Advancing the Digital Transformation of Armenian Businesses

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Foreword

In recent years, the Government of Armenia has demonstrated a strong commitment towards promoting private sector-led growth, including with a specific focus on supporting the development of small and medium-sized enterprises (SMEs) and facilitating their digital transformation. The OECD has been actively supporting these efforts through various initiatives aimed at advancing the design and implementation of SME policies and promoting digitalisation within the business landscape.

Armenia has prioritised the digital transformation as a key policy objective. In 2021, the government approved the Digitalisation Strategy of Armenia for the period 2021-25 (DSA), underscoring its dedication to leveraging digital technologies to enhance efficiency, transparency, and data-driven practices in public administration. Notably, the DSA recognises the pivotal role of SMEs in driving economic progress, underscoring the importance of equipping businesses with digital skills and promoting the widespread adoption of digital solutions throughout the country.

To this end, the OECD has provided policy advice to Armenia, offering guidance on creating an enabling environment and implementing policies to promote the adoption of digital business skills within SMEs. A particular emphasis has been placed on addressing sectoral and size-related disparities in digitalisation levels observed among SMEs in Armenia. Survey data from the World Bank highlights that while a considerable proportion of SMEs in the country utilize computers and have internet access, the extent of adoption of more sophisticated IT solutions varies significantly across sectors and enterprise sizes. Despite ongoing efforts to digitalise, a gap persists in the adoption of advanced solutions such as specialised software and cybersecurity measures.

Leveraging insights gathered through extensive research and engagement with local stakeholders through a series of stakeholder meetings, this report summarises the key findings and provides actionable policy options to 1) improve the framework conditions for SME digitalisation, 2) build a structured system for SME digitalisation support, and 3) foster synergies in the existing ecosystem.

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Table of contents

FIGURES

TABLES

BOXES

Acronyms and abbreviations

3D	Three dimensional
AI	Artificial Intelligence
AITC	Armenian-Indian Centre for Excellence in ICT
AMD	Armenian Dram
ANEL	Armenian National Engineering Laboratories
ARMSTAT	Statistical Committee of the Republic of Armenia
ASCENT	Advanced Solutions Centre
BANA	Business Angel Network of Armenia
BMZ	Bundesministerium für Wirtschaftliche Zusammenarbeit und Entwicklung [German Federal Ministry for Economic Cooperation and Development]
CC	Cloud Computing
CEDEFOP	European Centre for the Development of Vocational Training
CEF	Connecting Europe Facility
CEO	Chief Executive Officer
CIO	Chief Information Officer
CM	Comparable Methodology
CRM	Customer-Relations Management
COVID-19	Coronavirus disease
DIH	Digital Innovation Hub
DSA	Digitalisation Strategy of Armenia
EaP	Eastern Partnership
EBRD	European Bank for Reconstruction and Development
eIDAS	EU Framework for Electronic Signatures
EIF	Enterprise Incubator Foundation
ENISA	European Union Agency for Cybersecurity
EPIC	Entrepreneurship and Product Innovation Centre
ERP	Enterprise Resource Planning

ETF	European Training Foundation
EU	European Union
EUR	Euro
FAST	Foundation for Armenian Science and Technology
GDP	Gross Domestic Product
GGF	Good Governance Fund
GITC	Gyumri Information Technologies Centre
GNI	Gross National Income
GTC	Gyumri Technology Centre
GVA	Gross Value Added
HR	Human Resources
HRM	Human Resource Management
IC Armenia	Investment Council of Armenia
ICT	Information and Communications Technology
ILO	International Labour Organization
IMF	International Monetary Fund
IoT	Internet of Things
IRIS	Increased Resilience of Syrian Armenians and Host Population
ISAA	Information Systems Agency of Armenia
ISTC	Innovative Solutions and Technology Centre
IT	Information Technology
ITTD	Innovative Tourism and Technology Development
ITU	International Telecommunication Union
KPI	Key Performance Indicators
LAN	Local Area Network
Mbps	Megabits per second
ML	Machine Learning
MoE	Ministry of Economy
MoHTI	Ministry of High-Tech Industry
MoLSA	Ministry of Labor and Social Affairs
MSME	Micro, Small, and Medium Enterprises
NACE	Nomenclature Statistique des Activités Économiques dans la Communauté Européenne [Statistical Classification of Economic Activities in the European Community]
NCIE	National Centre of Innovation and Entrepreneurship
NGO	Non-Governmental Organisation

NIS	DIRECTIVE (EU) 2016/1148 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union
NIS2	DIRECTIVE (EU) 2022/2555 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148
ODA	Official Development Assistance
OECD	The Organisation for Economic Cooperation and Development
PIAAC	Programme for the International Assessment of Adult Competencies
PPP	Purchasing Power Parity
QR	Quick Response
R&D	Research and Development
RA	Republic of Armenia
RFID	Radio Frequency Identification
SaaS	Software-as-a-service
SAP	Systemanalyse Programmentwicklung [System Analysis and Software Development]
SBA	Small Business Act for Europe
SCM	Supply-Chain Management
SDG	Sustainable Development Goals
SME	Small and Medium-sized enterprises
SME DNC	SME Development National Centre
STAN	Science and Technology Angels Network
STEM	Science, Technology, Engineering and Mathematics
TPQI	Trade Promotion and Quality Infrastructure
TVET	Technical and Vocational Education and Training
UNDP	United Nations Development Programme
USD	United States dollar
V4	The Visegrád Group
VTC	Vanadzor Technology Centre
WAC	Website Authentication Certificate
y-o-y	Year-over-year

Key economic indicators: Armenia

Table 1. Key macroeconomic indicators for Armenia, 2017-2024

Indicators	Unit of measurement	2017	2018	2019	2020	2021	2022	2023[1]	2024[1]
GDP Growth*	Percentage y-o-y	7.52	5.23	7.63	-7.15	5.68	12.60	8.71	6.01
Inflation*	Percentage average	1.19	2.49	1.44	1.23	7.20	8.65	1.97	3.12
Government balance[2]*	Percentage of GDP	-4.79	-1.75	-0.98	-5.40	-4.58	-2.11	-2.02	-4.61
Current account balance*	Percentage of GDP	-1.26	-7.23	-7.06	-4.00	-3.48	0.77	-1.94	-2.81
Exports of goods and services**	Percentage of GDP	38.22	39.39	41.35	29.76	35.91	50.01	-	-
Imports of goods and services**	Percentage of GDP	48.99	53.08	54.76	39.72	43.76	50.99	-	-
FDI net inflows**	Percentage of GDP	2.19	2.14	0.74	0.46	2.64	5.11	-	-
General government gross debt**	Percentage of GDP	-	-	50.03	63.40	60.08	-	-	-
Domestic credit to private sector**	Percentage of GDP	51.54	55.50	60.16	72.19	61.67	52.55	-	-
Unemployment*	Percentage of total labour force	17.80	19.00	18.30	18.20	15.50	13.00	12.50	13.00
Nominal GDP*	USD billion	11.53	12.46	13.62	12.64	13.88	19.51	24.16	25.41

Note:[1]latest forecasts available; [2]General government net lending/borrowing (Percent of GDP).
Source: * (IMF, 2024[1]) ** (World Bank, 2023[2]).

References

IMF (2024), *World Economic Outlook*, https://www.imf.org/en/Publications/WEO/weo-database/2024/April. [1]

World Bank (2023), *World Development Indicators*, https://databank.worldbank.org/source/world-development-indicators. [2]

Executive summary

SMEs play a crucial role in Armenia's economic landscape, comprising nearly 99.9% of all enterprises, collectively contributing to 69.5% of total employment, and generating up to 66.2% of the value added to the economy. Yet, despite their prevalence, a significant portion is concentrated in low value-added activities, with over half operating within the wholesale and retail trade sector.

Amidst recent economic disruptions – notably the impact of the COVID-19 pandemic and the unresolved conflict with Azerbaijan – Armenia has demonstrated remarkable resilience, experiencing steady growth since 2020. This development, fuelled by an influx of migrants, businesses, and capital following Russia's full-scale invasion of Ukraine, positioned Armenia as the fastest-growing country in Eastern Europe and Central Asia in 2022, achieving a 12.6% GDP expansion. The country's information and communications technology (ICT) sector grew by 20% and generated 4.5% of Armenia's GDP in 2022 – largely boosted by the relocation of Russian IT specialist and enterprises.

Digitalisation – or the integration of digital technologies, data, and interconnections into business processes – holds tremendous potential for Armenian SMEs to enhance their operational efficiency, innovate in product and service delivery, expand their market reach, and, in turn, increase productivity. However, small businesses encounter numerous barriers to the adoption of digital tools, underscoring the need for targeted policy interventions. In this context, Armenia has placed significant emphasis on digital transformation, adopting various policy documents targeting digitalisation as well as on small and medium entrepreneurship. In 2021, the government approved the Digitalisation Strategy of Armenia for the period 2021-2025 (DSA), aimed at establishing a solid foundation for the digital transformation through a collaborative, multi-stakeholder approach. Nevertheless, despite the active engagement of various institutions, challenges in co-ordinating business development and digitalisation efforts persists, as recent shifts in institutional arrangements have negatively affected the delivery of SME support services.

SMEs exhibit a low level of digitalisation compared to larger enterprises across different sectors. Survey data from the World Bank shows that while a high percentage of SMEs in Armenia incorporate computers into their operations and have access to the internet, adoption rates vary across sectors and enterprise sizes. Smaller enterprises prioritise the integration of basic technologies in areas such as supply chain management and customer relations, while larger SMEs focus on digitalising functions like accounting and human resource management. A gap also persists in the adoption of advanced solutions, such as specialised software and cybersecurity measures.

Several obstacles hinder the digital transformation of SMEs in Armenia. These range from limitations in digital infrastructure, such as unreliable internet connectivity, notably in rural areas, incomplete regulatory frameworks, and low level of digital skills among the workforce and the general population. Additionally, the absence of sector-specific support makes it challenging for SMEs to design and implement digital strategies tailored to their needs. Insufficient awareness about available digital solutions and their benefits, coupled with financial constraints, hinder SMEs' ability to invest in digitalisation. Moreover, the inadequate level of digital skills among the workforce further complicates the integration of modern technologies into SME operations, and the absence of strong incentives and limited access to affordable advisory services deter digital transformation efforts. Obstacles such as complex e-signature processes and cybersecurity

concerns also hinder e-commerce development across sectors. Finally, resistance to change and a preference for traditional methods pose significant cultural barriers to digitalisation, particularly among the elderly workforce, creating a negative impact on the integration of digital tools into SME workflows.

Proactive policy measures and collaboration between government, private sector, and non-governmental stakeholders are needed to facilitate digital transformation and unlock SMEs' potential. Building on Armenia's existing policy efforts, this report provides key recommendations based around three main components:

- **Improving the framework conditions for SME digitalisation**. The establishment of the Digitalisation Strategy of Armenia (DSA) signals a commitment to enabling strategic digitalisation efforts. Strengthening the DSA's monitoring framework by ensuring comprehensive data collection and seamless co-ordination among stakeholders is crucial to improve the evaluation process and facilitate successful implementation. Furthermore, incorporating dedicated Key Performance Indicators (KPIs) and targets into Armenia's new Entrepreneurship Development Strategy would help establish a systematic framework for monitoring and evaluating the implementation of proposed measures for SME digitalisation and digital skills enhancement. Concurrently, strengthening the regulatory framework for digitalisation is key. To this point, ensuring the full implementation of relevant measures outlined in the Action Plan for the SME Development Strategy 2020-2024 will foster e-commerce growth among SMEs. Further alignment of regulatory standards on e-signatures with international standards and cybersecurity legislation with EU directives would contribute to laying a foundation for interoperability with global digital systems. The Government of Armenia could also establish a national certification scheme for digital security to bolster SMEs' cybersecurity readiness. Improving digital skills assessment and anticipation tools would be a good starting point to support digital skills development. Introducing new training programmes, raising awareness on the benefits of digital skills, and establishing a framework to track the effectiveness of available programmes while ensuring the engagement of relevant stakeholders and fostering co-ordination between public and private initiatives are all essential to bolster digital skills development.
- **Building a structured system for SME digitalisation support**. A pivotal step in strengthening SME support involves the establishment of an implementing agency to act as a digital one-stop-shop, providing a comprehensive range of SME development services. Such an agency could play a critical role in translating strategic priorities into actionable measures, acting as a central co-ordinating body and information centre for SME support, including for their digital transformation. Developing sector-specific programmes for SME digital transformation to address the unique needs of each sector would be an important second step. Finally, providing financial support for advisory services and technological upgrades through various instruments, including grants and vouchers, loan guarantees, interest subsidies, and cost reimbursement mechanisms, while also raising awareness about existing sources of financing, would be important to expand financial assistance and support SMEs in navigating the funding landscape.
- **Fostering synergies in the existing ecosystem.** To facilitate the digital transformation of SMEs, the Government of Armenia could consider embracing the creation of Digital Innovation Hub (DIH)-like initiatives. These hubs would serve as focal points for driving digital transformation, engaging various stakeholders and resources already available across the ecosystem. Armenia has a wide range of initiatives dedicated to advancing technological entrepreneurship, such as technology centres, accelerators, and incubators. Leveraging their expertise and infrastructure to act as digital educators would help enhance Armenia's digitalisation landscape. Facilitating SMEs' access to expertise from consulting firms and advisors will bridge awareness gaps, ensuring comprehensive support for SMEs embarking on their digital journey. Finally, encouraging local high-tech companies to serve as digital suppliers for the domestic market could facilitate access to digital technologies and solutions.

Table 2. Summary of recommendations: way forward

Objective	Recommendation	Way forward
Improve framework conditions for SME digitalisation	Adopt a strategic approach to digitalisation	Ensure effective implementation and monitoring of the DSA
		Mainstream support to SME digitalisation in the new Entrepreneurship Development Strategy
		Improve data collection on digital transformation
	Strengthen the regulatory framework for digitalisation	Ensure the full implementation of the measures included in the Action Plan for the SME Development Strategy 2020-2024
		Improve the regulatory framework on e-signatures
		Strengthen the policy framework for cybersecurity
	Support the development of digital skills	Improve digital skills assessment and anticipation tools
		Further promote digital skills development among businesses
		Ensure involvement of relevant stakeholders and co-ordination between public and private initiatives aimed at improving digital skills
Build a structured system for SME digitalisation support	Establish an implementing agency with a strong mandate to act as a digital one-stop-shop	First implementer of digital transformation policies set by the national government
		Single point of reference for businesses seeking public support to digitalise
		Key provider of information
		Co-ordinator of the resources available in the digital ecosystem
	Develop specific programmes to support SME digital transformation	Adopt a sectoral approach to facilitate advancement in digital maturity
		Develop enterprise digital maturity self-assessments
	Provide financial support for the digital transformation of SMEs	Grants and vouchers
		Loan guarantees and interest subsidies
		Cost reimbursement mechanisms for digital consulting services and trainings
		Awareness raising about existing sources of financing
Foster synergies in the ecosystem to facilitate digital transformation in SMEs	Consider embracing the creation of DIH-like initiatives	Adopting a decentralised approach, capitalising on the already vibrant digital ecosystem
	Leveraging technology centres, accelerators and incubators as digital educators	Engaging with initiatives such as Tumo Centers, ImpactAim accelerator, and Armath laboratories to design and implement tailored training programmes and developing and disseminating educational resources
	Using consulting firms and individual advisors as digital guides	Facilitating SMEs' access to the expertise offered by existing consulting firms and advisors
	Leveraging local high-tech companies as digital suppliers	Encouraging the development and implementation of tailor-made digital solutions specifically designed to meet the needs of local SMEs

1 Introduction and context

Amidst geopolitical challenges and economic disruptions, Armenia has demonstrated remarkable resilience and growth. This introductory chapter looks at recent economic performance, with a specific focus on the growing ICT sector. It highlights the pivotal role of SMEs in the economy and provides insights on Armenia's progress in the implementation of SME policies.

Introduction and structure of the report

This report aims to provide a comprehensive analysis of Armenia's digital transformation efforts and their implications for SMEs, offering insights into the challenges, opportunities, and policy recommendations to foster SME digitalisation. Chapter 1 provides a detailed overview of Armenia's current economic landscape, emphasising the role of SMEs and the implementation of SME policies since 2020. Chapter 2 delves into the core elements of the framework conditions for Armenia's digital transformation. This chapter outlines relevant policy initiatives and highlights the involvement of both public and private sector stakeholders committed to advancing SME digitalisation. Chapter 3 examines existing data on the current state of SME digitalisation and presents the results of an in-depth sectoral study. The analysis provides insights into the digital maturity level of SMEs across various industries, revealing the specific challenges and hurdles encountered within and across sectors. Building upon this analysis, Chapter 4 presents targeted and actionable recommendations aimed at overcoming barriers and fostering a conducive environment for SMEs to embrace digital technologies and reap the benefits offered by digitalisation.

Economic context

Armenia has faced several economic disruptions in recent years, notably the COVID-19 pandemic and, more recently, the conflict with Azerbaijan (World Bank, 2023[1]). Despite these challenges, the economy has experienced steady growth since 2020, registering 12.6% real GDP growth in 2022 and 9.4% in 2023, on preliminary estimates (World Bank, 2024[2]). This growth acceleration was fuelled by an influx of migrants, businesses, and capital following Russia's full-scale invasion of Ukraine. In 2022, Armenia was the fastest-growing country in Eastern Europe and Central Asia (World Bank, 2023[1]). Growth has been driven chiefly by the IT, trade, and transport sectors (International Monetary Fund, 2023[3]). The International Monetary Fund (IMF) expects growth of around 4.5% in 2024 (International Monetary Fund, 2024[4]).

In 2022, industry and agriculture accounted for 18.5% and 10.4% of GDP respectively, with the latter's significance in the economy steadily declining over the past decade (OECD/EBRD, 2023[5]). Meanwhile, the information and communications technology (ICT) sector has experienced rapid annual growth, expanding by over 20% and generating 4.5% of Armenia's GDP in 2023 (Central Bank of Armenia, 2023[6]). Much of the influx of Russian human and financial capital in 2022 was into IT. The real estate market also experienced a boost, leading to increased rental rates and driving growth in construction and services (Central Bank of Armenia, 2023[6]).

Exports surged by 75% in 2022, reflecting shifts in regional supply chains and trade patterns amidst the ongoing war in Ukraine (Central Bank of Armenia, 2023[6]). According to the World Bank, in 2023, exports and imports grew by 55% and 40%, respectively . (World Bank, 2023[1]). The robust trade growth, particularly of goods, during the first half of 2023 can be attributed chiefly to the rerouting of exports to Russia (World Bank, 2023[1]).

Inflation surged in 2022 following Russia's invasion of Ukraine, but it came down in 2023 and prices in the second half were largely stable, thanks to the implementation of a proactive monetary policy, an appreciation of the exchange rate, and declining prices in the food and transport sectors (World Bank, 2023[1]; International Monetary Fund, 2023[3]). Inflation decreased from 8.6% in 2022 to 3.1% during January-August 2023, and consumer price inflation was just 0.1% y-o-y in October 2023 (World Bank, 2023[1]). Fiscal management has been prudent, with the government recording small deficits in 2022 and 2023. The draft 2024 budget aims to maintain macroeconomic stability, moderate debt levels, and support priority social and capital expenditures.

Strong macroeconomic performance has helped Armenia respond to the socio-economic challenges posed by the the arrival of over 100,000 persons forcibly displaced from Nagorno Karabakh in late 2023, including by providing cash support to address essential needs, offering temporary shelters, and extending financial aid to cover accommodation and utility expenses (International Trade Administration, 2023[7]). The upper middle income poverty rate in the country is reckoned to have declined from 51.7% in 2022 to 36.6% in 2023[1], due to the robust economic growth observed in 2022-23 (World Bank, 2023[8]) However, these projections do not account for the potential effects related to the current geopolitical circumstances.

ICT sector

As highlighted above, the ICT sector has grown tremendously in recent years, and it has demonstrated enormous potential for growth, as evidenced by the active engagement of over 3,000 firms employing 20,000 workers and generating an annual revenue exceeding USD 1 billion (International Trade Administration, 2023[7]).

Armenia's ICT landscape encompasses several established business areas, including software development, web design, IT services, and app development, as well as emerging domains such as data science, artificial intelligence, quantum computing, and electronic design automation. The government is actively fostering the sector's growth, in accordance with the main objectives of the Digitalisation Strategy of Armenia for the period 2021-2025 (DSA). At the same time, it is collaborating with international donors to enhance the sector's competitiveness through different initiatives (see Chapter 2). The government is committed to supporting the development of the country's high-tech landscape, introducing various initiatives including technology centres, innovation districts, free economic zones, and tax privileges aimed at incentivising startups (International Trade Administration, 2023[7]).

Backed by government support, a skilled talent pool, and favourable operating costs, Armenia is working to position itself as an attractive destination for tech-related investments. Since 2022, the sector has been further boosted by the relocation of Russian IT specialist and enterprises. According to government officials, around 2000 high-tech companies moved to Armenia in 2022, most of which were of Russian origin. Nevertheless, businesses report that they face challenges in scaling operations and addressing talent shortages. Moreover, the proportion of enterprises in the ICT sector is relatively small (around 7%); around half of the SMEs in Armenia are engaged in low value-added activities, such as wholesale and retail trade (International Trade Administration, 2023[7]).

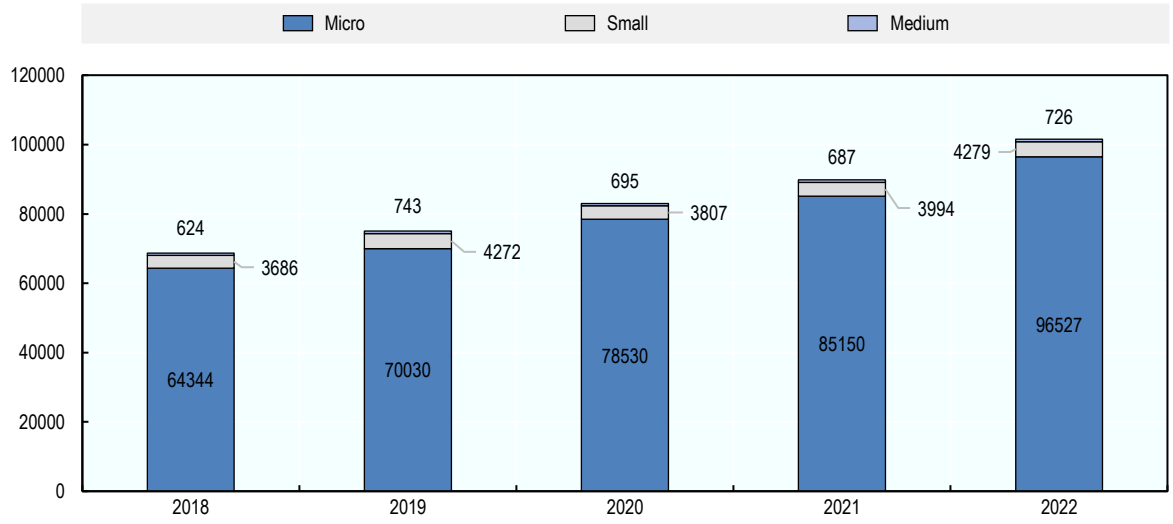
Finally, the sector's heavy reliance on exports, makes it sensitive to fluctuations in the foreign currency market (OECD/EBRD, 2023[5]). In addition, foreign ownership plays a significant role, with approximately a third of ICT firms in the country being foreign-owned, primarily by entities in the United States (International Trade Administration, 2023[7]).

SME sector

Armenia's definition of micro, small, and medium-sized enterprises, which has remained consistent since 2011, aligns with all criteria set by the EU, namely employment (≤ 250 employees), turnover (AMD 1 500 million, equivalent to EUR ~3 557 million), and balance sheet (≤ AMD 1 000 million, equivalent to EUR ~2 371 million) (OECD/EBRD, 2023[5]).

Between 2018 and 2022, the number of small and medium-sized enterprises (SMEs) almost doubled, increasing from 68,654 to 101,532 (Figure 1.1).

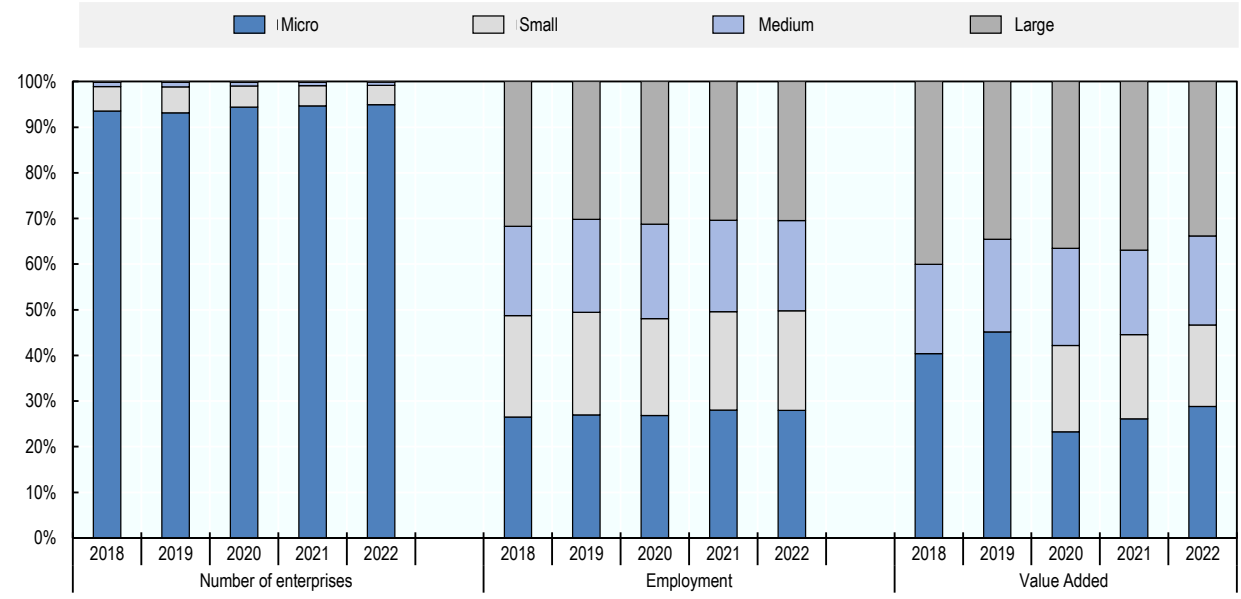
Figure 1.1. Number of Armenian SMEs by enterprise size, 2018-2022



Sources: (ARMSTAT, 2019[9]), (ARMSTAT, 2020[10]), (ARMSTAT, 2021[11]), (ARMSTAT, 2022[12]), (ARMSTAT, 2023[13])

In 2022, SMEs comprised nearly 99.9% of all enterprises, with micro-enterprises accounting for up to 95.1% of SMEs and 94.9% of all firms. In addition, it is worth noting that 54% of microenterprises do not employ any employees. SMEs also collectively accounted for 69.5% of total employment, generated up to 66.2% of gross value added, and accounted for 71.1% of turnover (Figure 1.2).

Figure 1.2. Business demography indicators in Armenia, by company size, 2018-2022

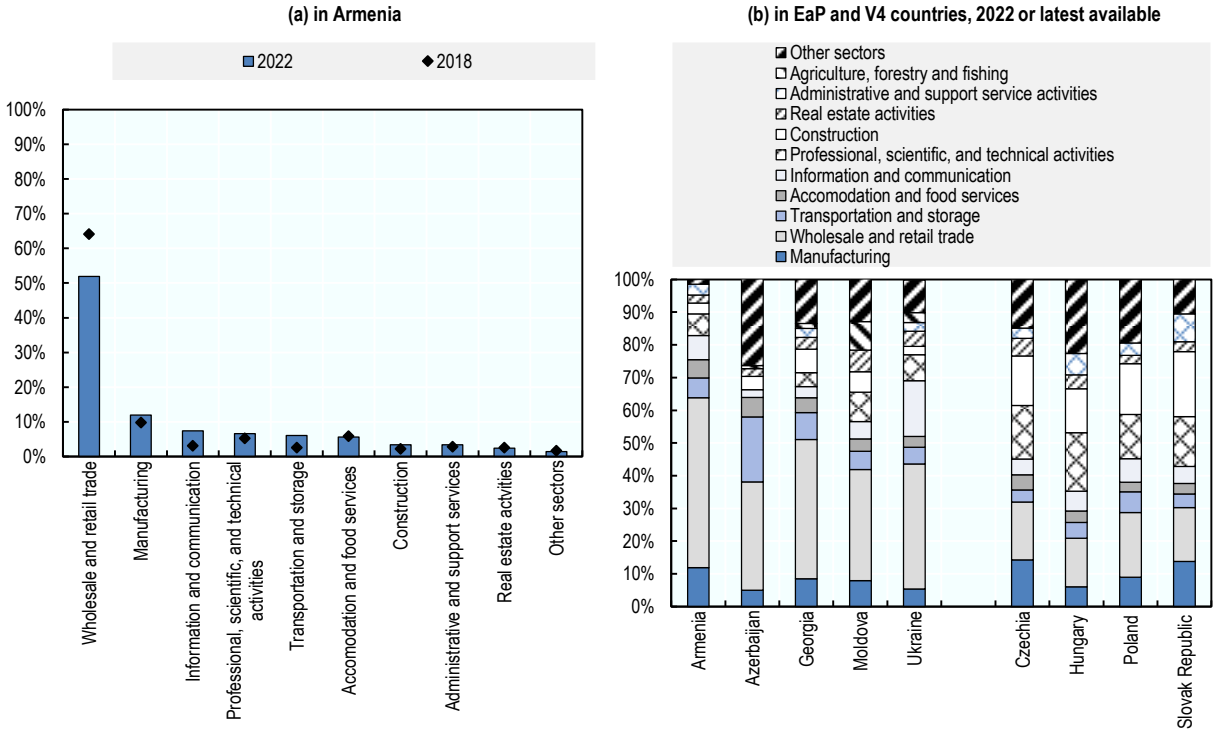


Sources: (ARMSTAT, 2019[9]), (ARMSTAT, 2020[10]), (ARMSTAT, 2021[11]), (ARMSTAT, 2022[12]), (ARMSTAT, 2023[13]).

The bulk of Armenian SMEs are concentrated in low value-added activities, with 51.9% operating in wholesale and retail trade (Figure 1.3). Although the shares of SMEs across most sectors have seen

minimal changes between 2018 and 2022, the wholesale and retail sector witnessed a decrease of 12.3 percentage points, while the ICT and transport and storage sectors increased by 4.3 and 3.6 percentage points respectively, reaching 7.4% and 6.2% of SMEs in all sectors respectively. Nevertheless, the wholesale and retail sector in Armenia attracts a greater number of SMEs compared to other EaP countries, comprising approximately one-third of SMEs operating within this sector. Overall, the sectoral distribution of SMEs in the EaP countries results to be more concentrated in selected industries when compared to SMEs in the Visegrád Group, which prioritise professional, scientific and technical activities, alongside construction activities, thereby showcasing a more diversified presence across sectors.

Figure 1.3. Sectoral distribution of SMEs (2022)



Note: **Panel a:** The wholesale and retail trade sector also includes the repair of motor vehicles and motorcycles. Other sectors include mining and quarrying; electricity, gas, steam, and air conditioning supply; water supply, sewerage, waste management, and remediation activities; and the repair of computers and personal and household goods. **Panel b:** 2022 data for Visegrád and EaP countries. Other activities include the "other sectors" cited in the left chart, as well as agriculture, forestry, and fisheries for Armenia and V4 countries, as the breakdown for that category is not available.
Source: (ARMSTAT, 2019[9]), (ARMSTAT, 2023[13]), OECD calculation based on data from National Bureau of Statistics of Eastern Partner Countries; Eurostat for V4 countries.

SMEs in Armenia are mostly concentrated in Yerevan. In 2022, SMEs in the capital accounted for 52.7% of the total, produced 73% of SME turnover, and accounted for around 65% of SME employment (ARMSTAT, 2023[13]). The other SMEs are dispersed across the regions, with notable concentrations observed in areas closer to the capital, such as Kotayk, Ararat, and Armavir.

Armenia's progress in the implementation of SME policies

The SME Policy Index is as a benchmarking tool used to evaluate progress in the implementation of SME policies. Originally established in 2006 by the OECD in collaboration with the European Commission, the

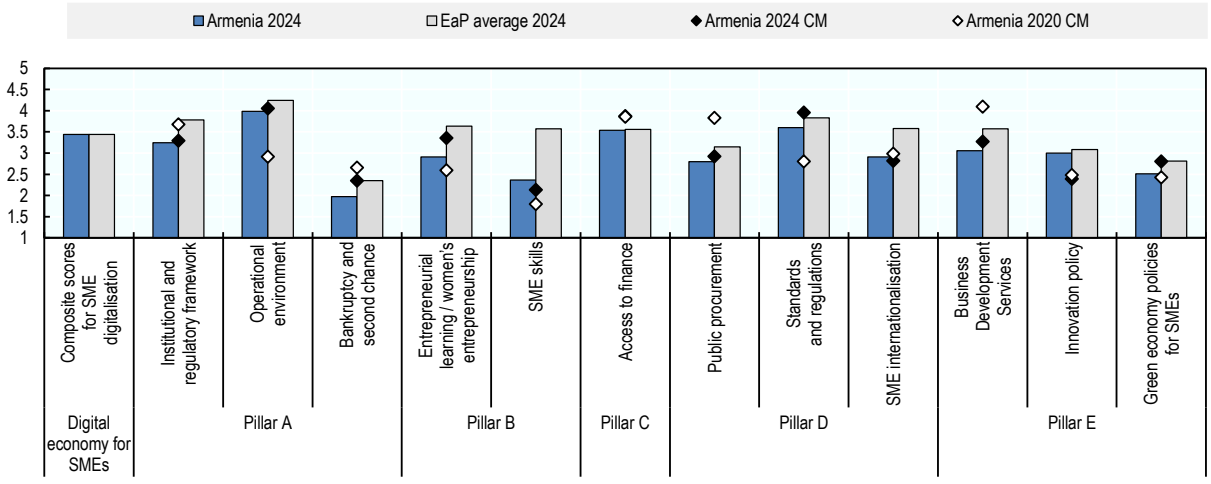
European Bank for Reconstruction and Development (EBRD), and the European Training Foundation (ETF), this index has been periodically applied to the Eastern Partnership (EaP) since 2012.

The Index is organised around five thematic pillars, subdivided into 12 aspects aligned with the 10 principles outlined in the EU's *Small Business Act for Europe* (SBA). It also incorporates priorities from the EU's SME Strategy for a Sustainable and Digital Europe and the OECD Recommendation on SME and Entrepreneurship Policy. In its 2024 edition, the SME Policy Index expanded its focus beyond the traditional 12 dimensions to include an evaluation of digital economy framework conditions and policies related to SME digitalisation.

Armenia has made modest progress since the previous assessment in 2020. The country performed around the EaP average in four dimensions, including operational environment (3.99)[2], access to finance (3.54), standards and technical regulations (3.60), and innovation policy for SMEs (3.00). However, its scores lag behind the EaP average in the remaining eight dimensions, notably, in areas such as bankruptcy and second chance, SME skills, and green economy. Armenia reached a composite score of 3.44 for its SME digitalisation policies, underpinned by a robust policy framework for digitalisation.

Figure 1.4. SBA Assessment score for Armenia (2023)

Country scores by dimension, 2024 and 2020 vs 2024 CM



Note: CM stands for comparable methodology. As the 2024 Small Business Act (SBA) assessment questionnaire underwent a major revision, both 2024 scores and 2020 scores have also been recalculated using a comparable methodology that allows an indication of the direction and magnitude of the policy changes.
Source: (OECD/EBRD, 2023[5]).

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Notes

[1] Measurement based on the upper middle-income country poverty line of USD 6.85/day (2017 PPP).

[2] Scores between 1 and 5 are used to assess the level of policy reform for each sub-dimension and dimension, with 1 being the weakest level and 5 being the strongest.

2 Framework conditions and policy setting for SME digitalisation

Armenia is working actively to enhance its digital infrastructure and foster a conducive environment for the digital transformation of its business sector. This chapter explores the importance of digitalisation for SMEs and describes the core elements of the framework conditions for Armenia's digital transformation. It concludes with an overview of the main policy documents, governmental bodies, institutions, and private sector entities driving SME digital transformation.

The importance of digitalisation for SMEs

Digitalisation involves the integration of digital technologies, data, and interconnections into business processes (OECD, 2021[1]). It is a multi-faceted and complex process that often integrates traditional and digital technologies to address specific issues and enhance business operations (Table 2.1),

Digital solutions are paramount for the growth and resilience of SMEs. They hold the potential of optimising and improving operational capacities, increasing firm productivity and innovation. By leveraging digital tools and capabilities, SMEs can enhance their operational efficiency, innovate in product and service delivery, and expand their market reach. In particular:

- **Digital technologies enable SMEs to reach a wider customer base and integrate more seamlessly into global markets** (OECD, 2021[1]). By establishing online presences through websites and leveraging e-commerce platforms, SMEs can effectively market and sell their products to a worldwide audience. Furthermore, by embracing tailored digital tools, SMEs can mitigate the expenses traditionally linked with transportation and border operations. This strategic approach enables SMEs to scale their operations efficiently without the need for mass expansion.
- **Digital tools provide SMEs with easier access to a broader pool of strategic resources**, offering opportunities to optimise operations at a relatively low cost through business intelligence and data analytics services. These tools empower smaller firms to finance and optimise their operations through innovative means like peer-to-peer lending, crowdfunding, and initial coin offerings. For instance, start-ups and entrepreneurs in the EaP region can tap into international crowdfunding platforms, such as Indiegogo.com and Kickstarter.com, enabling them to crowdsource funding (OECD, 2021[1]). Additionally, digitalisation can streamline recruitment processes, granting SMEs access to a broader pool of job seekers and bolstering workforce capabilities. It also facilitates online access to training opportunities and government services (OECD, 2021[2]).
- **Digital platforms enable SMEs to capitalise on network effects** by outsourcing various business functions, including advertising, e-commerce, and service delivery, to online platforms (OECD, 2019[3]). This fosters enhanced collaboration both within and across organisations, facilitating improved information sharing and communication among staff, suppliers, and networks.
- **Digital technologies improve decision-making by facilitating data-based insights**. These solutions grant SMEs access to real-time data, enabling them to make more informed and data-driven decisions (Devops, 2021[4]). SMEs can leverage predictive analytics tools like machine learning algorithms or predictive modelling software to forecast trends and analyse data, thus monitoring key performance indicators (KPIs), tracking customer behaviour, and identifying areas for improvement (Gartner, 2023[5]).

Table 2.1 presents a description of selected digital solutions often adopted by SMEs.

Table 2.1. Overview of Digital Solutions Adopted by SMEs

Technology	Description	Selected examples of application
High-speed broadband	Defined as having download speed of at least 100Mbit/s (i.e. fibre)	Adequate network access is essential to fully exploit exiting services over the internet and foster the diffusion of new ones.
Customer-Relations Management (CRM)	Used for managing a company's interactions with its customers and potential customers.	Coordination platforms: stakeholders can be put in direct contact and are constantly updated about the project's progression.
Cloud Computing (CC)	ICT services accessed over the internet, including services, storage, network components, and software applications.	Cloud Accounting: multiple users can simultaneously update information which allows to fasten the process and accessibility.

Technology	Description	Selected examples of application
Supply-Chain Management (SCM)	Used for managing the flow of goods and services and concerns processes that transform raw materials into final products	Supervisory Control and Data Acquisition (SCADA) Plant Management: integrated platform to monitor equipment and resources across the production line.
E-commerce	Describes the sale or purchase of goods or services conducted over computer networks by methods designed specifically for the purpose of receiving or placing orders. E-commerce can take place through a range of different commercial relationships, involving any possible pairing of customers, businesses or governments.	E-commerce platforms: they simplify the purchase process, increase product visibility and allow to reach a larger number of customers.
Enterprise Resource Planning (ERP)	Used to enhance back-office efficiency and strategic planning. These are software-based tools used for managing and integrating internal and external information flows.	Asset Inventory Management: allows to monitor inventories, thereby limiting the risk of overproduction and waste.
Radio Frequency Identification (RFID)	Allow near-field communication and are used for product identification, person identification or access control, monitoring and control of industrial production, supply chain inventory tracking and tracing, service maintenance information management, or payment applications.	Warehouse Management: tracking of assets to reduce the risk of loss, and increase efficiency in shipment.
5G	5G technologies are expected to support applications such as smart homes and buildings, smart cities, 3D video, work and play in the cloud, remote medical services, virtual and augmented reality, and massive machine-to-machine communications for industry automation.	Virtual Reality for Simulation: they allow to visualise finalised product, allowing to improve training and ease the design. Although they are already being used, 5G will make the experience more realistic and effective, prompting an increase in diffusion and usage
Blockchain	A shared ledger of transactions between parties in a network, not controlled by a single central authority.	Blockchain for Trade Documentation: end-to-end exchange of documents enabled by blockchain, increasing transaction security and transparency among all stakeholders.
Internet of Things (IoT)	Refers to the rapidly growing network of connected objects that are able to collect and exchange data in real time.	Traffic monitoring: useful in the management of vehicle traffic in large cities.
Artificial Intelligence (AI)	Simulation of human intelligence processes by computers.	Efficient Energy Management: digital sensors to monitor energy consumption, which allow to predict energy needs and reduce waste and costs.

Source: (OECD, 2019[6]; OECD, 2019[7]; ITU, 2022[8]; OECD, 2022[9])

Framework conditions for digitalisation in Armenia

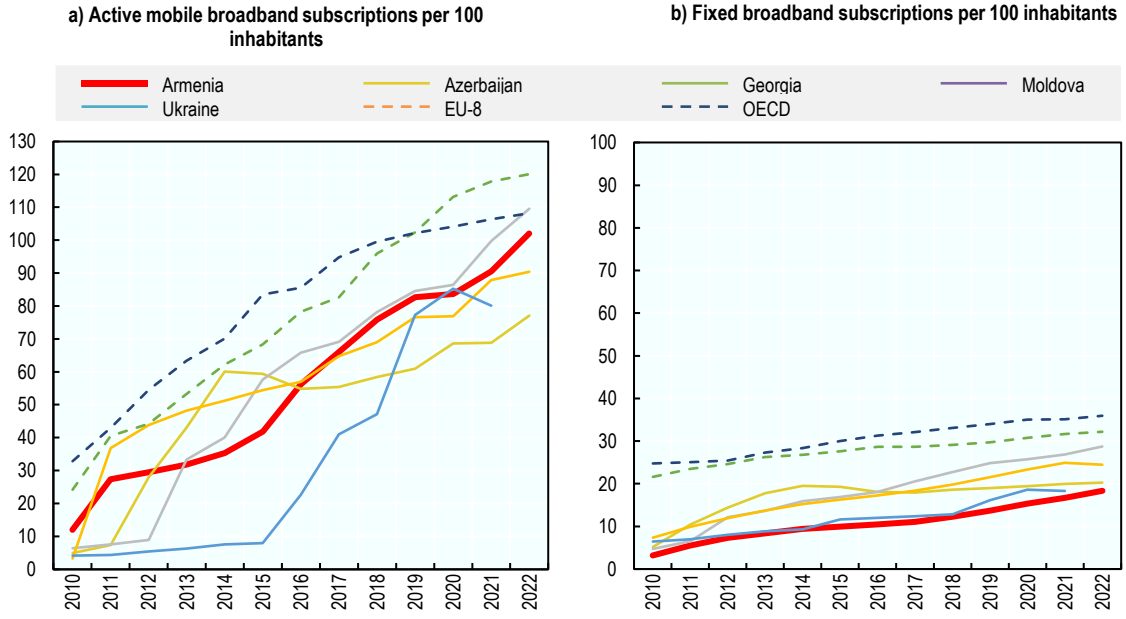
Connectivity and physical infrastructure.

The COVID-19 pandemic highlighted the need for robust and reliable internet services, as demand for remote work, online education, and e-commerce surged. Armenia has made progress in developing its internet infrastructure, achieving higher internet penetration rates and improved access to fixed broadband services. This progress can be attributed to proactive government initiatives, coupled with an increasingly competitive landscape among internet service providers. Despite advancements, challenges persist with regards to connectivity in Armenia, hindering SME digitalisation. Currently, there is no broadband strategy in place, since the strategy "Ensuring Access to Broadband Internet Connectivity in the Territory of the Republic of Armenia 2022-2024" was drafted, but not formally adopted (see Chapter 2).

Armenia falls below EU and OECD averages in terms of fixed-broadband subscriptions, with 18.4 subscriptions per 100 people in 2022 compared to median values of 32.2 and 35.9 for EU-8 and OECD countries respectively (Figure 2.1) (ITU, 2023[10]).[1] Additionally, the country's fixed-broadband connectivity is characterised by relatively low speed and high costs. In 2023, the average connection speed in Armenia

was 49.86 Mbps in 2023, behind that of other EaP countries, including Ukraine (75.14 Mbps) and Moldova (128.87 Mbps) (Speedtest, 2023[11]). The elevated costs can be partly attributed to Armenia's mountainous terrain and landlocked geography. As a consequence, Armenia heavily depends on its neighbouring country, Georgia, which possesses strategic access to submarine fibre-optic cables, for internet connectivity.

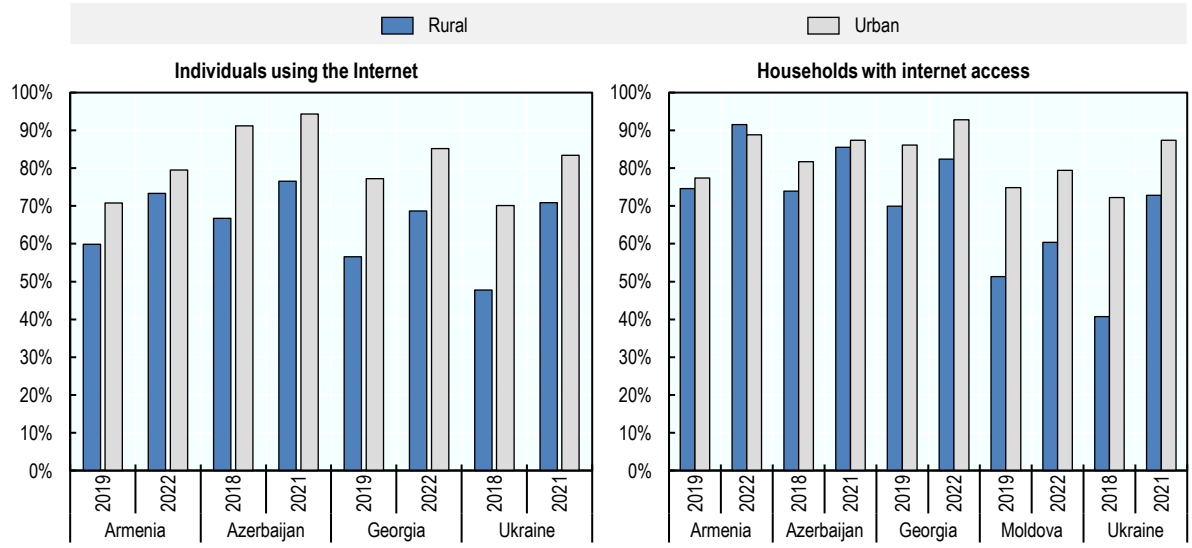
Figure 2.1. Internet penetration and access to fixed broadband in Armenia (2010-2022)



Note Median values for OECD and EU-8 (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovenia, Slovak Republic, Poland).
Source: (ITU, 2022[12])

Despite positive trends, there are persistent digital divides, notably between urban and rural areas. The urban-rural gap in the proportion of households with internet access has narrowed over time, largely due to the increased availability of mobile phones with internet connection (ITU, 2023[13]). Nevertheless, 73.3% of individuals living in rural areas were using the internet in 2022 compared to 79.5% for those living in urban areas (ITU, 2023[14]). Lower internet penetration rates in rural settlements compared to urban areas can be partially attributed to the rural population's lower digital competencies and a demographic structure more skewed towards older individuals, respect to urban areas.

Figure 2.2. Rural digital divide in Eastern Partner countries

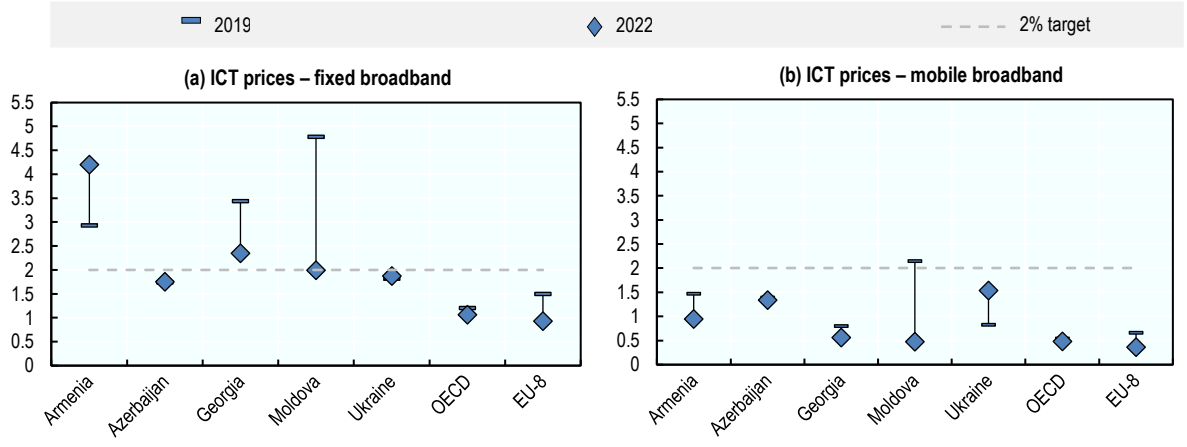


Note: No available data for individuals using the Internet in Moldova.
Sources: (ITU, 2023[14]; ITU, 2023[13])

Affordability also remains a concern, particularly for fixed broadband services. In 2022, the cost of fixed broadband Internet in Armenia was equivalent to 4.2% of gross national income (GNI) per capita, exceeding the international affordability target of 2% set by the ITU (ITU, 2023[15]; OECD, 2021[1]). This may partially explain the lower uptake of fixed broadband compared to mobile broadband services, which are more affordable, at 0.95% of GNI for the data-only mobile-broadband basket (ITU, 2023[16]).

Figure 2.3. ICT Prices (2019 vs. 2022)

% GNI per capita



Source: (ITU, 2023[17])

Addressing these challenges regarding connectivity and affordability is imperative for fostering inclusive digitalisation and driving economic growth across all regions.

Regulatory framework for digitalisation

Armenia has made significant strides in the provision of e-government services, automating administrative processes in order to streamline bureaucracy and facilitate efficient interactions with government entities through digital platforms (OECD/EBRD, 2023[18]). The range of services accessible via e-government platforms has expanded, encompassing a comprehensive system for submitting government requests electronically (www.e-request.am), a unified website for the publication of draft legal acts (www.e-draft.am), and the electronic State Register for Legal Entities (www.e-register.am). This development of e-government services not only widens the array of available services but also enhances accessibility and bolsters e-governance, thereby advancing Armenia's broader digital transformation efforts. The e-gov.am platform plays a pivotal role in the provision of e-government services by bringing together all electronic governance tools and databases of different Armenian state agencies (Box 2.1).

Box 2.1. e-Gov.am: Streamlining access to e-government services

The e-gov.am platform serves as Armenia's centralised hub for accessing a wide range of e-government services, bringing together the electronic governance tools and databases of multiple state agencies into a single convenient platform. This initiative reflects Armenia's commitment to leveraging digital technologies to improve interactions between citizens and businesses with government entities, thereby advancing the government's digital transformation agenda.

Key services available on this platform specifically addressed to businesses include:

- **Electronic signature**: Through online application processes, businesses and individuals can acquire an e-signature. This is also essential for streamlining online documentation, reducing physical paperwork, and ensuring the authenticity and integrity of electronic documents by safeguarding them against forgery.
- **Business registration**: Businesses can register online within minutes through the platform, adhering to the one-stop principle. Users can also access information on registered entities and track the progress of their applications.
- **Licensing applications**: Users can apply for various licenses online, streamlining the process for obtaining, renewing, or terminating licenses. The platform offers features such as application tracking and electronic signatures, saving time and enhancing transparency.
- **Electronic tax filing**: The Electronic Tax Filing System simplifies tax filing for both taxpayers and officials by automating report preparation, verification, and online submission. This digital solution not only saves time but also provides a transparent, secure, and traceable process for submitting tax reports, reducing the risk of corruption.
- **Intellectual property applications:** The platform provides access to the Intellectual Property Agency's databases, allowing users to search for information on industrial designs, trademarks, and more. A user-friendly tutorial facilitates efficient navigation of these resources.

Source: (Government of Republic of Armenia, 2024[19])

Armenia has taken steps to facilitate the use of electronic signatures through different legislative measures. In 2005, the Government of Armenia adopted the *Law On The Electronic Document And The Electronic Digital Signature*, aimed at facilitating the use of e-signatures. Amended in March 2018, it only covers only the use of qualified electronic signatures, and does not provide for the other two levels distinguished by the Integrated EU Framework For Electronic Signatures (eIDAS), namely simple and advanced (OECD, 2021[1]). On a positive note, Ekeng, Armenia's e-governance infrastructure implementation agency,

provides services to help citizens and business obtain electronic signatures, which play a crucial role in streamlining online documentation and reducing physical paperwork (Ekeng, n.d.[20]). However, while SMEs acknowledge progress made in the area of e-governance, barriers related to digital transactions persist, and they identify the complexity of processes related to obtaining and using e-signature services as one of the main limitations (see Chapter 2).

Box 2.2. The EU framework for electronic signatures

An electronic signature is an electronic indication of a person's intent to agree to the content of a document or a set of data to which the signature relates. E-signatures help reduce the time, costs, and risks associated with paper-based signatures, streamlining transactions, and ensuring a better user experience. They bind a signer's identity to each document, mitigating the risk of duplication or alteration and guaranteeing documents' integrity.

The EU eIDAS Regulation establishes a unified framework throughout all EU member states to ensure legal recognition and interoperability for cross-border business opportunities and covers a range of trust services. Citizens of EU countries, Iceland, Norway, and Liechtenstein, as well as governments and businesses, and service providers can all benefit from the use of eIDAS solutions. Businesses of all sizes can use eID solutions in both business-to-business and business-to-consumer transactions. Examples of trust services include:

- Electronic signature (e-signature): To express a person's agreement to a contract in an electronic format. The eIDAS Regulation defines three levels of electronic signature: 'simple' electronic signature, advanced electronic signature and qualified electronic signature.
- Electronic seal (eSeal): To guarantee the origin and integrity of an electronic document.
- Electronic timestamp (eTimestamp): To link an electronic document to a particular time.
- Website Authentication Certificates (WACs): To prove that a website is trustworthy and reliable.
- Electronic Registered Delivery Service (eDelivery): To allow users to send data electronically.

Trust services under the eIDAS Regulation support businesses across various sectors. Financial services benefit from the facilitation of remote account processes and the enhancement of account access. Online retail can use eID to implement website authentication certificates and cost-efficient e-signatures and eTimestamps. All sectors, including transport and professional services, can benefit from stronger client or customer identification checks to provide a secure login to a service, increasing consumer trust. Additionally, eID solutions can ensure the overall secure exchange of important documentation, highlighting accountability and reducing the risk of loss, theft, or damage.

Note: A checklist is available on the European Commission's website to help users understand the key criteria associated with eID and trust service solutions, and guide businesses to choose the appropriate services according to their needs.
Source: (European Commission, 2023[21]; EU4Digital, 2021[22]).

The country also faces challenges regarding cybersecurity governance, as it does not have a dedicated legislation in this domain.[2] Although Armenia has ratified the Budapest Convention on Cybercrime and actively engages in international cooperation initiatives, it has yet to align its cybersecurity framework with the EU's Directive on Security of Network and Information Systems (NIS Directive). Originally passed in 2020 and subsequently updated with the enactment of the Directive on measures for a high common level of cybersecurity across the Union (NIS2 Directive) in 2023, this legislation is designed to accommodate the escalating pace of digitisation (OECD, 2021[1]; European Commission, 2023[23]).

Box 2.3. EU framework on cybersecurity

The *EU Cybersecurity Strategy*, launched in 2020, aims to build collective capabilities to strengthen digital defences and enhance resilience against ever-evolving cyber threats. This strategy encompasses legislative measures, certification initiatives, and strategic policy measures, channelling resources from both the EU and its Member States to safeguard cybersecurity. The *European Union Agency for Cybersecurity (ENISA)* plays a pivotal role in providing support to Member States, EU institutions, and businesses in this endeavour.

The *Directive on measures for a high common level of cybersecurity across the Union (NIS2 Directive)*, which entered into force in 2023, stands as the cornerstone of EU-wide cybersecurity legislation. Building upon its predecessor, the *Directive on security of network and information systems (NIS Directive)*, this updated framework has been designed to address the challenges posed by heightened digitisation and emerging threats. Complementary legislation such as the *Cyber Resilience Act* is proposed to enforce cybersecurity standards for digital products and software. Moreover, the *Cybersecurity Act* bolsters the mandate of ENISA, while the *Cyber Solidarity Act* fortifies the EU's collective response to cyber threats. Concurrently, efforts are underway within the Commission to establish a comprehensive EU-wide certification framework for cybersecurity standards.

Cybersecurity played a critical role in the EU's research and innovation funding programme *Horizon 2020* and maintains its significance in its successor, *Horizon Europe*. Additionally, the European Commission actively bolsters cybersecurity preparedness and deployment through different programmes, including the *Connecting Europe Facility (CEF) (2014-2020)*, *InvestEU*, and the *Digital Europe Programme (2021-2027)*. Notably, the latter allocates a substantial EUR 1.9 billion to enhance cybersecurity capacity.

Furthermore, the EU has implemented comprehensive initiatives to respond to cybersecurity challenges. The Commission's *Blueprint for rapid emergency response* delineates a plan to tackle large-scale cross-border cyber incidents swiftly. Moreover, the proposed EU-wide *Joint Cyber Unit* serves as a platform ensuring coordinated responses to crises, thereby establishing a robust response and assistance framework.

Lastly, efforts to bridge the skills gap in cybersecurity entail the development of a framework to foster cybersecurity skills through initiatives like the *EU Cybersecurity Skills Academy*. In addition, awareness campaigns, such as the *European Cyber Security Month*, are being deployed to educate the general population on cybersecurity matters.

Source: (European Commission, 2023[23])

Digital skills

Despite progress, Armenia's digital skills assessment and anticipation efforts remain limited due to the absence of systematic and comprehensive data collection, falling behind its EaP peers in this regard (EU4Business, 2020[24]). Nevertheless, even with limited data availability, it is evident that the level of digital skills among the population is relatively low by international standards. These digital skills deficiencies disproportionately affect specific segments of the population, notably the elderly and residents of rural areas. Within these demographics, a significant portion lacks proficiency in utilising e-government tools and services (OECD/EBRD, 2023[18]).

According to a 2020 World Bank survey (World Bank, 2020[25]),[3] only 15% of the Armenian population used e-government tools. At the same time, only 2.8% used ID cards for electronic transactions, mainly to submit

tax declarations and to sign official documents. One of the most frequently cited reasons for not using e-government services is the lack of skills or knowledge, which is mentioned mostly by users older than 45. The use of e-commerce is also limited, with only 21% of the population buying or ordering goods or services online. Less than one third of Armenians carried out computer- or software- related activities during the previous year, with gaps existing between younger and older population, as well as between urban and rural residents. In general, the younger the population the higher are e skills. The restricted use of e-government solutions, e-commerce opportunities, and software can be in large part attributed to the population's limited digital skills.

As will be seen in detail in Chapter 2, Armenia is aware of this issue, and has already taken some measures in this field. Digital skills development is in fact one of the main priorities of the DSA, which outlines a plan to introduce in-depth courses in schools as an essential step for the development of digital literacy. Non-governmental stakeholders also play a crucial role in advancing digital skills in Armenia.

Support infrastructure for SME digitalisation

The digital transformation of businesses and their core operations has been reshaping the global economy since the early 2000s. As seen in Chapter 1, SMEs stand to gain significantly from adopting digital solutions, including in the optimisation of operational capacities and the enhancement of productivity and innovation activity by facilitating access to strategic resources. However, the journey towards SME digital transformation is arduous and persistent barriers remain. Challenges such as a lack of digital skills and unreliable internet connectivity continue to hinder or restrict the digital transition of SMEs (OECD, 2022[26]). Policy makers play a crucial role in facilitating and supporting the digital transformation of businesses. They can offer guidance and assistance to SMEs in overcoming size-related barriers that often impede access to critical resources such as information, finance, training, and high-quality advisory services (OECD, 2021[1]).

Recognising the evolving landscape of the global economy and the importance of supporting SME digital transformation, Armenia has placed significant emphasis on digitalisation within its policy agenda, aligning with the shifting dynamics of the digital age.

Different policy documents target business digitalisation

Digitalisation and small and medium entrepreneurship are regarded as crucial elements of Armenia's strategic development in the **Programme of the Government of the Republic of Armenia 2021-2026.** The programme specifically concentrates on establishing a modern digital environment in the country by digitising state administration, implementing information and cybersecurity management systems, enhancing digital literacy, implementing digital standards, and encouraging the use of digital tools in the private sector. In terms of the digital transformation of SMEs, the government places emphasis on promoting increased labour productivity in enterprises through the adoption of digital tools and the modernisation of technological capabilities in SMEs.

The **Small and Medium-sized Entrepreneurship Development Strategy for 2020-2024** is the central policy document in the area of SMEs. Adopted in 2020, the strategy focuses on four key pillars: i) increasing the accessibility to financial resources, ii) capacity building and development of business culture, iii) ensuring the accessibility of markets, and iv) providing favourable institutional and legal environment for SMEs. In addition, it identifies three main objectives: i) achieving a productivity growth averaging 3% per year during 2021-23 and 7.5% in 2024, ii) increasing employment in the SME sector by an average of 2.5% per year and iii) raising Armenia's score in the Global Entrepreneurship Index from 22.8 in 2020 to 40 in 2024, as a measure of improvements in entrepreneurial activity and business environment (OECD/EBRD, 2023[18]). The strategy also foresees the implementation of a support toolkit aimed at facilitating the

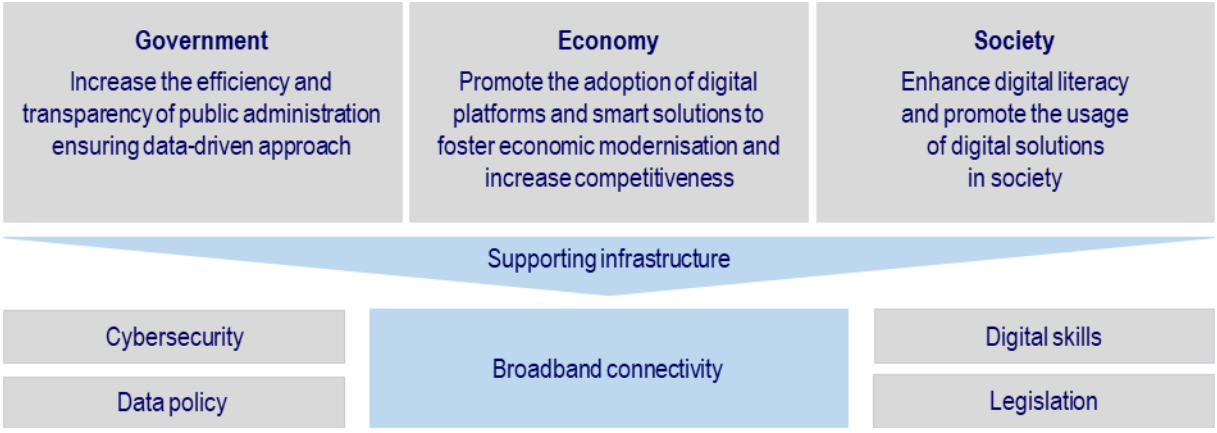
development and adoption of innovative tools in SMEs ultimately to achieve productivity growth in enterprises as one of the primary targets set by the government. The strategy also emphasises the importance of accelerating SME digitalisation, highlighting the government's dedication to bolstering SMEs' digital presence on commercial platforms. To achieve this, specific actions targeting digitalisation were integrated into the Action Plan associated with the strategy's implementation. In 2021, an allocation of AMD 50 million (approximately EUR 118,000) was designated for providing technical support to facilitate the digital transformation of export-oriented SMEs. It's noteworthy that a significant portion of this funding was sourced from donors (OECD/EBRD, 2023[18]).

While many elements of the strategy remain to be implemented due to different circumstances, including the dismantlement of the SME Development National Centre (see below), a new **Entrepreneurship Strategy** is currently being developed by the government. Based on the available information, the new strategy will cover a number of topics, including enterprises' digitalisation and protection of intellectual rights.

In 2021, the government approved the **Digitalisation Strategy of Armenia for the period 2021-2025 (DSA)**. This strategic framework underscores the government's commitment to fostering a comprehensive digital transformation under three strategic goals that extends across i) -public administration, ii) -economy, and iii) -society at large.

The DSA aims at addressing several key facets of digital transformation, emphasising efficiency, transparency, and data-driven practices in public administration. This aligns with the overarching goal of fostering economic modernisation and increasing competitiveness through the strategic deployment of digital platforms and smart solutions. An additional focus of the strategy is to encourage the development of digital skills and promote the widespread use of digital solutions throughout society, recognising the transformative impact these elements can have on various sectors (Figure 2.4).

Figure 2.4. Strategic directions of the DSA



Source: OECD analysis from the DSA.

The strategy seeks to establish a solid foundation that supports digital transformation within the country, underlining the government's commitment to creating an environment conducive to technological innovation and growth. Particularly noteworthy is the strategy's emphasis on advancing the technological capabilities of the private sector. The DSA envisions a robust digital infrastructure, with specific attention given to such critical areas as cybersecurity, data policies, broadband connectivity, and legislation.

Furthermore, the DSA recognises the pivotal role of SMEs in driving economic progress. To this end, the strategy outlines provisions aimed at raising awareness of digital technologies across the private sector;

fostering SMEs' uptake and use of digital solutions by various means (including events, legislative incentives and consulting programmes); and providing automated software-as-a-service (SaaS)-type solutions (accounting, personnel management, warehouse management, etc.) on a public cloud platform (free or on preferential terms). Additional measures are planned to develop e-commerce and innovative solutions.

The strategy benefits from a collaborative, multi-stakeholder approach to digitalisation policy, exemplified by the establishment of the Digitalisation Council in 2019. The Council brings together the deputy prime minister; the head of the Prime Minister's Office; the Ministers of Economy and High-Tech Industry; the deputy ministers of the Ministry of High-Tech Industry (MoHTI); the Minister of Education, Science, Culture and Sports; the First Deputy of the State Revenue Committee; and the CEO of Ekeng CJSC and the head of the SDG Innovation Lab in Armenia. This collaborative approach extends to the newly established Information Systems Agency of Armenia (ISAA), created in 2022, which plays a pivotal role in providing the technological foundations necessary for effective digitalisation (see below).

The Action Plan associated to the strategy is accompanied by a dedicated budget. During 2021-25, it is planned to allocate at least AMD 20 billion (EUR ~47 mln) for the implementation of the DSA. Monitoring and evaluation of the Strategy is performed annually by the Audit Chamber.

The DSA has identified the availability of broadband Internet access throughout the entire Armenian territory as a crucial milestone in the country's digital agenda. The draft strategy **Ensuring Access to Broadband Internet Connectivity in the Territory of the Republic of Armenia 2022-2024** stemmed from the DSA in 2022. The strategy is specifically aimed at fulfilling the government's target of providing broadband connectivity to at least 80% of urban and rural areas in the country. In the realm of broadband development, the draft strategy emphasises actions that encourage investments by the private sector, while also fostering co-operation models. The document specifically outlines the following measures:

- Encouraging the joint utilisation of infrastructures, aiming to minimise duplication of efforts;
- Liberalising frequency bands to introduce new mobile broadband communication technologies that enhance connectivity; and
- Implementing government-backed financial support instruments to ensure connectivity in underserved areas that private operators find unprofitable to invest in.

The current draft is still undergoing revisions and has not yet been formally adopted. The government's ongoing agenda involves the comprehensive mapping of existing optical-cable transmission networks, capacities, and determining the current demand for broadband internet connectivity in both the public and private sectors. These findings are set to facilitate the revision of the strategy draft and its subsequent approval and implementation.

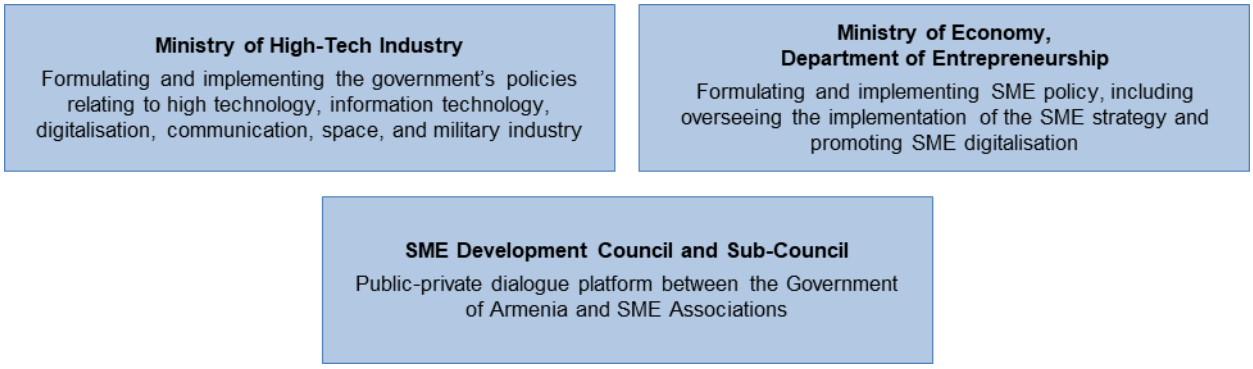
Government bodies and institutions driving SME digital transformation

Although various institutions are engaged in supporting SMEs, Armenia lacks a dedicated co-ordination unit for business development and digitalisation support. Over the past four years, significant changes have occurred in Armenia's institutional arrangements, which have negatively affected the provision of SME support services. The SME DNC, the governmental agency that provided a wide range of financial and non-financial support services since 2002, has been closed. Its functions have been transferred to the Department of Entrepreneurship within the Ministry of Economy and to a separate agency, the Investment Support Centre. However, the mandate of the latter, operating under the brand 'Enterprise Armenia', no longer covers SME support as it is currently solely focused on investment promotion.[4]

SME digitalisation support functions are currently dispersed among various government bodies and ecosystem participants (Figure 2.5). The Ministry of Economy (MoE) and the Ministry of High-Tech Industry (MoHTI) are the primary governmental entities responsible for policymaking and execution in the area of

SME digitalisation in the country. More specifically, the MoE provides general support to SMEs in the non-technological sector, while the MoHTI is specifically mandated to co-ordinate digital transformation and foster the high-tech sector within the economy.

Figure 2.5. SME support functions are dispersed among various bodies



Source: OECD analysis

Established in 2019, the **Ministry of High-Tech Industry** serves as a central body of executive authority responsible for formulating and implementing the government's policies in the spheres of high technology, information technology, digitalisation, communication, space, and military industry.[5] In line with its mandate, the MoHTI has played a leading role in formulating and implementing the "Digitalisation Strategy of Armenia for the period 2021-2025".

One of the core functions of the Ministry is the implementation of support initiatives aimed at promoting start-ups and enhancing digital skills in the sector. This agenda is reflected through the “Technological Ecosystem of Entrepreneurship" programme, which aims to enhance technology-based entrepreneurial education, develop start-up infrastructure, and facilitate the transfer of know-how into the Armenian technological ecosystem. With a budget of over 1 million EUR in 2023, the programme consists of several key initiatives, such as:

- *“From Idea to Business” Grant Programme.* The programme offers funding and resources to start-up technology companies and research groups, specifically targeting those in the idea and growth stages. Participants undergo an incubation programme, and upon completion, up to 30 eligible idea-stage projects and 20 growth-stage projects enter an acceleration phase and receive grants ranging from 10,000 to 20,000 EUR, respectively.[6]
- *“Neruzh” Diaspora Tech Start-up Programme.* The initiative aims to encourage professional repatriation by targeting start-up businesses with at least half of their founders or co-founders being Diaspora Armenians from anywhere in the world. During a 5-day bootcamp, participants gain insights into the advantages of the Armenian business environment, receive individual mentorship, refine their business ideas, and have the opportunity to receive grants of up to 30,000 EUR.[7]

Significant efforts are concentrated for the enhancement of digital skills through the "University-Private Sector Cooperation for Training Specialists" project.[8] With a budget of over 620 000 EUR in 2023, the Ministry aims to foster partnership among universities and technology companies by co-financing the development and implementation of targeted educational and training programmes in Yerevan and the regions. In 2022, the programme managed to engage approximately 900 specialists and seven IT companies.

The Ministry is responsible for overseeing the co-ordination of state support within the IT sector. In particular, the MoHTI implements a certification programme aimed at providing tax relief to tech start-ups.

Under this programme, companies with up to 30 employees are eligible for a 0 percent profit tax rate and a 10 percent income tax rate. Furthermore, technology companies that hire a minimum of 10 new employees are granted support in the amount of 50 percent of income tax.

Additionally, MoHTI is a key contributor to various sectoral networking events in the technology sector. One notable example is DigiWeek,[9] a one-week series of technology-related events that brings together technology experts, start-ups, and policymakers from around the world. The initiative is organised in collaboration with the Union of Advanced Technology Enterprises – one of the largest private sector representatives in IT.

The **Ministry of Economy** in Armenia is the primary state authority responsible for implementing SME policy in the country, particularly overseeing the execution of the Small and Medium-sized Entrepreneurship Development Strategy for 2020-2024. Over the past few years, several programmes focusing on the four key directions prioritised by the aforementioned strategy have been implemented by the departments and organisations operating within the Ministry's structure.

One of the key functions of the Ministry is to promote digitalisation among SMEs, which is being achieved through several initiatives:

- *Economic Modernisation Programme*. The programme offers financial support to enterprises, aiming to enhance their production capabilities and ultimately boost productivity. Beneficiaries receive up to a 10% interest rate subsidy on loans or leasing provided by partner financial institutions. The programme is specifically targeted at enterprises in sectors such as manufacturing, construction, transportation and storage, information and communication, professional and scientific activities, education, and healthcare and social services (Ministry of Economy of the Republic of Armenia, n.d.[27]). So far, approximately 60 billion AMD (equivalent to around 130 million EUR) has been directed at supporting SMEs that acquire new machinery and equipment. In January 2024, the Government Decree N 130-L expanded the scope of the programme by offering interest rate subsidies to enterprises purchasing digital software or platforms to digitise their business processes and/or acquiring consultancy services aimed at enhancing productivity.
- *Highly Qualified Specialist Attraction Programme*. Implemented by the National Centre of Innovation and Entrepreneurship (NCIE), the programme provides salary compensation to highly qualified specialists with the purpose of boosting productivity in Armenian enterprises. Compensation ranges from 20 to 70% of the salary, depending on the level of qualification of the professional, which is determined through certain criteria that have been defined regarding the professional's education and work experience (Ministry of Economy of the Republic of Armenia, n.d.[28]).
- *Accelerator #5:* As a joint effort between the UNDP's ImpactAim Accelerator, the Ministry of Labor and Social Affairs (MoLSA), and the MoE, this project focuses on empowering women entrepreneurs and fostering the growth of women-led startups. The initiative consists of pre-accelerator and accelerator phases, with both offering tailored programmes to deepen knowledge in specific areas. Furthermore, a separate programme called Platform #5 has been introduced to enhance the digital marketing skills of economically inactive women, ensuring secure employment opportunities (UNDP, 2023[29]).
- *The 19th measure for neutralisation of the Coronavirus-driven economic impact*: This measure is designed to facilitate the implementation of innovative ideas by expanding entrepreneurial knowledge and enhancing access to financing. The financial aspect of this measure entails provision of credit guarantees, meanwhile, the educational component aims to enhance entrepreneurial skills. The programme is coordinated by the "Enterprise Armenia" Investments Support Centre (Ministry of Economy of the Republic of Armenia, n.d.[30]).

In addition to general SME support, the MoE also implements sector-specific development plans and programmes, such as the *Textile Industry Development Strategy*. The latter is built upon three fundamental pillars aimed at advancing the textile sector: i) enhancing the quality of workforce in the industry, ii) advancing production capabilities and technology adoption, and iii) facilitating the growth of exports. The strategy was accompanied with an Action Plan for 2023-2026, outlining ten key actions that will be undertaken to achieve the set objectives, including the adoption of high technologies in production processes and the optimisation of business operations. An additional sector-specific development programme, targeted at the manufacturing sector, aims to fortify workforce stability and empower businesses to sustain and expand their operations. The programme primarily focuses on upskilling and reskilling employees and offers tax reimbursement incentives to employers who hire individuals with limited work experience.

The **National Centre for Innovation and Entrepreneurship (NCIE)**, established in 2004, has been operating within a relatively confined functional scope, focused on limited SME support initiatives as well as technology transfer. However, due to constraints in capacity and resources that have hindered its ability to fully carry out its functions, the Centre is currently in the process of being liquidated (see endnote 4).

Several institutions, including the SME Development Council and the Information Systems Management Board are responsible for ensuring interoperability among various governmental bodies and fostering an efficient public-private dialogue in the area of general SME support and digitalisation.

The **Investment Council of Armenia** (IC Armenia) and its **SME Development Council and Sub-Council** were established in 2012 as a public-private dialogue platforms through a collaborative effort between the RA Government and the EBRD. Initially supported by the EBRD, since 2020 they have been funded by the UK Government's Good Governance Fund (GGF). Comprising members from the government, business community, NGOs, and international organisations, these bodies hold monthly Sub-Council meetings led by the MoE, and quarterly Council meetings under the leadership of the Deputy Prime Minister.[10] During the Sub-Council meetings, relevant issues hindering businesses operation are identified and discussed and possible proposals are presented. Council meetings serves as platforms where experts pinpoint legislative bottlenecks affecting the seamless operation of SMEs. The experts collaborate closely with the relevant ministries to formulate reform packages aimed at enhancing the business environment and investment climate in Armenia.

Over the course of their operation, these forums have facilitated discussions and presentations on over 50 vital projects related to specific sectors. The focus has been on addressing diverse legal regulations that impact SME activities, encompassing areas such as tax administration and policy, the labour code, mandatory insurance, and more. In particular, over the past ten years, the SME Development Council, successfully enacted 25 significant legislative reforms. Notable achievements include the establishment of preferential tax regimes for IT start-ups, the implementation of a sales tax, and reforms in leasing practices. Since 2012 and as of the end of 2023, the Council has convened 22 meetings, eight of which were presided over by the Minister of Economy of Armenia (IC Armenia, 2024[31]). The monthly Sub-Council meetings consistently propose an average of 7-10 modifications to legislation governing SMEs (IC Armenia, 2023[32]).

As part of the DSA, significant institutional reforms have been implemented to facilitate digitalisation efforts in the country. First, the Deputy Prime Minister of Armenia has been assigned the role of Chief Information Officer (CIO), responsible for co-ordinating digitalisation initiatives. Additionally, an **Information Systems Agency of Armenia** has been established with the purpose of fostering the formation of a digital society in Armenia. The agency, which is currently in the process of developing the necessary capacities to achieve full operational functionality, is set to play a crucial role in providing the necessary technological infrastructure, organisational capabilities, legal and regulatory framework, as well as co-operation platforms for facilitating digital transformation in both governmental and private entities. The Agency will

be led through a collaborative approach between the Central Bank of Armenia and the Government, namely the Ministry of High-Tech Industry. To ensure co-ordinated and effective governance, an **Information Systems Management Board** has been formed. The board members comprise the Deputy Prime Minister, Deputy Chiefs of Prime Minister Staff, four Ministers[11] and the Chair of the Central Bank of RA. Among the responsibilities of the Board are the co-ordination of reforms and programmes related to the digital transformation of Armenia, development of a digital society and economy, and cooperation with international partners and private stakeholders.

Key stakeholders in Armenia's digital ecosystem

Digital transformation among SMEs in Armenia has been fuelled by a vibrant technology ecosystem that has evolved substantially over the past two decades due to various initiatives supported by donors and international organisations. These efforts have played a crucial role in generating talent, fostering digital skills among the youth, and raising awareness about the transformative potential of technology in business. Table 2.2 provides a comprehensive overview of the key stakeholders within the dynamic digital landscape in Armenia.

Table 2.2. Overview of acceleration and incubation programmes and other relevant talent generators in the technology ecosystem

	Strategic focus	Services offered
Armath Engineering Laboratory	Schoolchildren aged from 10 to 18	• Educational programmes on coding, animation, robotics, 3D modelling, and prototyping • Access to around 220 engineering laboratories located in schools across the country
Armenian National Engineering Laboratories (ANEL)	• Students and researchers at the State Engineering University of Armenia • Idea-stage start-up teams	• Provision of professional courses and certifications in various engineering specialisations • Access to 30 education and research laboratory facilities in the State Engineering University of Armenia
Armenian-Indian Centre for Excellence in ICT (AITC)	Researchers, students, and entrepreneurs in individuals and/or groups	• Training and workshops in the field of IT, entrepreneurship and design • Laboratory and co-working space at the Yerevan State University equipped with software and hardware capacities to meet R&D needs
Catalyst Foundation	• Technological start-ups • Early career professionals in IT sector	• Mentorship, capacity building and advisory to start-ups in both idea validation and traction stages through programmes such as the HeroHouse AI Incubator and Armenia Startup Academy accelerator • Educational programmes to generate talent in the IT sector with training topics covering a wide range of business, marketing, analytics and design aspects (e.g., Entrepreneurial Assistants' School programme) • Access to co-working and office facilities in Hero House Yerevan hub • Funding opportunities for start-ups through the SmartGate Seed Fund – partner of the Hero House project

	Strategic focus	Services offered
Engineering City	Established companies and start-ups in high-tech and engineering sectors	• Shared research facilities, prototyping labs, along with production machinery accessible for use for resident companies • Provision of mechanical and electronic services to resident companies • Specialised courses, lectures and skill training on engineering topics, as well as general entrepreneurial knowledge
Enterprise Incubator Foundation (EIF)	Promotion of Armenian IT/ High-tech companies and increasing their competitiveness in global markets	• Provision of support and advisory services for local IT startups and international IT company branches • Workforce development programmes through collaboration with global IT companies and universities to enhance professional skills of workforce • Facility planning and implementation for various institutions, including technoparks, universities, training centres, R&D facilities, and knowledge hubs (GTC, VTC, Engineering City, ANEL, AITC, ISTC Foundation)
Entrepreneurship and Product Innovation Center (EPIC)	Entrepreneurs and start-up teams generally led by students and/or alumni of the American University of Armenia	• Capacity-building, mentorship and networking opportunities within the framework of pre-incubation and incubation programmes • Monetary prize and advisory services, including legal, business and tech consultancy to selected start-ups • Access to collaborative working facilities, and a prototyping laboratory at the American University of Armenia
FAST Foundation	Start-ups with research and commercialisation potential Students in STEM education	• Educational programmes for entrepreneurs, industry representatives, university and school students • Networking opportunities through various events and conferences organised by the Foundation • Mentorship within the frames of the AI and biotech-focused venture builder programmes ASCENT and InVent • Access to facilities hosted by FAST foundation, e.g., Startup Studio co-working space • Funding opportunities for start-ups through the STAN angel network
Gyumri Technology Center (GTC)	• Youth in the local community • Companies operating within the ICT and creative industries sectors	• Educational programmes aiming to develop knowledge in IT and entrepreneurship • Consulting services to start-ups and established enterprises, including support in adopting technology solutions and optimizing operational models • Providing access to office space and essential facilities to resident companies
Gyumri Information Technologies Center (GITC)	• Students, specifically those from the regions of Armenia • Employed population • Vulnerable population groups, including veterans, single mothers, women, and displaced people	• Offline and online courses in programming, graphic and web design, digital marketing and project management • Mentorship and networking opportunities (e.g., internships for enrolled participants)
Impact Hub Yerevan	• Enterprises in all sectors that drive positive social impact in Armenia	• Implementation of educational workshops and events • Access to office spaces for both teams and individuals • Funding and mentorship opportunities through the VIA Fund

	Strategic focus	Services offered
ImpactAim Accelerator	• Start-ups that contribute to the implementation of SDGs • Students and/or recent graduates with a specific focus on women and regional youth	• Mentorship, training and networking opportunities through thematic acceleration and incubation programmes, such as Accelerator #5 for women-led businesses, AgriTech - technological solutions in agriculture, etc. • Start-up funding opportunities through some of its acceleration programmes (e.g., Climate Change Technology Accelerator, AgriTech Accelerator) • Educational programmes contributing to the enhancement of digital and entrepreneurial skills among youth and women, namely Accelerator #5 and Digital Art Entrepreneurship initiatives
IRIS Business Incubator and Academy	Innovative and impact-oriented SMEs and/or entrepreneurs in agriculture, industry, tourism, and other non-technological sectors, with a specific focus on Syrian Armenian businesses	• Financial support in the form of grant and/or loan funding • Mentorship and coaching programmes for enterprises enrolled in the business incubator • Access to IRIS CoWork facilities and participation in networking events
Innovative Solutions and Technology Centre (ISTC) Foundation	• Students and researchers • Technological start-ups	• Skill development and networking opportunities within the framework of the implemented acceleration and education programmes • Funding for collaborative research in emerging technologies, namely cloud computing, IoT, AI, Big Data, etc. • Access to a technologically equipped innovation hub and co-working space at the Yerevan State University
Microsoft Innovation Centre Armenia	• Students and professionals in the IT sector • Technological companies and start-ups	• Acceleration programmes for IT sector start-ups with mentorship and networking opportunities, as well as guidance in management, technological, financial and legal domains • Implementation of training and educational programmes for technology enthusiasts, students and professionals • Access to co-working facilities, laboratories, hardware and software resources
The Factory by BANA Angels	Technology start-ups	• Training, mentorship and networking opportunities with potential investors and clients within the framework of programmes such as BANA Start-up Incubator and SAP Start-up Factory • Funding opportunities for start-ups through the BANA angel network
TUMO Center for Creative Technologies	Teenagers (aged 12-18)	• Educational programmes in creative industries and IT (workshops, coaching, laboratory projects) • Technologically equipped hubs in Yerevan, Dilijan, and Gyumri, complemented by six TUMO Boxes situated in nearby towns
Vanadzor Technology Center (VTC)	• Youth in the local community • Companies operating within the ICT and engineering sectors	• Technology and business-focused courses, training sessions, lectures, and events • Mentorship, management, legal and technological advisory to technology companies both in idea and growth stages • Access to office spaces and prototyping facilities

Source: Official webpages and reports of observed programmes. For a detailed list, please refer to the section Websites at the end of the chapter.

The Enterprise Incubator Foundation (EIF), established with support from the World Bank, is one of the foremost players in the Armenian technology ecosystem. Focused on fostering the ICT sector, the EIF has initiated and led numerous projects that serve as cornerstones for nurturing digital skills among young professionals and entrepreneurs in the country. Some of these projects include the Microsoft Innovation Centre, the Innovative Solutions and Technology Centre (ISTC) Foundation, the Armenian-Indian Centre for Excellence in ICT, the Armenian National Engineering Laboratories, and the Gyumri and Vanadzor Technology Centres, among others. In a collaborative effort with higher education providers in the country, some of these programmes have resulted in the establishment of technology hubs on university campuses, particularly at the Yerevan State University and State Engineering University of Armenia. Equipped with digital technologies and resources, these facilities have evolved into centres dedicated to nurturing knowledge in entrepreneurship and digital technology. However, it is worth noting that most of the SME/start-up skills development programmes are delivered by NGOs, largely as a component of donor-funded projects.

With the aim of creating an environment that accelerates the emergence of complex engineering solutions in Armenia's high-tech sector, the high-tech incubator *Engineering City Project* has been launched through a collaboration of public and private stakeholders, including the EIF. This project is being executed as part of the *Trade Promotion and Quality Infrastructure* (TPQI) initiative by the World Bank, which encompasses various components focused on fostering innovation and digitalisation in the country. The goal of Engineering City is to provide engineering companies, including SMEs, with access to equipment, laboratories, and production facilities essential for their operations (Asbarez, 2023[33]).

The EU4Business *Innovative Tourism and Technology Development (ITTD) project*, going beyond the IT sector as it is focused on achieving innovation-led growth in both high-tech and tourism sectors. The project, started in November 2019 and running until April 2024, is co-funded by the European Union and the German Federal Ministry for Economic Cooperation and Development (BMZ) and is being implemented by German Development Cooperation GIZ under the umbrella of the Private Sector Development and TVET South Caucasus Programme. It has implemented various acceleration and incubation programmes through partnerships with private stakeholders, ultimately aiming to foster the integration of innovative technological solutions beyond the IT sector. Notable examples include the Tourism Innovation Academy, BANA Startup Incubator, SAP Startup Factory, Hero House AI Incubator, and others, which provide essential support to start-ups and entrepreneurs in target sectors through mentorship, training, and financing. Furthermore, in response to the adverse impacts of the Covid-19 pandemic, the project allocated funding for SMEs operating in non-tech sectors through the Innovation for Economic Recovery for MSMEs Grants Programme (EU4Business, 2023[34]).

Another initiative that shifts the focus of available support from tech to non-tech industries is the EU-EBRD *SME Finance and Advice Facility Project*, which consists of two primary components based on equity financing and consultancy services (EBRD, 2023[35]). Under its first component, the project operates of an equity fund to invest in SMEs involved in agriculture, manufacturing, and renewable energy sectors. Under the second component, the EBRD's Advice for Small Business programme connects SMEs to a pool of local and international consultants, offering co-financing for advisory services ranging from strategic planning to technology aspect. Recently, the programme has broadened its focus to include digital transformation support for beneficiary enterprises. Notably, it offers digital maturity assessments, training for consulting companies, and online webinars for SMEs. The offered courses equip advisors with the required knowledge and expertise to formulate and implement Digital Transformation Strategies in targeted enterprises.

In addition to the previously mentioned initiatives, several other programmes are dedicated to accelerating social entrepreneurship in Armenia. Among these, the *ImpactAim* Accelerator stands out as a pivotal contributor to thematic accelerators that support both early-stage and established start-ups. *ImpactAim* is a part of the global UNDP Impact Investment Vehicle initiative and specifically focuses on solutions that align with the Sustainable Development Goals (SDGs), addressing domains such as climate change, technology adoption in public administration and agriculture, as well as development of digital skills among women. Impact Hub Yerevan is another significant player in the social entrepreneurship space, having introduced over 20 incubation and educational programmes in Armenia. One of its most recent initiatives is the VIA Fund, an impact investment fund specifically designated for mentoring and investing in social enterprises, eventually scaling their impact and driving positive change in the country (Impact HUB Yerevan, 2023[36]).

Promoting science-based entrepreneurship remains a crucial aspect of Armenia's technological ecosystem, and the Foundation for Armenian Science and Technology (FAST) leads the way in this domain. FAST is actively engaged in implementing diverse programmes related to education, research, and technology commercialisation. It offers training in disciplines such as data science, artificial intelligence, and entrepreneurship. Additionally, FAST operates venture-builder programmes such as ASCENT and InVent, nurturing the generation and implementation of innovative start-up ideas. To further bolster the ecosystem, FAST established Armenia's first angel network, the Science and Technology Angels Network (STAN), providing financial support to early-stage start-ups in the country (FAST, 2023[37]).

Websites

Armenian-Indian Centre for Excellence in IT: www.armindia.am

ANEL: www.anel.am

Armenia Startup Academy: www.startupacademy.am

BANA: bana.am

Catalyst Foundation: www.catalyst.am

EIF: www.eif.am

EPIC Incubator: epic.aua.am

FAST: fast.foundation

GTC: gtc.am

GITC: www.gitc.am

Hero House: www.herohouse.am

ImpactHub Yerevan: yerevan.impacthub.net

ImpactAim Accelerator: yerevan.impacthub.net/impactaim-venture-accelerator/

IRIS Incubator: www.irisbi.am/en

ISTC: www.istc.am

Government of the Republic of Armenia: www.gov.am/en/

Ministry of Economy: http://www.mineconomy.am/en/

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TUMO: tumo.org

VTC: vtc.am/en

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OECD (2019), *Measuring the Digital Transformation - A Roadmap for the Future*, OECD Publishing, https://doi.org/10.1787/9789264311992-en. [7]

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Notes

[1] Such a difference may be partially attributed to the variation in the average number of people per household since, in Armenia, the average number of people per household is 3.3 whereas the equivalent in the EU is 2.2.

[2] According to information available at the time of drafting, a law on cybersecurity has been drafted and circulated for consultation among government bodies.

[3] Such a difference may be partially attributed to the variation in the average number of people per household since, in Armenia, the average number of people per household is 3.3 whereas the equivalent in the EU is 2.2.

[4] According to information available at the time of drafting, the government is currently planning to establish a new foundation focusing on innovation and entrepreneurship promotion at national level. The new foundation will be tasked with some of the main functions previously under the mandate of SME DNC and NCIE, including in regard to SME support.

[5] The Ministry of High-Tech Industry was established as a result of the reorganisation of the Ministry of Transport, Communication, and Information Technologies, which was previously responsible for coordinating government policies in information technology, digitalisation and communication sectors.

[6] For more details visit the website: https://hightech.gov.am/en/cragrer/cragrer/gagaparic-mincev-biznes-dramasnorhayin-cragir.

[7] For more details visit the website https://hightech.gov.am/en/cragrer/cragrer/neruz-spyurki-texnologiakan-startapneri-dramasnorhayin-cragir#:~:text=%E2%80%9CNeruzh%E2%80%9D%20diaspora%20technology%20startups%20program&text=The%20goal%20of%20the%20project,of%20a%20start%2Dup%20ecosystem.&text=%E2%80%9CNeruzh%E2%80%9D%20is%20a%20state%20program,has%20been%20implemented%20since%202018.

[8] For more details visit the website https://hightech.gov.am/en/cragrer/cragrer/masnagetneri-patrastman-bowh-masnavor-hatvac-hamagorcakcutyun-cragir.

[9] For more details visit the website https://hightech.gov.am/en/cragrer/cragrer/digi-week.

[10] The council operates under the Office of the Deputy Prime Minister of Armenia, while its Secretariat includes members from the Ministry of Economy, Enterprise Armenia Investment Support Centre and Investment Council of Armenia. Established in 2007 with the support of the EBRD, the Investment Council of Armenia (commonly referred to as the EBRD Business Support Office) executes initiatives in relation to

SME development, with a specific focus of promoting gender inclusivity within the operations of the SME Development Council.

[11] Minister of High-Tech Industry, Minister of Economy, Minister of Justice, Minister of Finance.

3 Unveiling digitalisation challenges across industries

Despite noticeable policy efforts, the overall level of digitalisation of Armenian SMEs remains low. This chapter starts by examining existing evidence on the current state of SME digitalisation. It then presents the results of a sectoral assessment of the digital maturity level of Armenian SMEs, identifying needs and obstacles faced by businesses in their digitalisation journey within and across different industries.

Evidence from Armenia's SME digitalisation journey

A discernible spectrum in technological adoption rates can be observed among enterprises worldwide. Such variability reflects nuanced patterns influenced by factors such as enterprise size, sector-specific requirements, and the level of technological sophistication. Similar distinctions can be observed among Armenian enterprises.

Despite the considerable emphasis that Armenia has placed on digitalisation within its policy agenda, the support outlined in various policy documents, and the vibrant digital ecosystem present in the private sector, the overall level of SMEs' digitalisation is still low. In contrast to their larger counterparts, SMEs in Armenia exhibit a limited uptake of digital solutions, indicating a substantial gap in their digital transformation. A similar gap can also be observed across SMEs in different sectors, as characteristics, challenges, and opportunities related to digitalisation can vary significantly across industries.

State of digitalisation of the SME sector in Armenia

In recent years, Armenia has made efforts to enhance the collection of data on the ICT sector and the adoption of digital solutions by enterprises. In 2021, Armstat, with the support of the World Bank, the EU, and the "Ecogeneration" environmental socio-economic development NGO,[1] conducted a survey utilising Eurostat's *ICT Usage in Enterprises* methodology (ARMSTAT, 2023[1]). The results of this assessment, published in 2023, are presented in Annex B. Armstat ICT survey.

Prior to Armstat's survey, the World Bank conducted a similar assessment, titled *ICT Usage in Households, by Individuals and in SMEs in Armenia*. This study, based on a countrywide survey conducted on a representative sample of 400 SMEs, aimed to understand their adoption and use of ICT (World Bank, 2020[2]).[2] According to the World Bank survey, as of 2019, over 97% of small and medium-sized enterprises incorporated **computers** into their operations, in contrast to a 67% adoption rate among microenterprises. Computer usage among small to medium-sized enterprises is most common in the services sector, while industry, construction and trade fall behind. Conversely, microenterprises exhibit higher level of computer adoption in the wholesale and retail trade sector.

In Armenia, 83% of all SMEs employing two or more people have access to the **Internet**, mostly through fixed broadband connections. To some extent, differences appear to be related to enterprise size, with 81% of microenterprises having access to the Internet compared to 95% of small to medium businesses. Notably, in terms of **Internet speed**, 31% of businesses in Armenia operate at a bandwidth ranging between 30Mbits/s and 100 Mbits/s. Additionally, medium and large businesses are more likely to utilize higher-speed connections, with speeds ranging between 500Mbits/s and 1Gbits/s (ARMSTAT, 2023[1]). Utilising **e-mail** addresses for business purposes is a more common practice among SMEs engaged in the services sector, namely in professional, scientific, technical, administrative and support activities, IT and real estate. However, the gap in e-mail usage between micro and small to medium-sized enterprises is 25 percentage points, with microenterprises showing an adoption rate of 55% compared to 80% of small to medium-sized enterprises.

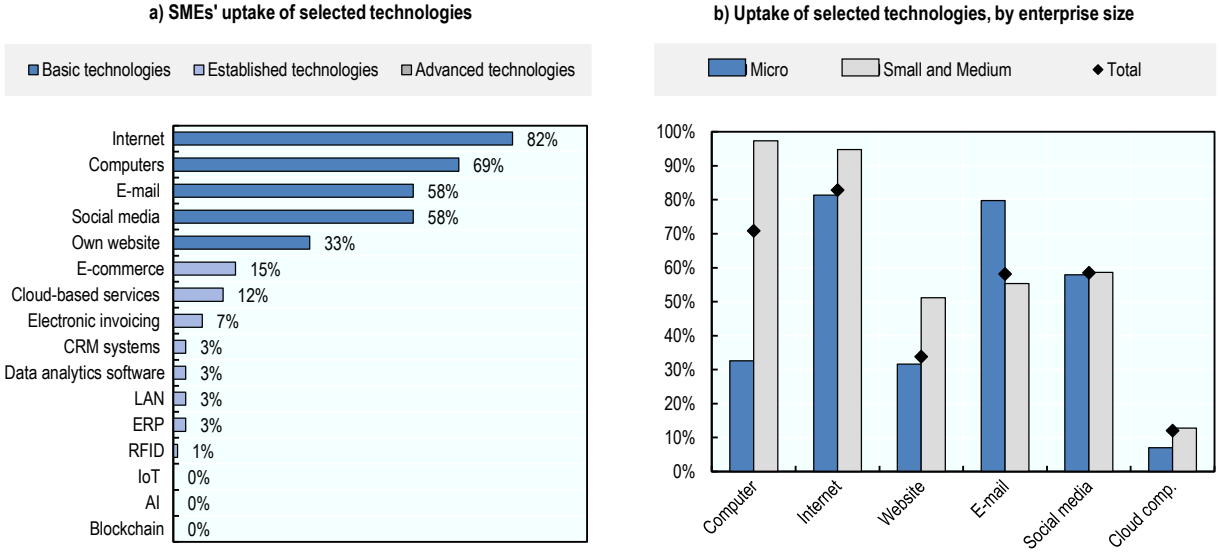
Social media presence is observed among 58.5% of all SMEs, primarily through platforms such as Facebook, LinkedIn, and other similar networks. Conversely, 43% of these enterprises maintain a presence on multimedia content sharing platforms (Instagram, YouTube, etc.). Companies operating within the services sector demonstrate higher engagement with social media, which is mainly attributed to objectives such as brand establishment and direct customer communication.

Maintaining a **website** is relatively less common among Armenian businesses, with only one third of SMEs owning their own websites.[3] Those in the services sector are more likely to have dedicated websites. Generally, these online platforms serve the purpose of describing available products and services,

disseminating information about pricing, and occasionally for activities such as online orders, reservations, or bookings. Despite the increasing popularity of **e-commerce** worldwide, only 21% of the Armenian population engages in online purchases of goods and services. Merely 13% of respondents indicate having made online purchases or orders in the previous three months. Similarly, only 18% of microenterprises and 11% of small to medium-sized companies are engaged in e-commerce.[4] Furthermore, the majority of sales conducted through online channels are focused on the local market and make a moderate contribution to the overall revenue of SMEs. For instance, in 2023 only 9% of Armenian micro-enterprises' turnover is generated through third-party webpages, while 26% is generated via their own webpage (ARMSTAT, 2023[1]).

Cloud-based services are embraced by 12% of SMEs, with the majority of this subgroup utilising such services for files storage and sharing. On the other hand, the deployment of sophisticated software designed for automating core business processes, including financial, accounting, and customer relationship management, remains less prevalent.

Figure 3.1. SMEs' adoption of selected technologies



Source: OECD calculations based on (World Bank, 2020[2]).

Armenian SMEs are exploring the integration of basic technologies into various aspects of their business functions. Processes such as supply chain management, customer relations, and accounting are the areas in which foundational technologies are most integrated. The adoption of digital technologies in business functions varies significantly across SMEs of different sizes. Larger SMEs tend to prioritise the integration of digital technologies in functions such as accounting, distribution, payroll, recruitment, and human resource management – resulting in the automation of specific job tasks and increased efficiency of work organisation. On the other hand, microenterprises exhibit a more digital approach to sales and marketing, leveraging basic tools such as social media to enhance their customer engagement and market reach.

In the realm of **cybersecurity**, Armenian SMEs exhibit varying levels of preparedness and awareness. Notably, only 17% of companies have mentioned having insurance against IT incidents, leaving a significant majority vulnerable to cyber-threats and other IT-related incidents. This underscores a potential gap in risk management practices within the digital culture.

Finally, **digital skills** of the workforce play a crucial role in ensuring greater technology adoption and cultivating a reliant digital culture in SMEs. They are the prerequisite to enabling the use of the new features

present in many digital tools and to fully understanding where and why a particular technology or data could be most relevant (OECD, 2023[3]). In this regard, around 60% of SMEs are confident of their employees' ability to use the Internet, while only half of them consider their staff to be proficient in using computers. Despite this, only over one third of SMEs that utilise computers in day-to-day operations employ IT support specialists, and only a small portion outsources this function.

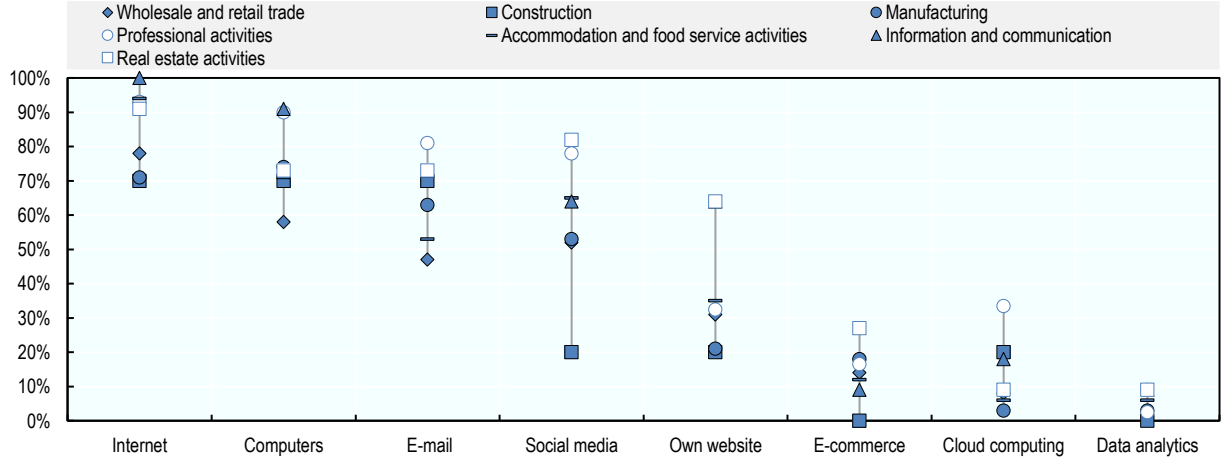
In both micro and small to medium-sized companies in Armenia, the familiarity and adoption of basic technologies, such as computers and e-mail addresses, is higher in comparison to more advanced solutions, such as specialised software for resource and operation management. Hence, a large untapped potential is prevalent in exploring innovative applications of emerging technologies, such as AI, IoT, Blockchain, Big Data, etc.

Overall, the willingness of SMEs to embrace new technological solutions showcases an inclination toward cultivating a dynamic digital culture. Over half of SMEs agree that they strive to implement new technologies in their operations as soon as they become aware of them.

A sectoral study of the digital maturity level of Armenian SMEs

As emerges from the results of the WB study, each sector and business entity possess distinct characteristics, challenges, and opportunities that must be recognised and addressed to facilitate effective and inclusive SME digitalisation efforts. Different sectors of economic activity demonstrate varying levels of maturity regarding the digital transformation of the SMEs (Figure 3.2). These differences encompass both technology adoption levels and the presence of practices that contribute to the digital culture within companies. While SMEs engaged in service-oriented activities – such as professional and administrative support, accommodation and food services, real estate, and IT-related activities – are more advanced in terms of integrating digital technologies into their operations, SMEs in more traditional sectors, i.e. manufacturing, trade, and construction, show relatively lower technology adoption rates.

Figure 3.2. Rate of technology adoption among SMEs in different sectors, by technology



Source: (World Bank, 2020[2])

Tailoring strategies to suit the specific requirements of different sectors ensures that interventions are relevant, targeted, and impactful. Whether it's agriculture, manufacturing, tourism, or technology, each sector has its own set of dynamics, market demands, and technological requirements that influence the digitalisation process. By acknowledging this diversity and adopting a flexible approach, policymakers, stakeholders, and SMEs can collaborate more effectively to drive digital transformation across all sectors

of the economy. Such an approach not only enhances the overall digital readiness and resilience of Armenian SMEs but also fosters sustainable growth and competitiveness in the ever-evolving digital landscape. Therefore, to design evidence-based and impactful supporting programmes and initiatives, policy makers should start from an assessment of the different industries in which SMEs are most represented.

To assess the level of digitalisation in the SME sector, the OECD, in collaboration with local consultants, conducted a sectoral assessment of Armenian SMEs. Given the different levels of digital development in various sectors of the Armenian economy, this study focused on identifying the existing discrepancies in digital maturity of SMEs on a sectoral basis. With this purpose, an analysis of secondary data was complemented by group interviews. In these sessions, SME representatives from selected sectors shared insights on the integration of digital solutions into their daily operations, as well as the extent to which a digital culture has been fostered within their respective enterprises.

The study enables i) identification of specific challenges that constrain the digital transformation of SMEs in selected sectors as well as across sectors, ii) assessment of the level of digital maturity in the covered industries, and iii) identification of sector-specific digitalisation plans based on an impact-based prioritisation assessment.

Methodology

In total, six group interview sessions were organised in an online format, involving participants from sectors where SMEs hold larger statistical representation. Specifically, the study dived into the following sectors:[5]

- Wholesale and retail trade (group interview with 2 interviewees),
- Manufacturing (focus group discussion with 5 participants),
- Professional, scientific, and technical activities; administrative and support service activities (focus group discussion with 7 participants),
- Accommodation and food service activities (group interview with 4 interviewees),
- Information and communication technologies (focus group discussion with 5 participants),
- Construction and real estate activities (group interview with 4 interviewees).

It is important to note that the SMEs surveyed in this study do not constitute a representative sample of the entire Armenian SME population. As such, the findings presented should be regarded as indicative rather than exhaustive. They serve as an illustration of a methodology employed for assessing digitalisation within the SME sector, emphasising the necessity of adopting a sectoral approach for a more comprehensive evaluation of digital transformation across different industries.

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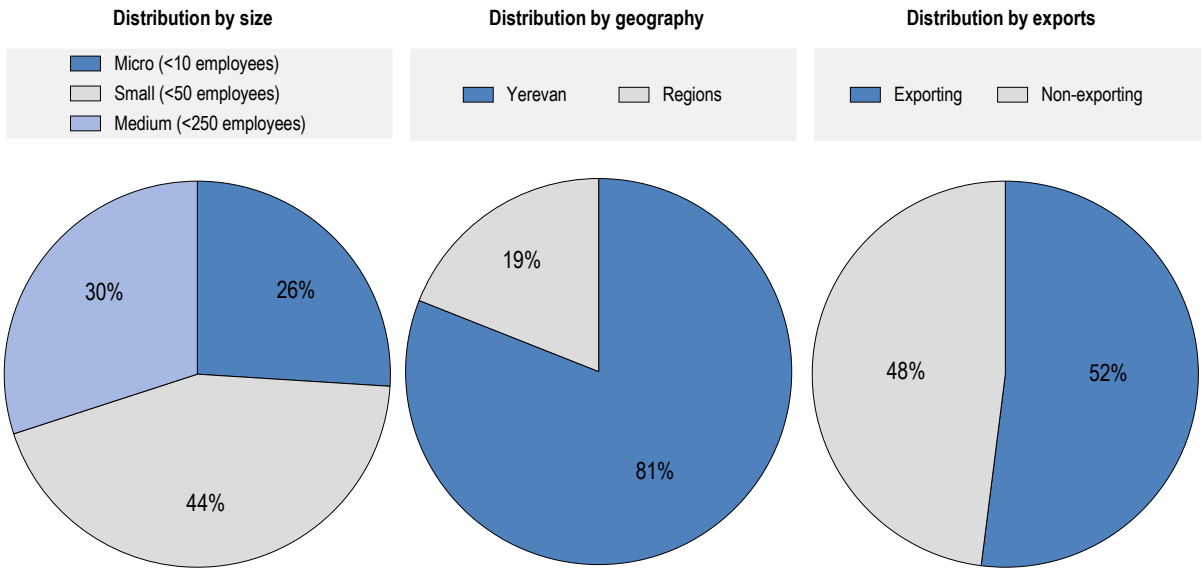
Figure 3.3. Distribution of interviewed SMEs by size, location and exports



Source: OECD analysis

At the basis of the study lies a framework that has been developed to assess SMEs' digital maturity in the different sectors. At enterprise-level, the digital transformation of SMEs is seen as a combined process of technology adoption matched by a growing digital culture. Hence, the framework looks both at digital tools and technologies adopted by SMEs in the considered sector, as well as element of digital culture absorbed into daily operations and management strategic vision.

The framework identifies five levels of digital maturity, ranging from absence of digital capabilities up to adoption of sophisticated technological capabilities. Table 3.1 provides a description of the characteristics of each level of digital maturity.

Table 3.1. SME digital maturity framework

Digital Maturity Stage	Technology Adoption	Digital Culture
Level 1	• Might have social media presence and/or email-address	• Limited or no awareness of digital solutions and their benefits
Level 2	• Basic online presence through a website and/or social media account • Email addresses are utilised for communication purposes • Electronic invoicing is used to streamline billing processes • E-commerce platforms are utilised to enable online sales	• Aware about the availability and benefits of digital solutions • Exploring new organisational set-ups
Level 3	• Well-established online presence through an active social media account and website • Enterprise Resource Planning (ERP) software is used to streamline various business processes, such as finance, HR, procurement, etc. • Cloud services such as Dropbox, Microsoft OneDrive, Google Drive, etc. are used to ensure data storage and sharing • Technologies such as Local Area Network (LAN) and/or Radio-Frequency Identification (RFID) are utilised	• The company has established new organisational set-ups • Focused on strengthening data management and privacy, trust, and security practices • Started investing in dedicated internal human resources to facilitate digitalisation
Level 4	• Customer Relationship Management (CRM) and Supply Chain Management (SCM) systems are put into practice to	• Cultivating innovative business models • Adopting the data-driven decision-making approach

Digital Maturity Stage	Technology Adoption	Digital Culture
	manage interactions with customers, clients, employees and suppliers • Cloud hosting services are applied to facilitate various types of information sharing (e.g. database hosting) • Data analytics is employed to extract valuable insights from large volumes of data	• Well-established data management and privacy, trust, and security practices • Existence of dedicated internal human resources to facilitate digitalisation and foster knowledge-sharing in the organisation
Level 5	• Investments in emerging technological capabilities such as data science, AI-powered solutions, IoT, Blockchain, etc.	• The company has established an advanced digital culture • A cybersecurity programme is well-established and efficiently implemented • Existence of digital acumen among the company's managerial team • Continuous enhancement of digital culture by attracting talent and investing in the digital skills of the workforce

Source: OECD analysis

Level 1 of digital maturity is characterised by the absence of digital capabilities in the enterprise. The business heavily relies on paper-based record-keeping methods and its operations are predominantly manual, hinging on the collective memory of employees and the physical records they maintain.

Advancing to Level 2, the enterprise begins to adopt foundational digital capabilities. Although not fully integrated, certain value chain data related to assets, operational performance, and customer service is being collected and stored in digital formats, and specific business processes are automated. However, the full potential of digital solutions is not yet harnessed.

At Level 3, the enterprise demonstrates a well-integrated digital infrastructure. Value chain data is stored and analysed systematically, providing useful insights for decision-making. Business processes such as finance, HR, and procurement are highly automated. Furthermore, the availability of technical assistance is ensured by hiring an IT-support specialist or outsourcing the function.

Level 4 is characterised by the presence of sophisticated technological capabilities. Analysis of performance data is conducted regularly, allowing to identify the most crucial areas for improvement. Advanced software solutions are applied to manage customer relationship and supply chain operations. A central IT team is established to manage day-to-day operations and maintain the evolving digital landscape.

At Level 5, the enterprise achieves the peak of its digital maturity. During this stage, an advanced infrastructure that catalyses digitalisation throughout the entire organisation is adopted. Leading technologies such as Predictive Machine Learning (ML), Artificial Intelligence (AI), and Big Data are applied to inform strategic decision-making. A centralised IT team takes the lead in new projects and initiatives for digital transformation, while also enhancing the overall digital proficiency of the workforce.

Results of the sector-specific assessment and consultations

The insights gathered during the consultations with the SME representatives have been analysed and used to assess the level of digital maturity of the industry in which they operate. Table 3.2 presents an overview of the assessment's outcomes for SMEs in each sector.

Table 3.2. Assessment of digital maturity of SMEs in selected sectors

Sector	Digital maturity	Technology adoption	Digital culture
Construction	Level 2	• Most companies have presence in social media platforms (e.g., Facebook) • Presence through own websites is less common, however still present in some SMEs • E-mails are utilised for communication purposes • Specialised solutions such as SCM or ERP systems are generally not integrated into day-to-day operations	• Low awareness of digital solutions and their benefits • Lack of strong incentives to invest in digitalisation • Gaps in terms of the technological capabilities of the workforce
Wholesale and retail trade	Level 2	• Active online presence through a social media account (e.g., Facebook, Instagram) and less often a website, both of which are largely leveraged for online sales and digital marketing • E-mails are present and, in most cases, functional • Although CRM, SCM and HRM systems are applied in some companies, majority of SMEs in the sector have not yet adopted such solutions	• Limited awareness of digital solutions and their benefits • SMEs have made the initial steps towards digitalisation and are focused on exploring new organisational set-ups • Internal capacities are leveraged to enhance technology usage competencies of the staff
Manufacturing	Level 3	• Online presence through active social media accounts and, in some cases, own website. Digital marketing through the mentioned channels is leveraged. • E-mails are applied for communication purposes • Enterprise Resource Planning (ERP) software are used to streamline business processes such as accounting and HR, while CRM and SCM systems are applied less commonly • LAN and/or cloud-based services are used for data storage and sharing purposes • Some companies find applications for RFID technologies (e.g., RFID cards for employees)	• Despite being aware of existing digital solutions, SMEs in the sector have limited understanding about the benefits of their application • Lack of strong incentives to invest in digital transformation generally persists in the sector • IT support services are usually outsourced • Digital skill gaps of employees are addressed leveraging internal capacities, and less commonly through external trainings • Gaps in terms of data management, security and data-driven decision making
Real estate activities	Level 3	• Active social media presence and, in most cases a functioning website. Digital marketing practices are applied. • Presence in local e-commerce platforms (e.g., list.am) • Utilisation of LAN and/or cloud-based services for data storage and sharing • ERP solutions are mostly integrated into accounting and HRM (e.g., employee hiring and onboarding, task management tools) • CRM systems are used to manage communication with clients	• Aware of existing digital solutions and their benefits • SMEs have kick-started their digital transformation journey and are focused on exploring further areas of improvement • IT support function is mostly outsources, although some companies started investing in internal capacities • Employees generally have basic technological competencies; however additional training is required when introducing new solutions • Resistance to change is often a key constrain existing within the digital culture • Gaps are present in terms of data management, security and privacy practices
Accommodation and food service activities	Level 3	• Active social media presence and widespread use of digital marketing • Most SMEs have their own websites, utilised for informative and online order placement purposes • Availability and functionality of e-mail services • SMEs in accommodation activities are represented in online booking platforms, such as Booking.com, while restaurant businesses co-operate with local food delivery platforms, such as Glovo • Food service providers use specialised software for managing internal operations (e.g., Gregsys	• Highly aware of the availability and benefits of digital tools, with discrepancies existing in regional SMEs • SMEs are generally focused on exploring new opportunities regarding digitalisation, although resistance and lack of strong incentives to invest in digitalisation is present in some sector representatives • Existence of either in-house or outsourced IT support capacities • Low level of basic digital skills and higher resistance to change are associated with certain

Sector	Digital maturity	Technology adoption	Digital culture
		system). QR codes are applied for digital demonstration of menus and offerings. • Accommodation service providers apply property management software, with integrated ERP and CRM solutions • Limited use of cloud-based services for data storage and sharing	job roles (e.g., housekeeping in accommodation). Employee reskilling is conducted through internal capacities • Despite examples of data collection and analysis for informed decision making among leading SME representatives, such practices are less common in the sector and evident gaps in this area persist
Professional, administrative and support services	Level 4	• Presence in social media (e.g., Facebook, LinkedIn, etc.) and application of digital marketing • Existence of own websites for informative and communication purposes • Availability and high utilisation of e-mail, along with other software solutions (e.g., Slack) for both internal and external communication • Widespread use of cloud-based services for data sharing and storage • CRM systems, along with digital solutions for project management, HRM, accounting and finance have been adopted and integrated into day-to-day operations • Data analytics tools are practiced in some SME representatives	• Highly aware of the availability and benefits of digital tools. Some companies in the sector provide advisory services to SMEs in other sectors regarding digitalisation • Most of the administrative and communicative processes in representative SMEs are digitised • Existence of IT support function, which is either in-house or outsourced • Staff reskilling is emphasised, however, workforce in the sector possesses relatively high level of digital skills • Strong digital acumen among most executives. Some SMEs have dedicated human resource capacities for coordinating digital transformation in the company. • Established data management, security and privacy practices
Information and communication technologies	Level 4	• Social media presence (e.g., Facebook, LinkedIn, Instagram, etc.) and practices of digital marketing • Presence of own website used for communication and provision of information • Availability and high functionality of e-mail addresses, as well as other software (e.g., Slack) for both internal and external communication • Utilisation of cloud-based services for data storage and sharing, as well as existence of cloud hosting practices • Software solutions for streamlining almost all processes are put into practice, ranging from project management (e.g., Jira) to HRM and CRM systems • Data analytics tools are applied	• Highly aware of the availability and benefits of digital tools. Companies in the sector commonly engage with other SMEs, assisting their digitalisation efforts • Almost all internal processes are digitalised, with the highest level of technology integration present in IT-related operations (e.g., product development) • Highest level of digital skills among the workforce compared to other sectors • Well-established cyber security and data management practices in most companies • Leading SME representatives invest into the development of customised software solutions for their business

Source: Consultations with SME representatives

SMEs operating within the construction and trade sectors exhibit low levels of digital maturity.

- *Construction.* SMEs in the construction industry are characterised by the lower stage of digital maturity than those in other observed sectors. Despite a few outliers that have adopted sophisticated tools, such as CRM, HRM and project management systems, technology adoption among most sector representatives hardly goes any further than basic online presence, often through social media platforms, e-mail addresses and own webpages. The limited adoption of digital technologies can be largely attributed to a lack of awareness regarding the potential benefits attainable through digitalisation. This results in low incentives among managers to invest in digital tools and enhancement of workforce digital skills. The high concentration of low-skilled labour in the sector compounds the issue, leading to persistent gaps in terms of technological competencies among SME employees.

- *Wholesale and Retail Trade.* Enterprises operating in wholesale and retail trade predominantly establish a presence on social media, with a subset having developed their own websites. As one might expect, in comparison to other industries, many SMEs in this sector engage in online sales, either through their own webpages or through specialised e-commerce platforms. Only a small subgroup, often characterised by above-average revenues, has adopted CRM, SCM, and HRM systems. The ongoing digital transformation challenge for this sector stems from the limited digital skills of the workforce and a preference for traditional methods, contributing to resistance against innovative digital solutions. Additionally, SMEs in the sector, particularly microenterprises, face financial constraints that impede investments in digital initiatives.

In contrast, industries like manufacturing, real estate, and hospitality have already integrated foundational digital capabilities into their operations, positioning themselves within the intermediate stages of digital maturity.

- *Manufacturing.* Digital tools in the sector are applied to streamline various business processes, especially in accounting and human resource management. Selected companies adopt CRM and SCM systems to enhanced efficiency. Examples of most used software solutions include *ArmSoft* systems[6] and *Bitrix24*.[7] Furthermore, LAN and cloud-based services (e.g., Dropbox, Microsoft OneDrive, Google Drive) are used for internal data sharing and storage purposes. While SMEs in the manufacturing sector have awareness of available digital solutions, the incentives for substantial investment in digitalisation remain somewhat limited. This can be attributed to the relatively low labour costs compared to automation expenses, resulting in a preference for labour-intensive manual operations.[8]
- *Real estate.* SMEs operating in real estate have effectively adopted basic technological capabilities, and an emerging trend within this sector is the integration of more sophisticated solutions, including CRM systems to streamline relationships with clients and customers. Additionally, ERP software is deployed to facilitate team management, employee onboarding, and other operations. Cloud services are employed for data storage and sharing. Despite these advancements, a noticeable gap persists in terms of familiarity with and implementation of property technology for further optimising transactions and asset management. An overarching challenge in the sector is the recruitment of high-skilled labour, equipped with the required skills to assist digital transformation process. Professionals, especially those with strong technological competencies, are often drawn to better-paying sectors like IT, where the average monthly nominal salary is around four times higher than in real estate. Additional gaps exist in the areas of data management, security, and privacy practices.
- *Accommodation and food service.* Positioned midway on the digital transformation journey, the accommodation and food service sector has established a solid foundation of basic technological capacities. Distinct variations emerge between accommodation and food service activities. Small and medium-sized hotels typically integrate property management software solutions with integrated ERP and CRM systems, streamlining their internal processes. Moreover, it is common for accommodation service providers to have a presence on online on booking platforms such as *Booking.com*. Simultaneously, food service providers utilise specialised software for managing internal operations, such as the *Gregsys* system.[9] Collaborations between restaurant businesses and local sharing-economy platforms for food delivery (e.g., Glovo) are also common. Overall, the sector is prone to quick digitalisation, however some constraints persist. A heightened awareness of digital solutions in the sector often correlates with the presence of international hotel or restaurant chains, facilitating the transfer of know-how. ICT integration is smoother within processes dominated by younger employees, while processes with a higher concentration of elderly workforce present complexity due to deficiency in basic digital skills. Technological competencies in the sector are fostered mainly through internal knowledge sharing practices. Furthermore, customer preferences in the local market shape digitalisation dynamics, with certain

SMEs opting for a cautious approach to total digital transformation, valuing in-person communication within the sector's operations.

Finally, SMEs engaged in professional, administrative, and support services, as well as those specialising in information and communication technologies, have attained more advanced stages of digital maturity. In addition, certain SMEs within these sectors actively collaborate with smaller enterprises from diverse industries, playing a pivotal role in supporting their digital transformation endeavours through digital advisory and offering of tailored software solutions.

- *Professional, administrative and support service.* The professional, administrative and support service sectors is characterised by a heightened level of digitalisation, with most businesses employing CRM and ERP tools for managing interactions with both external stakeholders and employees. Cloud systems are extensively utilised for information sharing, data storage, and analysis. In its current stage of maturity, SMEs within the sector place a significant emphasis on enhancing the aspects of data security and finding applications of emerging technologies. SMEs in the sector are aware of the benefits associated with digitalisation and are actively cultivating a reliable digital culture within their organisations. Despite the sector's workforce already boasts a relatively high level of digital competencies, particular emphasis is placed on staff reskilling when introducing novel solutions.
- *Information and communication technologies.* Among the observed sectors, SMEs in the IT sector are characterised by the highest level of digitalisation, having integrated numerous digital solutions into day-to-day operations. This includes the well-established adoption of CRM and ERP systems, alongside the extensive utilisation of cloud services. SMEs in the sector actively avoid manual processes to minimise errors, placing significant emphasis on bug tracking management and planning tools. Considering the expertise of staff in digital technologies, businesses within the sector gravitate toward the adoption of a "digital by default" approach in certain processes, including product development. Meanwhile, other support functions, such as accounting or HR, lag behind due to constrained technology absorption capabilities of employees in comparison to the core IT staff. Leading SME representatives in the sector also invest in the development of customised software solutions tailored to their business needs.

Cross-sectoral factors shaping SME digital maturity

Other than the sector-specific factors influencing SME digitalisation described above, the study also identifies three main factors influencing digital maturity levels of SMEs across all sectors.

1. *Scale*. SMEs of larger scale in terms of turnover and staff size are more likely to display higher levels of digital maturity considering the need to optimise larger number of business processes. As a result, microenterprises lag behind their small and medium-sized counterparts in terms of technology adoption. This discrepancy also partially arises from a lack of awareness concerning available digital solutions and their potential benefits. At the same time, microenterprises are more commonly challenged by financial constraints. Many of these entities hold the perception that integrating digital tools, such as CRM systems, is associated with significant investments, which might not bring adequate outcomes considering the limited number and scale of well-established business processes within their organisations. Generally situated within the first to second stages of digital maturity, microenterprises require well-established basic digital capabilities before transitioning to more sophisticated solutions.
2. *Location*. SMEs operating outside Yerevan are generally concentrated in earlier stages of digital maturity. This discrepancy can be partially attributed to the existence of a more advanced digital infrastructure in the capital, with high-speed internet connectivity and well-established IT services. At the same time, urban areas like Yerevan tend to harbour a concentrated pool of highly skilled professionals, facilitating the introduction of innovative digital practices and solutions within local

SMEs. Finally, exposure to a more competitive landscape in Yerevan incentivises SMEs to invest in digital transformation to enhance their competitiveness.

3. *Internationalisation*. SMEs engaged in global value chains tend to be in more advanced levels of digital maturity. Specifically, the companies that are linked to larger international corporations, whether as branches, franchises, or representatives, are often inclined to adopt more sophisticated solutions, promoted by their global counterparts, and have access to international know-how and expertise. Similarly, exporting SMEs are more likely to be well informed about advanced digital solutions and their associated benefits. Their exposure to global markets necessitates digital transformation to maintain competitiveness.

Overall obstacles to SME digitalisation

The information gathered though the group consultations with SMEs allowed to identify a number of key obstacles hindering the digital transformation of SMEs across all sectors.

Limitations in digital infrastructure

The availability of a robust and enabling digital infrastructure is one of the central conditions for SME digitalisation. Digital infrastructure is regarded as a composition of both virtual and physical components. As part of the physical infrastructure, high-quality and widespread internet connectivity is an essential precondition for SMEs to integrate digital tools into daily operations. Despite the significant progress Armenia has made in this realm, SMEs, especially those operating in rural areas, are negatively impacted by limitations in connection speed and stability, which serves as an impeding factor for the integration of digital tools. Internet-related issues might also be caused by the lack of technical IT support, especially in micro and small enterprises.

Lack of sector-specific support and public-private dialogue for digitalisation

SMEs generally hold the belief that a universal approach does not cater to their diverse needs and requirements considering the unique set of challenges faced in different sectors of economic activity. Thereby, the lack of sector-specific support is regarded as an obstacle to facilitating enterprise digitalisation. Without dedicated guidance and resources that address the different demands across industries, SMEs often struggle to effectively implement digital transformation strategies. Moreover, the lack of operational communication channels between the public and private sectors further compounds this challenge for SMEs. Enterprises often encounter difficulties such as the unclear representation of sector- and size-specific obstacles in policy documents, as well as inadequate awareness of available government support programmes.

Lack of awareness about the existing digital solutions and their benefits

Insufficient familiarity with the available digital solutions and their associated advantages stands as one of the main obstacles to SME digitalisation in Armenia, especially among microenterprises and in sectors in early stages of digital maturity. Executives often do not fully comprehend the benefits offered by the introduction of digital solutions and are inclined to direct their financial resources towards hardware and machinery, as the outcomes of such investments appear more tangible.

Moreover, SMEs are usually unaware of local digital solutions that are not only easily accessible, but also more cost-effective. Businesses' limited awareness results in their overlooking of such alternative, leading them to choose more expensive and widely known solutions. The adoption of such solutions often involves larger investments, making them financially burdensome for small businesses.

Financial constraints

Within this landscape, financial constraints present a substantial challenge, particularly for smaller enterprises. The upfront costs associated with acquiring and implementing digital solutions, as well as financing professional consulting and training services can be prohibitive for SMEs, often impeding their ability to embrace digital transformation. Additionally, the limited knowledge about alternative sources for financing digitalisation endeavours, such as equity funding or grant programmes, further complicates the situation.

Insufficient level of digital skills of workforce

Insufficient level of technological competencies among the workforce is a key challenge limiting and prolonging the process of SME digital transformation. Nevertheless, most companies rely on internal capacities to address the skills gap – largely through knowledge transfer and onboarding training. Overall, the existing skill gaps impede the integration of modern technologies into day-to-day operations and create a demand for employee reskilling. Although this is a withstanding obstacle across SMEs in all sectors, limitations in basic digital skills are more apparent within the construction, trade, manufacturing, and hospitality sectors, where concentration of low-skilled labour is relatively higher.

Lack of strong incentives to invest in digitalisation

A key factor restricting digitalisation in SMEs is the lack of strong incentives for allocating financial resources into digital transformation efforts. This is especially an issue concerning SMEs that are not exposed to highly competitive markets, and thus not driven by the need to increase competitiveness of their products and services. The opposite is observed among exporting SMEs or those that operate as parts of larger international corporations, with both being more prone to adopting digital solutions due to high exposure to a competitive environment driven by digitalisation.

Another factor resulting in low incentivisation to invest in digital transformation is the low level of wages in certain sectors. The availability of low-cost labour, especially in industries where labour-intensive tasks are common, results in less urgency to invest in digital transformation – the cost of manual labour is perceived to be relatively lower than the expenses associated with the implementation of new technologies and employee reskilling.

Costly advisory services

> *"Our business seeks professional guidance for ongoing digitalisation initiatives, yet the costs associated with consulting services are beyond the financial reach of a small business."*

In the journey towards digital transformation, SMEs face a significant obstacle in terms of the limited access to digital advisory services tailored to their needs. A successful digital transformation requires a strategic shift within the business, regarding not only the introduction of new technological solutions but also capacity building of the workforce, cultivation of an enabling digital culture and optimisation of specific business processes. Such a major transformation requires extensive advisory support. Yet, a substantial portion of SMEs lacks access to such guidance, mainly due to financial limitations. Without tailored advisory, SMEs can find the complexities related to digitalisation overwhelming, potentially deterring them from pursuing digital transformation altogether.

Obstacles to e-commerce development: e-signatures and cybersecurity concerns

> *"The private sector cannot fully embrace digital transformation without the presence of a highly digitalised public administration system in the country."*

Although SMEs generally recognise the significant progress in terms of e-governance in the country, most companies believe that additional room for improvement persists. The complexity of processes related to obtaining and utilising e-signature services has been identified as one of the main limitations for digital transactions, especially in real estate, trade, manufacturing and high-tech sectors. Additionally, SMEs in real estate and construction sectors have limited access to online property-related data, while companies in manufacturing and trade sectors are challenged by paper-based export and import documentation for customs procedures. Simultaneously, SMEs in the high-tech sector present concerns related to data security and high dependency on foreign servers, with data localisation procedures.

Cultural and traditional factors

Resistance to change and a preference for traditional methods over embracing innovative approaches pose significant obstacles to the digitalisation process. This phenomenon extends beyond specific sectors, emerging as a prominent challenge across various industries. Particularly noteworthy is the resistance observed among the elderly workforce, characterised by their familiarity with traditional methods and a certain degree of discomfort with technology adoption, creating a substantial barrier to embracing new approaches. Additionally, SMEs encounter difficulties in seamlessly integrating newly adopted digital solutions into their daily tasks and routines. The misalignment between the functionality of digital tools and the traditional workflow poses a critical risk of inefficiencies and heightened operational costs.

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Notes

[1] The "Ecogeneration" environmental, socio-economic development NGO is an organisation funded by the EU in the framework of the “Economic Governance, Business Environment, & Justice Reform” project.

[2] SMEs were stratified based on sector of activity, firm size, and geographical location. The study assessed the following areas: A) Use of computers, IT specialists and skills, B) Internet access and use, C) E-commerce, D) Use of other, more complex business solutions, E) Digital security, F) Expenditures on hardware, software or services, G) Business process, H) Attitudes and perception.

[3] Findings from Armstat's study reveal a higher rate of website adoption, standing at 45% among SMEs, and up to 69% for medium-sized enterprises.

[4] According to Armstat's 2023 survey, the e-commerce engagement rate for micro-enterprises is even lower (4%).

[5] The sectors are defined based on the NACE Rev. 2. Enterprises operating in all sectors that fall under the category of "Other sectors" (Mining and quarrying, Electricity gas steam and air conditioning supply, Water supply sewerage waste management and remediation activities, and Repair of computers and personal and household goods), as well as financial and insurance activities, have been excluded by the study due to the small number of SMEs operating in these sectors (1.4% of total SMEs). In addition, considering the generally low levels of digital maturity in microenterprises compared to SMEs of a larger size, SMEs with 10 or less employees were not involved in this assessment.

[6] *Armenian Software* is a company specialised in the development of business management systems, their implementation and further support. They provide standard solutions to SMEs as well as specific solutions to enterprises with complex accounting and banking systems to banks and credit organisations (Armenian Software, 2023[4]).

[7] *Bitrix24* is an all-in-one software designed to help SMEs streamline workflows and enhance team coordination. The software offers a wide range of functionalities and tools, including task management tools, communication tools and a CRM system (Bitrix24, 2024[5]).

[8] According to the Statistical Committee of Armenia, the average monthly nominal wage in manufacturing SMEs was equal to around 132,000 AMD in 2021.

[9] Founded in 2006, the *GregSys* company processes computer software for restaurants. Services offered include software and hardware installation, personnel training, software and computer services 24/7, and warranty and post-warranty services (GregSys, 2024[6]).

4 Developing an eco-system for the digital transformation of SMEs

Building on the analysis presented in previous chapters, this section offers conclusions and policy options that Armenia could consider to further foster SME digitalisation. It is structured around three main objectives: 1) improving framework conditions for digitalisation, 2) building a structured system for SME digitalisation support, and 3) fostering synergies in the ecosystem to facilitate the digital transformation of SMEs.

Introduction

This chapter provides a set of policy options that Armenia could implement to i) improve the framework conditions for digitalisation, ii) build a structured system for SME digitalisation support, and iii) foster the synergies in the existing ecosystem to facilitate the digital transformation of SMEs.

OBJECTIVE 1. Improve framework conditions for SME digitalisation

Adopt a strategic approach to digitalisation

Adopting a strategic approach to SME digitalisation would help ensure more effective use of resources and maximise the potential impact of government support for digitalisation. By strategically planning and co-ordinating policy efforts, Armenia could address the multifaceted challenges faced by SMEs in a more comprehensive manner. This would also enable the government to monitor progress, identify barriers, and adjust interventions accordingly, leading to more efficient and sustainable outcomes.

Moving forward Armenia could consider:

- **Ensuring effective implementation and monitoring of the DSA**. Armenia would need to closely monitor the implementation of the DSA's Action Plan, based on clearly defined responsibilities and predictable and secure funding mechanisms. Strengthening the monitoring framework through a comprehensive and regular collection of additional data on digital transformation, such uptake of digital solution by businesses and level of digital skills, could strengthen the evaluation process and provide a more robust foundation for assessing the efficacy of the actions undertaken as part of the plan (see below). Furthermore, it is important to ensure adequate co-ordination and consultation with a broad range of stakeholders, including governmental bodies such as the Ministry of Labour and local authorities as well as non-governmental entities, including businesses, civil society, and trade unions. The active involvement of these stakeholders in policy design is crucial in shaping digitalisation policies and, more importantly, in providing valuable support for their successful implementation. Recognising the integral role of trade unions, businesses, and civil society in this process underscores the need for ongoing collaboration and engagement to ensure the comprehensive and effective realisation of the DSA's objectives.
- **Mainstreaming support to SME digitalisation in the new Entrepreneurship Development Strategy**. The ongoing preparation of a new Entrepreneurship Development Strategy is a welcome opportunity to place specific emphasis on the digital transformation of SMEs. This would help acknowledge the transformative impact of digital technologies on business ecosystems and would underscore Armenia's commitment to fostering a dynamic and technologically empowered entrepreneurial sector. To ensure a comprehensive and measurable approach, the strategy should incorporate Key Performance Indicators (KPIs) along with associated targets. This is essential for establishing a systematic framework that enables the monitoring and evaluation of the implementation of all proposed measures. By delineating specific KPIs and targets, policymakers can track progress, identify areas for improvement, and measure the tangible impact of the strategy on SME digitalisation and digital skills enhancement.

Box 4.1. Good Practices in Defining Key Performance Indicators (KPIs)

How to define robust KPIs

Assessing performance is the first step in understanding the efficacy of any intervention and facilitating necessary adjustments. Key Performance Indicators (KPIs) and associated targets play a pivotal role in effectively monitoring and evaluating strategies, representing measurable values that gauge the effectiveness of governmental objectives. Robust KPIs exhibits the following characteristics:

- **Measurable progress**: KPIs provide measurable benchmarks and indicators to track the level of implementation, performance, and overall effectiveness of initiatives. By establishing clear targets, policymakers can assess progress to make data-driven decisions.
- **Targeted interventions**: Setting specific KPIs helps focus efforts and resources on priority areas. By defining clear objectives and targets, policymakers can ensure that interventions address critical challenges and opportunities, leading to more effective outcomes.
- **Accountability and transparency:** KPIs provide a transparent framework for evaluating performance, enhancing accountability. By publicly disclosing KPIs, policymakers demonstrate their commitment to accountability, fostering trust.
- **Continuous improvement:** Regular monitoring of KPIs allows for ongoing assessment and adjustment of strategies based on real-time feedback. By identifying areas of underperformance or unexpected outcomes, policymakers can continuously adapt interventions, maximising impact, and efficiency.

Good practice example: Georgia's SME Development Strategy 2021-25

Georgia is currently implementing its second multi-year SME Development Strategy for 2021-2025 and related Action Plans for 2021-2022 and 2023-2025. The document is articulated along seven strategic directions, each with related objectives and KPIs.

Table 4.1. Selected priorities and KPIs from Georgia's SME Development Strategy 2021-25

Priority	Indicators	
Improving the operational environment for SMEs	• "RIA SME TEST" is applied to legislative changes • Impact assessment performed for selected state support programs.	• Number of available detailed statistics of SMEs by various directions • Share of insolvency procedures which resulted in rehabilitation rather than liquidation of the enterprise
Promoting the Development of Entrepreneurial Skills	• Number of trainings / meetings held per year • Number of Vocational Educational Institutions where the concept of entrepreneurial culture is introduced	• Percentage of trained entrepreneurs that think the skills and knowledge they received during the training will be useful in improving/starting their own business
Improving Access to Finance for SMEs	• % of companies participating in State Financing Programs that are able to access financing from non-state sources after their participation in the State Financing Program	• Leasing Transaction Volume • Financial statement submission rate
Promoting electronic communications, information technologies, innovations and R&D for SMEs	• Number of SMEs that have developed (at the level of prototype) an innovative product or service among beneficiaries of State Support Programmes	• The number of entrepreneurs receiving digital skills trainings

Sources: (Ministry of Economy and Sustainable Development of Georgia, 2021[1])

Sources: (OECD, 2017[2]; OECD, 2019[3]; OECD, 2017[4]; Ministry of Economy and Sustainable Development of Georgia, 2021[1])

- **Improving data collection on the digital transformation**. Recognising the pivotal role of data in fostering evidence-based policymaking and monitoring the impact of policies, improving data collection on digital transformation would be helpful. Armenia already made noteworthy progress in this direction. In 2023, Armstat carried out a pilot survey encompassing 2400 firms based on Eurostat's ICT usage in enterprises database (see Annex B. Armstat ICT survey). This initiative represents a commendable step towards broadening the spectrum of outcome-oriented indicators for digitalisation policies. However, it would be important to institutionalise and expand such data collection processes as a regular component of the national statistical production. The pilot survey could serve as a precursor to sustained efforts that embed the collection of digital transformation data into the regular data collection exercises carried out by Armstat. In addition, collecting detailed data on the total number and evolution of available e-government services could also be helpful to monitor their use and effectiveness, therefore improving interactions between citizens and businesses with government entities. To this end, Armenia could consider collecting data on the total number of the available government services ranked by sophistication level, such as informational services, one-way/two-way interaction, transactions, and personalisation.

Box 4.2. Statistical indicators on ICT usage

Collecting statistical indicators on the adoption of digital technologies in the business sector is key to build the evidence base to monitor SME digitalisation and to develop sound policies to support businesses in their digitalisation journey. The Eurostat ICT Usage in Enterprises and the OECD ICT Access and Usage by Businesses databases offer important methodological references in this respect.

Eurostat ICT Usage in Enterprises

The Eurostat ICT Usage in Enterprises is a yearly survey collected by the National Statistical Institutes (NSIs) based on the annual Eurostat model questionnaires. Its aim is to gather and disseminate standardised and comparable data on the use of ICTs and e-commerce in enterprises at the European level. This information supports the measurement of one the key priorities outlined by the European Commission in its "Europe fit for the digital age" Plan. It also plays a vital role in monitoring the EU's digital targets for 2030, as set by the Digital Compass for the EU's Digital Decade.

The survey targets enterprises with more than 10 employees and it collects information on several subjects, including ICT systems, internet and electronic network usage, e-commerce, e-business processes, ICT competence, and the use of various emerging technologies.

OECD ICT Access and Usage by Businesses by OECD

The ICT Access and Usage by Businesses database features a selection of 59 indicators based on the second revision of the OECD Model Survey on ICT Access and Usage by Businesses. These indicators originate from two primary sources:

1. An OECD data collection covering selected OECD and accession countries or key partners, including Australia, Brazil, Canada, Colombia, Japan, Korea, Mexico, New Zealand, Switzerland, and the United States.
2. Eurostat Statistics on Businesses for OECD countries integrated into the European Statistical system. The indicators presented in the database align with the original indicators as published by Eurostat.

Notes: the full list of subjects covered by the Eurostat ICT Usage in Enterprises survey is as follows: ICT systems and their usage in enterprises, use of the internet and other electronic networks by enterprises, e-commerce, e-business processes and organisational aspects, ICT competence in the enterprise and the need for ICT skills, barriers to the use of ICT, the internet and other electronic networks, e-commerce and e-business processes, ICT security and trust, access to and use of the internet and other network technologies for connecting objects and devices (Internet of Things), access to and use of technologies providing the ability to connect to the internet or other networks from anywhere at any time (ubiquitous connectivity), use of Artificial Intelligence, use of Cloud computing, use of data analytics, use of 3D printing, use of robotics, use of social media, internet advertising, and ICT and the environment.
Sources: (Eurostat, 2023[5]), (OECD, 2024[6])

Strengthen the regulatory framework for digitalisation

As seen in Chapter 3, cybersecurity concerns and the perceived complexity of obtaining and utilising e-signatures are major obstacles that limit businesses' uptake of digital solutions. This, associated with scarce demand, limits SMEs engagement in e-commerce.

Although significant steps have already been taken to address these problems, the government could consider:

- **Ensuring the full implementation of the Action Plan for the SME Development Strategy 2020-2024**. The Action Plan defines specific measures aimed at creating a favorable environment for

the development of e-commerce among SMEs. Key measures include activities such as 1) analysing the legislative framework in the field of e-commerce and implementation of corresponding reforms, 2) improving access to international online payment systems (e.g., PayPal), 3) launching an electronic certificate of origin system, allowing to apply for a certificate online and receive it within a day, 4) analysising international postal deliveries and pinpointing prevalent issues that SMEs encounter during export, 5) developing guidelines and providing technical support for e-commerce through international trading platforms (e.g., ebay, etsy), and 6) developing a programme for promoting e-commerce among SMEs in the regions. Moving forward it will be important to ensure implementation of these measures, as the successful realisation of these initiatives will not only fortify the e-commerce landscape but also contribute significantly to the overall growth and resilience of SMEs within the national economic framework.

- **Improving the regulatory framework on e-signatures**. This will require a concerted effort to align with international standards such as, for example, the EU electronic IDentification And Trust Services (eIDAS) regulation. While initial steps have been taken and Armenia has embraced the use of qualified electronic signatures, these can only be obtained and accessed with a compatible ID card, potentially limiting accessibility for certain businesses, especially smaller ones. By extending the regulatory framework to include less sophisticated e-signatures, such as simple or advanced electronic signatures, Armenia can provide a more accessible and flexible solution for businesses that may not require the highest level of security and legal recognition. This approach not only caters to the diverse needs of SMEs but also promotes wider adoption of digital solutions. Furthermore, full harmonisation with the eIDAS regulation would bring several benefits, including compatibility with EU member states and several EaP countries, and serve as a foundation for interoperability with global digital systems. Moldova and Ukraine have already harmonised their legislation with the EU eIDAS regulation, Armenia's alignment would contribute to creating a seamless digital environment that facilitates cross-border transactions and enhances the interoperability of digital systems within the region.
- **Stregthening the policy framework for cybersecurity**. Armenia has demonstrated commendable progress in this area in recent years, and it is crucial to capitalise on this momentum by enhancing the existing policy framework for cybersecurity. First, the government could consider further aligning relevant legislation with EU directives (NIS2 Directive, see Box 2.3), as foreseen in the DSA. Armenia could also invest in better server security and strengthen the server infrastructure to increase resilience against cyber threats. Moreover, targeted initiatives aimed at encouraging SMEs to adopt cybersecurity measures would be essential. Such measures could include awareness raising initiatives to educate SME owners and employees about the various cyber threats they may encounter – such as phishing attacks, malware, or data breaches – to mitigate the risks. Finally, it would be useful for Armenia to establish a national certification scheme for digital security, delineating standardised criteria and assessment procedures to evaluate the cybersecurity posture of businesses – such as their ability to protect against cyber threats, detect security incidents, and respond effectively to breaches. Such a framework could help SMEs by providing them with clear and standardised guidelines for implementing cybersecurity measures and ensure that their digital security practices meet recognised standards.

Support the development of digital skills

Despite a vibrant private sector with many actors involved in digital skills development, the level of digital skills of the general population remains low and there is a shortage of professionals with digital skills in the private and public sectors.

Armenia is well aware of these issues and has included digital skills as one of the priorities of the DSA. However, achievements in digital skills assessment and anticipation remain relatively scarce. In addition,

data on digital skills levels (across individuals of different target groups and businesses) is not regularly collected and analysed, which significantly impedes policy monitoring and evaluation efforts.

Moving forward, Armenia could consider:

- **Improving digital skills assessment and anticipation tools**. To be in better position to identify skills needs, design adequate policies, monitor the implementation of measures and programmes, and adjust them as needed, Armenia could consider adopting a digital competence framework on the basis of which skills acquired by the general population could be benchmarked and certified. Armenia could consider using the EU's Digital Competence Framework (DigComp) as a reference (Box 4.3). Furthermore, producing and collecting information on the level of digital skills among citizens and firms, would be essential for identifying new demand for skills (OECD, 2019[7]). The difficulties that SME representatives declare to encounter in finding and hiring employees with adequate digital skills denote a skills mismatch issue. The DSA acknowledges that there is a shortage of professionals with digital skills in the private and public sectors, primarily due to a mismatch between education outcomes and labour market needs. Skills assessment and anticipation exercises represent useful tools to address the issue. Armenia could consider implementing similar assessments, starting from simpler methods such as skills survey and forecasting exercises (Box 4.4).

Box 4.3. The Digital Competence Framework for Citizens (DigComp)

In response to the rapid technology advancements and the ever-growing significance of digital skills, the European Commission has introduced DigComp – a framework designed to shape and assess individuals' digital competences. It fosters digital literacy and empowers citizens to engage proficiently and responsibly in various contexts, including education, workforce training and policy development. DigComp is a comprehensive roadmap for assessing and developing digital competencies in individuals across age groups and professions. It surpasses technical expertise, embracing crucial abilities and attitudes for the effective use of digital tools in the complexities of the digital era.

Table 4.2. DigComp five areas of digital competences

Area	Description
Information and data literacy	This area equips individuals to find, evaluate and manage digital information responsibly. Key aspects include information retrieval, evaluation, data management, privacy and copyright. It enables informed decision making and active digital participation while safeguarding privacy and digital identity
Communication and collaboration	This competence area focuses on developing individuals' proficiency in using digital tools and platforms to effectively communicate, share information and collaborate with others. It emphasises clear and meaningful digital interactions, enabling collaborative and productive exchanges across various contexts and platforms.
Digital content creation	The DigComp's digital content creation is designed to empower individuals with the skills to proficiently produce, edit and share digital content across various formats, including text, images, audio, and video. It plays a pivotal role in enabling the effective expression of ideas and fostering valuable contributions to the digital landscape with professionalism and creativity
Safety	The safety competence area encompasses the acquisition of essential knowledge and skills that enable individuals to ensure their security and privacy in the digital environment. This entails a comprehensive understanding of digital security measures, proficiently safeguarding personal data and adopting responsible online practices to effectively mitigate potential risks and threats
Problem solving.	Problem solving encompasses the acquisition of adept skills in analysing and resolving challenges proficiently via the use of digital tools and technologies. This proficiency enables individuals to identify issues, devise innovative solutions and take informed decisions in the digital landscape

Source: (European Commission, 2023[8])

DigComp facilitates the development of essential digital skills, enhancing individuals' employability in a technologically driven job market. It promotes digital inclusion and bridging the digital divide and fosters responsible digital citizenship. The framework aids policy makers in designing effective digital literacy initiatives and policies, fostering a competent and productive society.

Source: (OECD/EBRD, 2023[9]; European Commission, 2023[8])

Box 4.4. Skills anticipation tools

Skills anticipation tools are typically defined as activities designed to estimate future skills needs in the labour market "in a strategic way, using consistent and systematic methods" (ILO, 2015[10]). These practices prove valuable for policy makers to understand the evolution of skills demand and supply and to implement appropriate measures to prevent and/or address skills shortages and mismatches. Given the rapid pace of technological advancements and their impact on economies and societies, these exercises are particularly relevant in the context of digital transformation.

In practice, tools for anticipating skills needs are diverse, ranging from simple surveys among employers or school/training graduates to quantitative projections based on macroeconomic modeling. A recommended approach involves a combination of different methods, sometimes employing both quantitative and qualitative approaches to gain a thorough understanding of current and upcoming trends. Most OECD countries have implemented multiple types of exercises, but forecasting exercises are particularly widespread, as they were being used by about 90% of OECD countries surveyed in 2016. Foresight exercises, which take a qualitative approach gathering stakeholders to develop future scenarios, identify priorities, and propose policy actions, are less common and were reported by only about half of OECD respondent countries.

Sources: (OECD/EBRD, 2023[9]; OECD, 2016[11]; CEDEFOP, 2008[12]; ILO, 2015[10])

- **Further promoting digital skills development among businesses**. Armenia could further promote digital skills development among businesses, especially small ones, by introducing new digital skills development programmes and ensuring the effectiveness of the existing ones. In terms of new programmes, the government could consider implementing additional re-skilling and upskilling opportunities for SMEs, as well as dedicated training modules on digitalisation including examples of digital solutions available to small businesses. In addition, a concerted effort in communication and outreach programmes would ensure that the diverse range of existing support initiatives is well-understood and accessible to the target audience. Awareness campaigns could also emphasize the tangible benefits and practical applications of digital skills in the contemporary business landscape. Finally, monitoring and evaluation of available training programmes should be implemented to ensure their continued relevance and effectiveness.
- **Ensuring involvement of relevant stakeholders and co-ordination between public and private initiatives aimed at improving digital skills**. To bolster digital skills development, the government should enhance the involvement of pertinent stakeholders while fostering seamless co-ordination between public and private initiatives targeted at enhancing digital skills. This multifaceted approach aims to cultivate a comprehensive ecosystem that facilitates the alignment of diverse efforts geared towards digital skills development. By actively engaging key stakeholders from both the public and private sectors, Armenia can leverage a collective wealth of knowledge and resources to drive meaningful advancements in digital literacy and proficiency. In addition, Armenia could raise awareness about the available support mechanisms among businesses and the general population. Finally, a robust monitoring and evaluation framework could be established to systematically assess the impact of digital skills development initiatives. This entails tracking the effectiveness of the various programmes, identifying areas for improvement, and measuring the overall progress towards enhancing digital capabilities in SMEs. In implementing these recommendations, Armenia could capitalise on the strengths of existing successful initiatives such as the Armath Engineering Laboratories, the TUMO Centre for Creative Technologies, and the Gyumri Technology Centre (see below).

OBJECTIVE 2. Build a structured system for SME digitalisation support

Establish an implementing agency with a strong mandate to act as a digital one-stop-shop

Like other cross-cutting policy issues such as gender, green growth or development, priorities to facilitate and manage the digital transformation are relevant in many domains, which calls for a holistic and co-ordinated approach to policy making. As noted in Chapter 2, the government's ability to assist the SME population was reduced due to significant changes in Armenia's institutional arrangements for SME support services and, although digitalisation stands as a discernible policy priority for the government, its implementation appears to be dispersed across various policy documents and different institutions. This fragmented approach poses a potential risk to the efficacy of the policy endeavours.

Moving forward, it would be useful to identify a co-ordinating institution (hereafter *SME support agency*) with a strong political mandate and sufficient resources to translate strategic priorities set by the government into tangible initiatives to help bolster the digital transformation of SMEs. Such an agency could provide a comprehensive range of SME development services, including those with a focus on digital transformation. In this context, it is important to highlight that the support should extend beyond businesses in the IT sector, ensuring a holistic approach to fostering digitalisation across diverse industries, including in particular also more traditional ones where the majority of SMEs operate (OECD, 2021[13]).

This SME support agency could act as:

- **First implementer of digital transformation policies set by the national government**. The SME support agency would take the lead in implementing governmental policies defined in official policy documents (e.g. SME strategies and action plans). The agency would operate as the central co-ordinating body endowed with both the mandate and the requisite resources to translate strategic priorities related to business digitalisation into actionable measures. By assuming this responsibility, the agency could effectively bridge the gap between overarching policy objectives and on-the-ground implementation.
- **Single point of reference for businesses seeking public support to digitalise**. The designation of the SME support agency as the single point of reference for businesses seeking public support to digitalise is paramount in simplifying and streamlining the process for SMEs navigating the landscape of available assistance. By consolidating various resources, programmes, and initiatives under one roof, the agency could become a centralised focal point where SMEs could receive guidance and support tailored to their digitalisation needs.
- **Key provider of information**. The agency would become the main provider of information for all businesses seeking guidance and support. In this capacity, the agency could:
    - *Raise awareness of the benefits of digital transformation for businesses*. Through targeted outreach campaigns, workshops, seminars, and informational materials, the agency would educate SMEs about the tangible benefits of digital transformation, such as increased efficiency, productivity, competitiveness, and market access. By fostering a culture of digital awareness and literacy, the agency would help SMEs understand the benefits of digitalisation as a strategic step for sustainable growth and resilience.
    - *Maintain an observatory of digital solutions and a database of trusted digitalisation experts*. The agency could curate and maintain an observatory of digital solutions, tools, and technologies relevant to SMEs. This repository would serve as a valuable resource for SMEs seeking guidance on selecting and implementing digital solutions tailored to their specific needs and requirements. Additionally, the agency could establish a database of trusted digitalisation experts, including consultants, service providers, and technical specialists. SMEs could then

leverage this network of experts for advisory support, technical assistance, and capacity-building initiatives, enhancing their digital capabilities and competitiveness.

- *Clearly present information on existing support programmes for the digital transformation*. As the central repository of information, the agency should provide clear and accessible information on existing support programmes and initiatives aimed at facilitating the digital transformation for SMEs. This includes details on eligibility criteria, application procedures, available funding, and support services offered under each programme.

- **Co-ordinator of the resources available in the digital ecosystem.** The agency could serve as a focal point for co-ordinating activities and fostering collaboration among various stakeholders in the digital ecosystem (see below). This entails establishing partnerships with government agencies, industry associations, academia, and the private sector to pool resources, share best practices, and leverage synergies in supporting SME digitalisation.

Develop specific programmes to support SME digital transformation

While a number of SME support programmes are readily available within the country, there is a lack of targeted efforts to enhance SME digitalisation, particularly evident in traditional sectors beyond IT. To address this, the government could consider:

- **Adopting a sectoral approach to facilitate advancement in digital maturity**. Navigating the digital landscape poses common challenges for SMEs; however, adopting a one-size-fits-all strategy proves ineffective. As seen in Chapter 3, the extensive diversity across industries and the business population in Armenia demands a tailored and flexible approach. Recognizing and addressing the unique needs and characteristics of each sector and business entity is essential for fostering successful and inclusive SME digitalisation.

  To ensure adequate and targeted support, the government could start by assessing the different needs and challenges to SME digitalisation in the different sectors (Chapter 3). Based on the insights gathered from this analysis, tailored digitalisation plans could be designed to accommodate the specific demands and opportunities within each industry. Priority sectors should be identified as a starting point, with focused efforts directed towards formulating sector-specific digital plans to drive targeted support initiatives (an example of impact-based prioritisation and sector-specific digital plans is provided in the Annex).

- **Developing enterprise digital maturity self-assessments**. The level of digital maturity can vary considerably across enterprises in a given industry, as businesses with different levels of digital readiness usually coexist. To support enterprises in their digitalisation journey, it would be useful to provide them with tools to assess their digital maturity and receive tailored recommendations for improvement. An online platform for self-assessment would enable entrepreneurs to conduct self-tests and receive personalised recommendations based on their specific needs and challenges. the effectiveness of such a tool relies on businesses' awareness of its existence, highlighting the need for robust awareness-raising efforts. In addition to the development of the platform, Armenia could consider involving consulting firms and individual advisors to provide free-of charge express diagnostic tool. A useful reference in this context is the Digital Maturity Assessment (DMA) framework developed to investigate the digital maturity level of EDIHs' beneficiaries (Box 4.5).

Box 4.5. EDIH Digital Maturity Assessment framework

A digital maturity assessment (DMA) tool is instrumental to measure the digital maturity status of an entity. In order to monitor the increase in the digital maturity of EDIH customers over time, the Joint Research Centre (JRC) developed a DMA framework that is based on an online questionnaire ready to be used by SMEs and public sector organisations (PSO) with the support of an EDIH expert.

The framework is used to investigate the base digital maturity level of every beneficiary organisation before the EDIH intervention starts, and to observe its evolution until 3 years later to understand their digital maturity's growing curve. It consists of two main modules: this first module collects general data about the EDIH customer such as contact details, address, type and size of organisation, sector of activity and more that will serve for statistical analysis; the second module is the core part of the DMA questionnaire for SMEs consisting of questions assessing the different aspects of digital maturity within an organisation, grouped under six dimensions.

Table 4.3. Six dimensions of the second module of the EDIH DMA framework for SMEs

Dimension	Description
Digital Business Strategy	The questions of this dimension intend to capture the overall status of a digitalisation strategy in the enterprise from a business perspective. They ask about the enterprise's investments in digitalisation per business areas (either executed or planned) as well as the company's readiness to embark in a digital journey that might require organisational and economic efforts not yet foreseen
Digital readiness	The digital readiness dimension provides an assessment of the current uptake of digital technologies (both mainstream and more advanced technologies) that is valid for both manufacturing and service companies.
Human-Centric Digitalisation	This dimension looks at how staff are skilled, engaged and empowered with and by digital technologies, and their working conditions improved, with a view to increase their productivity and wellbeing.
Data Management	This dimension captures how data is digitally stored, organised within the enterprise, made accessible across connected devices (computers, etc.) and exploited for business purposes, keeping an eye on ensuring sufficient data protection via cybersecurity schemes.
Automation & Intelligence	This dimension explores the level of automation and intelligence facilitated by digital means that is embedded in business processes.
Green Digitalisation	This dimension captures the capacity of an enterprise to undertake digitalisation with a long-term approach that takes responsibility and cares about the protection and sustainability of natural resources and the environment (eventually building a competitive advantage out of this).

Source: (Kalpaka, 2023[14])

The responses to the questionnaire are then scored to obtain a quantitative measure of the digital maturity level. In particular, each question is scored on a scale from 0 to 10 and each dimension is scored on a scale from 0 to 100 (with higher scores indicating higher maturity). Each Item contributes equally to a question score and each question contributes equally to Dimension score.

Source: (Kalpaka, 2023[14])

Provide financial support for the digital transformation of SMEs

Frequently, SMEs encounter significant challenges in their digitalisation journey due to limited resources available to invest in the transformation process. Armenia could leverage ongoing initiatives such as the Economic Modernisation Programme (referenced in Chapter 2) to expand financial assistance dedicated

to SME digitalisation. In order to alleviate the financial burden on businesses, a diverse array of instruments could be deployed:

- **Grants and vouchers** are key tools in facilitating SME access to digital resources. By providing direct financial assistance, grants enable businesses to invest in essential technologies and infrastructure lowering the overall associated cost. On the other hand, vouchers offer a flexible mechanism by subsidizing the cost of digital services or training, thereby making them more accessible to SMEs.
- **Loan guarantees and interest subsidies** constitute another form of facilitating SMEs' acquisition of digital tools. Embracing the "test-before-invest" principle ensures that financial support is allocated to SMEs for adopting technologies or solutions that promise increased operational efficiency and ultimately drive productivity growth. Through loan guarantees, the government can mitigate the risk for financial institutions, encouraging greater access to capital for SMEs seeking digital investments. Simultaneously, interest subsidies reduce borrowing costs, easing the financial burden and incentivizing SMEs to explore and adopt transformative technologies.
- **Cost reimbursement mechanisms for digital consulting services and trainings**, including tax incentives, play a pivotal role in supporting SME digitalisation efforts, effectively lowering the financial barriers associated with acquiring specialised expertise and skills. This support enables SMEs to access tailored guidance and training to navigate the complexities of digital transformation, optimize their use of digital tools, and capitalise on emerging technologies. Additionally, cost reimbursement mechanisms encourage SMEs to invest in continuous learning and skill development, fostering a culture of innovation and adaptability within the business ecosystem.
- **Awareness raising about existing sources of financing** is instrumental in empowering SMEs to leverage available resources for their digitalisation endeavours. Through targeted campaigns, workshops, and outreach initiatives, SMEs can gain valuable insights into the diverse array of financing options offered by governmental bodies, financial institutions, and other stakeholders. Similar initiatives can support SMEs to navigate the funding landscape and make informed decisions that align with their specific needs and goals.

OBJECTIVE 3. Foster synergies in the ecosystem to facilitate digital transformation in SMEs

Consider embracing the creation of DIH-like initiatives

Establishing a single agency to serve as a one-stop-shop for SME support, including facilitation of digitalisation endeavours, is an important first step. However, the process of setting up such an entity could prove to be time-consuming and resource intensive. In light of this, Armenia could consider adopting a decentralised approach, capitalising on the already vibrant digital ecosystem. Embracing DIH-like initiatives could provide a viable solution, allowing for the integration of various stakeholders and resources across the ecosystem to efficiently cater to the diverse needs of SMEs aiming to digitalise.

A Digital Innovation Hub (DIH) serves as a focal point for driving digital transformation, functioning as a collaborative ecosystem, bringing together various stakeholders from the public and private sectors, including consulting firms, incubators, universities, research institutions, and industry players. These entities collectively offer a wide range of services and facilities aimed at supporting SMEs in their digitalisation journey. This encompasses providing access to **test-before-invest facilities**, where SMEs can experiment with new technologies and solutions before making significant investments. Additionally, DIHs offer **skills training programmes** to equip SMEs with the necessary competencies to leverage digital tools effectively. They also provide **support in finding investment opportunities**, facilitating

access to funding sources, and fostering **ecosystem building** and networking activities to promote collaboration and knowledge exchange among stakeholders (Kalpaka, Sörvik and Tasigiorgou, 2020[15]; European Commission, 2023[16]).

Hybrid business models, combining public and private financing, are often adopted to sustain and expand DIH initiatives, ensuring their continued development and ability to deliver valuable services to businesses within predefined criteria.

Considering the robust ecosystem already in place, Armenia stands to benefit significantly from building upon its successful existing initiatives. This can be achieved through strategic utilisation of key resources:

- Leveraging technology centres, accelerators, and incubators to serve as digital educators, providing SMEs with essential knowledge and skills to navigate digital transformation effectively.
- Engaging consulting firms and individual advisors as digital guides, offering personalised guidance and expertise tailored to the unique needs and challenges faced by SMEs in their digitalisation endeavours.
- Partnering with local high-tech companies to serve as digital suppliers, facilitating access to cutting-edge technologies and solutions essential for SMEs to enhance their digital capabilities and competitiveness.

Box 4.6. European Digital Innovation Hubs

European Digital Innovation Hubs (EDIHs) help businesses as well as public sector organisations respond to digital challenges and become more competitive. Through their regional presence, they can easily reach local companies and address them in the local language while also granting them access to the broader innovation ecosystem. As the network of digital innovation hubs is EU-wide, companies can benefit from European best practices, which fosters co-operation and knowledge transfer between all stakeholders. This unique combination of regional expertise, paired with a European network, enables well-tailored support on digital transformation with access to a community of hubs.

Digital Innovation Hub services

EDIHs receive 50% of their funding from the European Commission and 50% from the respective member state, associated country, or region, or from private sources. The hubs' services can be divided into four main categories: i) access to technical expertise and the opportunity to "test before invest" in new technology, often through the involvement of third-party companies; ii) support to identify financing and investment opportunities; iii) provision of trainings and skill development; and iv) access to the innovation ecosystem and European network to share skills, resources, and knowledge.

EDIHs have proven to be important enablers for the digital transformation of SMEs. This best practice can be replicated under the EU's Economic and Investment Plan for the EaP region, which is worth EUR 2.3 billion in grants, blending and guarantees, with a potential to mobilise up to EUR 17 billion in public and private investments (EIB, 2020[17]).

Latvia's Digital Innovation Hubs

In Latvia, two organisations - the Latvian IT Cluster and the Latvian Digital Accelerator - have been granted EDIH status. The hubs offer a comprehensive range of services aimed at empowering local companies to embrace digitalisation and enhance their competitiveness. They focus on several key areas, including:

- **Raising awareness and capacity building**. Through marketing campaigns, "kickstart" workshops, networking events, and trainings on general digital skills, the hubs aim to increase awareness among SMEs about the benefits of digitalisation.
- **Matchmaking with mentors and grant opportunities**. The hubs facilitate matchmaking between SMEs and experienced mentors, providing invaluable guidance and support throughout the digital transformation process. Additionally, small grants (EUR < 5 000) are available to enable SMEs to test new technologies and innovative solutions.
- **Support for technology adoption**. To assist SMEs in adopting digital technologies, the hubs offer grants and other financial instruments. Furthermore, dedicated skill upgrade programmes help SMEs develop the necessary expertise to leverage digital tools effectively.
- **Fostering further digital transformation:** Through initiatives such as corporate hackathons, access to industry experts, and grants for innovative technologies, the hubs encourage continuous digital innovation and transformation among SMEs.

Through their diverse range of services and partnerships, these EDIHs are committed to driving digital innovation, empowering SMEs, and contributing to the country's digital growth.

Source: (European Commission, 2023[16]; Latvia's Digital Innovation Hub, n.d.[18]; OECD/EBRD, 2023[9]; Digital Accelerator of Latvia, n.d.[19]; IT Cluster, n.d.[20])

Leveraging technology centres, accelerators and incubators as digital educators

Armenia boasts a wide range of dynamic initiatives dedicated to nurturing talent and advancing technological entrepreneurship across the country, exemplified by initiatives such as Tumo Centres, ImpactAim accelerator, and Armath laboratories (see Chapter 2). Leveraging the expertise and infrastructure of these initiatives, they can play a pivotal role in:

- Designing and implementing tailored training programmes specifically tailored to enhance the technological competencies and knowledge of employees and executives within SMEs. These programmes could be customised to address the unique needs and challenges encountered by SMEs in adopting and leveraging digital technologies effectively.
- Developing and disseminating comprehensive online educational resources geared towards bolstering digital skills among the broader population. These resources could encompass a wide range of topics, including basic digital literacy, advanced technological concepts, and practical skills.

Entities involved in these initiatives could be well-positioned to become DIH, as they often possess the basic expertise, infrastructure, and networks to serve as focal points for driving digital innovation and transformation. With their diverse range of programmes, resources, and partnerships, they can provide SMEs with essential support services, including tailored training programmes, access to digital technologies, and networking opportunities. Leveraging their existing strengths and capabilities, these entities can effectively serve as collaborative ecosystems, facilitating knowledge exchange, experimentation, and collaboration among stakeholders to drive digitalisation and innovation across various sectors of the economy.

Using consulting firms and individual advisors as digital guides

The government could play a pivotal role in facilitating SMEs' access to the expertise offered by existing consulting firms and advisors. Specifically, the government could consider implement specialised training programmes aimed at enhancing consultants' capacities to formulate and execute digital transformation strategies tailored to SMEs' needs. This initiative could also include the development of a certification program to ensure the quality of consulting services and establish a repository of accredited providers.

Leveraging local high-tech companies as digital suppliers

Finally, the analysis highlighted the limited awareness of SMEs on the availability of local and cost-effective digital solutions. Compounding this issue, a substantial proportion of high-tech firms specializing in digital tools have traditionally targeted foreign markets. To address this gap, the government could serve as a vital intermediary between SMEs and local providers of digital solutions performing a matching exercise. By fostering collaboration and incentivising local tech companies, the government could encourage the development and implementation of tailor-made digital solutions specifically designed to meet the needs of local SMEs. Additionally, the government could play a proactive role in raising awareness among SMEs regarding the availability and benefits of these local digital solutions. This could involve the preparation and dissemination of informative materials aimed at educating SMEs about the diverse range of cost-effective digital tools and services offered by local providers, empowering them to leverage digital technologies.

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Annex A. Designing sector-specific digitalisation plans: an exemplary approach

To ensure that policy interventions are relevant, targeted, and impactful, it is important to analyse and understand the distinct characteristics, challenges, and opportunities that characterise SMEs in different industries on their digitalisation journey. Chapter 2 presented an illustration of a potential sectoral assessment of Armenian SMEs, along with the study's results. Notably, the study identified specific challenges that constrain the digital transformation of SMEs in selected sectors, as well as across sectors, and assessed level of digital maturity in the covered industries.

Once the sectoral analysis is completed and the unique challenges and needs of businesses within each sector are identified, the government can proceed by i) performing an impact-based prioritisation assessment to select priority industries to target, and ii) developing sector-specific digitalisation plans, encompassing targeted support measures to effectively address the identified challenges.

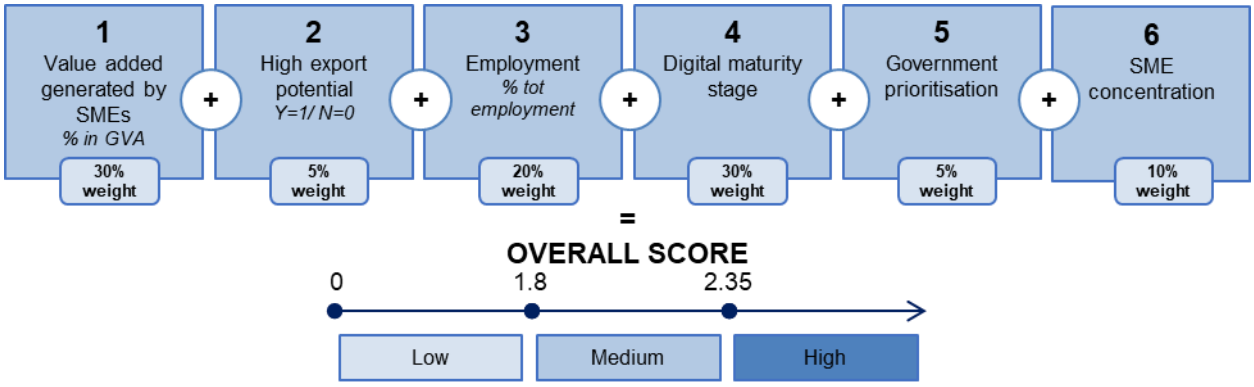
Impact-based prioritisation

In the framework of our exemplifying study, we conducted an impact-based prioritisation assessment to identify key sectors for targeted intervention and to design tailored support measures. This analysis relied on a comprehensive array of data sources, encompassing national statistics, policy documents, and firsthand insights acquired during the SMEs group consultations. The assessment considered the following elements:

- Contribution to value added generated by SMEs in a given sector, as a percentage of total value added;
- Export potential of a given sector;
- Contribution to employment of SMEs in a given sector, as percentage of total employment;
- Digital maturity stage of the industry (as identified in the first part of the study in Chapter 2);
- Government prioritisation, as deducted from the main policy documents; and
- Concentration of SMEs in the given sector.

Each of the six indicators across various sectors underwent categorisation into low, medium, and high categories, based on a predetermined scale. Each category was assigned a score of 1, 2, or 3, respectively. Subsequently, a weighted average was calculated to derive the final score, with weights reflecting the relative impact of each indicator on the final score. Finally, this computed score was used to determine priority level allocated to each sector (Figure A A.1).

Figure A A.1. Impact-based prioritisation model



Source: OECD analysis

Table A A.1 presents the outcomes of the impact-based evaluation, identifying wholesale and retail trade and constructions as the industries with highest priority.

Impact-based prioritisation model Impact-based prioritisation model Impact-based prioritisation model Impact-based prioritisation model

Table A A.1. Sectoral priority levels

	Priority	SME concentration	Digital maturity stage	Value added by SMEs % in GVA	Export potential	Employment in SMEs % in total employment	Government prioritization
Wholesale and retail trade	*High*	51.8%	Level 3	21.2%	Low	21.8%	Non-priority
Construction	*High*	3.4%	Level 2	10.2%	Low	5.8%	Non-priority
Manufacturing	*Medium*	11.9%	Level 2	11.2%	High	14.4%	Priority
Accommodation and food service activities	*Medium*	5.6%	Level 3	3.3%	High	7.2%	Non-priority
Information and communication	*Medium*	7.3%	Level 4	7.0%	High	6.7%	Priority
Professional, administrative and support service activities	*Low*	9.9%	Level 4	3.9%	High	1.9%	Priority
Real estate activities	*Low*	2.4	Level 3	2.4%	Low	7.4%	Non-priority

Source: OECD analysis.

Sector-specific digitalisation plans

As seen in Chapter 2, different sectors of economic activity demonstrate varying levels of maturity regarding the digital transformation of the SMEs. These differences encompass both technology adoption levels and the presence of practices that contribute to the digital culture within companies. While SMEs engaged in service-oriented activities such as professional and administrative support, accommodation

and food services, real estate, and IT-related activities have integrated digital technologies into their operations, SMEs in more traditional sectors like manufacturing, trade, and construction show relatively lower technology adoption rates.

To steer digital progress within each sector, comprehensive support programs should be designed and implemented. Notably, the programmes should identify specific support initiatives and instruments to be deployed by the government and other stakeholders to address the different needs of SMEs within the prioritised sectors. The ultimate objective is to guide SMEs from their present stage of maturity towards more advanced phases. The roadmaps must outline priorities in terms of technologies and practices that should be promoted considering the current stage of digital maturity in the sector. Apart from defining tailored support initiatives and instruments, the programs should also outline timelines, responsible entities, and anticipated outcomes. Based on the results of the current study, (Table A A.2) outlines recommended technologies for adoption and practices for promotion to propel the digitalization efforts within each of the assessed sectors.

Table A A.2. Digitalisation plans by sector

Sector	Advancement	Prioritized technologies	Practices to be promoted
Manufacturing	Level 3 → Level 4	• Widespread adoption of CRM and SCM systems • Promote the utilisation of cloud-based services • Apply data analytics software	• Increase the motivation of executives to invest in digital initiatives • Promote the practices of engaging external expertise and outsourcing employee training for digital skills • Strengthen data management and security practices • Foster data-driven decision making, especially in sales and strategic governance
Construction	Level 2 → Level 3	• Introduction of ERP software solutions, specifically to streamline HR and project management process • Adopting CRM and SCM systems	• Increase the awareness about digital solutions and their benefits • Incentivise investments in digitalisation efforts • Focus on enhancing digital skills of the workforce
Wholesale and retail trade	Level 2 → Level 3	• Widespread adoption of CRM systems to streamline sales and marketing processes • Promote HRM and other ERP solutions • Increase the utilisation of cloud-based services	• Increase the awareness about digital solutions and their benefits • Engage workforce in digital skill development training • Promote data driven decision making, especially in sales and marketing
Professional, administrative and support service activities	Level 4 → Level 5	• Foster the utilisation of data analytics tools • Assist efforts in finding applications for emerging technologies	• Promote data-driven decision making • Increased focus on cybersecurity practices
Accommodation and food service activities	Level 3 → Level 4	• CRM and other specialised software such as queue management and automatic reservation systems in food service providers • Widespread use of CRM system and specialised property management software for accommodation service providers	• Increase the motivation of executives to invest in digital initiatives • Promote external training practices for staff • Foster data-driven decision making

Sector	Advancement	Prioritized technologies	Practices to be promoted
		• Apply data analytics software	
Information and communication	Level 4 → Level 5	• Promote the adoption of big data analytics tools • Foster the introduction of emerging technologies into day-to-day operations	• Promote data-driven decision making • Increased focus on cybersecurity practices
Real estate activities	Level 3 → Level 4	• Widespread adoption of CRM systems across the sector • Promote the utilisation of HRM and other resource planning software • Increase the utilisation of cloud-based services • Apply data analytics solutions	• Increase the motivation of executives to invest in digital initiatives • Promote external training practices for staff

Source: OECD analysis.

Annex B. Armstat ICT survey

Eurostat ICT Usage in Enterprises database and Armstat's study

The *ICT Usage in Enterprises* database by Eurostat is a collection of comparable data on the use of ICT and e-commerce in enterprises. Through a yearly survey based on standardized Eurostat model questionnaires, it gathers information on the usage of ICT by enterprises across EU member states and other countries participating in the Eurostat program.[1]

Over 2021, Armstat, with the support of the World Bank, the EU, and the "Ecogeneration" environmental socio-economic development NGO,[2] carried out a survey conducted using Eurostat's 2021 methodology and a questionnaire developed on Eurostat's model.

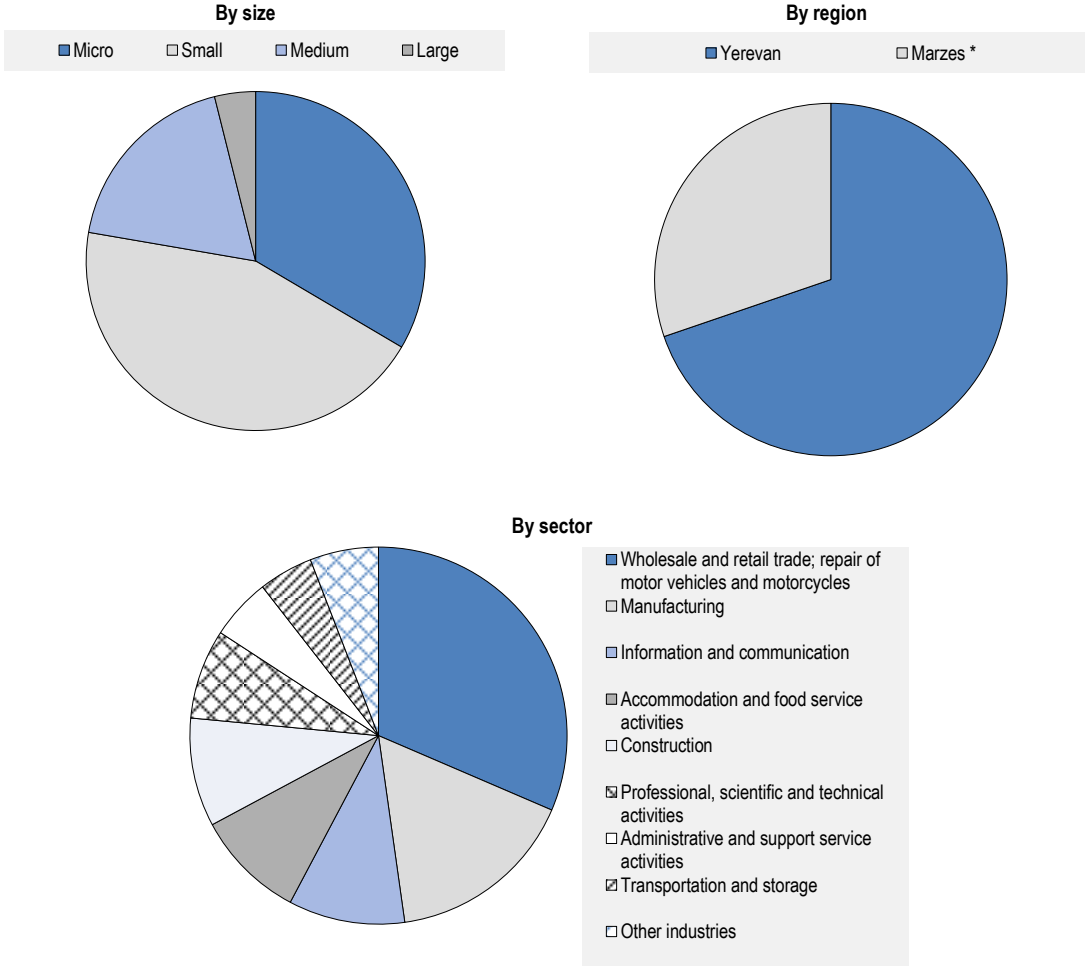
The data collection was implemented in two phases: a first pilot phase involving 100 enterprises located in the capital city, followed by a second phase encompassing 1300 enterprises located in Yerevan and 600 dispersed across 10 cities in the regions. A stratified random sampling approach was employed to ensure the survey's representativeness. This method accounted for territorial coverage, type of economic activities, and enterprise size classes based on average annual number of employees (very small, small, medium, large).

Sample of surveyed enterprises

Of the total 1974 enterprises that completed the questionnaire, 1377 were located in Yerevan and 597 outside the capital city. It is noteworthy that, unlike Eurostat's standard survey, the Armenian sample encompassed microenterprises with less than 10 employees.

SMEs constitute the majority of the sample, comprising 96% of the interviewed businesses, with small enterprises representing 44% of the total. Among the surveyed enterprises, only 30% are located in the regions, with the rest of the enterprises operating in Yerevan. Finally, the wholesale and retail trade sector represents 31% of the sample, followed by the manufacturing and information and communication sectors, which account for 16% and 10% respectively. Together, these industries form the most represented business sectors, comprising more than half of the sample (Figure A B.1).

Figure A B.1. Sample distribution



Note: Other industries include electricity, gas, steam, and air conditioning supply; water supply, sewerage, waste management, and remediation activities; real estate activities; and other service activities.
Source: (ARMSTAT, 2023[1])

Armenian businesses adoption of digital technologies

Technology uptake significantly varies across industries

As emerged from the WB study cited in Chapter 3 (World Bank, 2020[2]), Armstat's survey confirms that different sectors of economic activity exhibit varying levels of technology adoption rates (Figure A B.2). Notably, while basic technologies exhibit high adoption rates, there are significant disparities among sectors. Conversely, the adoption rate of more advanced digital tools is lower and shows less variation.

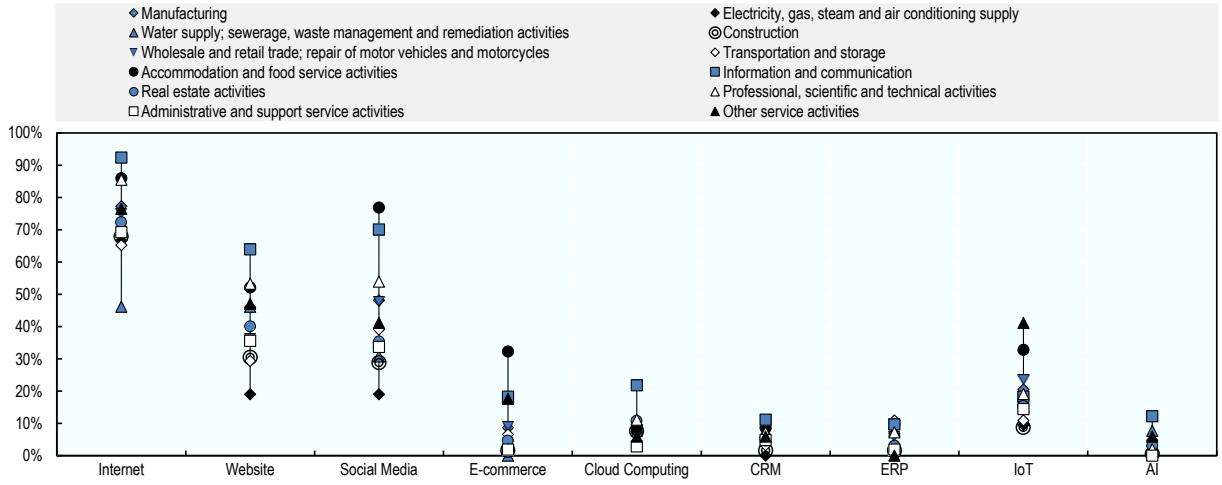
Seventy-seven percent of Armenian enterprises provide Internet access to their staff for business purposes, a proportion comparable to that of businesses in Latvia (Eurostat, 2023[3]; ARMSTAT, 2023[1]). However, certain sectors, such as information and communication, accommodation and food services activities, and professional, scientific, and technical activities, prioritise Internet provision, while others, such as water activities and transportation and storage, lag behind. Despite this widespread Internet provision, the adoption of advanced digital technologies remains limited. Only 9% of enterprises reported e-commerce activity in 2023, with a mere 2% utilizing AI. Similarly, the employment of software aimed at

enhancing efficiency and reducing operational costs, such as CRM and ERP, is not widely embraced across all sectors.

The information and communication sector stands at the forefront in terms of integrating digital solutions into day-to-day operations, adopting advanced tools and software such as CRM, ERP, and AI. Similarly, the accommodation and food service activities sector demonstrates strong adoption of basic technologies like websites and social media platforms (52% and 77% respectively), especially for digital marketing purposes.

Figure A B.2. Adoption rate of selected technologies, by sector

Percentage of enterprises using the technology, 2023



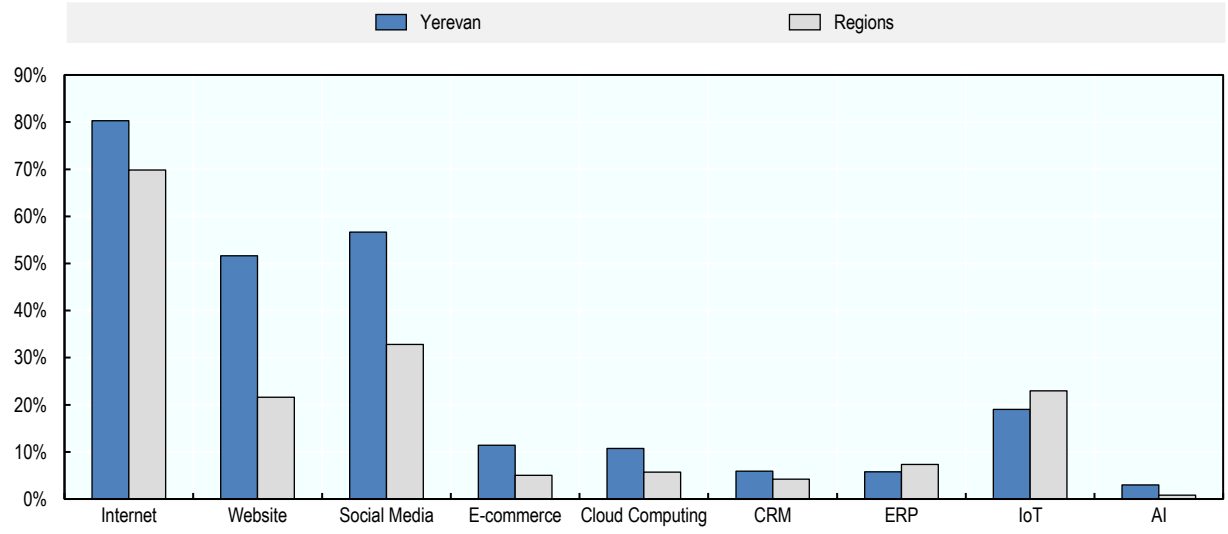
Source: (ARMSTAT, 2023[1])

Geographical location impacts substantially on adoption of digital tools

Businesses located in Yerevan tend to integrate digital tools in their operations more extensively respect to enterprises in the regions (Figure A B.3). This can be partly attributed to the concentration of businesses operating in more technologically advanced sectors, such as information and communication, administrative support services, and real estate, are primarily concentrated int the capital (ARMSTAT, 2022[4]). Interestingly, the adoption of IoT technology appears to be more widespread among businesses located in the regions as opposed to those operating in the capital.

Figure A B.3. Adoption rate of selected technologies, by region

Percentage of enterprises using the technology, 2023



Source: (ARMSTAT, 2023[1])

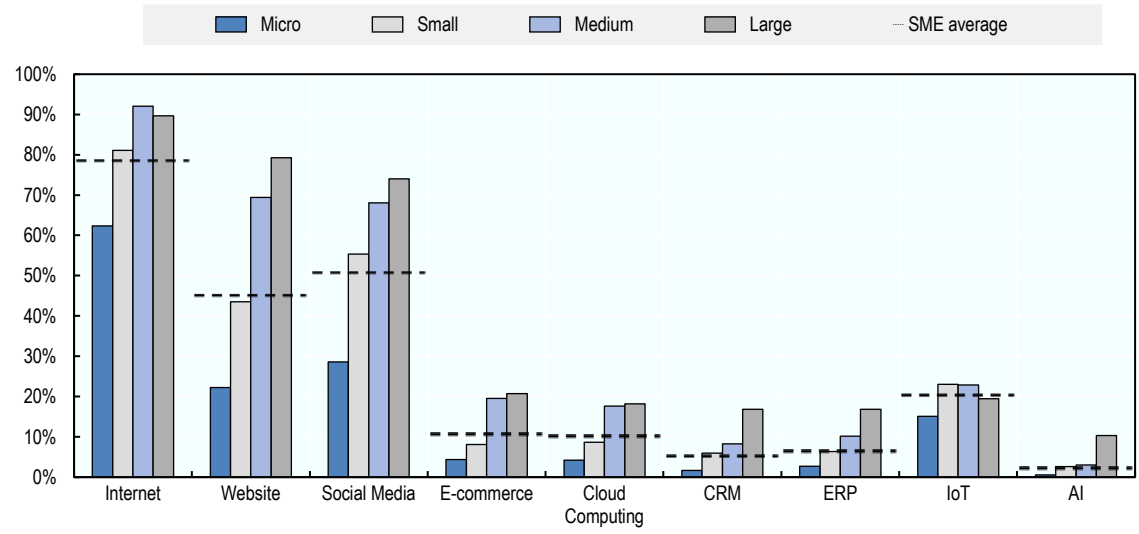
Technology adoption rates differ significantly between SMEs and large firms

In general, large firms exhibit a higher propensity for adopting digital technologies and more complex technological solutions. Conversely, SMEs, particularly micro-enterprises, predominantly rely on basic services such as providing internet access to employees and utilizing social media platforms. Whilst internet provision reaches 62% among Armenian SMEs, all other technology adoption rates remain below 30%.

Interestingly, medium-sized enterprises in Armenia come close to matching the adoption rates of large businesses, and in some instances, even outperform them. For instance, medium enterprises excel over large firms in areas such as providing internet access to employees and implementing IoT solutions.

Figure A B.4. Adoption rate of selected technologies, by enterprise size

Percentage of enterprises using the technology, 2023



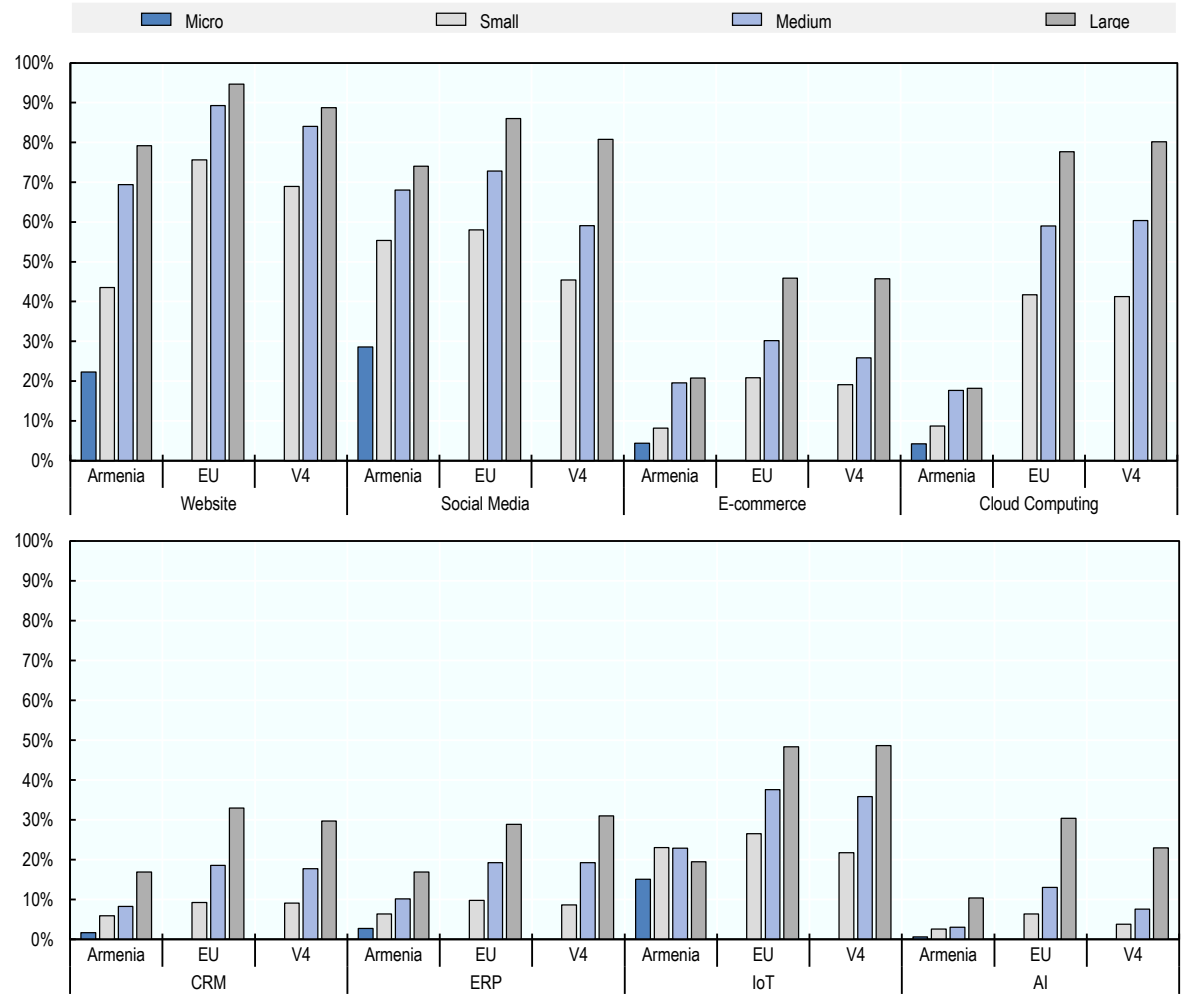
Source: (ARMSTAT, 2023[1])

In general, SMEs in Armenia demonstrate a delayed adoption of digital technologies in comparison to counterparts in the EU and Visegrád Group countries (Figure A B.4). This trend holds true across all selected indicators, with the exception of social media usage, which is notably high among Armenian SMEs.

However, as technology advances, particularly in the realms of IoT and AI, the levels of adoption in Armenia converge with those observed in V4 countries. Notably, although overall adoption rates remain lower, the disparity between SMEs and large firms in Armenia is narrower compared to the EU and V4 countries.

Figure A B.5. Adoption rate of selected technologies among Armenian, EU and V4 businesses, by enterprise size

Percentage of enterprises using the technology, 2023 or latest available



Note: 2021 data for IoT uptake in EU and V4 countries.
Source: (ARMSTAT, 2023[1]), Eurostat for EU and V4 countries.

References

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ARMSTAT (2022), *Marzes of the Republic of Armenia and Yerevan city in figures*, https://armstat.am/en/?nid=82&id=2526. [4]

Eurostat (2023), *ICT Usage in enterprises*, https://ec.europa.eu/eurostat/databrowser/view/isoc_ci_it_es__custom_11056852/default/table?lang=en. [3]

World Bank (2020), *ICT Usage in Households, by Individuals and in SMEs in Armenia*. [2]

Notes

[1] Countries covered by the ICT Usage in Enterprises are: Belgium, Bulgaria, Czechia, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, Norway, Bosnia and Herzegovina, Montenegro, Serbia, Türkiye.

[2] The "Ecogeneration" environmental, socio-economic development NGO is an organisation funded by the EU in the framework of the “Economic Governance, Business Environment, & Justice Reform” project.

Advancing the Digital Transformation of Armenian Businesses

Armenia's ICT sector has experienced remarkable growth, expanding by 20% in 2022, underscoring the country's commitment to digital transformation as a policy priority. Despite these efforts and trends, SMEs continues to face significant obstacles in their digital transformation, including lack of awareness, low digital skills levels, and financial constraints. This reports aims to support the Armenian government in addressing these challenges and fostering business digitalisation.

Building on previous OECD work on digitalisation policies and insights from the 2024 edition of the SME Policy Index for Eastern Partner countries, this publication offers a comprehensive overview of Armenia's institutional framework and policy initiatives for SME digitalisation. Through data-driven analysis, it examines the challenges hindering the digital transformation of Armenian businesses and provides insights to unlock their potential. This report serves as a guide, offering detailed recommendations aimed at improving framework conditions for SME digitalisation, building a structured system for SME digitalisation support, and fostering synergies in the ecosystem to facilitate digital transformation.

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