting the significant demand for connectivity and digital skills. Broadband expansion has been thwarted by the absence of an enabling environment and lack of investment. While the regulatory body is relatively newly established, regulations are outdated and there is a call to strengthen the agency to enable it to foster competition and attract investment. The dominance of state-owned providers is a major threat that stifles innovation and market growth. Furthermore, the inadequacy of infrastructure investment, especially with regard to fiber optics, impedes network expansion and prevents necessary upgrades, all of which curb the delivery of high-speed broadband services to urban and rural areas alike.

KIIs with ISPs have shed light on certain challenges. One key issue is Azerbaijan's geographic diversity, whereby its rural and remote areas create much difficulty in deploying and maintaining the necessary infrastructure. The rugged terrain makes it challenging to install the underground cables and establish reliable communication lines—an issue that has been highlighted by Hajigabul rayon. ISPs often must invest in repairing infrastructure that has been disrupted beyond their control, an example of which is Oghuz rayon, whereby the provider is required to carry out repairs on a regular basis.

Rural residents often are not able to afford broadband connection. This is evident in the Aghdash and Barda rayons where, according to those ISPs interviewed, rural residents often complain about the high price of their monthly broadband subscription, a reason for which could be the price of broadband being much higher in rural areas. While the survey data shows that the median monthly cost of broadband in such areas is slightly less, at manat 20 per month compared to manat 21 in urban areas, a comparison of monthly household income, however, reveals that the gap is much higher, with rural survey respondents reporting a monthly household income of manat 500–750 compared to urban survey respondents at manat 1,250– 1,500. A KII with an ISP in Baku divulged that a number of builders fail to provide the necessary broadband cables during construction, thus exacerbating installation of cables in many buildings.

Expansion of Internet services in Azerbaijan is hampered due to the lack of awareness among the general population about the benefits of using the Internet. This particular observation was made by an ISP in one of the rural rayons where broadband connectivity is an issue. The low level of acquaintance with and awareness of how the Internet can improve lives, businesses, and communities has resulted in little demand. ISPs are therefore discouraged from investing in the expansion of infrastructure, particularly in the rural and remote areas where costs tend to be higher. Moreover, without an understanding of the value of the Internet, individuals are hesitant to adopt new technologies or pay for Internet services, thus further limiting market growth and creating a self-perpetuating cycle, where limited demand leads to inadequate investment which, in turn, perpetuates low awareness and usage.

3.1.6 Planned Interventions

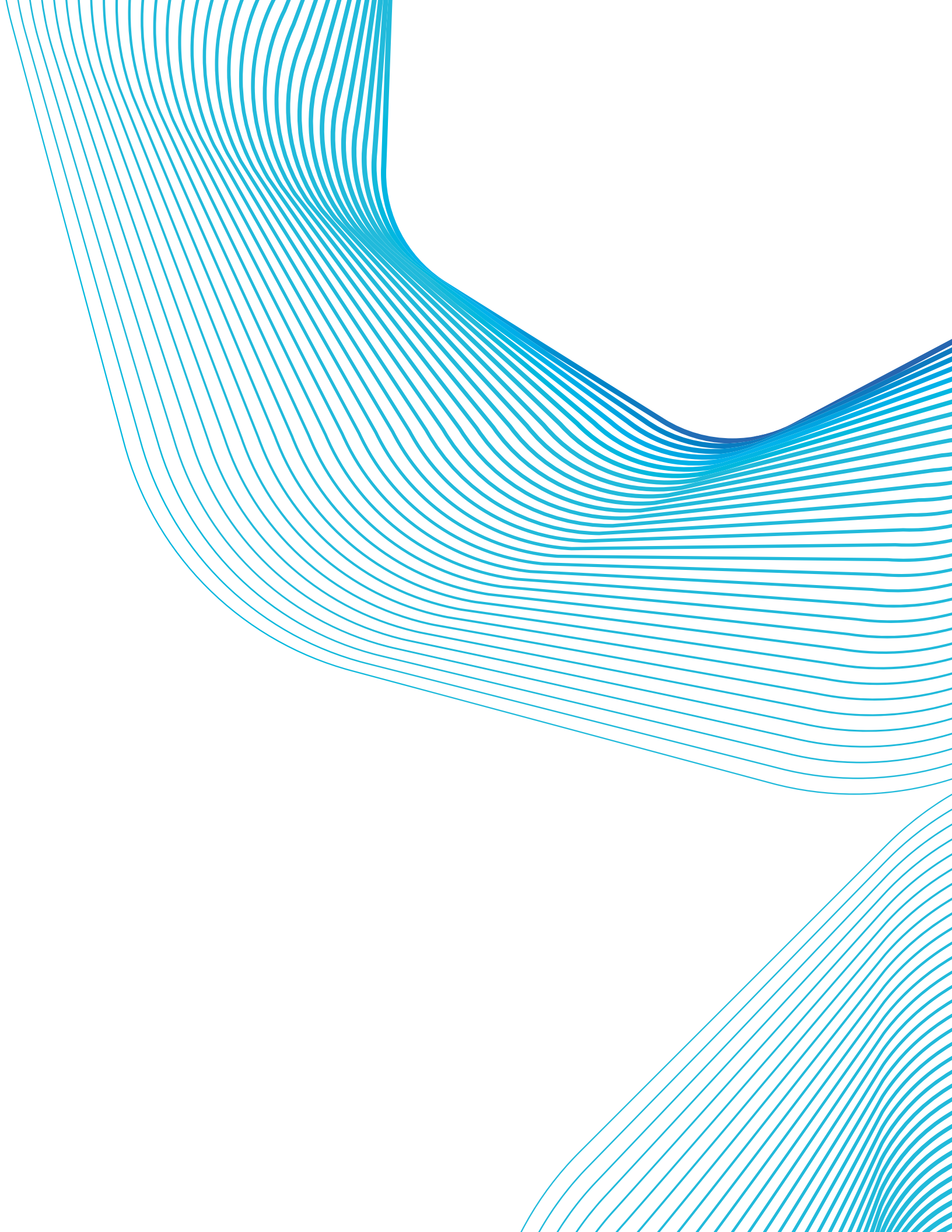
Azerbaijan is rapidly advancing its digital landscape through several key initiatives. One focus is to improve its digital infrastructure. For instance, the Online Azerbaijan project is revolutionizing Internet access by upgrading existing infrastructure to fiber optic technology, specifically the Gigabit Passive Optical Network.[12] This ambitious undertaking will provide high-speed broadband Internet (up to 100 Mbps) to the entire population by the end of 2024. As of 2023,

the project has already connected over 1.1 million households and businesses, representing 66 percent of the total population. In parallel, Azerbaijan is strengthening its digital infrastructure by partnering with the United Arab Emirates Ministry of Investment to develop various data centers.[13] This initiative addresses the growing need for reliable data storage and processing capabilities as the nation's digital economy expands. By leveraging the United Arab Emirates' expertise and collaboration, Azerbaijan's data-handling capacity will be enhanced, innovation in data-driven technologies can be encouraged, and further investment in the technology sector will be forthcoming.

A key strategy for the Government of Azerbaijan involves collaborating with the World Bank and the EU's EU4Digital Initiative, as well as aligning itself with EU norms and practices so as to support its own digital transformation. The EU4Digial initiative focuses on key areas such as telecom rules and regulations, e-Trust and cross-border digital services, e-Trade, ICT innovation, e-Health, and digital skills. Through technical assistance, capacity building, awareness raising, and financial support, the initiative seeks to improve digital infrastructure, enhance digital literacy, foster a stronger digital economy, improve public services, and enhance a country's competitiveness in the global digital market. Ultimately, the EU4Digital Initiative would contribute to Azerbaijan's economic growth, job creation, and improvement in the quality of life of its citizens.

[12] Government of Azerbaijan. 2024. "Azerbaijan's digital development path–ARTICLE." Baku: Ministry of Digital Development and Transport. https://mincom.gov.az/en/media-en/news/azerbaijans-digital-development-path- article (accessed December 6, 2024).

[13] Government of the United Arab Emirates. 2023. "UAE and Azerbaijan Sign a Memorandum of Understanding Set To Facilitate Digital Infrastructure Investments." December 15. Abu Dhabi: Ministry of Investment. https://www.investuae.gov.ae/announcement/uae-and-azerbaijan-sign-a-memorandum-of-understanding-set-to- facilitate-digital-infrastructure-investments (accessed December 6, 2024).

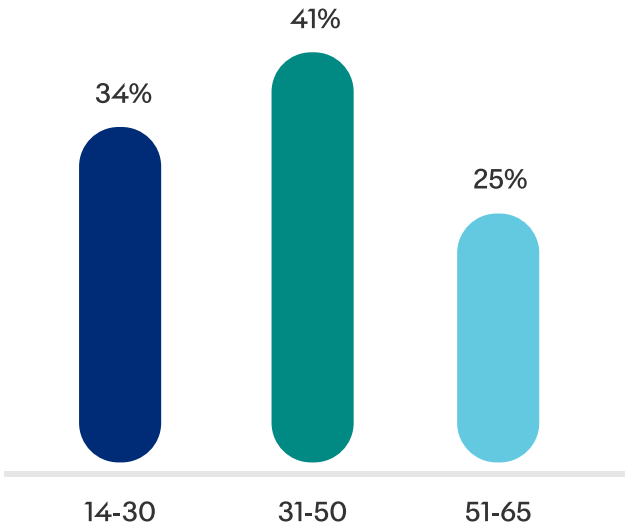


4. RESPONDENT PROFILE

4.1 Demographic Characteristics

A total of 1,000 respondents were interviewed, of which 50 percent were male and 50 percent were female, with most respondents (41 percent) being within the age range of 31 to 50. The age distribution is somewhat similar across Azerbaijan's rayons, the only exceptions being in the Aghdash and Khazar rayons where most respondents were within the range of 14 to 30 years of age. Among respondents, approximately 36 percent represented heads of households, of whom most were male (80 percent).

Figure 2: Age Breakdown of Sample Source: World Bank



More than two-thirds of respondents (69 percent) reported a household size of four or less and a majoritya (66 percent) were classified as married. The distribution of household size across rayons does not vary significantly, except in that of Hajigabul where more than 50 percent of respondents reported a household size of four or less. The size of households is smallest in Nesimi Rayon followed by Khazar Rayon. Among the rural areas, the average household size is lowest in that of Aghdash. The share of single respondents is highest in the urban areas of Nesimi and Khazar, perhaps due to these rayons having a higher share of younger ones.

More than half of the respondents reported that Grade 11 is their highest educational level of education. In all except two rayons (i.e., Kha-

Figure 3: Gender Breakdown of Sample Source: World Bank

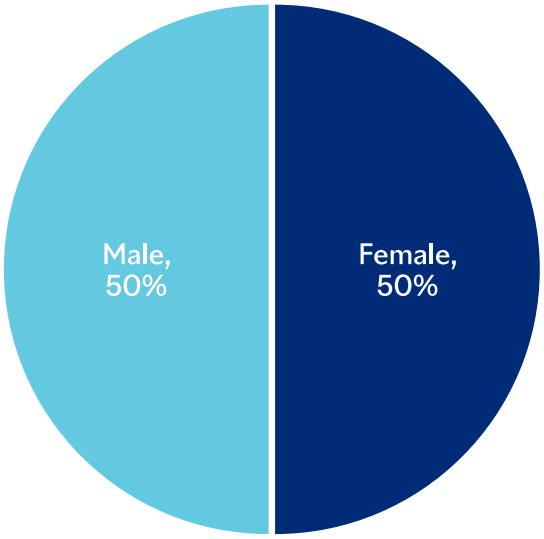
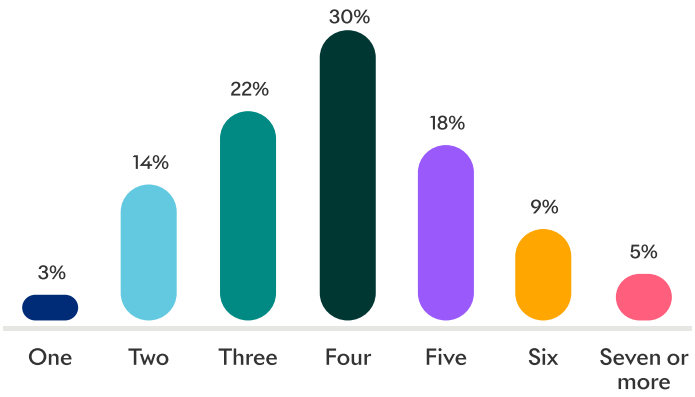


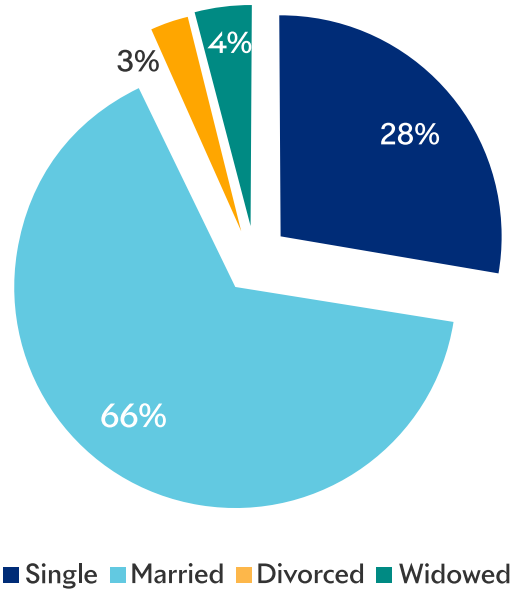
Figure 4: Number of Members per Household



Source: World Bank

Figure 5: Marital Status of Respondents

Source: World Bank



4.2 Socioeconomic Characteristics

zar and Nesimi), Grade 11 is the highest educational attainment. For the two exceptions, attainment level is a university degree, with Khazar at 41 percent and Nesimi at 45 percent. Among the rural regions, Kangharli Rayon has the highest share of university graduates, at 29 percent, followed by Sharur Rayon. The share of respondents with a vocational/professional degree was highest in Oghuz Rayon, at 31 percent. Only one respondent in the rayon of Barda reported having no formal education whatsoever.

The variation in the status of employment is significant across rayons. While Kangharli Rayon leads with 62 percent of respondents in either formal or informal employment, the share of self-employed is highest in the rayon of Barda. In the latter, formal and informal work that is remunerated is lowest, at 6 percent, with the share of those unemployed but actively seeking work highest in the rayon of Oghuz, at 12 percent, and lowest in the rayon of Kangharli, at 20 percent. For those not seeking work (e.g., homemakers), the figure is highest in Aghdash Rayon, at 26 percent, and lowest in Nesimi Rayon, at 4 percent. Respondents from the urban areas of Nesimi and Khazar rayons rely mostly on employment for their income (Annex Table A1).

The rural economy of Azerbaijan is largely dependent on agriculture. The share of respondents working in agriculture is highest in the rayons of Barda (78 percent), Aghdash (79 percent), and Gakh (53 percent), suggesting their significant livelihood reliance on agricultural activities. In the overall sample, more than 23 percent of the respondents surveyed are employed either in education or training. Disaggregation by rayon shows the highest share in the rayon of Sharur (41 percent), followed by those of Hajigabul (37 percent), Kangharli (36 percent), Khazar (29 percent), and Oghuz (24 percent). Industrial sectors such as mining, manufacturing, and electricity, among others, have relatively low employment shares in most rayons, indicating limited industrial development. The data reveals significant regional disparities in employment patterns; for instance, Barda Rayon heavily concentrates on

agriculture while Oghuz Rayon has a more diversified economy with notable shares in trade and education (Annex Table A2).

In general, most people (32 percent) have an individual monthly income in the range of manat 250 and manat 500, with a small percentage within the middle or high range. Nesimi Rayon stands out as having a higher percentage of individuals with high incomes and a lower percentage of zero-income individuals compared to other rayons. Those with the highest percentage of zero income are in the rayons of Aghdash (44 percent) and Gakh (38 percent), while that of Nesimi has the lowest (18 percent). Most people in the rayons of Barda (65 percent) and Aghdash (67 percent) have a monthly income of less than manat 250, while Nesimi Rayon has the lowest (22 percent). Significantly few people across all rayons fall into the high-income category (more than manat 1,000), with Nesimi having the highest percentage (18 percent) and Aghdash and Sharur rayons with the lowest (1 percent) (Annex Table A3).

5. DIGITAL SKILLS AND USAGE

5.1 Household Digital Connectivity

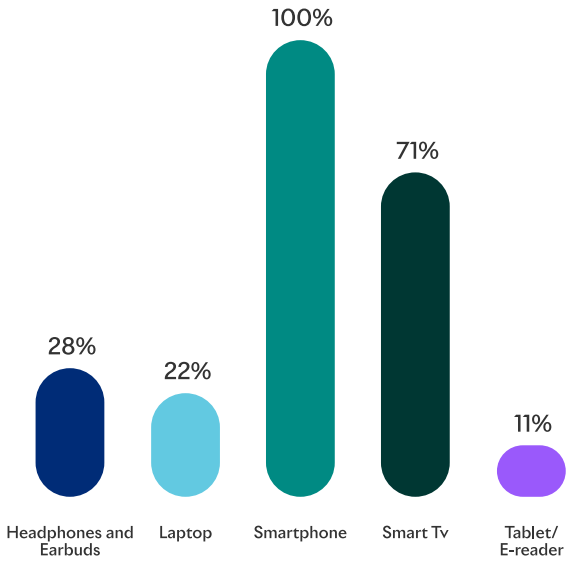
5.1.1 Digital Access

Most households have Internet access, primarily through Wi-Fi in the home, with the most common device the smartphone. The quality of service and speed connection varies, with some participants using mobile data outside the home. Another digital device used by respondents is the laptop, whereas desktops and tablets are less common. Laptops are mostly used by those who have income-generating employment. The use of computers, based on the survey, is gender neutral and from some of the discussions, it was found that the younger children in the household are not usually permitted to use the Internet due to its potential health risks. A few respondents noted that elder members of the household face difficulty in using the devices. In the remote areas of Sharur Rayon, there is broadband service. Discussions also brought to the fore an emphasis on household members mostly using Wi-Fi to access the Internet, while mobile data is used only when outside the home. Respondents with disabilities, in particular, admitted using multiple devices, including smartphones, without difficulty. The above findings from the survey corroborate those relating to digital access.

5.1.2 Digital Device Ownership

Smartphones are the most popular digital device, with almost all respondents owning one. This is followed by the smart TV, at 71 percent of ownership. Other devices with high ownership shares are headphones/earbuds (28 percent), laptops (22 percent), and tablets/e-readers (11 percent). The major difference between urban (i.e., rayons of Nesimi and Khazar) and the rural rayons (i.e., the balance) is in the ownership of tablets and e-readers, whereas the ownership pattern of smart TVs is quite even across rayons, with households in most reporting more than 50 percent ownership, except for those of Gakh Rayon and Hajigabul Rayon.

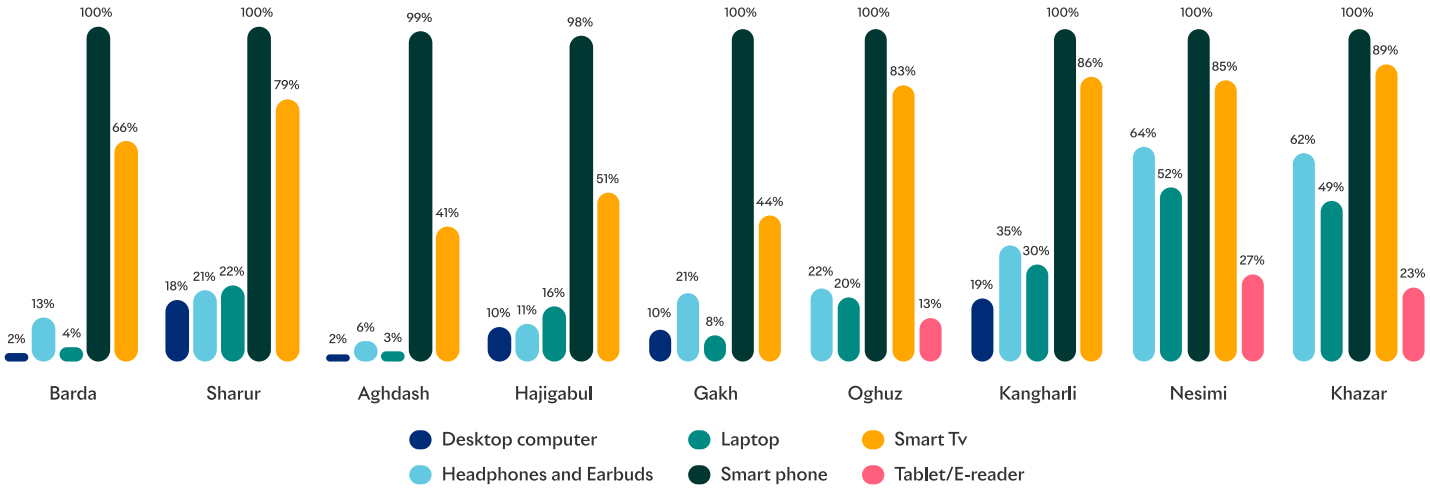
Figure 6: Top Five Devices, by Ownership Source: World Bank



When categorized by individual income, the group with the least (i.e., manat 0–250 per month) has the lowest overall device ownership. However, this has been modified to exclude students as well as the unemployed who are seeking, as well as not seeking, work from the 29 percent surveyed and who reported no income. Device ownership by the zero-income group (3.6 percent) is questionable, given that 68 percent of those reporting an individual income of zero stated that when taking into consideration the total household income, it amounts to manat 500 or more. A closer examination of the employment status of respondents who claimed zero income shows that more than 73 percent perform unpaid work within the household or have a home business and another 18 percent are self-employed, thus implying that other household members are the ones employed and able to afford the devices.

Figure 7: Top Five Devices by Ownership and by Rayon

Source: World Bank

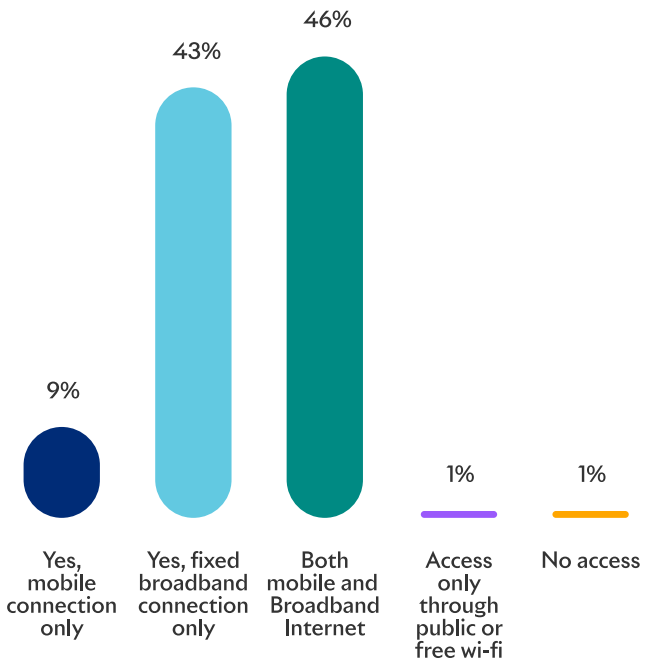


5.1.3 Type of Internet Services Accessed

Almost half (46 percent) of those surveyed access the Internet by mobile and broadband, while 43 percent only have a fixed broadband connection. Disaggregation by rayon shows that the high share of respondents accessing the Internet by mobile as well as fixed broadband is driven mostly by those respondents from the urban areas of Khazar Rayon and Nesimi Rayon. The share of respondents using only fixed broadband is high in the rural areas, with the rayons of Aghdash (78 percent) and Gakh (74 percent) reflecting the highest shares. The rayons reporting the highest share of respondents with only mobile access to the Internet is Sharur (38 percent), followed by Barda (18 percent). Survey findings in Sharur Rayon confirm the insight gained from FGDs conducted in the rayon—that broadband connection is not available in remote

Figure 8: Type of Internet Access

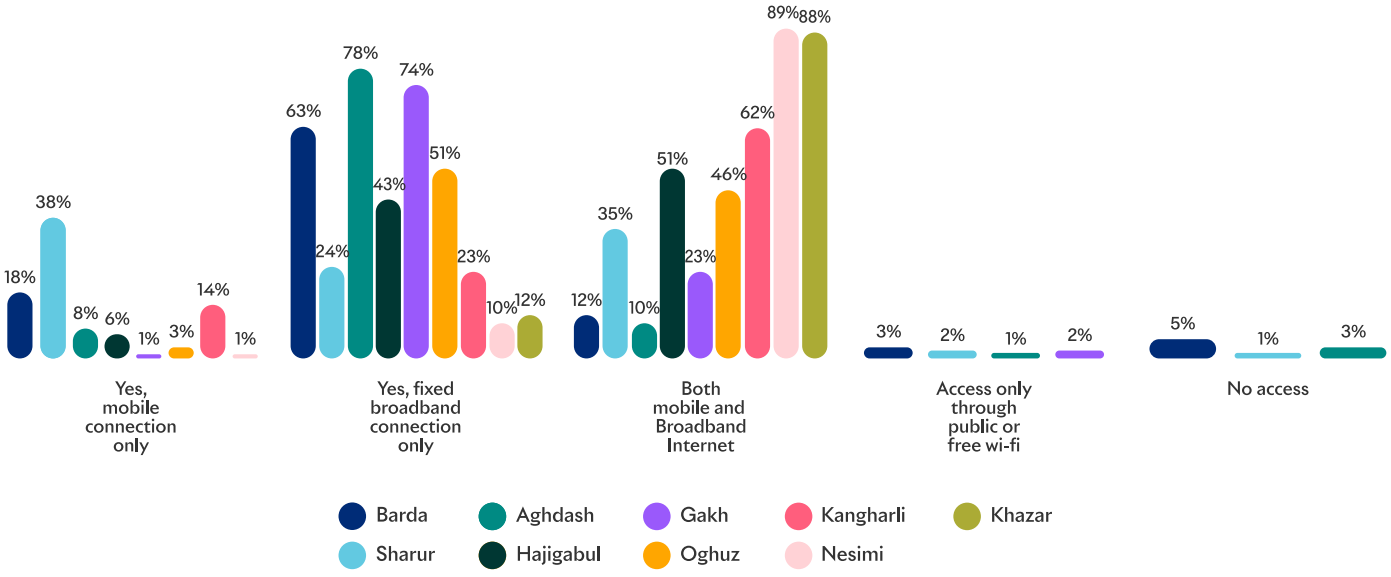
Source: World Bank



areas, which explains the spike in Internet usage by mobile there. The rayon with the highest share of respondents with no access to the Internet is Barda, at 5 percent. Disaggregation by individual income shows respondents reporting a high individual monthly income of manat 500 and above as more likely accessing the Internet by mobile and fixed broadband, the highest percentages representing the rayons of Kangharli, Nesimi, and Khazar.

Figure 9: Internet Access by Rayon

Source: World Bank

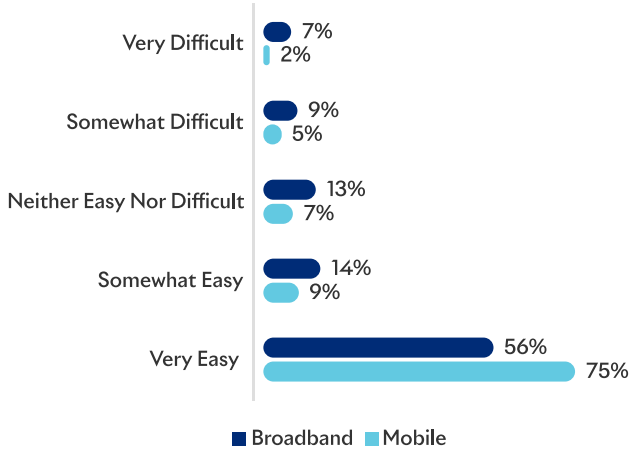


5.1.4 Ease of Connection

The vast majority (84 percent) of respondents surveyed found it "very easy" or "somewhat easy" to connect their new mobiles to the Internet, while only 7 percent found it "very difficult." Broken down, approximately 56 percent found it significantly easy for mobile connection, with 14 percent somewhat easy and 16 percent with difficulty. Overall, new mobile connection is perceived easier than broadband connection. Disaggregation by rayons also shows a similar trend. A higher percentage of respondents found it "very easy" or "somewhat easy" to connect their new mobile compared to broadband. This implies that mobile service providers

Figure 10: Ease of Initial Connection

Source: World Bank



have streamlined their onboarding processes more effectively than have broadband providers. Nevertheless, there are significant differences between rayons based on how easy it is to connect a mobile. Most (50 percent) found it significantly easy, but the share varies between 56 percent in Aghdash Rayon and 96 percent in Gakh Rayon. Those respondents in the "very difficult" and "somewhat difficult" categories are reflected highest in the rayons of Aghdash and Kangharli, respectively. The ease with which one can set up a broadband connection is lowest in Sharur Rayon, with 41 percent reporting significant difficulty.

5.1.5 Current Services

While broadband penetration is noted as quite high, there is yet scope for improvement in the quality of service. Most respondents surveyed reported having access to the Internet via broadband, despite the varying quality of connection. In Baku for instance, respondents reported the speed as not at optimal performance. In addition, congestion of the network leads to poor service quality during peak hours, mostly in the evenings. While most of the rural-area respondents have fixed broadband access at home, some have to rely on mobile data because of the deficiency in infrastructure or, in some cases, financial constraint. The dissatisfaction reflected with speed is more common among those who access the Internet by fixed broadband compared to those using mobile Internet. The former group reports that the Wi-Fi signal is not sufficiently strong and they yearn for more reliability in village broadband infrastructure.

5.1.6 Service Satisfaction

A larger proportion of respondents is satisfied with the quality of fixed broadband connection service rather than that of mobile. This may suggest that fixed broadband providers in those rural parts of the Azerbaijan rayons surveyed deliver a higher quality of service than do mobile providers. A disaggregation by rayon shows significant differences in satisfaction between each. When considering mobile and broadband connections, some regions (e.g., Baku) rate satisfaction as high, while others (e.g., rayons of Barda and Hajigabul) report a lower rate. Service quality and infrastructure in the rural areas, therefore, may not be at par with those in the urban areas of the rayons of Nesimi and Khazar. Kangharli Rayon reports the highest share of respondents who are "very dissatisfied"' with the quality of their mobile (25 percent) and broadband connections (62 percent).

Figure 11: Satisfaction with Quality of Mobile and Broadband Connections

Source: World Bank

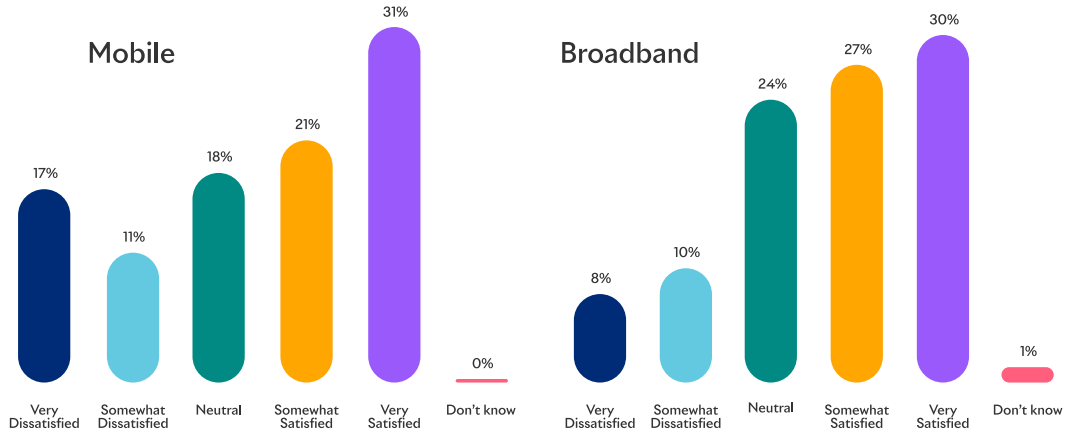
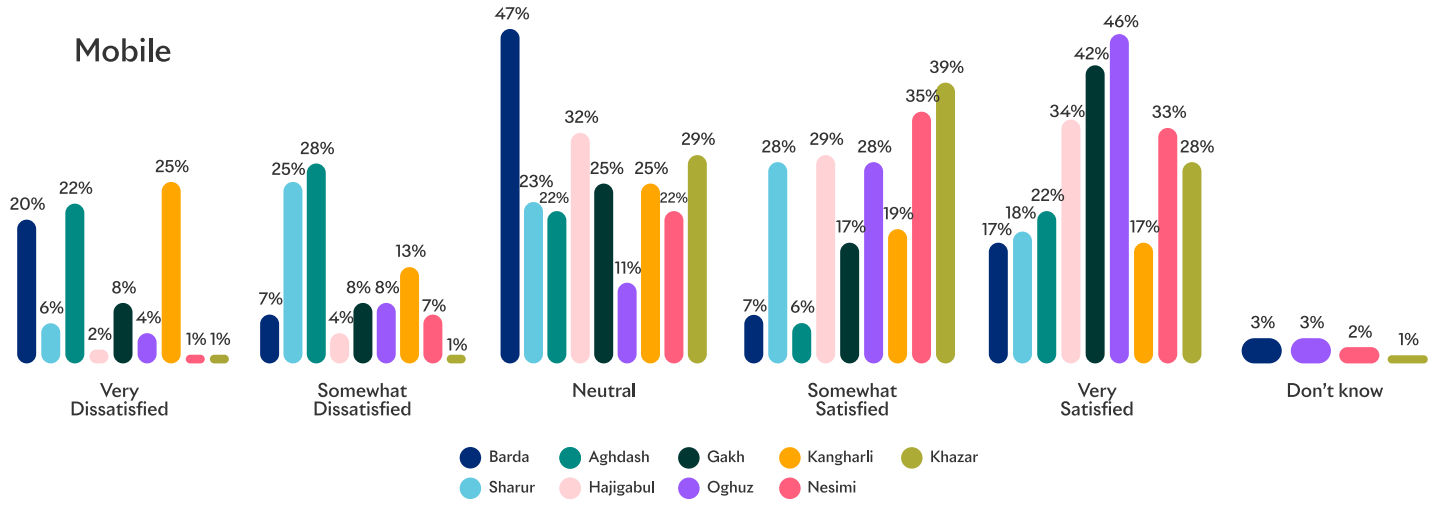
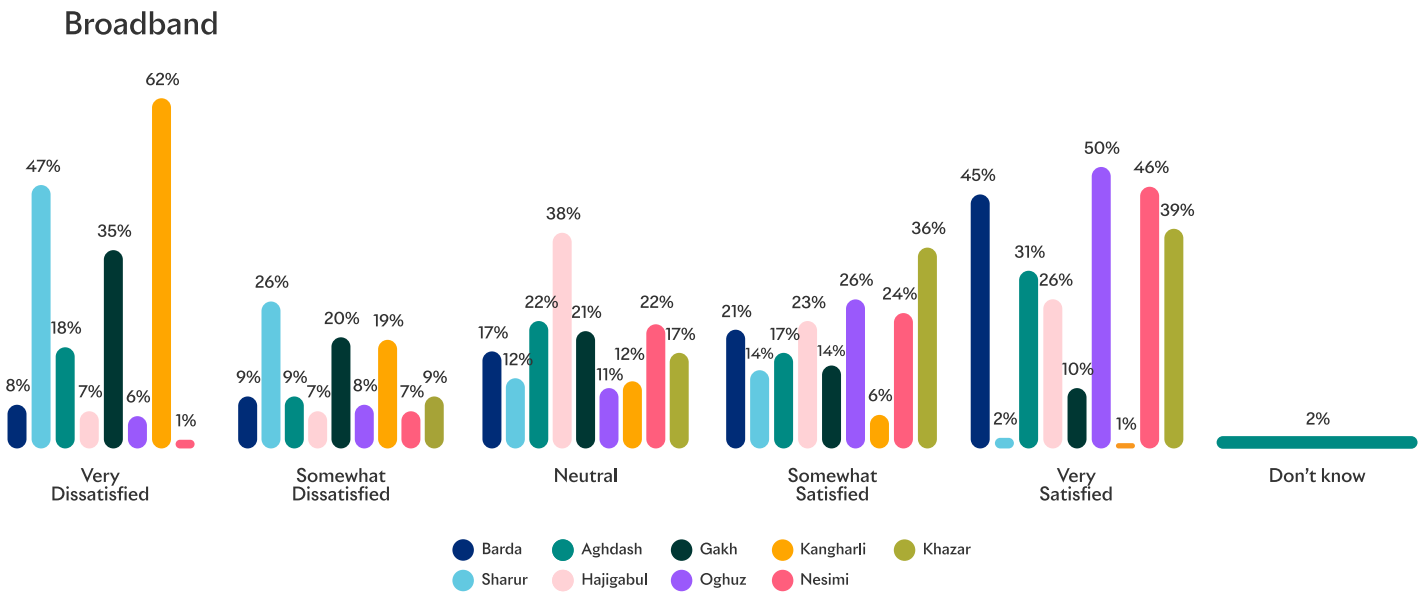


Figure 12: Satisfaction with Connection Quality by Rayon

Source: World Bank



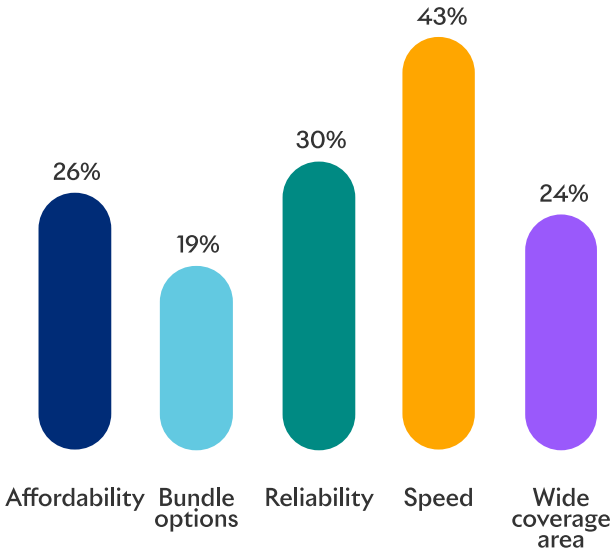


5.1.7 Service Preference

(a) Mobile Connection

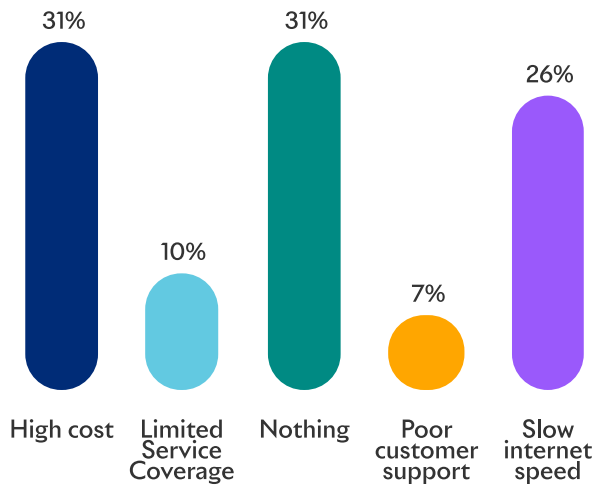
Preference for mobile connection in Azerbaijan varies across rayons and income levels, with speed (43 percent) and reliability (30 percent) the most vital for those respondents surveyed, despite the high dissatisfaction with its excessive cost (31 percent). Conversely, 30 percent of respondents stated they had no complaints regarding their mobile connection. This feedback reflects the critical need to tailor the cost and reliability of mobile connection service based on the area so as to level the playing field. Of particular note were those respondents with a higher income, compared to those on a lower income, who complained about the high cost for connection being their main reason for dissatisfaction. The above findings highlight the need for Azerbaijan to ensure that mobile service offers become more personalized and region specific in meeting the needs of its users.

Figure 13: Top Five Reasons for Favoring Mobile Connection (overall sample)



Source: World Bank

Figure 14: Top Five Reasons for Disfavoring Mobile Connection (overall sample)

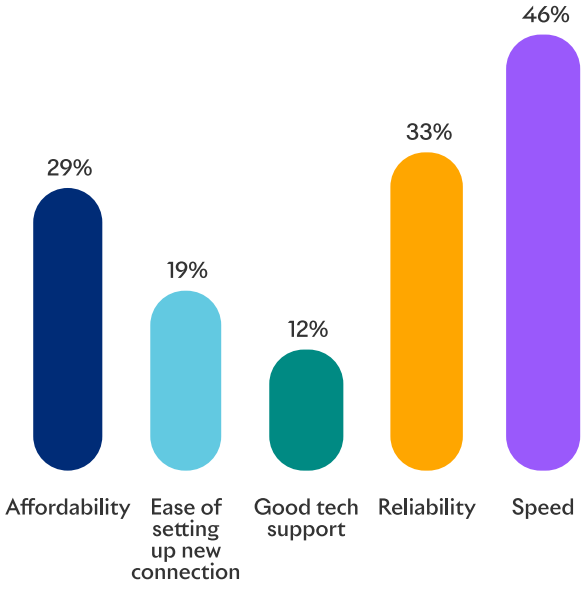


Source: World Bank

(b) Broadband Connection

While speed, reliability, and affordability are the key factors for broadband satisfaction, the opposite is primarily driven by its slow speed and high cost. Despite varying levels of preference across rayons, speed, reliability, and affordability were cited by survey respondents as their main reason for potentially preferring broadband connection. Some rayons prioritized speed, while others either cited the ease with which to connect or were completely satisfied with the system. In this case, income levels did not significantly influence respondent preferences, although those at a higher income level were more likely to afford connection. Dissatisfaction with broadband arises more as a result of slow speeds, followed by high cost and unreliability. A significant portion of respondents in various regions nevertheless reported their complete satisfaction, but highlighted the existing regional disparities in quality of service.

Figure 15: Top Five Reasons for Favoring Broadband Connection



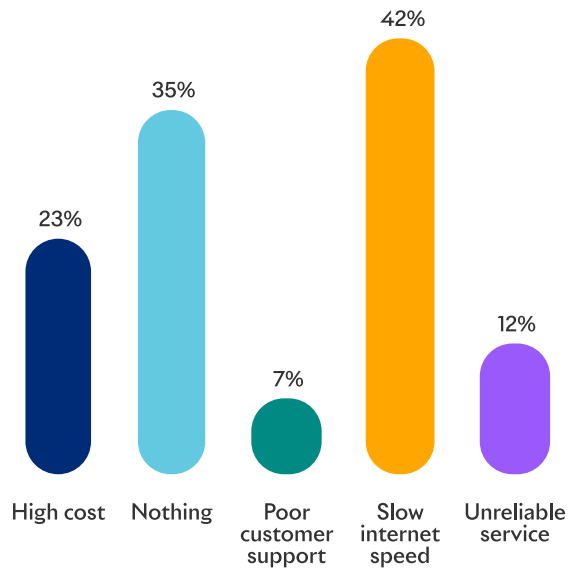
Source: World Bank

Ultimately, 30 percent or more of respondents across all income levels were consistently satisfied with their broadband connection.

(c) Reasons for not Favoring Broadband Connection

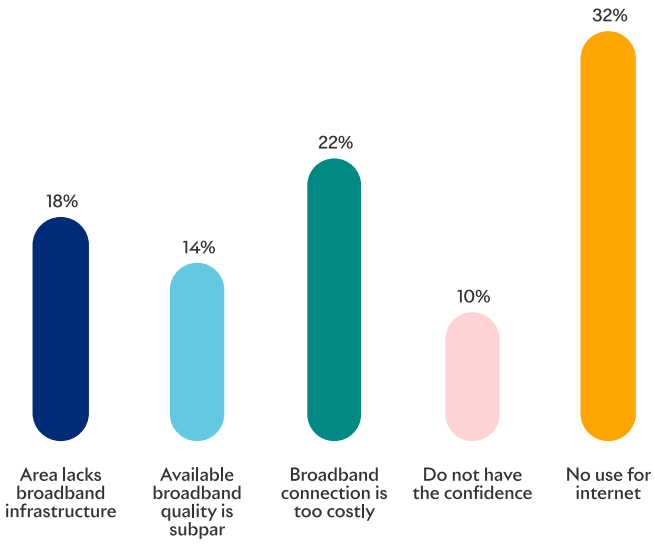
The most cited reason by surveyed respondents for not preferring a broadband at home is that there was no need for the Internet (32 percent), followed by its cost (22 percent). More than 91 percent of those respondents with no need for broadband, instead, access the Internet via mobile connection. Other reasons put forth for not favoring broadband were the need for more infrastructure (18 percent) and the fact that quality was subpar (14 percent). A disaggregation by rayon indicated that the principle reason among them all for not favoring fixed broadband connection is, again, the need for more infrastructure. In Hajigabul Rayon, however, there is little demand for broadband Internet (67 percent) while in Oghuz Rayon, the cost is excessive (67 percent) and in Kangharli Rayon, the quality is low (50 percent). Close to 17 percent of respondents in the rayon of Hajigabul reported one of the reasons for the low demand for broadband is that its women are discouraged from using the Internet. A categorization of opinions based on individual income shows the principle issues are not only the lack of Internet infrastructure but also the need for quality service. Among students, however, 40 percent stated that there was little need for broadband Internet, given their use of mobile connection.

Figure 16: Top Five Reasons for Disfavoring Broadband Connection



Source: World Bank

Figure 17: Top Five Reasons Households Do Not Connect to Broadband



Source: World Bank

5.2 Digital Literacy

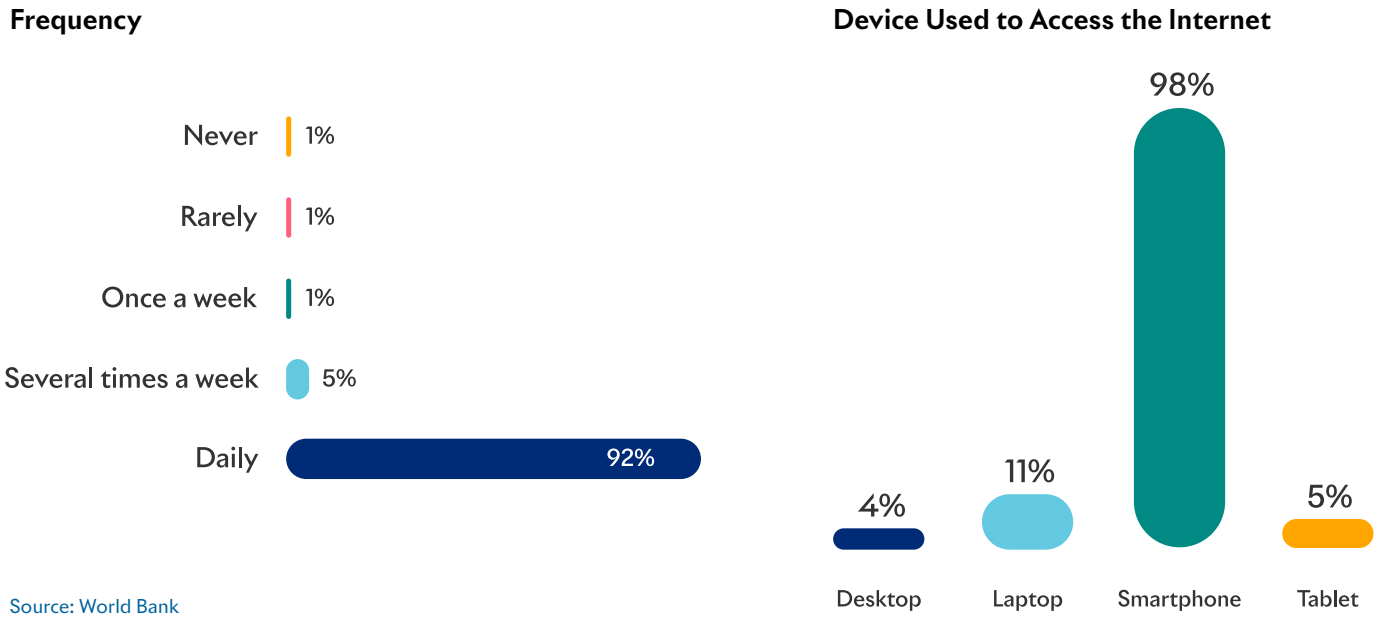
The general attitude of respondents toward the use of smart devices and the Internet is positive, in recognition of the latter's significant potential for online educational resources, research materials, and courses. Respondents expressed keen interest in learning new digital skills (e.g., coding and design) as essential for future employment and personal growth. The convenience and efficiency of digital services, particularly for tasks such as online shopping, banking, and accessing information are widely acknowledged. Moreover, the time-saving benefits of these services and their potential to improve one's daily life are highly appreciated. Digital technology's ability to connect with friends and family through social media platforms and messaging applications also facilitate staying connected in the digital age, something that is highly valued. Platforms such as YouTube are appreciated for their entertainment value and as a source of educational content. The potential of digital technology for business growth and online entrepreneurship is well recognized, especially by women who work from home and earn income.

Nevertheless, respondents in the survey also expressed their apprehension about the negative aspects of digital technology and Internet access. A major concern from the survey includes the health effects of excessive screen time, particularly on vision and sleep patterns. Respondents were aware of the risk of addiction to smartphones and social media, especially among younger individuals, as well as the likelihood of distracting from school/work. In urban areas, people are aware of the potential for hacking, data breaches, and online scams. Furthermore, concerns were raised about the security of financial transactions and breach of personal information. Some respondents are aware of misleading online information or inappropriate content. They expressed a mix of fascination and apprehension about AI. Despite recognizing AI's potential for information retrieval and automation, they nevertheless are concerned about job displacement and the potential risk of AI replacing humans in various tasks. The fear appears stronger among older individuals.

5.2.1 Internet Use

The vast majority (92 percent) of respondents use the Internet on a daily basis, with only a fraction reporting infrequent or no use. This high usage rate is primarily facilitated by the smartphone (98 percent), the predominant device to access the Internet, followed by laptops at a distant second. Laptops (11 percent), desktop computers (4 percent), and tablets (5 percent) play a minor role in Internet access. Other than respondents in the rayons of Barda, Sharur, and Aghdash, more than 90 percent of those from the other six rayons report using the Internet on a daily basis. The share of respondents who do not use the Internet is highest in Aghdash Rayon (7 percent). To access the Internet, at least 98 percent of respondents from the 9 rayons use smartphones, other than the rayon of Aghdash, where the figure stands at 93 percent. Respondents from Nesimi Rayon report the highest number of laptop (desktop) (9 percent) and tablets (14 percent) ownership.

Figure 18: Internet Use

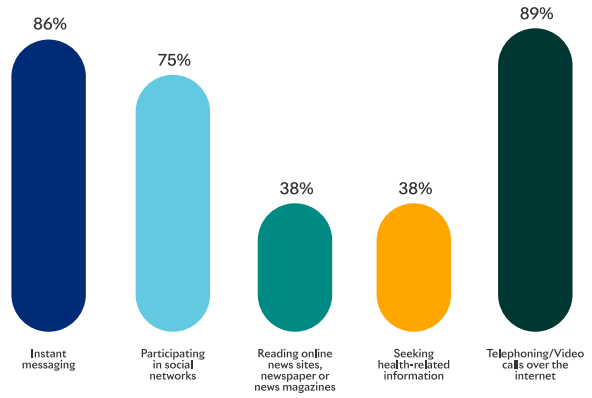


Source: World Bank

5.2.2 Purpose for Using the Internet

Among respondents, the Internet is used most for telephoning and making video calls (89 percent), followed by instant messaging (86 percent) and participating in social networks (75 percent). Other popular activities include reading online news, newspapers, and news magazines (38 percent) and seeking health-related information (38 percent). In the rayons of Nesimi and Khazar, it is common to make online purchases (56 percent and 54 percent, respectively). Internet banking is one of the top five activities in the rayons of Kangharli (57 percent) and Hajigabul (32 percent). Respondents from all income groups show a similar trend, with most using the Internet to telephone and make video calls as well as instant message and participate in social networks. The high Internet need to download/install software or applications is observed in 37 percent of students (with zero income) and 48 percent of respondents who are currently unemployed and seeking work. In terms of Internet banking, it is commonly used among the respondents with incomes of more than manat 250 per month.

Figure 19: Top Five Internet Activities (overall)

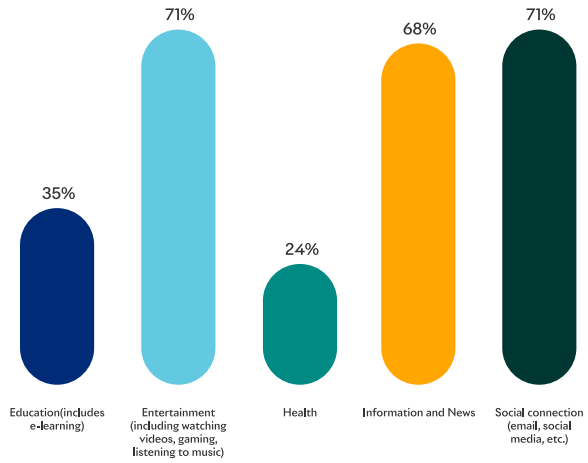


Source: World Bank

Internet for social connection, this purpose does not feature in the top three preferences in Barda Rayon. The share of respondents using it for information and news varies from 46 percent in Aghdash Rayon to 88 percent in Kangharli Rayon. Those using the Internet for entertainment is highest in the rayons of Khazar and Aghdash (92 percent and 39 percent, respectively).

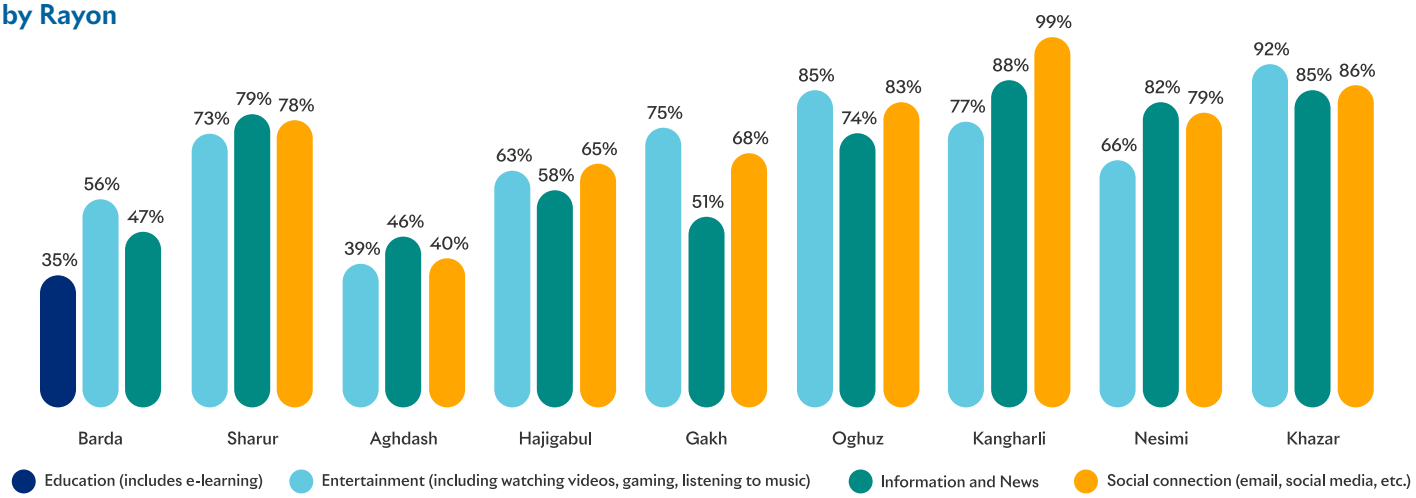
The most popular reason for using the Internet among respondents is for entertainment (71 percent) purposes and social connection (71 percent), followed closely by the need for information and news (68 percent). Others included education (35 percent) and health information (24 percent). Disaggregated by rayon, information and news, entertainment, and social connection are the top three reasons for the Internet in most rayons, except for that of Barda. The share of respondents nevertheless varies across rayons. For instance, while 99 percent of respondents in Kangharli Rayon use the

Figure 20: Top Five Purposes for the Internet



Source: World Bank

Figure 21: Top Three Purposes for the Internet, by Rayon



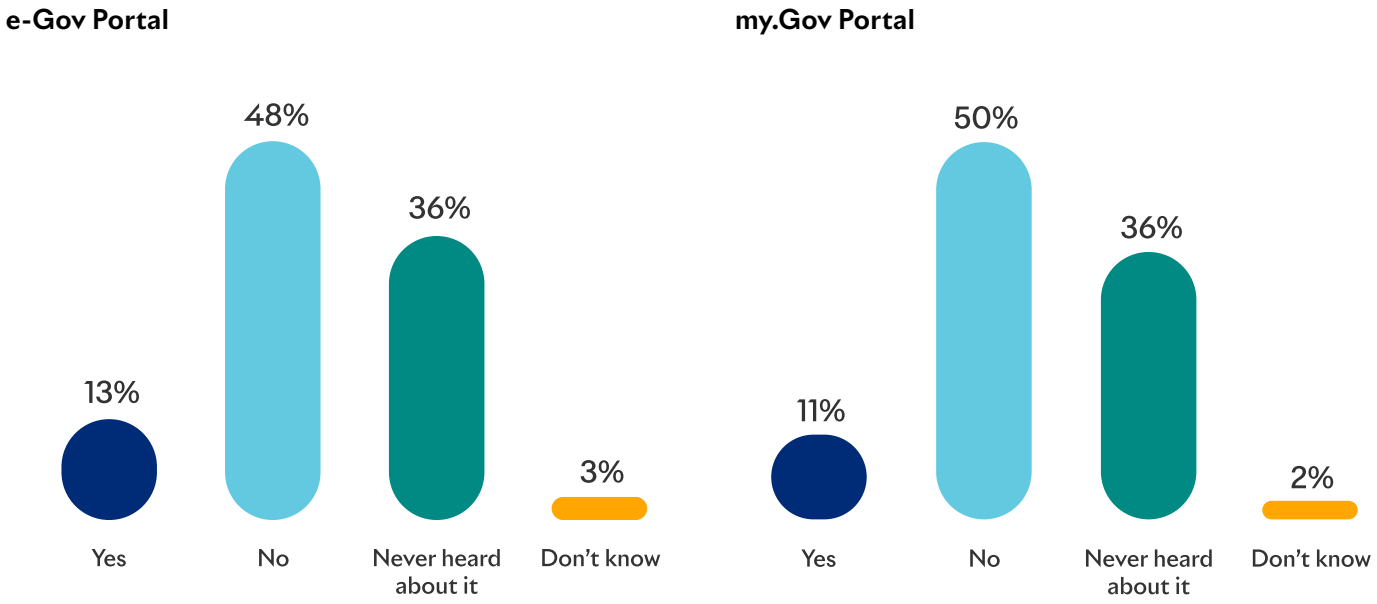
Source: World Bank

5.2.3 Digital Government

Digital government services in the context of rural Azerbaijan appear to be underutilized and poorly understood by the general population. Insight from the FGDs reveals that while some individuals use basic digital payment platforms and educational portals, the broader spectrum of government e-services remains largely untapped. The lack of awareness and use of these can be attributed to several factors. Firstly, many respondents are neither aware of the specific services available nor are they of the potential benefits. Secondly, were individuals in fact aware of them, they nevertheless may be deficient in the necessary digital literacy skills to navigate and use them effectively. This rationale, in particular, can be applied in the case of the elderly population who consider learning new skills to be challenging. Finally, while the smartphone is common, reliable Internet access remains a challenge in the areas, thus preventing a wider use of online services.

Despite these challenges, there is definite interest in accessing online government services. This has been demonstrated by the inclinations of participants to book appointments online, use payment services, and seek agriculture and healthcare resources. Knowledge of digital government services in rural areas, however, is significantly low compared to urban areas, where awareness is sufficiently broad to include existence of the Asan Imza mobile identity, SIMA for electronic transfers and payments, and the government e-service portal. However, knowledge and usage of these government services is not omnipresent.

Figure 22: Digital Government e-Service Portal Registrations



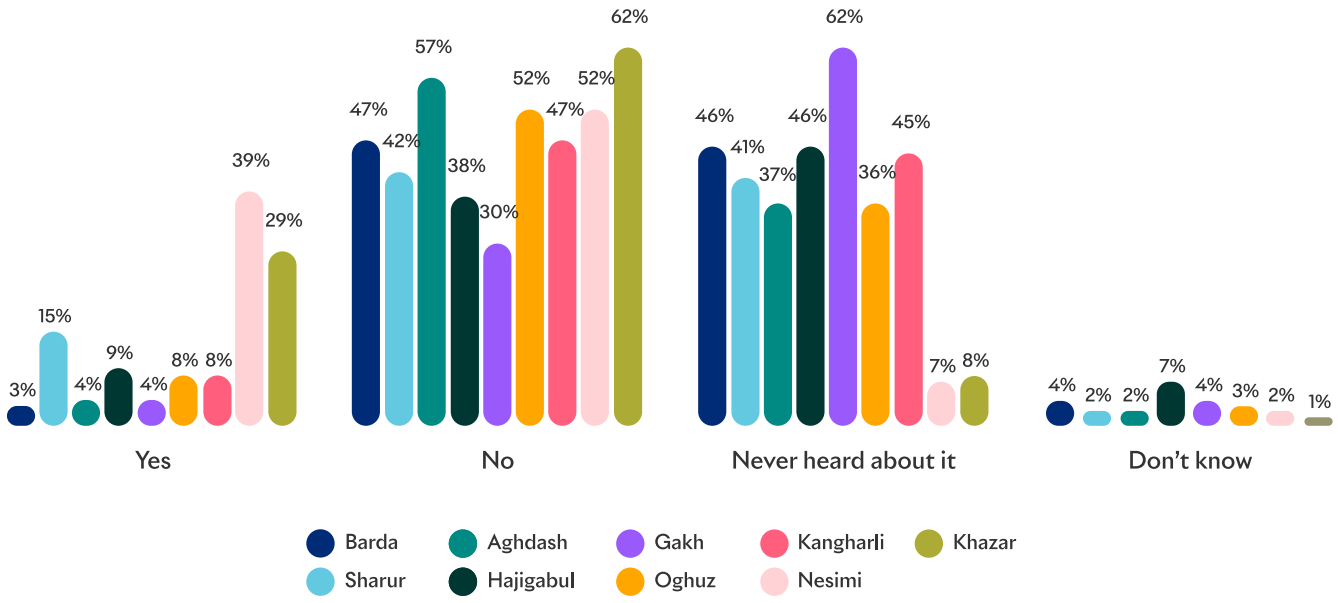
Source: World Bank

Registration on the e-gov.az and my.gov.az portals is relatively low among respondents, at 13 percent and 12 percent, respectively. The portion of those unaware of these is quite high, at 36% for both. A disaggregation by rayon results in Nesimi with the highest registration for the e-gov.az portal (41 percent) and my.gov.az portal (39 percent), while Barda has the lowest, at 2 percent for the e-gov.az portal and 3 percent for the my.gov.az portal. Survey results suggest a low awareness of these platforms in Gakh Rayon, with the share of people unaware of the platforms reaching 60 percent for the e-gov.az portal (60 percent) and 62 percent for that of my.gov.az. As expected, awareness is highest in the urban areas of Nesimi and Khazar rayons, where only 7 percent to 8 percent reported being unaware of digital government services.[14] Disaggregation by individual income shows that usage is much higher in households with a higher income, providing the assumption that this is driven by a higher concentration of these urban area households in the sample.

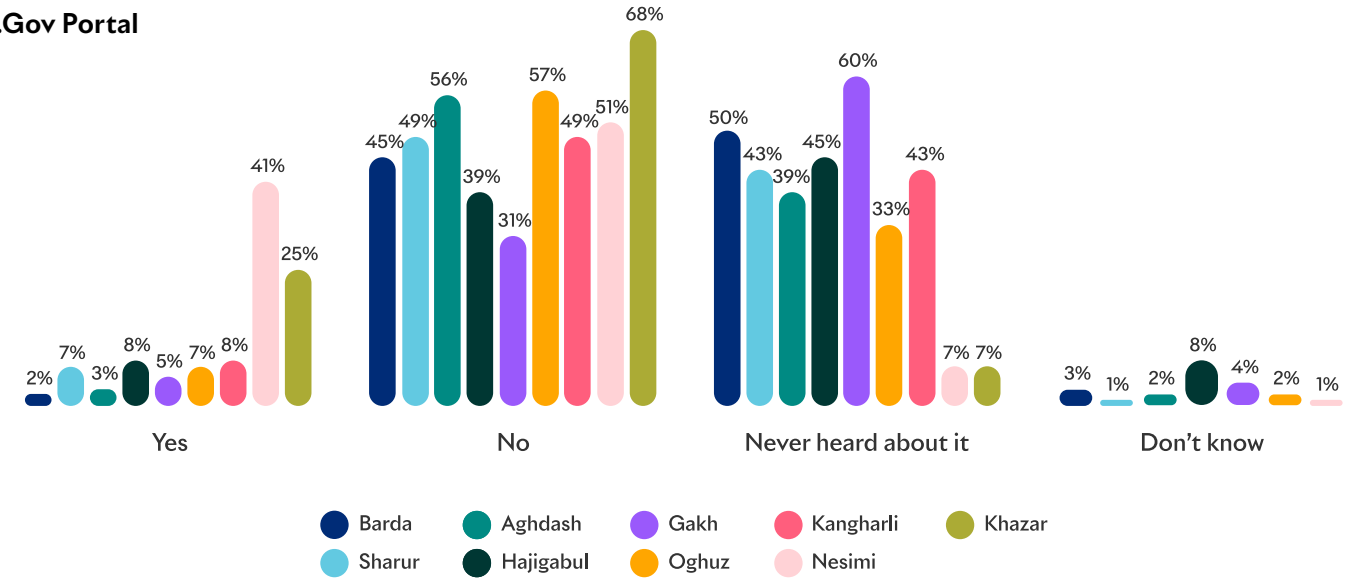
[14] Those living in the cities are constantly exposed to various sources of information from billboards, advertisements, public events, and social interaction, thus increasing awareness.

Figure 23: Digital Government e-Service Portal Registrations, by Rayon

e-Gov Portal



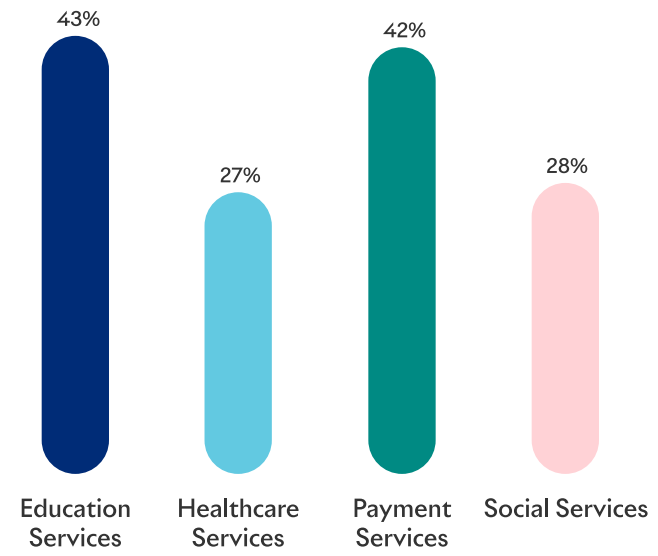
my.Gov Portal



Source: World Bank

The most popular reason to use government e-service applications is for education (43 percent) and payment transfers (42 percent).[15] The government payment portal, for instance, offers a convenient online method with which to pay for various services, including taxes, utilities, fines, state duties, social services, education fees, and other government-related invoices with a mobile e-wallet of credit cards. Other popular reasons are for healthcare and social services, each of which is at 27 percent. Education and payment transfers are among the top four services of in all rayons, with the payment application most popular in Gakh Rayon (71 percent) as is the high use of the custom service application, at 69 percent among those surveyed. Across income levels, the access is somewhat consistent, with students the highest users for education purposes, at 56 percent. Access for payment transfers ranks top in the highest income bracket (manat 1,000 or more per month) and lowest among those reporting zero income.

Figure 24: Top Four Reasons to Use Digital Government e-Service Portal

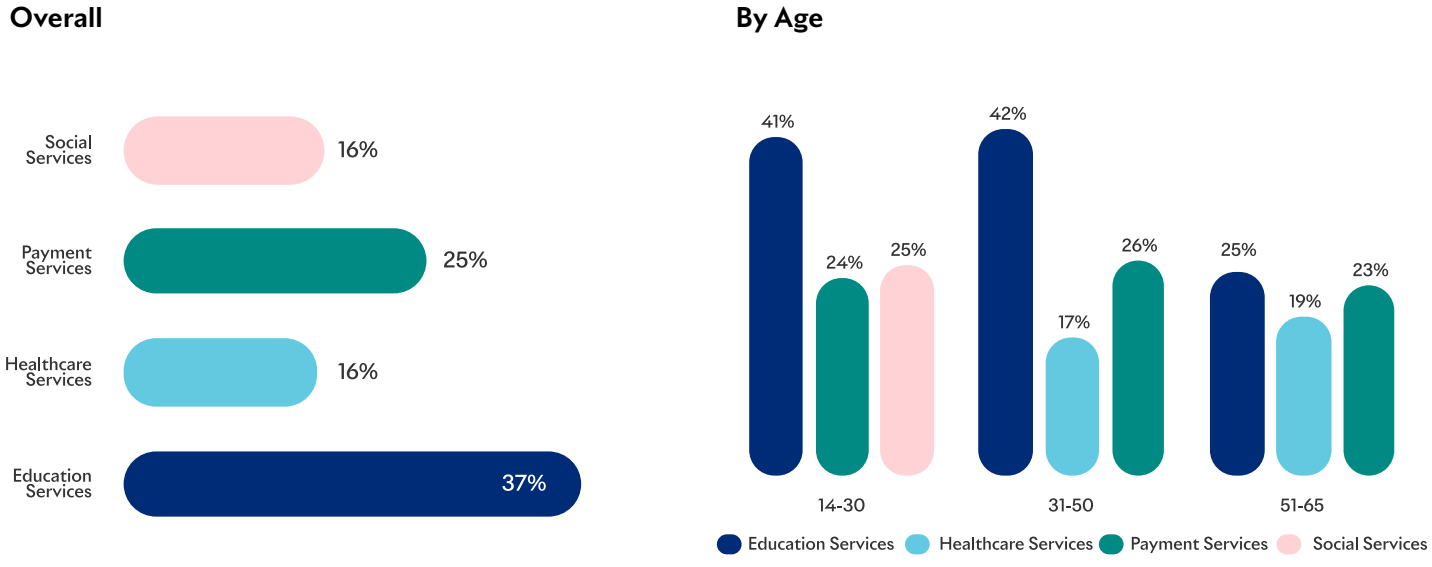


Source: World Bank

[15] This represents the share of respondents who either use digital government service applications or are aware of others using them.

Overall, 37 percent of respondents rate Azerbaijan's education e-service portal as useful, followed by 25 percent for payments (25 percent). This highlights the strong demand for accessible and effective government online educational resources and services. The importance of Internet access for education also was underlined during one of the FGDs in Baku City, where participants noted that the COVID-19 pandemic had propelled Azerbaijani schools toward online classes, for which several of the survey households were not prepared. The perception that the education e-service is more advantageous does not alter when disaggregating respondents by age. For the age group of 14 to 30, access to social services was considered the second most useful. For those of 31 to 50, healthcare was more prevalent (17 percent) as it was for those between the ages of 51 and 65 (19 percent). By rayon, the government education e- service is considered more important in all except for that of Gakh (66 percent), where the payment e-service is the leading option. Grouped by employment status and income, social services are more relevant to students and those currently unemployed.

Figure 25: Perception of Government e-Service Portal Usefulness



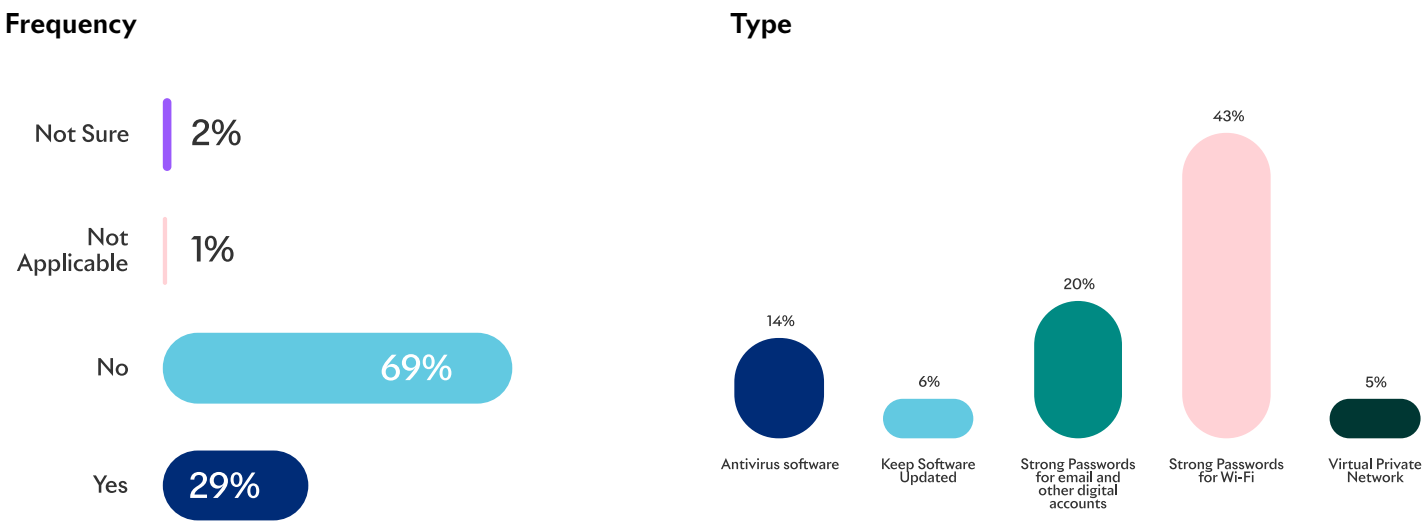
Source: World Bank

5.2.4 Digital Security

The vast majority of respondents (69 percent) reported that they did not engage in regularly updating their digital security. The most common type of security practice was that of creating strong passwords for Wi-Fi (43 percent), while 2 percent were unsure and 1 percent found security practices irrelevant. The absence of security may allude to a lack of awareness or a perception of futility. By rayon, adoption of security practices varies significantly, with some (i.e., Barda, Aghdash, and Nesimi) doing more so than in others (i.e., Sharur, Hajigabul, Oghuz, Kangharli). Strong passwords for email and digital accounts are applied by 20 percent of respondents, indicating at least some knowledge of the need to protect their online accounts. The low use of antivirus software (14 percent) may be due to a cost factor or the complexity of the software. Strong passwords for Wi-Fi are consistently applied across all income and employment levels, ranging from 21 percent to 60 percent, respectively. This suggests a widespread understanding of the significance of security on Wi-Fi networks. Overall, security practices become more proliferent among high-income individuals, indicating that they are at the forefront of digital security aspects; in fact, the two-factor authentication feature ranks among the top three security practices within the manat 1,000 per month income group.

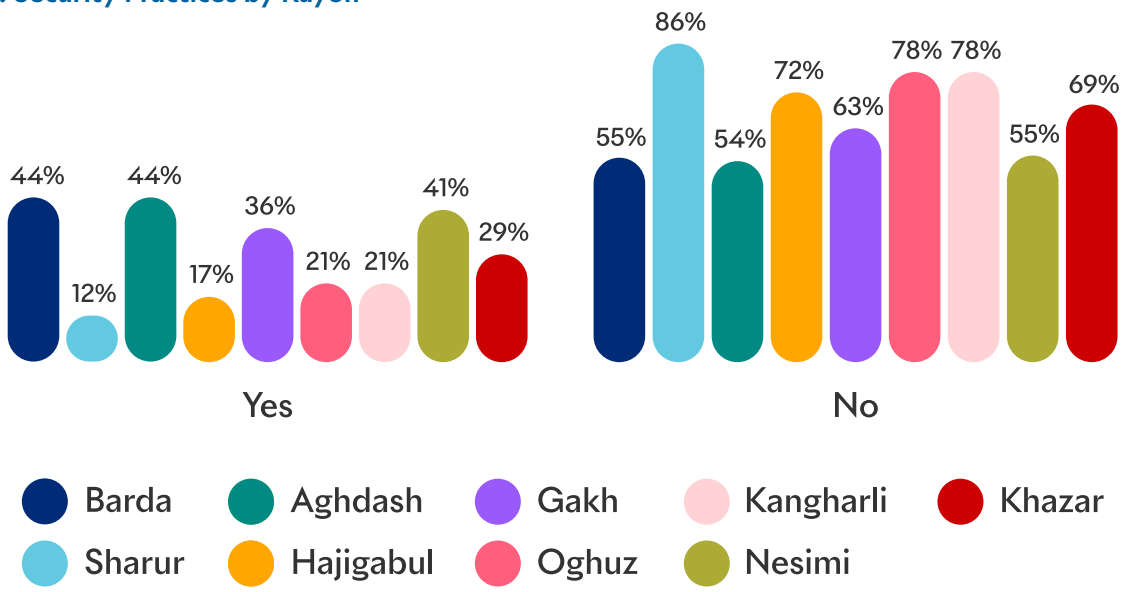
A significant majority (37 percent) of individuals fail to critically evaluate online information, with Gakh Rayon the highest in negligence (65 percent). This indicates their potential vulnerability to misinformation and digital threats. Only a small proportion (11 percent) of those respondents surveyed regularly and critically evaluate the information they access, while a smaller group (7 percent) report frequently doing so. The share of respondents who fail to assess the information obtained is lowest in the rayon of Nesimi (10 percent), followed by that of Khaz-

Figure 26: Security Practices



Source: World Bank

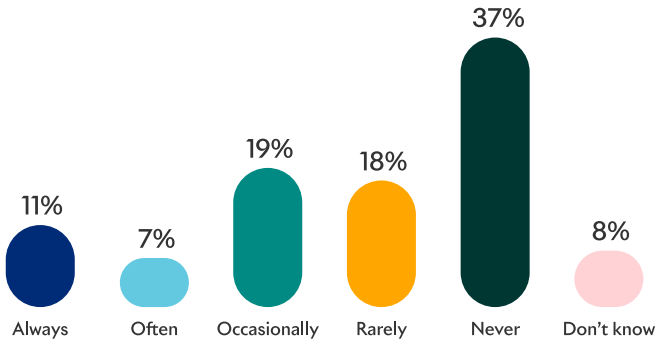
Figure 27: Security Practices by Rayon



Source: World Bank

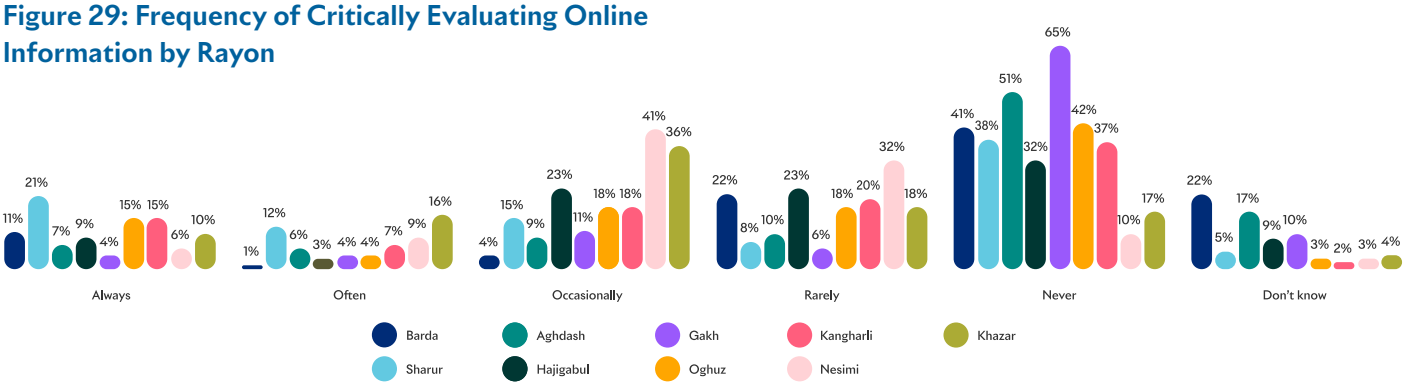
ar (17 percent). Distribution in Sharur Rayon is somewhat distorted, where most respondents never critically form an opinion of the online information they gather, despite it having the highest rate of respondents who always assess the information (21 percent). Higher income levels generally correlate with a greater frequency of critical evaluation, although even in the highest income bracket (i.e., more than manat 1,000 per month), 22 percent report never really assessing the data they collect.

Figure 28: Frequency of Critically Evaluating Online Information



Source: World Bank

Figure 29: Frequency of Critically Evaluating Online Information by Rayon



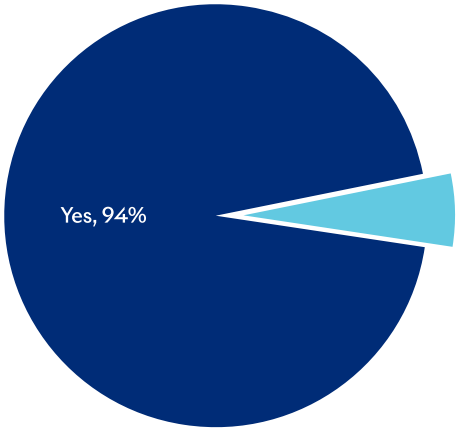
Source: World Bank

5.3 Training and Capacity Building Needs

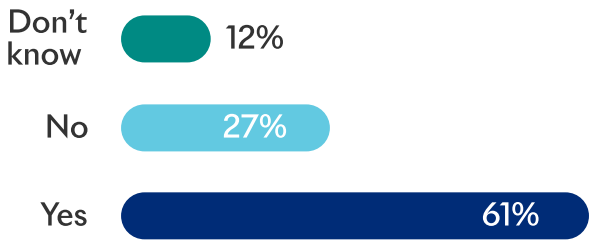
Most respondents (94 percent) have never attended a digital training program. There is a significant gap in digital skill training and a need for greater access and awareness of the programs available. This is reflected by 61 percent of respondents, which suggests little variation by rayon from those already having had digital training. The share of respondents who have attended digital training programs is highest in Nesimi Rayon and lowest in Barda Rayon. However, perception for the need varies significantly depending on the rationale, at 33 percent in Nesimi Rayon and 87 percent in Kangharli Rayon. Participation is quite high in Sharur Rayon, with 79 percent of respondents expressing a desire to learn digital skills. Respondents in all but one employed income group—the highest—consider a need for training.

Overall, seeking health-related resources (22 percent) is a skill that respondents would like to achieve, although it reflects mainly those above the age of 30. The rate is high for those interested in being able to search for online information (20 percent), reflecting a demand for basic digital literacy training, particularly in consideration of the many who are not comfortable installing device software and applications. The younger age group of between 14 and 30 are more focused on learning how to access personal data and write code in program language. By age group, there is high demand to be able to purchase or sell online (ages 31 to 50) and perform online banking transactions (ages 51 to 65). Significant difference exists by rayon in terms of the skills in demand. People in rural areas are most interest in learning how to seek online information resources, especially in relation to health.

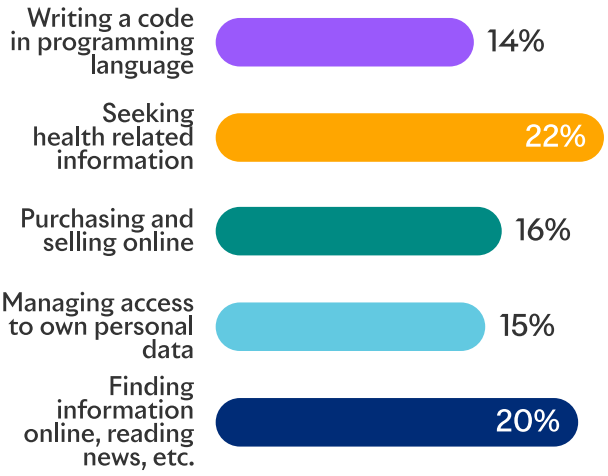
Figure 30: Digital Training Source: World Bank



Past Participation in Digital Training

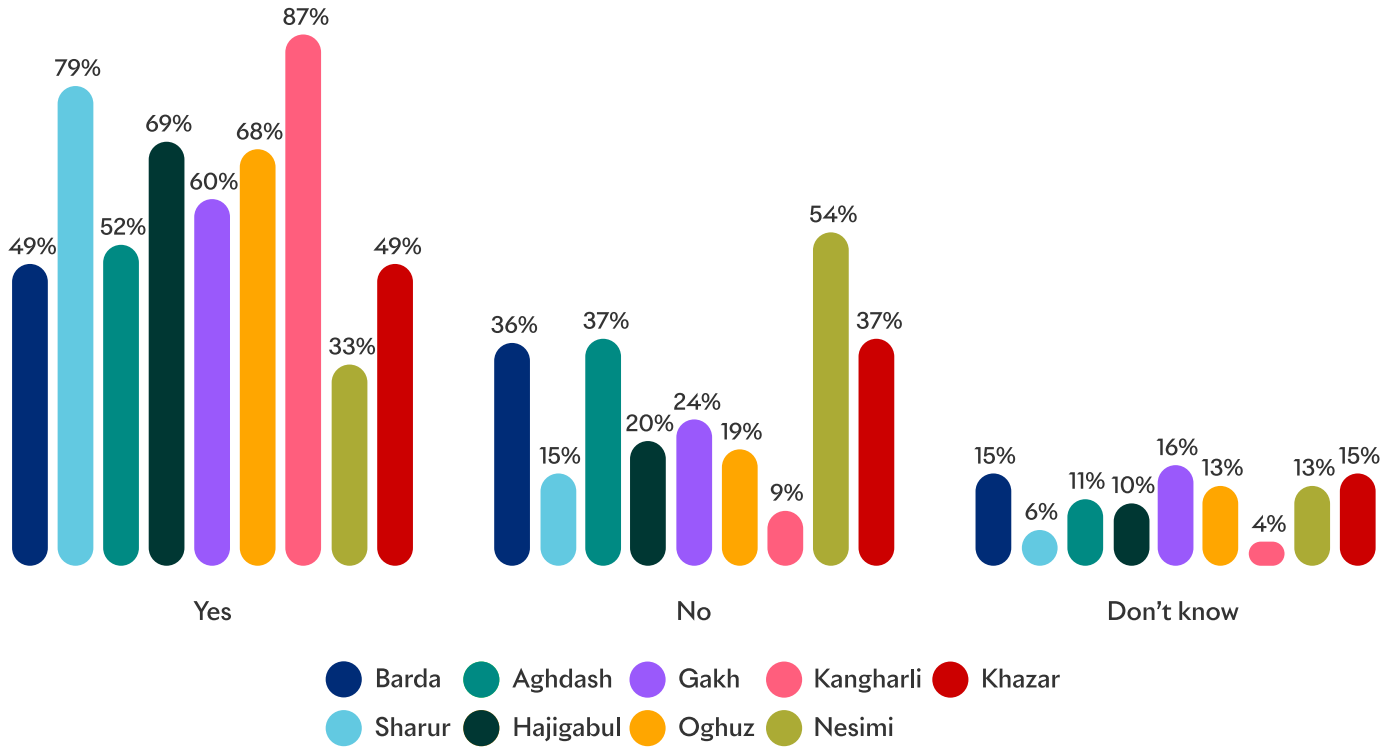


Perceived Need for Future Training



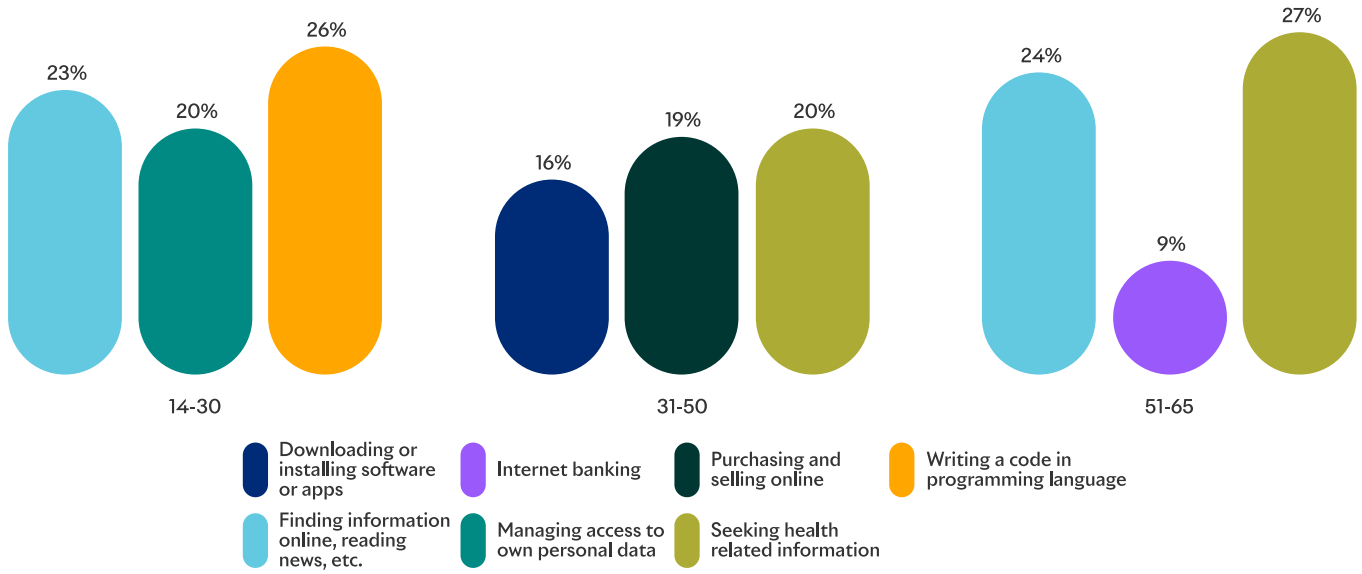
Top 5 Digital Skills in Highest Demand

Figure 31: Perceived Need for Future Digital Training



Source: World Bank

Figure 32: Online Skill Demands by Age Group



Source: World Bank

Micro-size enterprises frequently access a multitude of digital services despite their limited knowledge of digital technology. Insight from KIIs with women-owned businesses reveals that the demand for digital skills for work is particularly high in rural areas, especially (i) those to increase digital literacy from the basic (e.g., computer usage, Internet navigation, software applications); (ii) e-commerce skills and online financial management; (iii) digital marketing and business development; and (iv) government e-service support (e.g., programs and financial resources). To address these, digital skill training is necessary across various types of business, particularly in rural areas, to enable businesses to thrive in the digital economy. In addition, the agriculture sector will benefit from adopting smart farming methods and techniques, precision farming, digital marketing, and e-commerce, with the ability to access the Internet once they have developed their technology skills.

The preferred mode of training is face-to-face for more than half (55 percent) of those respondents surveyed. Among those expressing this preference as well as for hybrid classes, 49 percent are willing to travel anywhere in the village for the training. Close to a quarter (25 percent) of the sample would like to be able to learn online. The demand for face-to-face classes varies from 43 percent in Aghdash Rayon to 65 percent in Hajigabul Rayon, while for online classes, it is highest in the latter (47 percent), closely followed by Gakh Rayon (46 percent). Preference for online classes is highest among those who are currently unemployed and are seeking it (35 percent)—perhaps due to their desire for remote work and flexible work schedules. Demand for face-to-face classes is relatively high among respondents earning between manat 750 and manat 1,000 per month, possibly due to the ability to increase their income once they have achieved the necessary digital skills.

Residents in rural rayons seek practical and personalized digital skill training specifically to improve their livelihoods. For instance, respondents in Barda Rayon are interested in e- commerce and digital marketing to promote and sell their local products (e.g., agricultural goods, cattle). In the rayon of Gakh, demand exists for basic computer skills, such as software, Internet navigation, and understanding online safety factors. Younger individuals expressed a keen interest in graphic design and coding, which would lead to a broadening of their employment opportunities and entrepreneurial ventures. In recognition of the ever-increasing digitalization of financial services, respondents in the rayons of Gakh and Aghdash seek training in online banking, money transfers, and digital payment methods.

The lack of the digital skills listed above creates significant challenges for residents in rural areas. Findings from the FGDs held in rural areas suggest that digital illiteracy can prevent access to many job opportunities within and outside the villages which, in turn, causes financial stress, particularly in terms of online banking and payment systems. There is recognition of the inability to access online educational resources and participate in a growing digital economy. Some FGD attendees cited communication barriers as a consequence, making it difficult for them to stay connected with friends and family living elsewhere. Furthermore, Azerbaijan's current school curriculum in rural areas fails to adequately equip students with the necessary digital skills for the modern workforce. The desire for practical, hands-on learning experiences and more resources in schools was a recurring issue brought forward in FGDs, emphasizing the need for affordable training programs that will focus on the skills required in the community.

6. RECOMMENDATIONS

Challenge 1:

Findings from quantitative surveys and FGDs point toward the absence of digital skills among respondents and their apparent willingness to acquire them.

Recommendation 1:

Adoption of a national standard for digital literacy and skill development with regional and demographic targets for delivery.

1.1. Adoption of a national standard for digital literacy and skills development allowing for targeted delivery: A national standard for digital literacy and skills development in Azerbaijan could be a crucial step towards fostering a digitally empowered society and workforce. Utilizing global good practices such as the EU's Digital Competence Framework, adapted to Azerbaijan's specific needs, would define core competencies for citizens to thrive in the digital age. It would help develop essential skills and competencies such as information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving. Such a framework tailored to Azerbaijan can enable the government to identify specific user groups and related standards for digital competencies for each user group. This may include identifying user groups based on demographics like age as well as along professional categories such as public servants, in turn allowing Azerbaijan to develop customized standard of competencies for these various groups of digital users.

1.2. Targeted Digital Skills Programs for Demographic Groups: Based on a comprehensive digital Skills framework, develop tailored digital skills programs for different user groups, such as public service officials, women, youth, persons with disabilities, the elderly.[16] Survey data referenced in this report indicates diverse digital infrastructure and skills needs across regions. The establishment of a digital skills framework and standards for each user group allows a varied set of stakeholders (public and private) to develop and deliver customizable upskilling and re-skilling programs while ensure they align towards common objectives. Programs can be prioritized based on specific demographics and in-demand skills, such as health information (for elderly and persons with disabilities), coding (for young people), and e-commerce (for farmers and other businesspeople). Lower income households have also been identified to adopt fewer online security measures and would therefore require targeted attention to reduce their vulnerability.

1.3. Blend the teaching approach: Online as well as offline training should be provided to accommodate a diverse set of learning preferences and Internet access modes. Data gathered reflects a strong preference for face-to-face and online learning among particular groups who opt for flexibility.

1.4. Apply plain language and cultural sensitivity: For digital services and materials to be more accessible, plain language and culturally familiar terms should be adopted so as to align with IDDA's efforts to use simple language on public service platforms (e.g., my.gov.az portal). Simplification of digital service interfaces with the spoken Azerbaijani language will make services easier to navigate.

1.5. Appoint local digital literacy facilitators: Since survey data indicate that approximately

[16] The World Bank team is support IDDA develop an action plan towards establishing such a digital skills framework based on the EU's Digital Competence framework for two specific target groups – public servants and rural populations requiring basic digital literacy.

34 percent of respondents would prefer a trusted member of the community to conduct the courses, local community members can be appointed as digital literacy facilitators. As well as an effective method, it also will significantly raise traction in the uptake of programs. Engagement with local communities will assist in identifying those individuals who are tech- savvy and are at a level not only to be able to provide the necessary training of trainers, motivation, and mentoring, but also who have the capacity to organize outreach campaigns.

Challenge 2:

A significant share of respondents (36 percent) report never having heard of the digital government service portal. This unfamiliarity with digital connectivity, services, and opportunities calls for Azerbaijan to invest in the citizen uptake of digital technology.

Recommendation 2:

Awareness campaigns and outreach-events.

2.1. Organize awareness campaigns and outreach events: The Government of Azerbaijan should conduct educational campaigns to increase awareness of the benefits of digital services, including those relating to public services. Establishing community trust by collaborating and partnering with respected local figures will significantly boost the credibility of the initiative.

2.2. Form community workshops and demonstrations: Workshops and seminars in venues such as schools, libraries, and cultural centers that are accessible will be helpful, with focus on such practical applications as online banking, e-commerce, digital marketing (e.g., for agriculture products), job searches, telehealth, and online learning platforms. Such events will be useful in demonstrating how digital services are able to improve one's daily life and increase economic opportunities.

2.3. Introduce mobile digital outreach: Introduction of mobile access via an Internet electric bus (e-Bus) with interactive screens will be helpful when traveling to remote areas. Such mobile access offers.... on-site demonstrations and interactive learning, providing practical exposure to digital services and addressing accessibility challenges.

2.4. Partner with local influencers: Partnering with local leaders and influencers, including government officials, school principals, and leaders of local nongovernment organizations will help in promoting digital learning. The training of members in existing community advocacy programs will ultimately provide them with the capacity to become effective advocates for digital learning as well as build trust within their own communities.

2.5. Integrate with community events: To boost digital learning participation, it is worth promoting digital services at local and cultural festivals and events where there are booths featuring interactive games, quizzes, and contests. To meet Azerbaijan's rural community needs, adapt a community-based approach that emulates India's Digigaon Foundation initiative that provides digital literacy in agriculture, finance, and healthcare.

2.6. Engage in advertising campaigns: Create engaging TV and social media campaigns to showcase how digital services can simplify and improve one's daily life. Real-life examples and community success stories can be compelling.

Challenge 3:

The dearth of affordable and reliable Internet services (mobile and broadband) and existing infrastructure disparities pose challenges to digital expansion efforts in rural Azerbaijan

Recommendation 3:

Enable affordability and quality of service improvements of broadband services and private sector participation to expand digital access. Establish Innovation and Digital Community Centers and promote greater use of digital public services among individuals and businesses in rural areas.

3.1. Develop a pro-investment and pro-competition enabling environment for broadband services. Aligning the telecom sector's legal and regulatory framework with international good practices and standards for a broadband based communications market allows the use of policy and regulatory tools to enable competition, affordability, and improved quality of broadband services. Prioritizing finalization and adoption of the new Electronic Communications Bill will be a significant step in upgrading the sector's enabling environment, allowing the newly established sector regulatory body (ICT Agency) to recommend regulatory actions to support investment and market competition.[17] Issues such as ex-ante competition regulation, quality of service rules and monitoring, as well as cross-sectoral infrastructure sharing are critical steps to support improved access, affordability, and quality of service.

3.2. Support private sector participation in expanding broadband access through catalytic public financing. Rural areas tend to lag urban centers in terms of expansion of high-speed broadband networks and adoption of modern technologies due to high investment needs to cover sparsely populated areas and lower expected returns on these investments, rendering these investments financially unviable. Public sector financing support models, such as State-Aid programs in the EU and Universal Service Funds, can fill viability gaps to develop a positive business case for investment in expanding high-speed broadband networks (fiber optic based) to rural areas. The World Bank's technical assistance through the EU4Digital Phase II program will support MDDT identify potential viability gap financing models that can be sued to ensure universal access to high-speed broadband across Azerbaijan.

3.3. Establish Innovation and Digital Community Centers. Develop Innovation and Digital Community Centers in existing local infrastructure, such as schools or libraries to maximize impact and accessibility. These centers will provide free internet, digital tools, and a collaborative environment for discussing ideas and supporting business ventures and startups. Such centers can also be hubs for the promotion of financial products and government incentives for investing in digital services. The centers will also host training programs, conferences, and workshops, becoming central hubs for community education and professional development.

3.4. Establish Senior Digital Guidance Centers. Within Innovation and Digital Community Centers, create areas and/or specific time slots for

[17] The World Bank team is supporting MDDT and ICTA, through the EU4Digital Phase II technical assistance program (2024-2026), with legal and regulatory support to finalize the new Electronic Communications Bill as well as a new law in infrastructure sharing, and develop regulatory frameworks to implement the draft bills once adopted.

senior citizen engagement similar to the Finnish SeniorSurf Networks offering hands-on training, one-on-one assistance, and workshops on basic computer skills, internet safety, and online government services. This will bridge the digital divide and promote social inclusion for older adults.

3.5. Invest in expanded use of digital technology public service delivery. In addition to efforts to raise public awareness and, therefore, household use of online e-services, investments should be made in increasing the use of digital technologies by rural public service providers such as schools, health centers, agricultural development services (i.e. climate smart, digital agriculture technologies), local government, community and household energy systems, rural water supply and irrigation, and others. Furthermore, using promotion actions (temporary) such as zero-rated mobile data for essential public information websites and public service delivery applications can incentivize greater digital adoption in rural areas. This can be complemented with promotion activities such as those listed above under awareness building to drive sustained use over time.

Challenge 4:

Insufficient attention is being granted to digital skills in the education sector and in the technical and digital professions.

Recommendation 4:

Strengthen and broaden computer science and STEAM (Science, Technology, Engineering, Arts, and Mathematics) within the educational curricula at the local level.

4.1. Integrate computer science and STEAM within school curricula: Introduce computer science education in primary and secondary schools. The learning of foundational coding, computational thinking, and problem-solving from an early age will prepare students for the digital economy. In tandem, implement a STEAM-based digital program within the curriculum for the interdisciplinary understanding of digital technologies. Collaborate with international education organizations for curriculum updates and ensure that standards and teaching methods are on par with global ones.

4.2. Reform the education and training of teachers: Strengthen the digital literacy of teachers through specialized training, mentoring, and access to local resources. Provide ongoing professional support (e.g., help desks and online forums) to ensure educators are continually updated on new technologies and methods.

4.3. Expand vocational education and training centers to include technical specializations: To meet the increasing demand for specialized technical skills across Azerbaijan, expand its vocational training centers by offering technology-focused programs aligned with industry needs. Offer flexible learning options, certifications, and career support services, as well partner with industry for curriculum development and job placement.

Annex

Table A.1: Azerbaijan: Employment Status by Rayon

	Barda (in percent)	Sharur	Aghdash	Hajigabul	Gakh	Oghuz	Kangharli	Nesimi	Khazar	Overall
	(in percent)									
Employed (formally/ informally)	6	51	10	47	23	43	62	56	61	40
Self-employed/ business owner	45	21	42	13	30	22	13	14	5	23
Unemployed, seeking work	8	5	6	3	11	12	2	6	11	8
Student	10	10	7	17	9	7	11	15	100	10
Retired	6	1	6	2	1	2	2		1	2
Unemployed, Not seeking work	22	7	26	11	18	9	7	4	6	12
Unpaid domestic work/care function	1	3		6		6	2	4	6	3
Has a disability	1	1	2	1	7	1				1

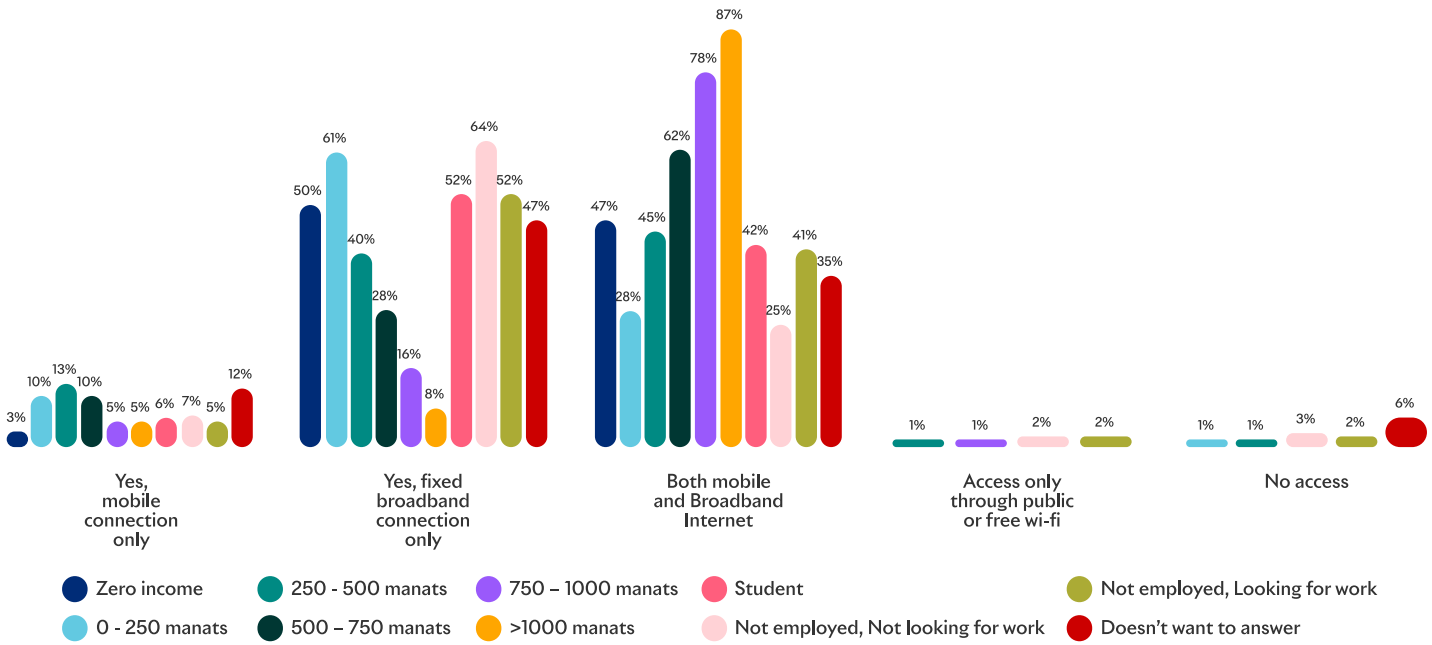
Table A.2: Employment Sector by Rayon

	Barda	Sharur	Aghdash	Hajigabul	Gakh	Oghuz	Kangharli	Nesimi	Khazar	Overall
	(in percent)									
Agriculture, forestry, fishing	78	17	79	11	53	16	8		2	25
Mining, quarrying				2		1		1	2	1
Manufacturing	2					3		1	3	1
Electricity, gas, steam, air conditioning				2	4	3		7	6	3
Water supply; sewerage, waste management		1	2	2	2		1			1
Construction	4	6	6	4	4	13		10	18	8
Trade	2	12		7	6	2	11	13	3	6
Transportation, storage		1	2	2		3	1	7	3	2
Accommodation, food service activity						3	1	1	2	1
Information, communication				5	4	2	1	4	2	2
Financial, banking, insurance activity					2			4	6	1
Professional, scientific, technical							1	1		0
Administrative/support service activities		7		5	2	5	8	1	2	4
Public administration, defense				2	4	7	11	10	2	5
Education, training	6	41	8	37	15	24	36	10	29	24
Human health, social work	2	4	2	2	4	7	12	7	9	6
Arts, entertainment, recreation						1				0
Other service activities	6	7	2	16	2	6	1	7	5	6
Other domestic government or civil services		3		5		1	4	4	6	3

Table A.3: Distribution of Individual income, by Rayon

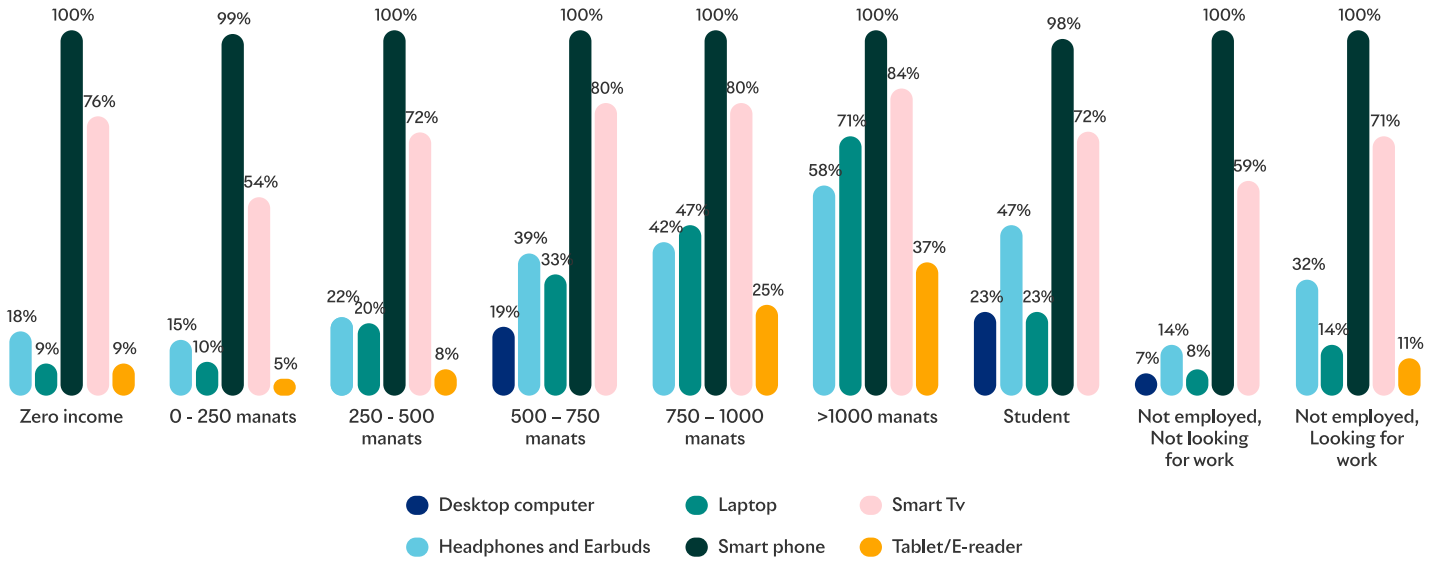
	Barda	Sharur	Aghdash	Hajigabul	Gakh	Oghuz	Kangharli	Nesimi	Khazar	Overall
Manat	(in percent)									
Zero Income	35	22	44	35	38	28	21	18	23	29
0 – 250	30	16	23	6	28	8	6	4	5	14
250 – 500	25	41	27	34	24	42	30	24	28	32
500 – 750	2	16	4	11	7	12	19	17	19	12
750 – 1000	2	3	3	12	2	4	15	17	18	8
>1000	1	1		2	1	1	6	18	7	4

Figure A.1: Internet Access, by Respondent Income Level



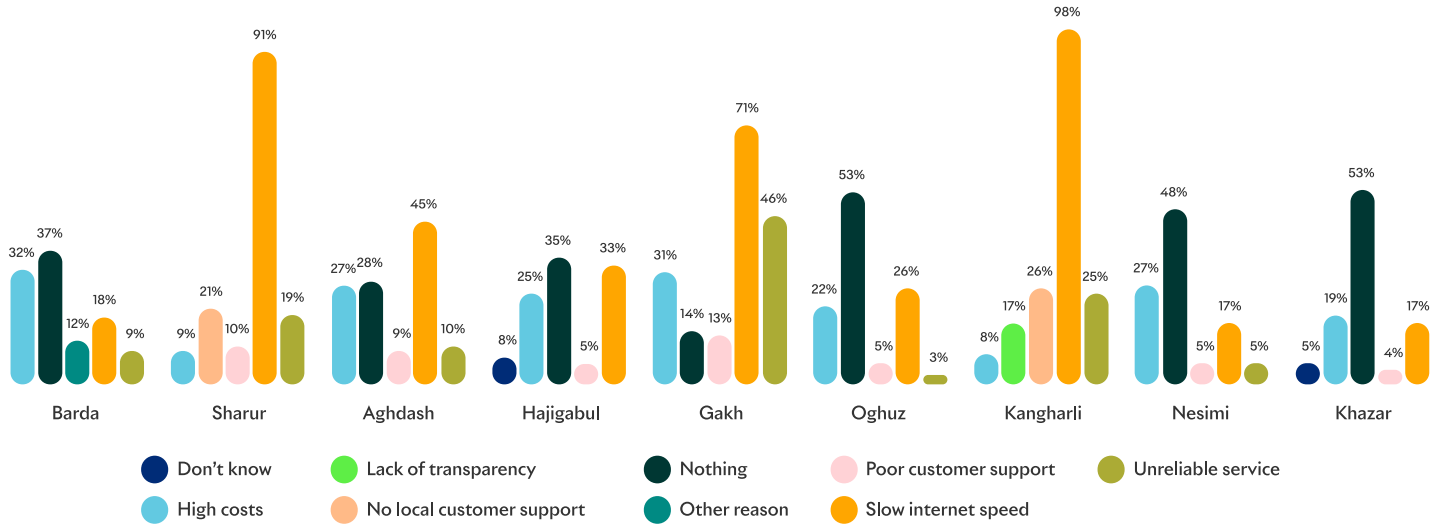
Source: World Bank

Figure A.2: Top Five Devices Used by Respondent Income Level



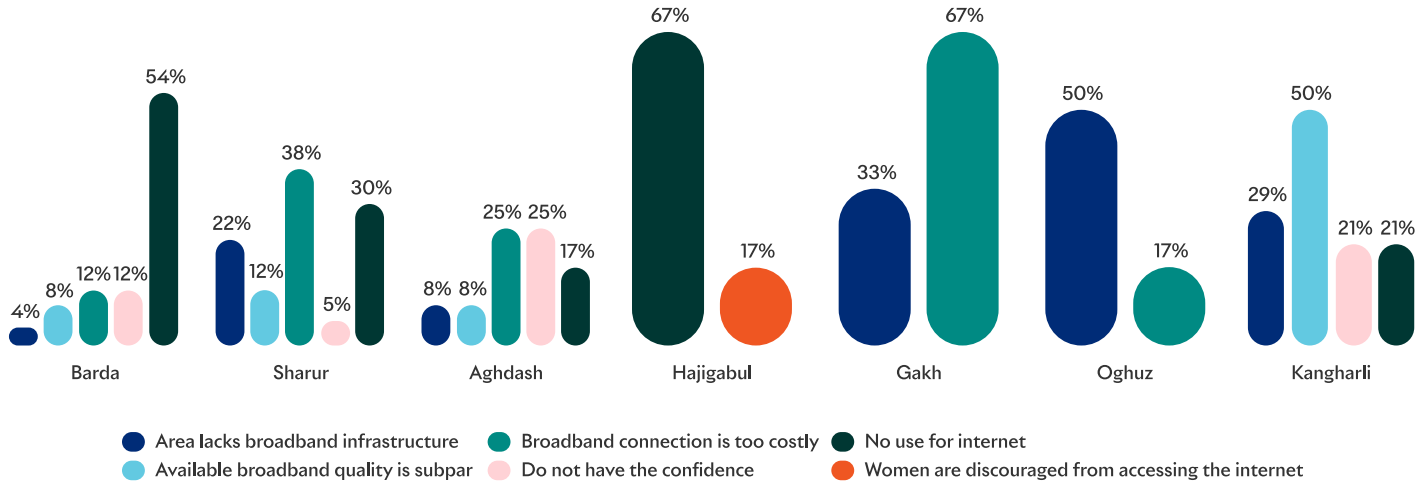
Source: World Bank

Figure A.3: Top Five Reasons to Dislike Broadband Connection, by Rayon



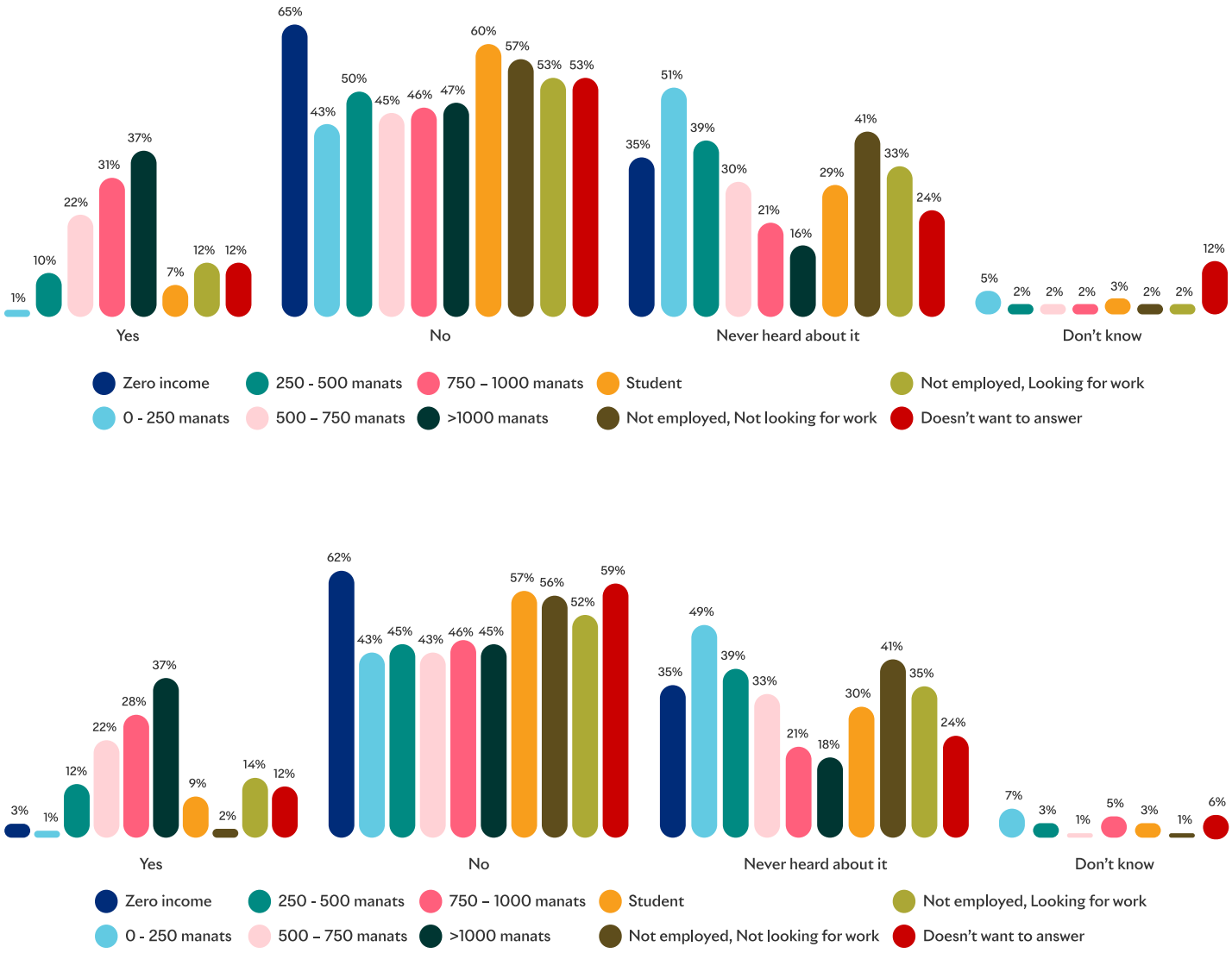
Source: World Bank

Figure A.4: Top Five Reasons to not Select Broadband Connection, by Rayon



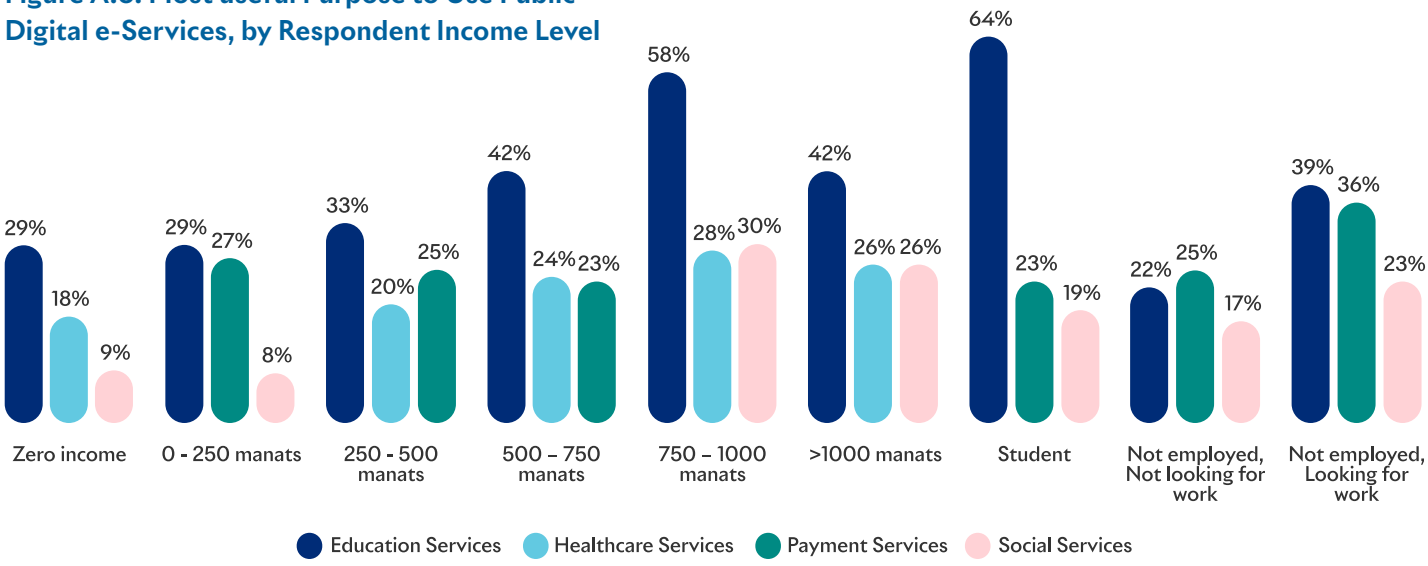
Source: World Bank

Figure A.5: Registration on Digital e-Government Services, by Respondent Income Level



Source: World Bank

Figure A.6: Most useful Purpose to Use Public Digital e-Services, by Respondent Income Level

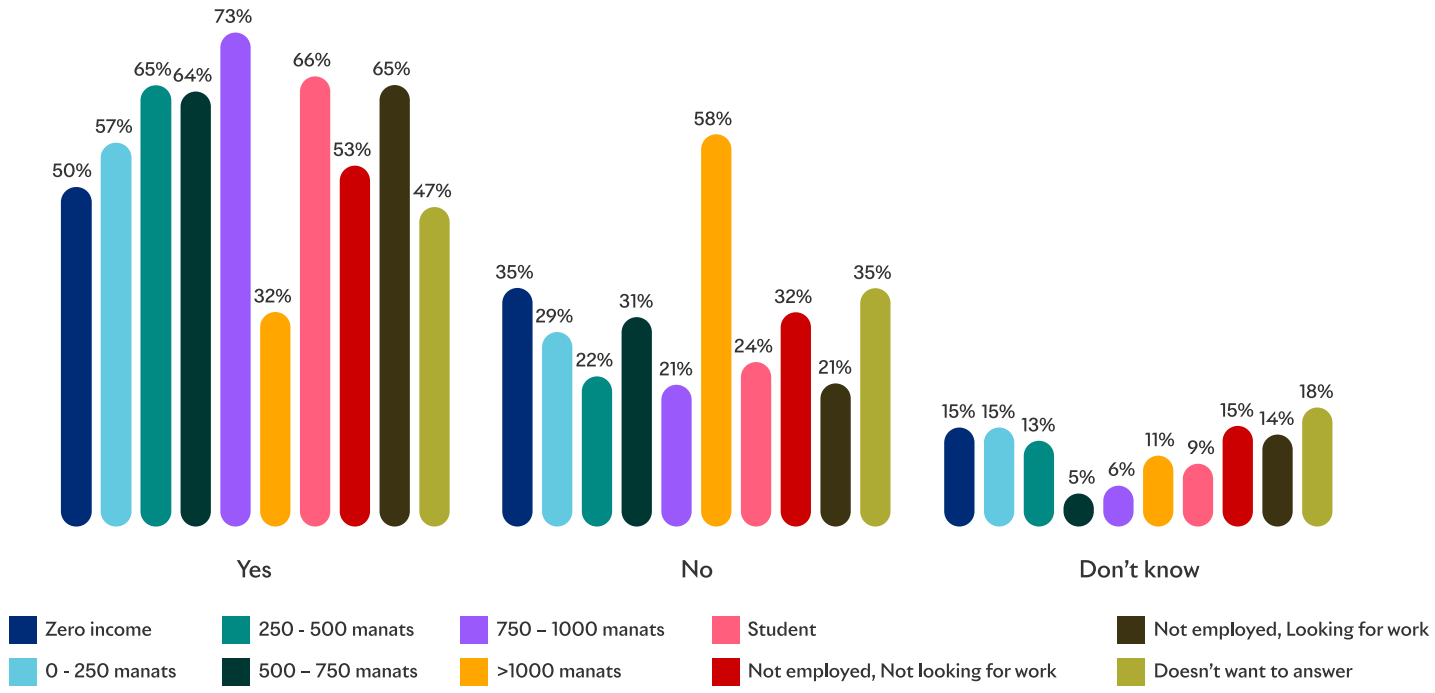


Source: World Bank

Figure A.7: Frequency of Critical Evaluation of Online Information, by Respondent Income Level

Source: World Bank

Figure A.8: Perceived Need for Online Training, by Respondent Income Level



Source: World Bank