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.

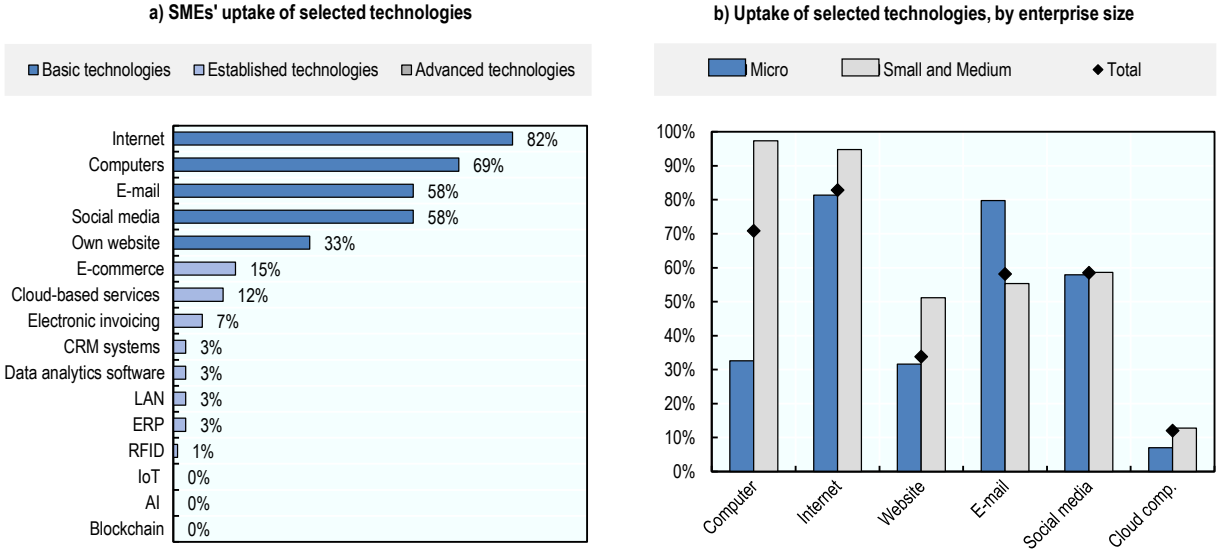
Social media presence is observed among 58.5% of all SMEs, primarily through platforms such as Facebook, LinkedIn, and other similar networks. Conversely, 43% of these enterprises maintain a presence on multimedia content sharing platforms (Instagram, YouTube, etc.). Companies operating within the services 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.

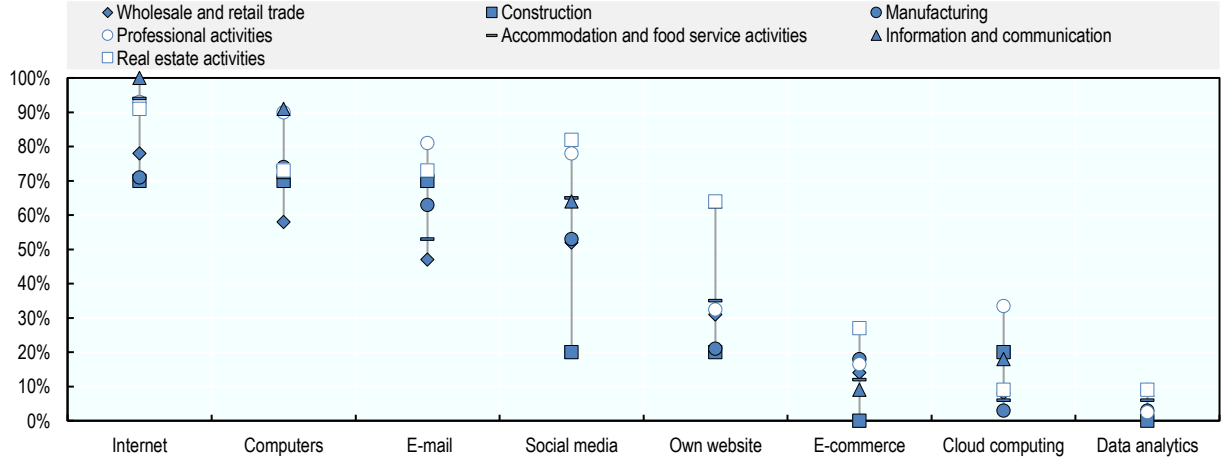
In both micro and small to medium-sized companies in Armenia, the familiarity and adoption of basic technologies, such as computers and e-mail addresses, is higher in comparison to more advanced solutions, such as specialised software for resource and operation management. Hence, a large untapped potential 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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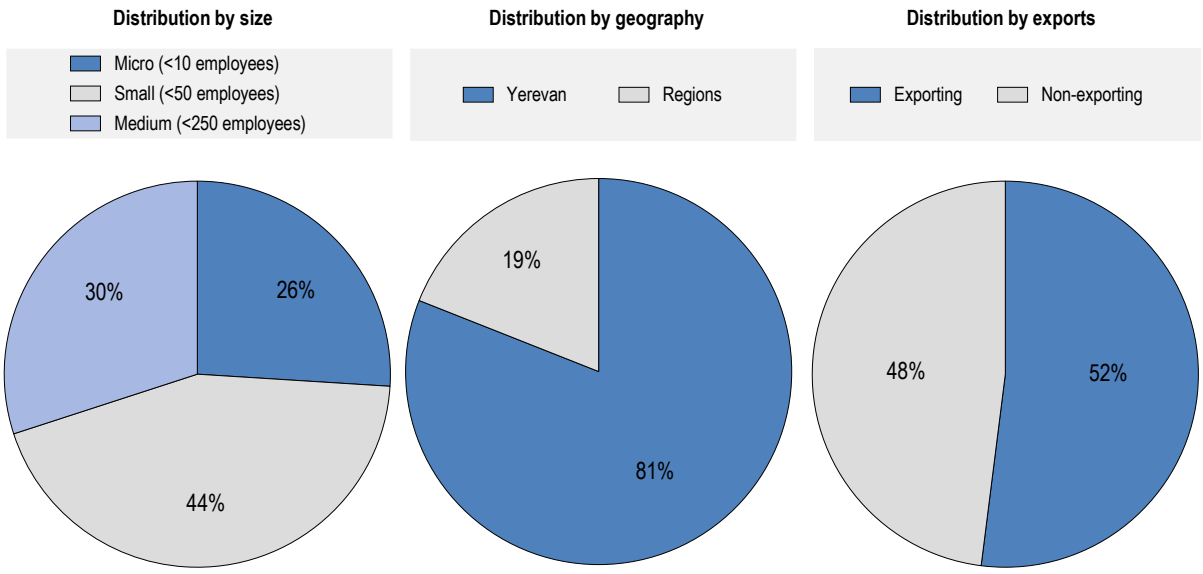
The study enables i) identification of specific challenges that constrain the digital transformation of SMEs in selected sectors as well as across sectors, ii) assessment of the level of digital maturity in the covered industries, and iii) identification of sector-specific digitalisation plans based on an impact-based prioritisation assessment.

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.

References

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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]).