Policy Insights

Beyond COVID-19
Advancing Digital Business Transformation in the Eastern Partner Countries

OECD

EU4Business

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Foreword

Digital technologies have spread rapidly in recent years and found new applications in many dimensions of our societies, whether in health, education, communications, industry, or government. The COVID-19 pandemic has further accelerated these trends and new digital solutions have helped households, firms and the public sector to better cope with lockdowns and other restrictions to movement and physical contact, such as the ability to work remotely for extended periods. Nevertheless, digitalisation comes with its own specific set of challenges, such as widening inequalities caused by digital divides, and it has raised a number of new concerns, for example with regards to issues such as digital security, privacy and consumer protection, as well as fair competition in online marketplaces.

In the process of digital adoption, small and medium sized enterprises (SMEs) face a clear opportunity to introduce fundamental changes to the way they do business, experiment with new technologies and ultimately increase productivity. The limited size of SMEs, however, can act as a barrier to adoption due to a widespread lack of financial resources and human capabilities to sustain the digital transformation. As such, policy makers can play an important role to create the right environment for SMEs to start their digital journeys, both by working on the main drivers of the digital economy, as well as by designing dedicated tools to help SMEs overcome size-related barriers to their digital transformation.

To complement the analysis presented in this report and to stimulate regional policy dialogue and facilitate the exchange of international best practices, the OECD organised three thematic policy seminars in June, September and October 2021, with the participation of representatives of Eastern Partner countries and international practitioners with established expertise in the field of public policies to accelerate the digitalisation of businesses.

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Executive summary

The adoption of digital technologies by businesses in various industries is a phenomenon that has characterised economies all around the globe since well before the COVID-19 pandemic, and the challenges and benefits of the digital transformation have been widely debated for years. While digital technologies represent an opportunity to increase productivity, lower prices and provide better quality goods and services, their adoption and integration into business processes require firms to undergo a deep transformation, bringing major cultural changes.

The digital transition can be particularly challenging for small and medium-sized enterprises (SMEs), as they are often unaware of the benefits digitalisation can bring and their resources, in terms of both financial means and human capital, are usually limited compared to larger firms. Yet the potential impact of increased digitalisation for SMEs is evident, as digital tools can help overcome some of the intrinsic challenges that SMEs face. In fact, digitalisation can offer SMEs easier access to strategic resources, help them reach a wider customer base, integrate more easily in global markets, allow them to achieve scale without mass, and enable them to capitalise on network effects.

COVID-19 pushed many SMEs online for the first time and started their digital transformation journey, for instance by opening online sales channels, investing in digital marketing or reorganising internal processes to minimise disruptions to operations. Some of these changes are going to be irreversible and will shape the direction of recovery from the pandemic in terms of investments made, relationships along value chains, and skills needed to make the digital transformation possible.

Despite the clear benefits arising from digitalisation, however, **SMEs lag behind larger firms in technology adoptio**n, which may widen the existing productivity gaps. To compound this, Eastern Partner countries appear to be lagging behind OECD economies in their digitalisation: businesses of all size classes show systematically lower rates of technology adoption compared to their peers in OECD economies.

Policies supporting the digital transformation of SMEs should embrace both the process of technology adoption with the need to foster a digital culture within the firm. There are three main pillars on which policy makers should dedicate their attention, which are to i) improve the framework conditions for the digital economy, ii) raise the skills level of the population to achieve a successful digital transformation of companies and society, and iii) implement specific policy instruments to support SME digitalisation.

In terms of framework conditions, **ensuring internet connectivity is one of the first steps towards a successful digital transformation**. However, broadband uptake varies considerably among EaP countries, remains below OECD levels, and shows disparities between urban and rural areas and between SMEs and large firms. In line with the *OECD Recommendation on Broadband Connectivity*, EaP countries should accelerate the deployment of high-speed broadband at affordable prices and bridge connectivity gaps by boosting competition and private investment.

Similarly, the growth of e-commerce in EaP countries has been fast, but remains at an early stage of development. **Important gaps in legislative frameworks exist with regards to e-commerce platform**

regulation, parcel delivery, consumer protection, and integration with wider European e-commerce markets is limited. Moreover, the current legislative frameworks for e-signature are not aligned with international standards; this inhibits cross-border trade operations. Finally, digital security threats can generate considerable economic and social losses and in turn erode consumers' trust. To maximise the growth potential offered by e-commerce to the region's SMEs, policy makers in the EaP could strengthen regulatory frameworks governing consumer protection and digital security, and align e-signature and trust services standards, as well as legislation on digital security and data protection, with EU standards and frameworks.

The promotion of digital skills has a pivotal role in the digital transformation. However, SMEs struggle to understand the potential of digital tools and the benefits deriving from their adoption, face difficulties in attracting and retaining skilled employees, and lack the capacity and networks to identify and access talent. In general, ICT skills in EaP countries are well below those of OECD countries. The foundations for digital skills are laid in schools but school curricula are generally not flexible enough to accommodate rapidly evolving technologies and tend to quickly become obsolete. Comprehensive digital literacy policies are still at a nascent stage in EaP countries, and a stronger emphasis on adult skills development would be essential for supporting transitions between jobs and developing a workforce ready for the digital economy. Overall, EaP governments should consider measures to equip SME managers and employees with the necessary skills to embrace the digital transformation. These include raising awareness among SME managers of the different types of trainings available and relying on local ecosystems and communities to access relevant skills and promote exchange of best practices.

National digital strategies appear to be the most suitable instruments to create sound digitalisation policies, and they are becoming increasingly common in EaP countries, although they rarely include specific actions to promote SME digitalisation. However, initiatives to support the digital transformation of SMEs may also be introduced outside the scope of all-encompassing strategic documents.

To inspire policy makers' reform efforts, the report presents a "blueprint" of policy measures to be considered by enterprise support agencies to support the digital transformation of SMEs in the EaP countries:

- An implementing agency – e.g. the national enterprise/SME support agency – with a strong mandate in the policy framework for digitalisation should act as a **"digital one-stop-shop"** for businesses wishing to advance their digital transformation, with the objective of providing information and raising awareness of the benefits of digitalisation.
- To help SMEs navigate the complexity of the digitalisation process, while bearing in mind industry-specific needs, policy makers should develop and provide **sector-specific digital plans** listing recommendations for suitable digital solutions, fundamental business capabilities needed, and available digital training.
- In order to assess their level of digital maturity and receive ad hoc recommendations, SMEs should be able to undergo a **digital self-assessment** via a self-diagnostic tool.
- To facilitate SMEs in understanding and achieving their **digital capacity building** needs, EaP countries can build a reliable network of certified consultants and advisors, as well as ensure tailored training opportunities are available.
- Policy makers should provide **financial support for digitalisation** through a palette of instruments such as grants, vouchers, loans, and indirect financial incentives.
- Finally, policy makers should nurture and co-ordinate the **ecosystem for digital transformation**, comprising all agents and stakeholders supporting SME development (e.g. incubators, high-tech parks, digital innovation hubs, universities) to maximise the impact of the existing structures.

Table 1. Summary of recommendations: way forward

Policy area	Strategic direction	Way Forward
Framework conditions for the digital economy	Strengthening the connectivity and physical infrastructure	• Boost competition and private investment • Foster demand for quality broadband • Explore options to expand the roaming agreements
	Ensuring competitive market conditions and clear regulations for digitalisation	• Ensure that NRAs are established and comply with EU standards • Strengthen regulatory frameworks governing consumer protection • Establish consolidated central distribution networks • Improve compliance with electronic payments • Align e-signature and trust services standards with EU standards • Strengthen policy frameworks for digital security • Harmonize legislation on digital security and data protection at the regional level and align it with the EU's NIS and GDPR • Step up multi-stakeholder cooperation initiatives
Skills for the digital economy	Empowering the population with the relevant skills for the digital world	• Strengthen policy frameworks to promote digital skills • Conduct regular digital skills needs assessments • Use digital technologies to bridge educational and geographical divides • Encourage public-private partnerships to broaden access to digital devices in schools • Involve teachers when elaborating strategies and frameworks for digital skills in educational curricula
	Equipping SMEs with relevant skills to navigate the digital solutions to improve their business	• Raise awareness among SME managers of the different types of trainings available • Rely on local ecosystems and communities • Measure the impact of skills development programmes/ trainings
Blueprint for accelerating SME digital transformation	Embracing the role of digital one-stop-shops	• Perform studies on the state of digital maturity of different sectors • Raise awareness of the benefits of digitalisation • Maintain an observatory of digital solutions and a database of trusted digitalisation experts • Clearly present information on existing support programmes for digitalisation • Co-ordinate resources and refer to other actors in the ecosystem for digital transformation
	Providing sector-specific digital plans to guide SMEs in their digitalisation process	• Provide step-by-step, sector-specific recommendations on available digital solutions • Provide a list of fundamental capabilities needed by the SME • Provide a list of recommended digital trainings
	Providing SMEs with a digital self-assessment tool	• Provide a platform for a digital self-diagnostic tool aimed at evaluating how digitally mature a business is • Offer enterprise-specific recommendations based on the outcome of the self-assessment
	Supporting in the identification of digital skills required and ensuring the supply of capacity building	• Facilitate access to a reliable network of certified consultants and advisors able to guide SMEs through their digital transformation strategy • Ensure that tailored training opportunities for digitalisation are available to SMEs
	Ensuring financial support for digitalisation	• Ensure SMEs have access to grants for the purchase of digital products and services • Provide vouchers to incentivise SME managers to reach out for support in terms of mentoring, counselling and training • Facilitate SMEs access to loans by offering guarantees and counter-guarantees • Stimulate private investment through indirect financial incentives for digitalisation
	Nurturing the existent ecosystem for the digital transformation	• Optimise resources by co-ordinating the network of "innovation agents" • Maximise the impact of the existing structures and direct SMEs towards "innovation agents" that offer relevant services of proven quality

1 Understanding the digital transformation in Eastern Partner countries

This chapter introduces the concept of digital transformation by defining its scope in light of the current wave of adoption of digital technologies. It also describes the relationship between digitalisation and productivity and the implications for policy, highlighting the importance of a digital culture to complement technology adoption. Finally, it proposes a framework for supporting the digital transformation of SMEs in Eastern Partner countries.

Introduction

This report aims to help policy makers in the Eastern Partner countries to create the right environment for SMEs to start their digital journeys, both by working on the main drivers of the digital economy, as well as by designing dedicated tools to help SMEs overcome their size-related barriers impeding their digital transformation. The report is structured as follows: Chapter 1 introduces a definition of digital transformation and its relevance for Eastern Partner countries. Chapter 2 discusses important elements of the framework conditions for the digital economy, touching upon the current state of broadband connectivity and selected aspects of the regulatory environment, such as the legal and regulatory framework for e-commerce, e-signatures and digital security. Chapter 3 sheds light on the human capital dimension of the digital economy, and assesses the skills needed by SMEs to undergo a successful digital transformation. Chapter 4 concludes the report and presents a "blueprint" for EaP countries to design the building blocks of policy to respond to SME needs and facilitate their digital transformation.

This chapter, in particular, provides an overview of the main drivers and trends of the digital transformation. It starts by exploring the concept of digital transformation, bringing clarity on how the process is articulated, as well as on the use of digital data and the main digital tools and practices that characterise the so-called fourth industrial revolution. The focus then shifts to the relationship between digitalisation and productivity, with a reflection on how beneficial digitalisation can be for SMEs and the policy implications of unequal access to digital technologies. After presenting a two-fold framework for supporting the digital transformation of SMEs in the EaP region, the chapter concludes with an analysis of the impact of the pandemic on SMEs and the impulse it provided to the adoption of digital technologies.

Towards a definition of digital transformation

From digitisation to digital transformation

Digitisation, digitalisation and digital transformation are distinct conceptual terms that are often used interchangeably and applied inconsistently. However, it is important to bring clarity to the terminology used to describe the expanding role of digital technologies in order to understand their impact on households and firms, and to carve out space for appropriate policy interventions. Research into the digital transformation of businesses, in particular, has revealed three main stages, which reflect the degree to which digital tools have an impact on a firm's business model (Verhoef, 2021[1]):

- *Digitisation* is the process of converting analogue information (e.g. text or film reel) into a digital format that computers can process (e.g. PDF or MP4). In a broader understanding, it can refer to the integration of digital tools to carry out existing tasks. At firm level, digitisation is usually confined to an internal and external documentation process without fundamental changes to value creation activities (e.g. use of digital forms in ordering processes, or digital applications for internal financial documents).
- *Digitalisation* has a broader meaning and refers to "the use of digital technologies, data and interconnections that result in new activities or changes to existing ones" (OECD, 2019[2]). The rapid increases in computing power, capacity to store data and speed of communication have created the conditions for the emergence of a vast and diverse ecosystem of technologies. Some have been in use for at least a decade (e.g. front and back-office management software, social media), while others are still at earlier stages of diffusion (e.g. artificial intelligence, blockchain, internet of things). In the business sector, digitalisation refers to the adoption of digital technologies

to alter existing business processes, such as the creation of new communication channels enabling customers to connect with firms (e.g. customer reviews).

- *Digital transformation* goes one step further and refers to the economic and societal effects of digitisation and digitalisation. Digital technologies can transform the way citizens communicate, work and organise their lives, how firms produce and sell goods and services, and how governments design and deliver public services. The widespread use of digital technologies offers opportunities to rethink virtually every aspect of our societies, from health to education, from finance to trade, and from competition to innovation, thus leading to the digital transformation of public and private lives as the outcome of digitisation and digitalisation. In the business sector, the digital transformation has profound organisational implications and requires changes to core business models and value creation processes. Firms can use technology to seize new business opportunities, e.g. by entering new markets, creating new value through enhanced customer experience, or by making production more efficient with digital tools (e.g. robotics or data analysis to optimize inventory management).

While all three phases described above are needed to understand the level of digital maturity of a business, this report will focus on the drivers, features and implications of the latter two.

Data as a source of value

Unlike analogue data, digital data can be used – stored, processed, tracked, duplicated – without degradation, at very high speed, and at negligible marginal cost. These features of digital data are one of the enablers of digital technologies and a by-product of their use. Driven by the omnipresence of mobile consumer technologies and the increased time spent online, over the last ten years the world has experienced an unprecedented growth in the volume of data created, copied and consumed.[1]

However, data on their own do not necessarily have intrinsic value. They become valuable only to the extent that they are used to improve social and economic processes, products, and organisational methods. Such data-driven innovation is at the core of many new business models that transform markets and sectors, ranging from agriculture to transport to finance, and improvements in the design of government policies (OECD, 2019[3]). The increasing role of data as a valuable commodity is therefore becoming a central aspect of the digital transformation.

Much of the value of digital data stems from its non-rival[2] and reusable nature, which drives economies of scale and scope. The same lines of code underpinning software products can be replicated and installed on millions of digital devices at near zero cost for the developer. The same movie can be streamed to countless viewers at the same time, spreading the cost of production across a wide user base without any loss of quality. Data collected by one firm and organised in databases can be reused for different purposes, either by the same firm or by other firms provided they can access the database. The initial investment in data collection is thus a sunk cost that can be amortised across many different uses and users, spur

[1] The total amount of data created, captured, copied, and consumed globally grew from 2 zettabytes in 2010 to 64.2 zettabytes in 2020 (CAGR=41%), and is forecast to increase rapidly to more than 180 zettabytes in 2025 (1ZB = 10^{12}GB). In 2020, the growth was higher than previously expected due to the COVID-19 pandemic, as more people worked and learned from home and used home entertainment options more often. In line with the strong growth of the data volume, the installed base of storage capacity is forecast to increase, growing at a compound annual growth rate of 19.2 percent over the period from 2020 to 2025. (Statista, 2021[130])

[2] A non-rival good is a good that can be consumed or possessed by multiple users without affecting the supply of the good – and without reducing the consumption (or consumption opportunities) of other users (e.g., a television broadcast – one viewer tuning in does not reduce the ability of others to watch, as well). The alternative is a rival good, the consumption of which by one consumer reduces its availability to others (e.g., a piece of fruit, which can only be eaten by one consumer).

innovation and enable the production of new data services that the original data collector had not anticipated (Martens, 2020[4]).

Data analysis is essential to extract insights from datasets and to create value. Especially with the advent of "big data" (large volumes of data, available in a variety of formats and at very high speeds), it is becoming increasingly important for public and private organisations to build the capabilities to derive information from data, generate knowledge and support decision making. This means both setting up the technology needed for data collection, storage and protection, as well as the human capacity for data management and analytics through software, AI, and visualisation tools.

The digital transformation in the business sector and the fourth industrial revolution

Digital transformation is a process that encompasses technological as much as cultural and societal aspects. It builds on the possibilities offered by technical progress to redefine modes of interaction, the way organisations work, and the ways people build trust, store information, create value and carry out transactions. Ultimately, it provides opportunities for individuals, businesses and governments to innovate. As such, it is multidisciplinary by nature and cannot be reduced to any of its components or fields of application.

With regards to the business sector, the definition of digital transformation provided above can be further nuanced as "a change in how a firm employs digital technologies to develop a new digital business model that helps to create and appropriate more value for the firm" (Verhoef, 2021[1]). Successful digital transformations require not only a technological upgrade but also a strategic vision to reimagine the firm's business model, the managerial competence to translate it into practical operational processes, and a workforce equipped with appropriate digital skills and mind-set to implement them.

Theorists of long-term technological change argue that the current wave of digital transformation is heralding the transition from the third industrial revolution to the fourth (Schwab, 2017[5]). Industrial revolutions are driven by "general purpose technologies", which have a wide scope of application across sectors, can generate long-term productivity increases and become a core part of the technological basis for the economy's structure. The dramatic increases in computing power and a simultaneous decline in related costs since the middle of the last century have enabled the emergence of a new set of digital solutions that are driving the rate and direction of technological change. In the business sector, technological change is making it possible for firms to go beyond the simple adoption of digital tools to improve existing operations and, instead, innovate to create new digital products, evolve value chains, and fundamentally transform their business models to achieve a full digital transformation.

Overview of digital tools and practices

Digital technologies can transform the way firms produce goods and services, innovate, and interact with other firms, workers, consumers and governments. They can bring a wide range of benefits to a company's operations and, ultimately, promise to offer a vast potential to enhance firm productivity.

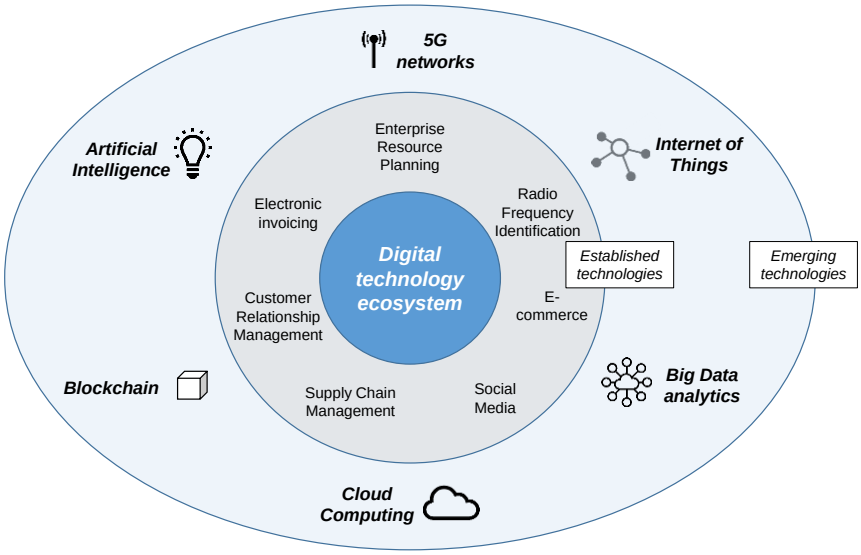
Digital tools and practices allow companies to improve product design, optimise production processes, reach new customers and facilitate relations with suppliers along the value chain. They also enable more flexible business models through lower expenditure on capital assets (e.g. cloud computing offers on-demand access to data storage and processing capacity) and labour (artificial intelligence allows companies to automate increasingly complex tasks). In the case of online platforms, such as Google, Amazon or Kickstarter, digital technologies make it possible for firms to perform key business functions (e.g. marketing, sales, financing) while benefitting from substantial positive network effects and access to global markets (OECD, 2021[6]).

The ecosystem of digital technologies (Figure 1.1) is evolving fast. While some can be considered as "established" tools with proven applications and known value for businesses, others can be considered as

"emerging technologies" driving the current wave of digital transformation and underpinning the fourth industrial revolution.

Figure 1.1. The ecosystem of digital technologies

Established and emerging digital technologies



Source: adapted from (OECD, 2019[2]) and (OECD, 2021[6])

Established technologies

- **Enterprise resource planning (ERP)** systems are software-based tools for managing and integrating internal and external information flows, from material and human resources to finance, accounting and sales. ERP automates planning, inventory, purchasing and other business functions, thus enhancing the efficiency of back-office tasks and strategic planning.
- **Radio Frequency Identification (RFID)** technologies allow near-field communication and are used for product identification, monitoring and control of industrial production, supply chain and inventory tracing, or for payment applications (e.g. highway tolls, passenger transport). Applications of RFID tools help enhance efficiency in production and logistics.
- **Customer Relationship Management (CRM) and Supply-Chain Management (SCM)** software are used to manage a company's interactions with its customers, clients, employees and suppliers. CRM and SCM enhance front-office integration and supply chain operations, optimizing inventory management and shortening production times.
- **Social Media** refers to Internet-based applications for connecting, creating and exchanging content on line with customers, suppliers or partners, or within the enterprise. Businesses' use of social media favours external interactions, including developing the enterprises' image and marketing, responding to customers' opinions, reviews and questions, and recruiting employees.
- **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 (i.e. webpages, extranet or electronic data interchange). E-commerce allows firms to dramatically increase customer and supplier base, and reach markets beyond traditional physical boundaries.
- **Electronic invoicing** is a form of electronic billing in which transaction documents such as purchase orders and payment terms are shared digitally among relevant parties in a standardised

format. Electronic invoices support compliance-by-design approaches with tax rules and help reinforce the integration of accounting systems, ultimately alleviating administrative burden on companies.

Emerging technologies

- **5G connectivity** is the next generation of wireless technology, providing up to 200 times faster connectivity than the current 4G networks and expected to spur a wave of software and hardware innovations across all sectors. 5G networks will increase capacity for more, more reliable and faster machine-to-machine communication and are conceived for a world in which tens of billions of communication devices, machines and objects are connected to the Internet.
- **Internet of Things (IoT)** comprises devices whose state can be altered via the Internet, with or without the active involvement of individuals. It includes objects and sensors that gather data and exchange these with one another and with humans, from smart home devices, wearables and health monitors, to advanced applications like autonomous vehicles. The number of connected devices in and around people's homes in OECD countries is expected to increase from 1 billion in 2016 to 14 billion by 2022 (OECD, 2016[7])
- **Big data analytics** refers to the use of techniques and tools for the analysis of large volumes of data that are generated by the increasing digitisation of content, the greater monitoring of human activities and the spread of the IoT (OECD, 2016[7]). It can be used to infer relationships, establish dependencies, and perform predictions of outcomes and behaviours. For example, retailers routinely use big data analytics to make tailored suggestions to customers based on the customers' interests as revealed by their prior browsing and shopping behaviour.
- **Cloud Computing (CC)** refers to ICT services accessed over the Internet. CC offers opportunities to access online extra processing power, storage capacity, databases and software in flexible quantities that match the short-term company needs. As such, CC reduces the cost of technology upgrading by exempting firms of upfront investments in hardware, software, and regular expenses on maintenance, IT human resources and certification.
- **Artificial intelligence (AI)** is defined as the ability of machines and systems to acquire and apply knowledge and to carry out intelligent behaviour. This means performing a broad variety of cognitive tasks, e.g. sensing, processing oral language, reasoning, learning, making decisions and demonstrating an ability to move and manipulate objects accordingly. Progress in applying AI is driven by machine learning (when machines make decisions based on probability functions derived from experience) that enables new kinds of software and robots with wide applications in industry, for instance in the automation of routine task.
- **Blockchain** is a distributed ledger that is maintained and stored across a network of computers. The network regularly updates the ledger in every place it exists, so that all copies are always identical. This means that the records are visible and verifiable by everyone else in the network, and there is no need for intermediaries to serve as authenticators. As such, the technology provides "trust by design", and offers the potential to lower transaction costs by removing the need of intermediaries to conduct secure transfers of value or signing legal contracts.

Digitalisation and productivity

Productivity gains from digitalisation

The digital technologies described above promise to offer significant potential to enhance firm productivity and ultimately lift living standards. While the full impact on productivity of emerging "general purpose" technologies such as artificial intelligence has yet to materialise, a vast literature has already described

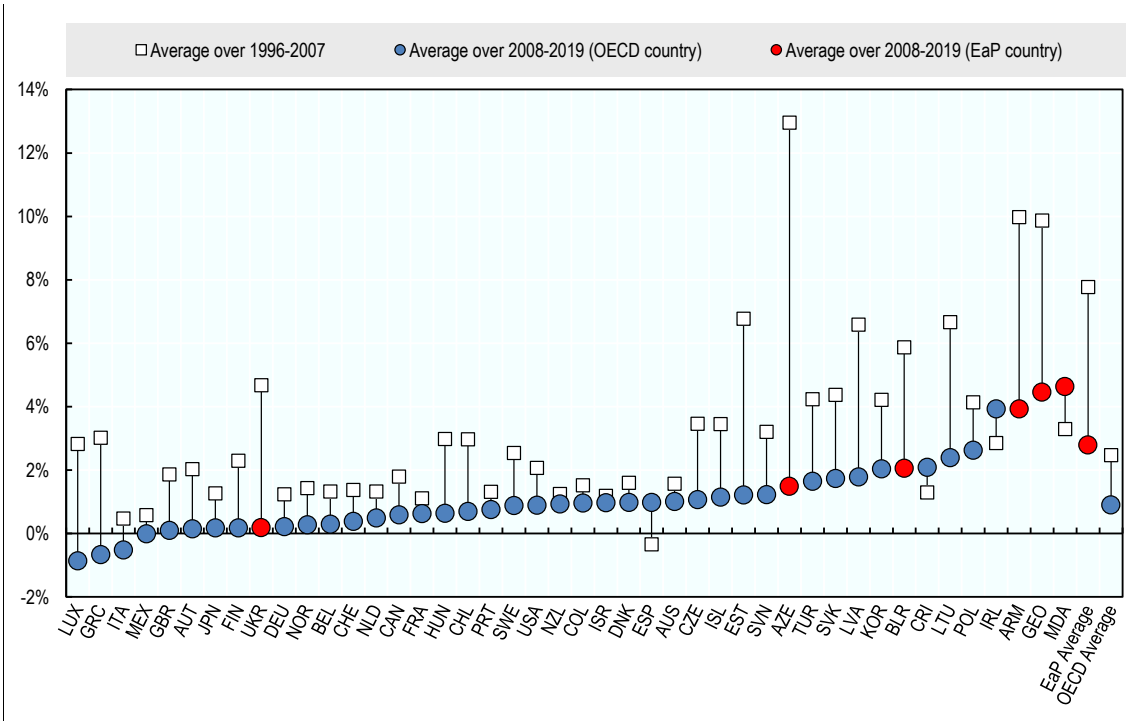
the existence of positive links between the adoption of established digital tools and firm productivity. For example, one recent estimate based on firm-level data from EU countries suggests that a 10-percentage points increase in the share of firms using cloud computing in a given industry is associated with a 2.3% increase in productivity for the average firm in the same industry after 3 years (Gal et al., 2019[8]).

The channels through which digitalisation can improve company performance are diverse. Just to highlight a few examples on the operations side, advanced data analytics can offer insights to optimise choice and negotiation with suppliers and reduce procurement costs; enterprise resource planning software allows for "just-in-time" inventory management and a reduction in inventory costs; in manufacturing, by using automation, RFID sensors, and predictive algorithms in quality control – a labour-intensive aspect of manufacturing – companies can improve quality at lower cost. On the marketing and sales side, firms can use digital solutions and gain better customers' insight by analysing their online shopping behaviour, preferences and social media, and then use that data to tailor more effective marketing messages and increase sales (BCG, 2020[9]).

Despite the rapid advances of digital technologies and the ongoing wave of digitalisation, however, aggregate productivity growth across much of the world has slowed over the past decade. A similar trend may be observed in the Eastern Partner (EaP) countries. Indeed, with the exception of Moldova, all EaP countries experienced a marked slowdown in productivity growth in the 2010s compared to the previous decade, even though the ample room for catch-up with more advanced economies favoured overall faster growth dynamics than the average OECD country (Figure 1.2).

Figure 1.2. Productivity growth slowdown across OECD and Eastern Partner countries

Labour productivity growth, annual average



Note: Productivity is measured as output per worker (constant 2011 international $ in PPP)
Source: (International Labour Organization, 2020[10])

A modern productivity paradox

Disappointing productivity gains in spite of widely available digital technologies have led many to think of it as a "modern productivity paradox", with reference to Solow's original intuition from 1987 that "you can see the computer age everywhere, but in the productivity statistics" (Brynjolfsson, Rock and Syverson, 2017[11]). Why do societal and economy-wide boosts to productivity always seem to be further down the line? Is the productivity slowdown a general feature of the economy, or does it hide differences across sectors and firms? What prevents firms from taking full advantage of the opportunities offered by digital technologies?

Recent empirical research explored the channels through which digitalisation can support productivity, and offers important insights and explanations for the productivity paradox[3].

- There are significant differences among countries and industries in the uptake of digital technologies by businesses. For example, firms in sectors such as agriculture, mining and real estate consistently display lower rates of adoption of digital technologies than firms in telecom and IT services, lowering the overall impact of digital on productivity at the aggregate level (Calvino et al., 2018[12]).
- The aggregate picture hides a widening productivity gap between "frontier" and "laggard" firms. While a small share of highly productive firms experience strong productivity growth, for a majority of businesses productivity growth is stagnating, and this is especially true in digital-intensive sectors. Digitalisation is likely to have contributed to this trend, since the most productive firms are also more likely to adopt and enjoy the benefits of new technologies (Sorbe et al., 2019[13]).
- Digital technologies are characterised by strong complementarities among i) technologies, ii) firms' capabilities and assets (e.g. technical and managerial skills, financing capacity), and iii) policies that promote efficient reallocation of resources within and across industries. Shortfalls or implementation lags in these complementary factors can slow down the diffusion of digital technologies and delay the associated boost to productivity (OECD, 2019[14]).

The SME productivity gap

The relationship between firm productivity and digitalisation described above becomes even more important from a public policy perspective when the analysis considers the extent to which small and medium-sized enterprises can be at a disadvantage compared to larger firms in the process of digital transformation.

SMEs are typically less productive than large firms, as one would expect in activities characterised by economies of scale and scope. This feature is widely shared by advanced and emerging economies alike, although cross-country differences in the size of the gap exist, reflecting in part the sectoral composition of the economies and the specific sub-sectors in which SMEs operate.

In the manufacturing sector, where production tends to be more capital-intensive and larger firms can exploit economies of scope and increasing returns to scale, large firms generally exhibit higher levels of productivity than smaller ones. In the service sector, differences in productivity across firms of different

[3] In specific circumstances, the decrease in productivity growth could also be related to a decrease in innovation activity, which in in turn can be caused by phenomena such as *killer acquisitions*. These types of acquisitions occur in highly concentrated markets, particularly in digital markets, when an incumbent acquires start-ups or "nascent" firms with the sole objective of discontinuing the target's innovation projects, thereby pre-empting the emergence of future competition, and hence the related gains. This implies a need to consider changes to strengthen competition enforcement in digital markets (Gurría, 2020[133]) – a topic that is beyond the scope of this report. For a more detailed discussion of *killer acquisitions* and their competitive effects, see (OECD, 2020[134])

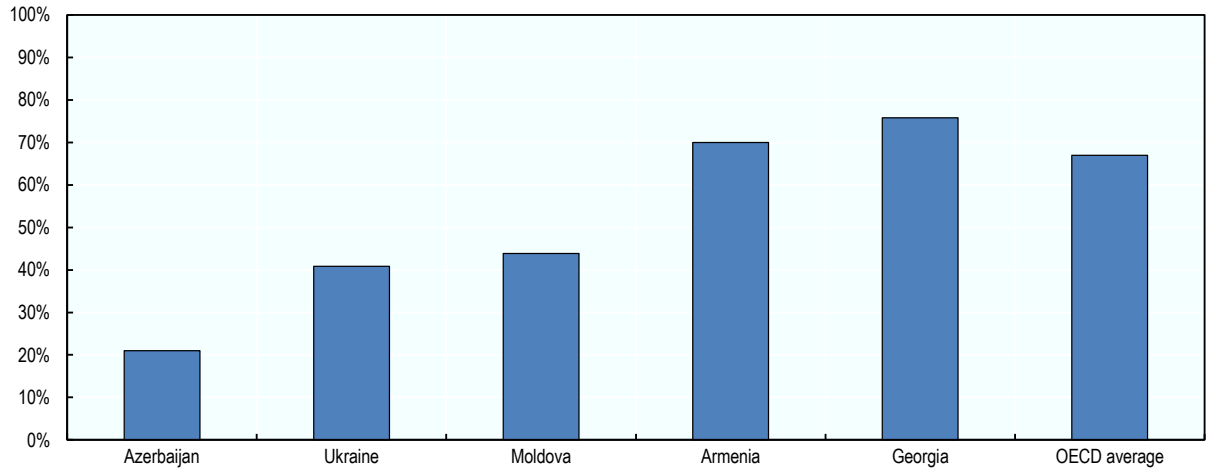
size are smaller, and small and medium firms can sometimes even outperform larger ones because of competitive advantages in niche or high intellectual property content activities (OECD, 2019[15]).

The structural productivity gap between SMEs and large firms is observed in the EaP region as well (Figure 1.3). This is not surprising, as SMEs in the region concentrate in low value-added sectors (wholesale and retail trade), and the professional, scientific and technical activities (legal and consulting services) in which SMEs can outperform larger firms in more advanced economies are still at very nascent stage.

While this trend is common to many OECD economies (OECD, 2019[16]), it should remind policymakers in the EaP region of the importance to consider the implications of differences in the pace of adoption of digital technologies in the enterprise population. The productivity premium enjoyed by larger frontier firms threatens to further increase gaps with smaller and less productive firms that may consistently lag behind in the adoption of new digital solutions.

Figure 1.3. SME productivity gap vs large enterprises

SME productivity as % of large enterprises, 2018



Note: Productivity measured as Value added / Persons employed in OECD, Armenia, Azerbaijan, Georgia, and Ukraine, as Turnover / Persons employed in Moldova. Data for Belarus not available.
Source: OECD SDBS Structural Business Statistics database; National Statistical Offices of the Eastern Partner countries

Why digitalisation matters for SMEs

The specific benefits of digitalisation for SMEs

Digital technologies can have a positive impact on firm productivity, as described in the previous sections, but they are also changing the market conditions under which companies operate. On the demand side, digitalisation creates a better-informed and more differentiated customer base that requires reactivity and flexibility in production, marketing and sales. On the supply side, it lowers the transaction costs associated with a range of market activities, effectively reducing the incentives for firms to internalise them and thus lowering the efficient firm size (OECD, 2021[6]). For instance, digital supply-chain management allows for fast and accurate exchange of technical information with suppliers, increasing incentives for the firm to outsource the production of even highly customised inputs.

While affecting all kinds of enterprises, digital technologies can offer specific benefits for SMEs, which can help counterbalance some of the size-related structural disadvantages they face and positively affect firm performance in terms of growth, innovation and internationalisation:

- First, **digitalisation enables SMEs to more easily access a wider pool of strategic resources**. Smaller businesses, which typically find it hard to obtain external financing, can now leverage a wide range of digital instruments to finance their operations, such as online lenders, peer-to-peer lending, crowdfunding, and initial coin offerings. Likewise, SMEs with limited human resource management capabilities can use job recruitment websites and online task hiring to improve access to a broader network of job-seekers that meet the desired skills profile.

  For example, in the EaP, start-ups and entrepreneurs seeking to finance innovative projects can now access international crowdfunding websites such as Indiegogo.com and Kickstarter.com, in addition to locally available platforms such as the Ukrainian Biggggidea.com.

- Second, **digital technologies help SMEs reach a wider customer base and integrate more easily in global markets**. Companies' own websites and online e-commerce platforms make it possible to directly advertise and sell their products to a global audience of consumers. Furthermore, digitalisation reduces the costs associated with transport and border operations and makes a wide range of services tradeable.

  As an example of local online marketplaces in the EaP countries, Mymarket.ge in Georgia, kufar.by, catalog.onliner.by, deal.by (residents of the High-Tech Park), and 21vek.by in Belarus and Rozetka.com.ua in Ukraine are all experiencing strong user growth, and provide opportunities for local SMEs to increase their online presence. This is in addition to online e-commerce giants such as Amazon, EBay, and Aliexpress (Galt & Taggart, 2021[17]) (Gavrilyuk, 2021[18]).

- Third, **digitalisation allows SMEs to achieve scale without mass**. The digitisation of products and services, notably software and data, brings their marginal costs close to zero. Combined with the global reach of the Internet, this makes it possible for SMEs developing successful digital products to increase their customer base, revenues and productivity very quickly (scale), often with few employees and low investment in tangible assets and physical footprint (mass) (Attrey et al., 2020[19]).

  As an example, B2C.ge is a successful Georgian digital start-up helping clients to set up their online shops. Launched in 2018 with a team of nine employees, the company's business has grown fast from a user base of 23 online shops in early 2019 to over 600 users by mid-2021 supported by 36 employees.

- Fourth, **digital platforms enable SMEs to capitalise on network effects**. As the number of users of a platform increases, so do the benefits for all users to operate on the same platform (network effect). From the point of view of SMEs, the larger the user base, the more likely the firm is to find a match (e.g. with service providers, suppliers, clients), which in turn can reduce search and transaction costs and information asymmetry. OECD research has highlighted how digital platforms can deliver positive network effects to SMEs outsourcing a wide range of business functions to online platforms (e.g. advertising, e-commerce, service delivery) (OECD, 2019[20]).

  A case in point of digital platforms, websites offering order management, payment and delivery of food have become a prime channel through which restaurants (typically SMEs) can make themselves known and deliver to a large base of potential customers. Network effects are clearly at play here, whereby the more restaurants are using the platform, the more customers it attracts, the higher the value for the marginal restaurant to join the platform. Ifood.md and straus.md are good examples of food delivery platforms available in Moldova.

Lastly, and as a result of all the factors described above, digitalisation disrupts industries and allows smaller and more flexible SMEs to experiment with new business models, develop new market niches

and challenge incumbents. While digitalisation can go a long way to increase productivity for "incumbent" SMEs, it is also creating the conditions for the emergence of SMEs "born digital" (Box 1.1).

Box 1.1. How digitalisation can improve company performance

Businesses decide to invest in digital tools and practices for a variety of reasons: to innovate, to respond to competitive pressure, to expand to new markets. Ultimately, the process of technology adoption should bring about tangible benefits for the firm embarking in a process of digital transformation.

Beyond the most telling indicator measuring company performance (productivity), specific ones could be considered to assess the impact of digital technologies on a number of other relevant dimensions. While it is clear that different digital tools may only affect a specific subset of a company's operations, the following indicators provide initial guidance for SME managers and policymakers to evaluate the tangible benefits of the investment in digitalisation.

- Revenue growth
- Share of sales from online channels
- Reduction in operating costs
- Reduction in time / cost spent on administrative functions
- Customer growth (domestic / international)
- Reduction in customer acquisition costs
- Number of new products / services
- Reduction in time to market
- Customer satisfaction

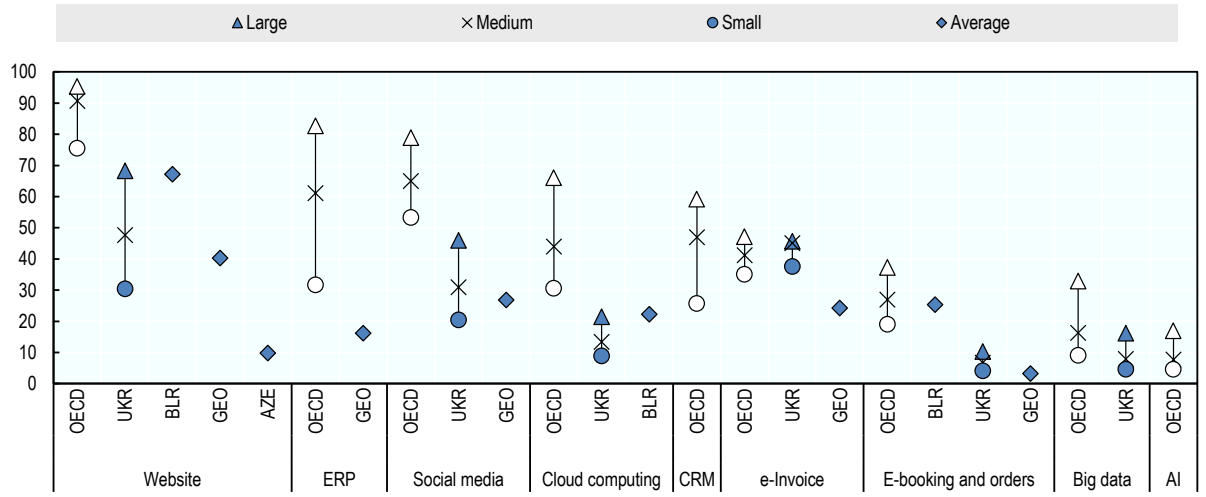
Source: Adapted from (BCG, 2020[9]), (Deloitte, 2019[21])

Adoption of digital technologies by businesses in the EaP region

Despite the opportunities described above, and the overall positive trend of digitalisation of businesses in recent years, evidence from international databases sheds an interesting light on the extent to which the size of the enterprise is also associated with different rates of technology adoption. Figure 1.4 below is built on data from the OECD ICT Access and Usage by Businesses Database, complemented with the available information collected from the websites of national statistical authorities of EaP countries.

Figure 1.4. Diffusion rates of digital technologies, by technology and enterprise size class

Percentage of enterprises using the technology, 2020 or latest year available



Note: OECD values represent the median adoption rates in countries for which data are available
Source: OECD ICT Access and Usage by Businesses Database, National Statistical Authorities of Azerbaijan, Belarus, Georgia and Ukraine. Data for Armenia and Moldova not available. Adapted from (OECD, 2021[6])

While there are limitations in the scope of technologies considered and cross-country data availability, several trends can be identified to describe the current state of diffusion of digital technologies.

As a general feature, SMEs lag behind larger firms in technology adoption. Diffusion rates are consistently lower among small and medium sized enterprises compared to large ones across all technologies for which data are available. Even within the SME sector, smaller firms have a lower likelihood of adopting digital tools than medium ones.

Moreover, gaps in adoption are more evident as technologies get more sophisticated, or where firm size matters. Larger firms are around four times more likely to perform advanced big data analytics or use artificial intelligence applications than small ones, but only twice as likely to use online solutions for receiving bookings or orders. Similarly, the adoption of ERP systems is much more common among large firms than small ones, which can be explained by the need to reach a critical threshold of clients, suppliers and internal resources for the investment in ERP to be economically viable for the firm.

Finally, while limitations in data comparability[4] suggest caution with the analysis, EaP countries appear to be lagging behind OECD economies in their digitalisation journey. Businesses of all size classes show systematically lower rates of technology adoption compared to their peers in OECD economies, a trend that applies to both established digital tools such as having a website or using social media, and more advanced solutions such as cloud computing or big data analytics.

[4] For instance, National Statistical Authorities in EaP may use different wordings in the questionnaires used to collect information from the enterprise sector about the use of digital technologies.

Box 1.2. E-commerce in Eastern Partner countries

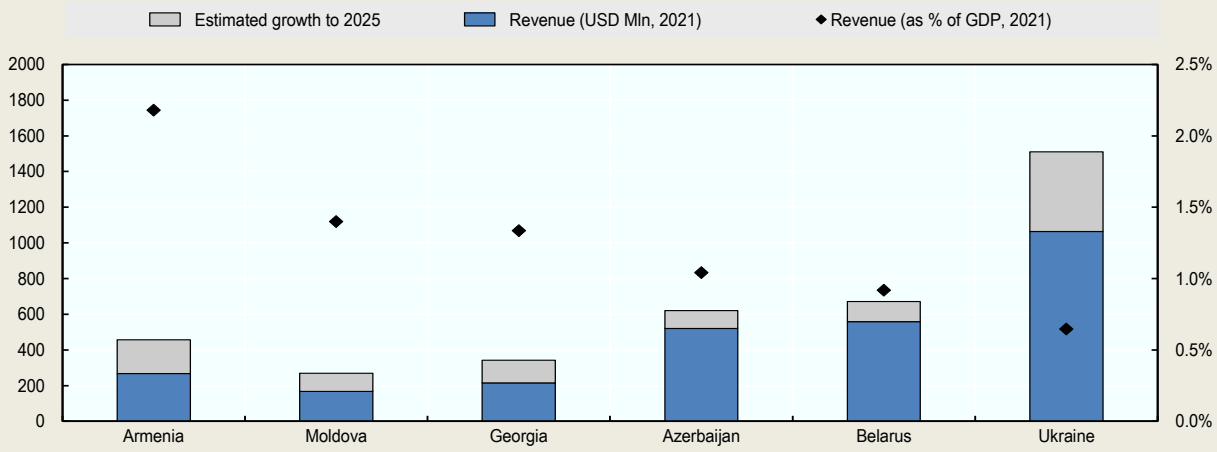
Online trade is small but growing rapidly on the back of the COVID-19 pandemic

E-commerce markets in EaP countries have grown rapidly in recent years, and particularly since early 2020 on the back of the COVID-19 pandemic, opening up new opportunities for SMEs to increase their online presence and reach a wider audience. Estimates of the size of the e-commerce market vary widely depending on the source of the data, on what product categories are included, and how the models take into account limited data availability and transparency in the case of e-commerce platforms.

According to one estimate, in 2021 the total combined value of the e-commerce market in the EaP countries amounted to USD 2.4 billion. Relative to GDP, Armenia has the region's largest and Ukraine the smallest e-commerce sector. In absolute terms, e-commerce in the EaP countries is still at a nascent stage of development, but growth rates in most EaP countries are expected to surpass the European average, ranging from 4.6% in Azerbaijan to 14.4% in Armenia. In terms of sectoral turnover, fashion is the most important product category in Azerbaijan, Moldova, and Ukraine, food and personal care in Armenia, and electronics in Belarus and Georgia (Statista, 2021[22]).

Figure 1.5. Size of the e-commerce market in EaP countries

(mln USD and as % of GDP)



Note: e-commerce market includes the sale of physical goods to a private end user through digital channels. Digital services (e.g. digital media downloads), B2B markets and markets for used goods are excluded.
Source: OECD calculations based on e-commerce market size estimates from (Statista, 2021[22]) and GDP estimates from (IMF, 2021[23])

The future potential of e-commerce is also corroborated by the still relatively small share of population purchasing goods online, which was below 30% for all EaP countries against over 60% for OECD members in 2017 (World Bank, 2017[24]), and the low penetration of online sales as a share of total retail sales. As an illustrative example, e-commerce sales in Georgia in 2020 represented only 1.1% of retail turnover, against an average in Europe of 16%, even though both local (e.g. Mymarket.ge, Extra.ge) and international (e.g. Amazon.com, aliexpress.com) e-commerce websites are experiencing fast growth (+320 and 41%, respectively, in 2020) (Galt & Taggart, 2021[17]).

The EU4Digital initiative supports harmonisation of e-commerce between EU and EaP countries

With its e-commerce activity, the EU4Digital initiative supports Eastern Partner countries to achieve a smooth electronic trade with the EU, and suggests harmonisation of three areas of e-commerce: i) legislation (e.g. consumer protection, parcel delivery), ii) standards (e.g. interoperability, digital customs pre-declarations), iii) e-commerce ecosystem (e.g. taxation, payments) (EU4Digital, 2021[25]) (Box 1.3).

Source: (Statista, 2021[22]), (World Bank, 2017[24]), (IMF, 2021[23]), (Galt & Taggart, 2021[17]), (EU4Digital, 2021[25])

Box 1.3. The EU4Digital Initiative

The EU4Digital Initiative has the main objective of harmonising digital markets, extending the benefits of the EU Digital Single Market to the EaP countries (see Box 2.3). It serves as a platform to identify policy priorities and implement them through dedicated programmes.

The Initiative was launched by the European Commission at the *Eastern Partnership Ministerial Meeting on the Digital Community* in 2016, when the six **EU4Digital Regional Networks** were established to support the work of the *Panel on the Harmonisation of Digital Markets*. Each network focuses on one of the key policy areas identified: 1. Telecom; 2. Trust and security; 3. eTrade; 4. ICT innovation; 5. eHealth; and 6. eSkills. Their ultimate goal is to serve as a platform to share best practices, promote the design and implementation of national strategies, and develop common projects.

The EU4Digital is an umbrella initiative under which four main projects are carried out:

1. **EU4Digital Facility** (2019-2022). The project aims to extend the benefits of the European Union's Digital Single Market to the Eastern Partner countries, supporting them in reducing roaming tariffs, developing high-speed broadband to boost economies and expand e-services, harmonising digital frameworks across society in areas ranging from logistics to health, building cyber security, developing skills, and creating more jobs in the digital industry.
2. **EaP Connect** (2020-2025). The project aims to bring together research and education communities from EU and Eastern partner countries and to reduce the digital divide. The project will extend network infrastructure to scale up scientific exchange across borders, offer new services to enhance international R&E cooperation, strengthen national research and education networks (NRENs) in R&E ecosystems, and build knowledge, skills and collaborative working through events, training, and other initiatives.
3. **EU4Digital: Cybersecurity EAST** (2019-2022). The objective of this project is to develop technical and cooperation mechanisms that increase cybersecurity and preparedness against cyber-attacks, in line with the EU standards.
4. **EU4Digital: Broadband Strategies in the EaP region** (2018-2020). The project, implemented by the World Bank (WB), supports Eastern Partner countries in their development and early implementation of national broadband strategies, in line with relevant EU best practices and strategies, through the provision of technical assistance and capacity building support.

In addition to these, the European Union also supports a number of other projects that share similar objectives, both at regional and bilateral level.

In March 2020, new objectives were adopted for the Eastern Partnership beyond 2020 including: a) creating sustainable and resilient economies; b) enforcing the rule of law and strengthening of security; c) building environmental and climate resilient economies and societies; d) working jointly for the digital transformation; and e) promoting fair and inclusive societies. The objectives will guide EU4Digital's action in the forthcoming years.

Source: (EU4Digital, 2021[26])

Complementarities and implications for SME policy

The differences in productivity and associated adoption rates of digital technologies presented above are a static representation of the structural gaps between large firms and SMEs. This issue becomes even more pressing when adopting a dynamic view: digitalisation may contribute to fuel productivity growth, which in turn brings wage growth, improvements in living standards and more digitalisation. Over time, gaps in the adoption of digital technologies may thus contribute to increasing inequalities among firms, people and places.

Complementarities among digital technologies compound this dynamic. Even though one might think that integrating proven technologies would be faster and less risky than testing new ones, and therefore SMEs could grow rapidly by "just" catching-up on the adoption gap, evidence shows that larger and more digitalised firms are often better able to step up to new technological environments as early adopters (OECD, 2021[6]). Because of such complementarities among digital technologies and the frequent "first mover advantages" typical of certain digital markets, over time, smaller and less productive firms may consistently miss out on opportunities to enter new markets, lower costs, build their customer base, gather insightful data, and ultimately compete successfully in highly contested markets.

Complementary factors at the firm-level matter as well and can explain why SMEs that adopt digital solutions may still follow a different trajectory from that of larger enterprises. A wealth of research has shown how the propensity of digital technologies to boost productivity largely depends on complementary factors inside the firm (Brynjolfsson, Rock and Syverson, 2017[11]) (Acemoglu and Restrepo, 2018[27]). Upgrading managerial and technical skills within the firm are necessary steps to reap the benefits of investments in digital technologies, while redesigning processes around new sets of tasks and rethinking the organisation of work based on new roles is needed to match the possibilities offered by digital tools. Likewise, re-evaluating not only the internal processes but also supply and distribution chains may be required to fully unlock value from the adoption of digital solutions.

Lastly, complementarities with the policy environment and the overall framework conditions for the digital economy can affect incentives and the returns to investment in digital technologies (Box 1.4). Policies promoting competition, lowering barriers to entry and switching costs for businesses and consumers alike may create a more convincing business case for SMEs to experiment with innovative ideas and digital business models. At the same time, the ability to access adequate internet broadband infrastructure is a pre-requisite for the successful adoption and functioning of a wide range of digital solutions.

While SMEs are generally considered more agile and able to respond quicker to changing market conditions, the adjustments in complementary factors needed for a successful digital transformation may place smaller firms at a disadvantage vis-à-vis large enterprises. For instance, the well-documented obstacles to finding (digital) skills could hinder the ability of small and medium enterprises to tap into the talent pool required to manage and implement their digital transformation, and a penalising access to broadband infrastructure may delay their opportunity to benefit from the full spectrum of available digital technologies (OECD, 2019[16]).

Recognising the extent to which the complementary factors described above apply to their countries, policy-makers in the Eastern Partner region should equip themselves with a range of policies aimed at bridging the existing digital gaps between smaller and less productive firms and more digitalised larger ones. Failing to do so would have important implications on the rate and direction of the digital transformation of the local SME sectors, and the related productivity and inequality challenges.

Box 1.4. The OECD Going Digital framework

The OECD Going Digital framework is an integrated policy framework that equips policy makers with the relevant tools to make digital transformation a driver of growth and well-being. In particular, it provides a useful reference for policy makers to think about and deal with the vast range of complementary factors that underpin the digital economy and accounts for the complex and intertwined effects of digital transformation.

Figure 1.6. Going Digital Integrated Policy Framework

The framework defines seven policy dimensions that have to be considered to fulfil the digital transformation potential, and addresses specific policy issues in the areas of: 1) access; 2) use; 3) innovation; 4) jobs; 5) society; 6) trust; and 7) market openness. Each dimension entails a number of policy domains that have to be examined together, and invites governments to develop a whole-of-government approach to policymaking for the digital economy, easing co-ordination among policy makers and relevant stakeholders.

The analysis presented in this report draws inspiration from the Going Digital comprehensive approach, but focuses on a subset of selected policy dimensions deemed of particular relevance to advance SMEs' digitalisation in the EaP countries: broadband connectivity (access), technology adoption (use), digital skills (jobs), and regulations (market openness and trust).

Source: (OECD, 2020[28]), (OECD, 2021[29]), (OECD, 2021[30]), and (OECD, 2019[31]).

COVID-19 as a catalyst for the digital transformation

The impact of the pandemic on EaP countries fell disproportionately on SMEs…

With a lag of several weeks compared to their EU neighbours, the COVID-19 pandemic hit Eastern Partner countries in the first months of 2020. In terms of containment measures, with the exception of Belarus, national governments were quick to react and introduce restrictions to protect their citizens and manage

the pressure on national health systems (OECD, 2020[32]). The progression of the pandemic, however, did not spare the EaP region and subsequent waves of infections hit EaP societies and economies hard. By the end of 2020, excess deaths were estimated to be in the range of +5% for Georgia to perhaps +27% for Azerbaijan compared to the yearly average over 2015-2019[5]. Likewise, the impact of the health crisis and of government-mandated lockdowns on economic activity, amidst a generalised slowdown in demand due to the global contraction, caused EaP economies to experience drops in GDP ranging from -0.9% in Belarus to -7.6% in Armenia in 2020 (IMF, 2021[33]).

The stringent containment measures adopted to combat the spread of the virus led to significant short-term declines in output in OECD and EaP countries alike. The sectors most affected by the COVID-19 pandemic have been those requiring direct contact between customers and service providers and those relying on long supply-chains. During the period of national lockdowns, tourism, hospitality and many "non-essential" bricks-and-mortar retailers saw virtually all of their revenues disappear as a result of the restrictions on movement and the requirements of social distancing. Altogether, the most-affected sectors account for 30-40% of total output in the EaP economies (OECD, 2020[32]).

SMEs have suffered from the economic crisis disproportionately, as they are over-represented in the services sectors most impacted by the pandemic. They often have a smaller number of clients and suppliers than larger firms, and may find it difficult to reconnect with their networks if supply chains are disrupted and former trade partners have entered into new business contracts with competitors. SMEs are also more vulnerable to sudden drops in demand and revenues, as liquidity shortages can put them at risk of insolvency.

With vaccination campaigns lagging behind the more advanced economies, and the possibility of new and more contagious variants of the virus spreading around the world, the threat of new generalised lockdowns in the EaP countries – or at least of persisting restrictions to movement and to physical contacts – real and ever-present (Shah et al., 2021[34]). This should serve as an incentive for businesses of all sizes and in all sectors, but in particular for the more fragile SMEs, to question the "old" operating models and explore new ways of doing business.

…and pushed SMEs to start or accelerate their digital transformation journey

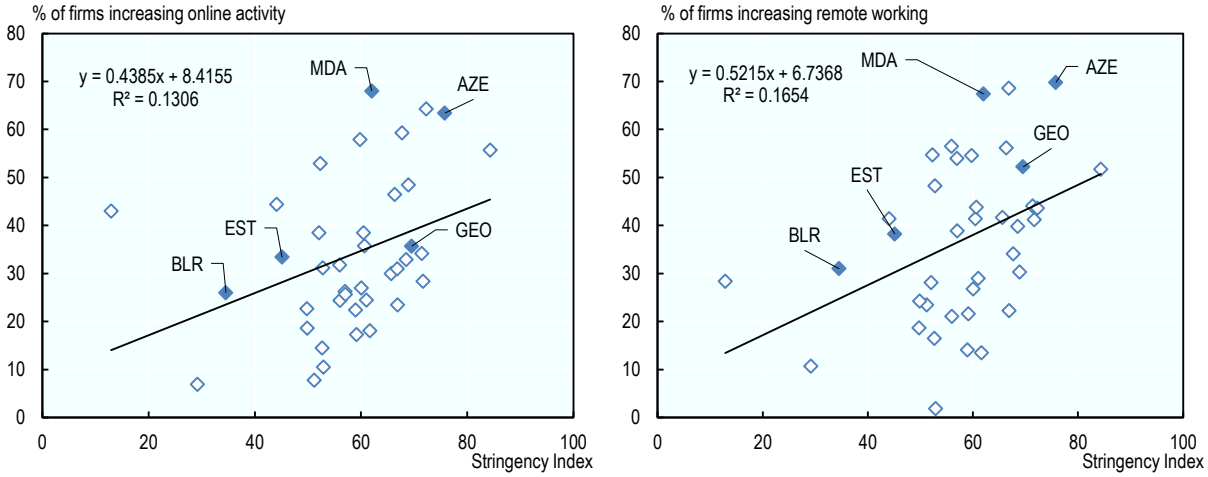
The COVID-19 crisis has stressed the need to accelerate business digitalisation, to weather the disruptions in the short term and increase resilience in the longer term. Containment and social distancing measures highlighted the limits of non-digital business models, and the widening gaps in opportunities between firms with an advanced digital profile, or that could rapidly shift to digital modes, and the digital laggards.

While many companies were forced to (temporarily) interrupt their activities, some managed to quickly adapt to the situation by shifting operations online and expanding the use of remote work. The share of business increasing their use of digital technologies was greater in countries with more stringent containment and social distancing measures. In other words, the stricter the measures, the greater the pressure on firms to adopt new means of doing business. On average, for a sample of 42 countries covered by the World Bank's enterprise surveys, a 10-point increase in the value of the Stringency Index is associated with 4-5% percentage points increase in the share of companies stepping up their digital profile (Figure 1.7). Azerbaijan and Moldova, which experienced very stringent lockdowns, saw over 60% of their firms increasing digital uptake since the beginning of the pandemic, significantly more than in countries with comparably softer lockdowns, such as Belarus or even Estonia, where only 26% and 33% of firms increased online activities, respectively.

[5] Based on data from (Karlinsky and Kobak, 2021[131]). Excess deaths estimated as difference in the number of deaths in 2020 (excluding those related to armed conflicts) and the yearly average over the period 2015-2019. Data for other countries: Armenia (+16%), Belarus (+21%), Moldova (+7%), Ukraine (+6%).

Figure 1.7. Businesses have turned online to respond to the COVID-19 restrictions

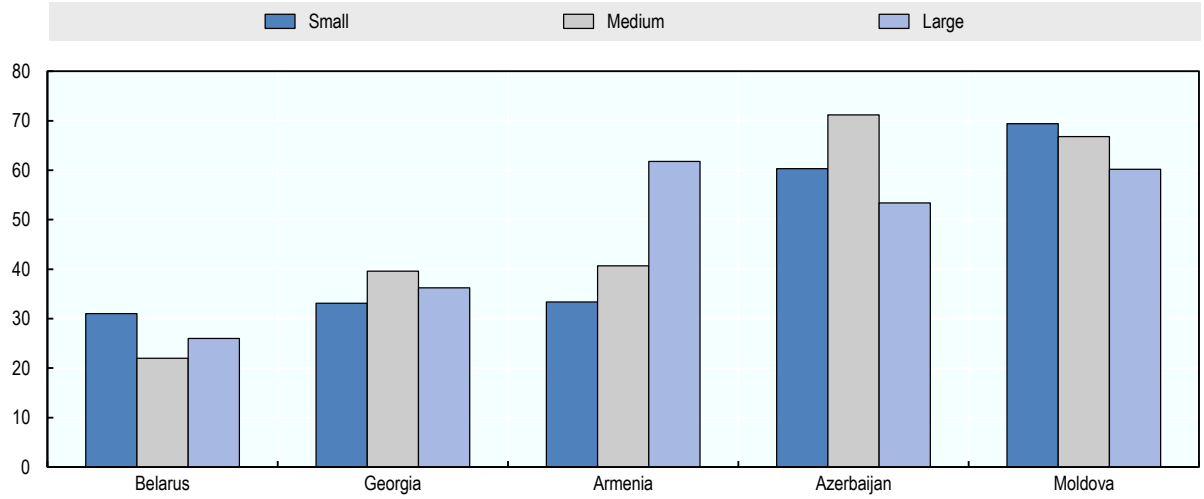
Stricter lockdowns are associated with a higher share of firms increasing online activities and remote working



Note: 1. The charts above include data for 42 countries covered by The World Bank's COVID-19 follow-up surveys. 2. The Oxford COVID-19 Government Response Tracker Stringency Index captures the strictness of 'lockdown style' policies that primarily restrict people's behaviour. It is calculated using ordinal containment and closure policy indicators (school closing, workplace closing, cancel public events, restrictions on gathering size, close public transport, stay at home requirements, restrictions on internal movement, restrictions on international travel) plus an indicator recording public information campaigns. The values displayed are the simple average of the value of the index for each country over the period 1 March 2020 – 30 June 2021.
Source: (Hale et al., 2021[35]), (The World Bank, 2021[36])

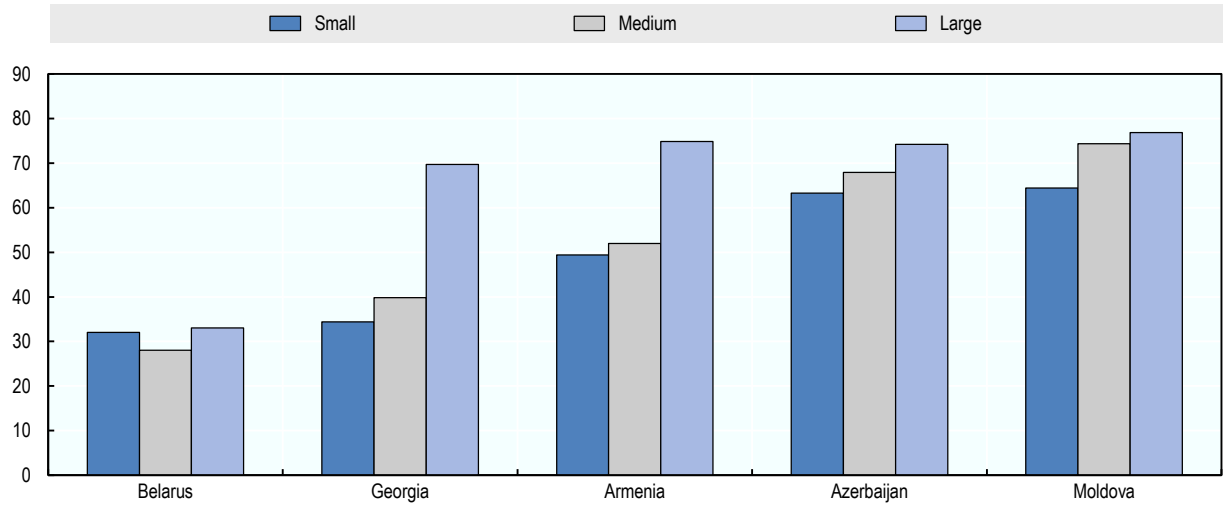
A closer look at EaP countries suggests that the pandemic has greatly accelerated the use of digital tools for companies of all size classes. With the exception of Armenia, where large firms have been twice as likely to increase their online operations than small firms, no major difference is observable between companies of different size classes within each country (Figure 1.8). This may in part reflect industrial specialisation – large extractives companies, for example, will have continued operations more or less normally, and to have done little business on-line, as compared with some other sectors. Large companies, however, were more easily able to switch to remote working for at least part of their workforce (Figure 1.9), possibly due to a higher share of employees with professional IT equipment, more established use of cloud-based solutions, and higher levels of digital literacy.

Figure 1.8. % of firms that started or increased online business activity in response to COVID-19



Note: Data for Ukraine not available
Source: (The World Bank, 2021[36])

Figure 1.9. % of firms that started or increased remote work in response to COVID-19



Note: Data for Ukraine not available
Source: (The World Bank, 2021[36])

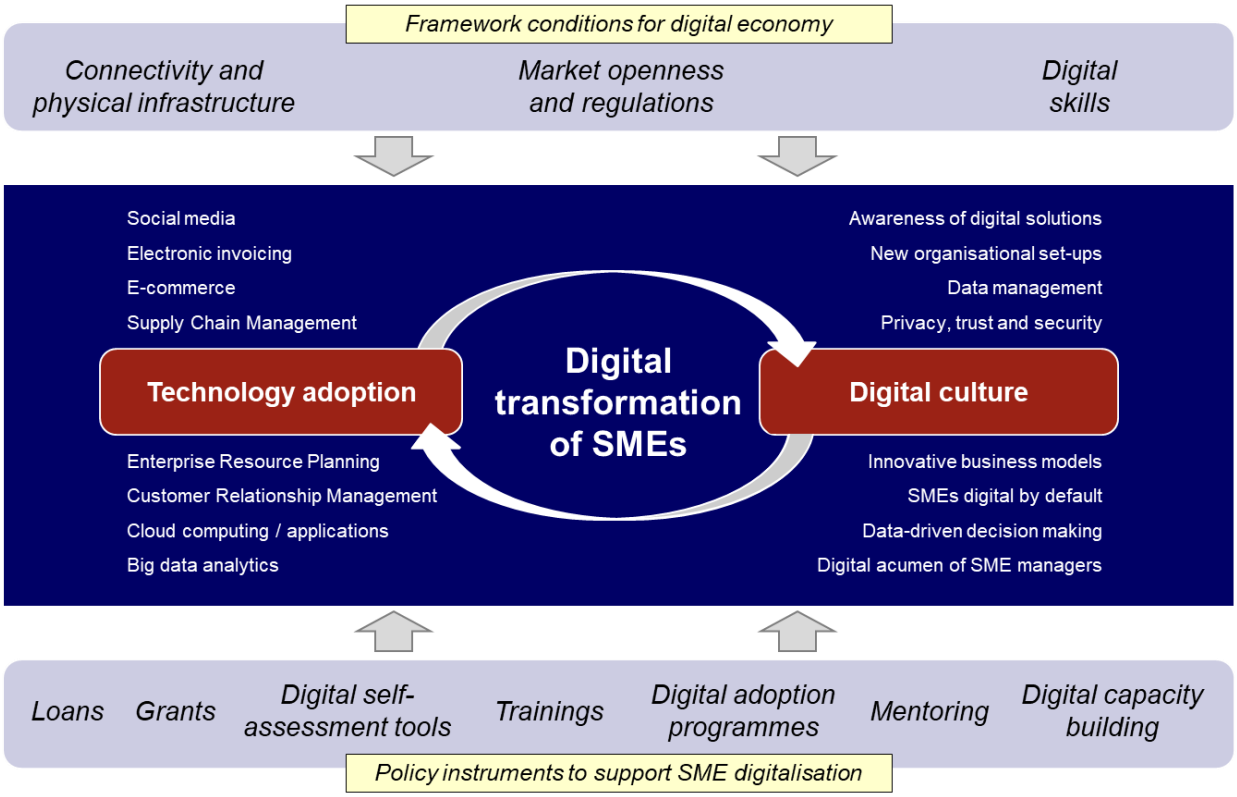
COVID-19 pushed many companies to go online for the first time and start their digital transformation journey. Some of the changes introduced by businesses are going to become irrevocable, and the longer the crisis goes on, the more this will be the case. On the one hand, most investment made will be irreversible: an SME that successfully opened a new sales channel through e-commerce is unlikely to return to a pure bricks-and-mortar model once the pandemic is over. And on the other hand, companies may have experienced first-hand the benefits of going digital or observed how more digitally mature competitors managed to adapt more quickly or even thrive in the new context.

A framework for supporting the digital transformation of SMEs in the EaP region

From a policymaker's perspective, a proactive SME policy means addressing market failures that put small firms at a disadvantage, and creating an environment in which SMEs can operate exploiting all business opportunities arising from a digital transformation process. In the context of the digital transformation, this means managing the complementary factors that can hinder or, conversely, invigorate the process of technology adoption and continuous innovation that determine the trajectory of an SME's digital journey.

In order to guide the analysis and inform policy, this report suggests a framework for supporting the digital transformation of SMEs (Figure 1.10). At the level of the individual firm, the digital transformation of SMEs is seen as a combined process of technology adoption matched by a growing digital culture. Around these core elements, governments can direct their policy efforts on two levels to i) improve the framework conditions for the digital economy and ii) implement specific policy instruments to support SME digitalisation.

Figure 1.10. Framework for supporting the digital transformation of SMEs in the EaP



Source: OECD analysis

The subsequent chapters of this report look at each of these components. Chapter 2 describes core elements of the framework conditions for the digital economy in the EaP countries, ranging from broadband connectivity and selected aspects of the regulatory environment such as frameworks for e-commerce, e-signatures and digital security. Chapter 3 is about the human capital for the digital economy, and looks at the state of play of digital skills in the EaP region in the general population and among SMEs. Chapter 4 concludes with a "blueprint" of policy instruments that governments and enterprise support agencies can design to accelerate the digital transformation of SMEs, such as tailored financial tools, digital self-assessments, training, and programmes to accompany individual firms in the process of digital adoption.

A digital culture needs to complement technology adoption

At the core of the proposed framework, the digital transformation requires SMEs to embrace a truly digital culture to accompany the adoption of new technologies. As noted in the previous sections, at the macro level, advances in modern digital technologies do not directly translate into productivity gains. A large part of the explanation rests on dynamics taking place at the micro level, where a series of adjustments to a firm's organisation and processes are needed to fully benefit from the new technologies (Brynjolfsson, Rock and Syverson, 2017[11]).

Firms investing in digital technologies often fail to achieve and sustain a boost in value creation (Everest Group, 2018[37]). Rigid organisational structures, lack of clear vision or leadership to transform operating models, the narrow scope of technology upgrade, often limited to a particular business function, and inadequate skills to adapt to the new digital environment represent common obstacles to a full digital transformation. Conversely, companies that embrace a digital culture (e.g. in product development, customer interaction, internal management) are vastly more likely to experience continued improvements in their financial performance than those neglecting it (BCG, 2018[38]).

Developing a digital culture starts with increasing awareness of the availability and benefits of digitalisation among SME managers and entrepreneurs. Because of their small size, SMEs may not have dedicated internal human resources (e.g. Chief Technology Officers, IT specialists) that can stay abreast of the latest developments in digital solutions. It also means having the managerial acumen to adjust organisational set-ups to meet changing demands, customer behaviour and make the most of the investment in digital technologies. A digital culture also requires harnessing the value of data and analytics to make better business decisions, and having a strategy for data management, privacy and security. A foundational element to all the aspects described above, SME managers can continuously develop their companies' digital culture by attracting talent and investing in the digital skills of the workforce.

The importance of developing a digital culture applies to all SMEs, regardless of their stage of digital maturity. In a plain example, a small business in the retail sector that just decided to go digital by setting-up its own website will not achieve much if well-functioning e-commerce functionalities are not included and visible to potential customers, if they are not supported by dedicated online marketing campaigns to generate traffic to the website, and if dedicated organisational processes are not put in place to manage orders, handle payments, and deliver goods to the final clients.

While this logic clearly applies to "traditional SMEs" embarking on their digital transformation journey, the central role of digital culture is even more apparent in the case of SMEs "digital by default". Here, the entrepreneur's intuition to develop a digital product or service and experiment with innovative business models based on the opportunities offered by digital technologies, internet connectivity and online platforms is at the very origin of the entrepreneurial venture.

2 Framework conditions for the digital economy

This chapter describes core elements of the framework conditions for the digital economy in the Eastern Partner countries. It provides an overview of the current state of broadband connectivity and touches upon selected aspects of the regulatory environment, such as the frameworks for e-commerce, e-signatures and cybersecurity.

Introduction

This chapter delves into the framework conditions necessary to foster the development of digital economies and societies. It starts by taking stock of the accessibility, quality and affordability of broadband in the six EaP countries, also looking at competition in the telecommunications sector. The second part is dedicated to selected aspects of the regulatory framework such as legislation and regulations on e-commerce, e-signatures and digital security, and provides a comparative overview of the current situation and policy initiatives in each country. Based on the gap analysis, some policy options are outlined for consideration towards the end of the chapter, in order to strengthen the enabling environment for the digital transformation.

Connectivity and physical infrastructure

Ensuring efficient connectivity is one of the first steps towards the digital transformation of economies and societies. Access to the internet is even recognised as a basic right in several OECD countries (OECD, 2021[39]) and striving "to provide universal and affordable access to the Internet" has been included among the UN Sustainable Development Goals (SDGs) (United Nations, 2021[40]).

Indeed, the internet is playing an increasingly important role for households and businesses alike. Citizens are using it for an ever-increasing variety of purposes. Over 80% of the OECD population use it to exchange emails and get information about goods and services, and at least half go online for internet banking, to purchase goods and services, and to communicate with public bodies (ITU, 2020[41]). Simultaneously, businesses increasingly use the internet to maximize their outreach through e-commerce practices, but also need it to adopt digital technologies in general. The quality and affordability of broadband is critical in this regard, as both established and emerging technologies require a powerful internet connexion. An increase in uptake among businesses in turn improve performance: a recent study by (Sorbe et al., 2019[13]) showed that increasing the uptake of high-speed broadband among firms by 10 percentage points can lead to an estimated productivity gain of 0.8 to 1.9%.

The COVID-19 pandemic has renewed the need to provide citizens with a reliable access to broadband services, as containment and social distancing measures enacted by countries have forced individuals and businesses to move operations online, leading to a surge in internet traffic. Recent data show that OECD countries increased internet bandwidth by 58.4% on average between 2019 and 2020, and with traffic increasing up to 90% some member states (OECD, 2021[39]). Beyond guaranteeing country-wide access, governments have to ensure the quality and affordability of networks and services, so that everyone can benefit from the digital transformation.

Competition in the provision of connectivity infrastructure

The telecommunication sector was historically largely centralised and characterised by publicly controlled monopolies. However, in the last couple of decades, digital technology developments radically changed the sector and opened the possibility for market entry by a range of competitors. This shift of paradigm resulted in the establishment of open and competitive markets in most countries.

As liberalisation of the market unfolded, it brought significant benefits to businesses, consumers and to the wider economy. In fact, countries with increased competitive pressure experienced a greater choice for the consumers of telecommunications services, offering a broad range of new and innovative services and products. The quality of the services also improved, while tariffs fell. Investment opportunities in the

telecommunications sector have expanded and service provision to remote and under-served areas, as well as to the main population centres, has accelerated (ICC, 2007[42]; EaPeReg, 2017[43]).

In the EaP region, the liberalisation of telecommunications markets evolved at different speeds. The countries that have not done so yet (Belarus, for instance) should update their telecommunication laws to create a more liberalised market, increasing privatisation in the sector where conditions are conducive to competition and establishing and/or strengthening independent regulatory authorities. This represents the first step towards the enhancement of broadband penetration, the improvement of service quality and the reduction of tariffs.

Private investment in telecommunication infrastructures in the Eastern Partnership

Openness to competition and private investment can help EaP governments develop their telecommunications infrastructures. This is especially vital now, as 5G networks are deployed around the world, and still at a very early stage in the EaP region.

A 2015 OECD report on investment in infrastructure concluded that private sector participation in telecommunications infrastructure, when accompanied by a supportive regulatory environment, can boost overall investment in the sector. Therefore, countries should commit to stimulating private investment by building more competitive environments, especially given that low levels of competition in telecom infrastructure contribute to limited affordability and service innovation, resulting in lower adoption of broadband services.

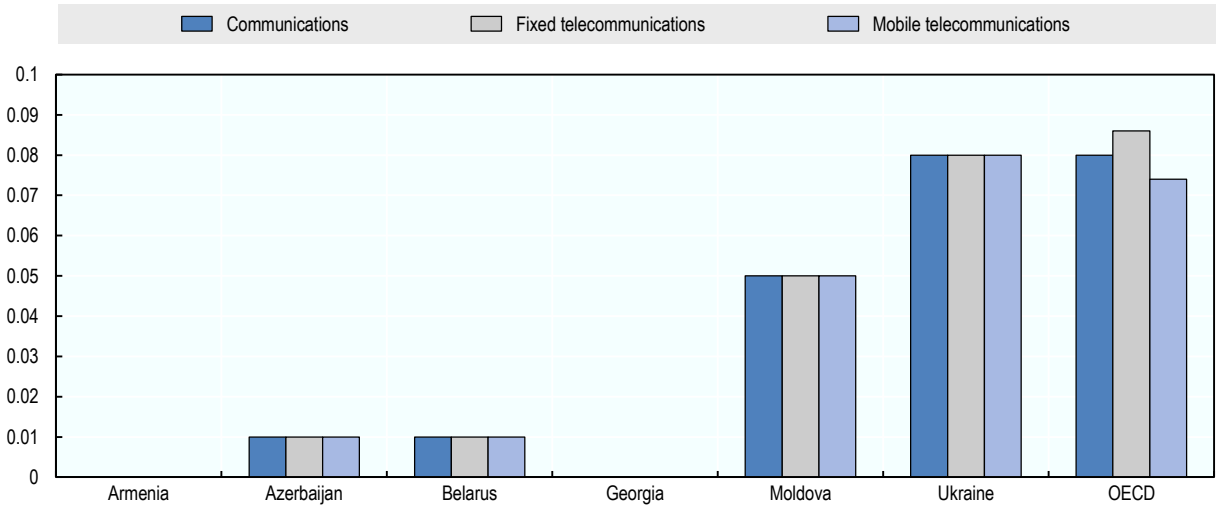
To do so, government can work towards removing barriers to entry, e.g. by unbundling the network infrastructure and granting regulated access to other operators, and strengthening the independence of regulatory bodies to establish stable and credible frameworks for investment (OECD, 2015[44]).

As reported below, broadband affordability in EaP countries is limited and this may be contributing to lower adoption, in turn lowering incentives to invest in network expansion, especially in rural areas. Overall, the combination of limited broadband uptake and low affordability (especially for fixed broadband, and ultrafast broadband) due to high levels of concentration and low levels of competition, indicates the potential to unlock greater development of the EaP countries' broadband markets.

Foreign telecommunication operators played an important role in developing the region's network infrastructure in the past and could also help speed up the roll out of new networks, with their ability to mobilise capital, technology and capabilities for infrastructure and application development.

In terms of formal barriers to foreign direct investment, the telecommunications sectors in EaP countries are relatively open; indeed, with the exception of Ukraine, all EaP countries have scores on the OECD FDI restrictiveness index below the OECD. Armenia and Georgia have no formal barriers to foreign direct investment in telecommunications, with open market conditions comparable to the most open OECD economies. However, the index measures only *formal* barriers to foreign investment; it does not take into account informal barriers to entry, for example, the potential role of corruption in reducing competition in the sector or the scope for *ad hoc* political interventions in such decisions, which is considerable in some countries (Figure 2.1).

Figure 2.1. OECD FDI Restrictiveness Index scores in telecommunications sectors, 2019



Note: Armenia and Georgia have values of 0 for all three sectors which means that there are no statutory restrictions to FDI.
Source: (OECD, 2019[45])

Broadband penetration

Broadband uptake is increasing in the Eastern Partnership, but is still below OECD levels

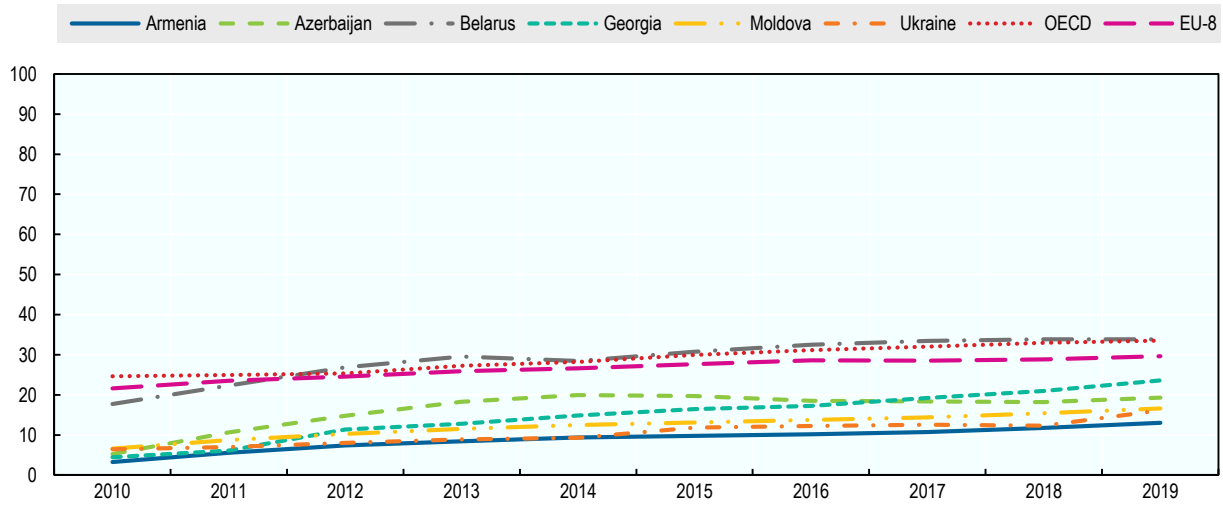
Broadband uptake has been growing in both Eastern Partner (EaP) and OECD countries over the past ten years, but data show considerable disparities (Figure 2.2, Figure 2.3). The number of both fixed and mobile broadband subscriptions per 100 inhabitants varies across EaP countries, ranging from 34 and 89 respectively in Belarus, to 16 and 47 in Ukraine. From an international perspective, both figures in all EaP countries except Belarus remain below OECD and EU-8[6] levels, with a 14 percentage point difference between EaP and OECD median values for fixed broadband, and 24 pp. for mobile broadband. However, looking at the evolution in uptake since 2010, one can see that EaP countries have registered a considerably sharper increase in subscriptions: the number of fixed broadband subscriptions has more than tripled (+267%) between 2010 and 2019, while it increased by 36% in the OECD over the same period. As for mobile broadband connections, they are fourteen times higher than in 2010 in the EaP[7], while data for the OECD show a +216% increase.

[6] EU-8 refer to the eight central and eastern European countries that joined the EU in 2004 (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Slovenia, Slovak Republic, Poland).

[7] Median values.

Figure 2.2. Evolution of fixed broadband subscriptions in Eastern Partner countries, EU and OECD

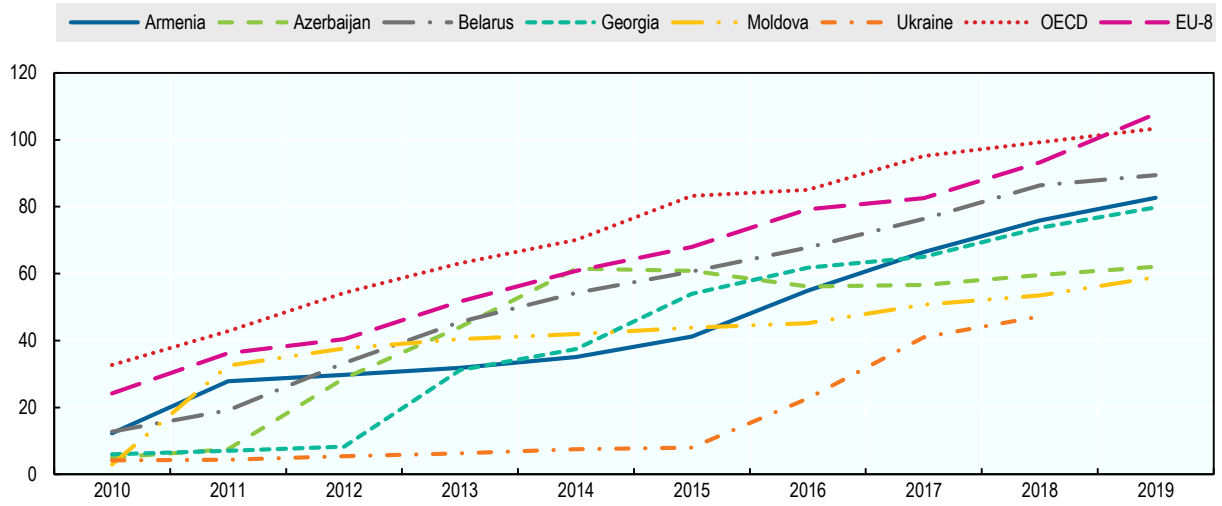
Fixed broadband subscriptions per 100 inhabitants, 2010-2019



Note: Median values for OECD and EU-8 (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia).
Source: (ITU, 2021[46]).

Figure 2.3. Evolution of mobile broadband subscriptions in EaP countries, EU and OECD

Active mobile broadband subscriptions per 100 inhabitants, 2010-2019



Note: Median values for OECD and EU-8 (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia). Data for 2019 not available for Ukraine.

Source: (ITU, 2021[46]).

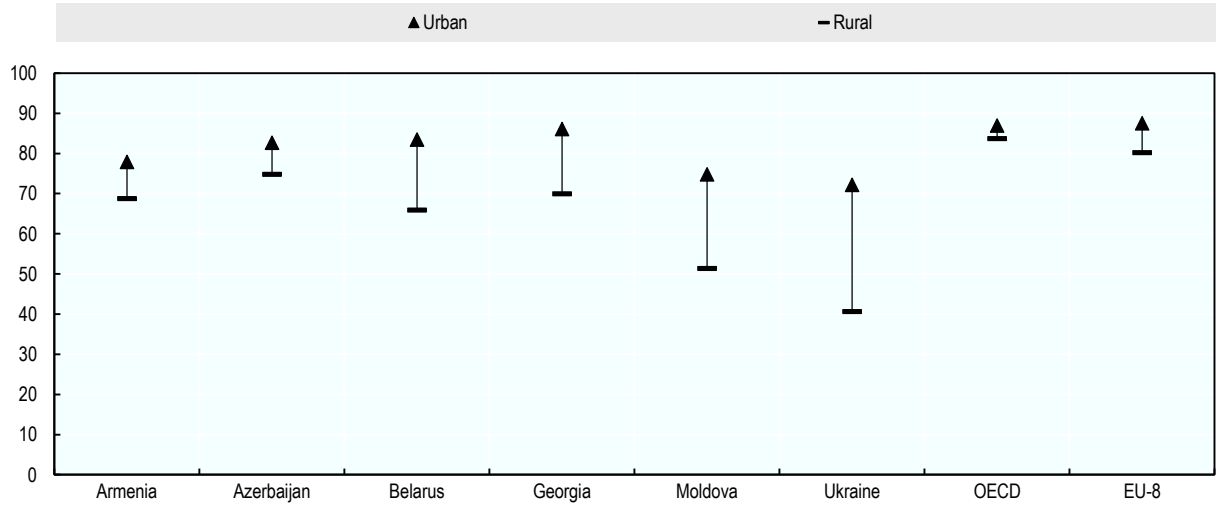
Digital divides remain significant

Despite these positive trends, access to the internet is not yet equally available within countries; there are persistent digital divides, notably between urban and rural areas. For instance, although Belarus shows relatively high numbers of broadband subscriptions overall, only 66% of its rural population has access to the internet at home. In general, the urban/rural gap appears wider in the EaP than in the OECD

(Figure 2.4). Moreover, internet use is also unequal between men and women in most EaP countries, especially in Azerbaijan and Moldova, while there is no significant gender gap in the OECD (ITU, 2020[41]). Finally, businesses' connectivity varies notably depending on the company size, with SMEs lagging behind large firms in that regard (Figure 2.5). Policy makers need to monitor these connectivity gaps and consider them when designing broadband policies by including targeted measures, as these divides are increasing existing inequalities between territories, people and firms. The experience of OECD countries suggests that sound competition and effective broadband policies can help reduce such digital divides in access (OECD, 2019[47]).

Figure 2.4. Rural digital divide in Eastern Partner countries

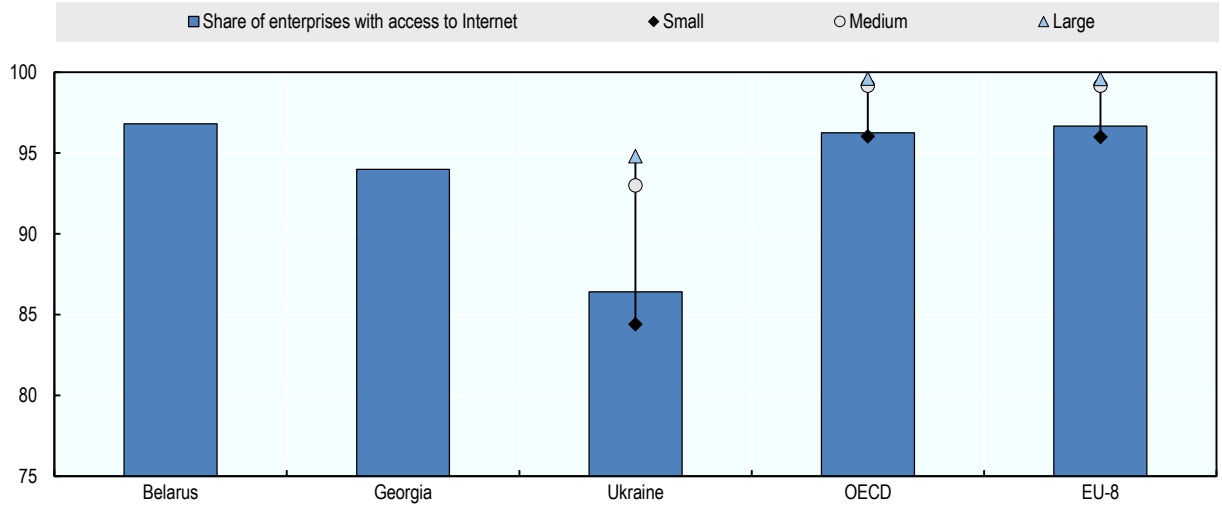
% of households with internet access at home, 2019 or latest year available



Note: Data refer to 2019 except for Armenia (2016) and Ukraine (2018). Median values for OECD and EU-8 (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia).
Source: (ITU, 2021[46])

Figure 2.5. Businesses' access to internet

% of businesses having access to internet, 2019 or latest available



Note: Data not available for Armenia and Moldova, breakdown by size class not available for Georgia and temporarily unavailable for Belarus due to the ongoing implementation of State Programmes related to these matters. The share of enterprises with access to internet does not include micro-enterprises. Data for Azerbaijan not included because of methodological differences. Median values for OECD and EU-8.
Source: National statistical offices for EaP countries, and OECD database on ICT access and usage by businesses for OECD and EU-8.

Policies and strategies for enhanced connectivity in the EaP

Broadband connectivity is gaining increasing prominence in national policy documents in EaP countries. While only Georgia and Moldova have a dedicated national broadband strategy, the other four countries have included policy objectives and measures in their broader ICT strategies/digital agendas (Table 2.1). Most of them aim to further develop digital infrastructures, particularly in rural areas. All countries foresee additional measures to that end, but these vary in focus: for instance, Belarus' main goal is to further develop its infrastructure, while Azerbaijan is planning to liberalise the telecommunication market. Georgia's new National Broadband Development Strategy 2020-2025 includes provisions to stimulate demand for broadband through increased digital literacy. Ukraine is also developing several tools to build citizens' knowledge of broadband services and quality, and monitor connectivity improvements, such as an interactive map of telecommunication infrastructure and a speed test, an online tool enabling users to instantly assess their internet connection. Moreover, EaP countries have benefitted from international assistance in the design and implementation of broadband policies – e.g. the *Broadband Strategies in the Eastern Partner region 2018-2020* project, jointly run by EU4Digital and the World Bank.

Table 2.1. Policies and strategies for broadband connectivity in the EaP

	Armenia	Azerbaijan	Belarus	Georgia	Moldova	Ukraine
National policy documents for broadband development	Connectivity policies included in the 2018-2030 Digital Agenda and the 2021-2025 digitalisation strategy.	Included in 2016-2020 Strategic Roadmap on development of telecoms and IT.	Included in Digital Development State program 2021-2025, in the subprogram "Infrastructure for Digital Development"	Standalone strategy – the National Broadband Development Strategy 2020-2025.	Broadband Development Programme 2018-2020 and included in the Digital Moldova Strategy 2020.	One of 94 digital transformation projects dedicated to the development of broadband infrastructure (e-Access project).
Main objectives	Ensure internet access throughout the country, incl. remote areas Improve the legal and regulatory framework Define goals supported by citizens and, businesses Promote partnerships with the private sector	Improve governance structures and strengthen ICT Increase productivity and efficiency of the business environment Digitalize government and social environment	Broaden fixed broadband access through infrastructure development Develop wireless broadband access by extending mobile networks	Enhance legal and regulatory framework by aligning to EU standards Bridge urban/rural digital divide Increase competition Attract investments Foster digital skills	Develop broadband networks with greater data transfer capacity Modernize electronic communication networks	Ensure the coverage of Ukraine by high-speed fixed and mobile broadband Improve digital accessibility for people with disabilities Develop digital infrastructure
Connectivity targets	80% of settlements covered by high-speed connection by 2025 1 Gbps for 80% of the population by 2030.	50 Mbps for 80% of the population by 2025.	96% of population as wireless subscriber 35% of population as fixed broadband subscriber 99% coverage with LTE services	99% of territory covered by 4G by 2025, 100% of households covered by at least 100 Mbps 1 Gbps for all institutional entities	30 Mbps for 60% of households by 2020. 85% of municipalities with mobile broadband	95% of the population covered by high-speed fixed connection by 2024

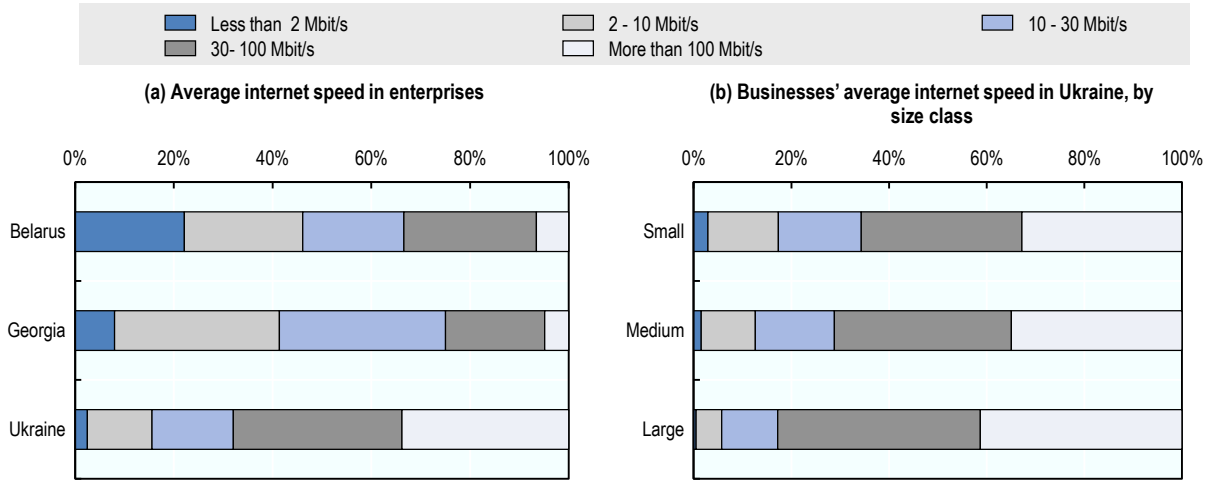
Source: (Government of Azerbaijan, 2016[48]), (EU4Digital, 2013[49]), responses to OECD fact-finding questionnaire in June 2021.

Quality

Bridging the connectivity gap requires not only providing access to broadband across the territory, but also ensuring high-quality services at affordable prices (OECD, 2021[50]). Coverage and speed do not appear correlated: while internet penetration is lower in Moldova and Ukraine than in the rest of the EaP region, over 90% of the fixed broadband subscriptions in both countries are above 10 Mbps (ITU, 2021[46]), compared to 64% in Belarus. Internet speed remains an issue in Azerbaijan: while mobile broadband performs quite well, with a mean download speed of 40.69 Mbps (against a regional EaP average of 34.9 Mbps), download speed over fixed broadband is only 25.1 Mbps (against a regional EaP average of 65.5 Mpbs). Over a third of fixed broadband subscriptions are below 2 Mbps/s (Ookla, 2021[51]) (ITU, 2021[46]) . These trends are reflected in businesses' connection quality (Figure 2.6, panel (a)): Ukrstat reports that a third of Ukrainian businesses with access to the internet had a high-speed connection (over 100 Mbps), but disparities persist between SMEs and large firms: the smaller the firm, the slower the connection (Figure 2.6, panel (b)).

Figure 2.6. Average internet speed in enterprises

% of enterprises with internet access, 2019 or latest available



Note: Panel (a) 2018 data for Belarus. Data not available for Armenia, Azerbaijan and Moldova
Source: Panel (a) National statistical offices. Panel (b) OECD calculation based on Ukrstat.

Despite improvements in internet speed in recent years, current networks in EaP countries are not yet able to deliver gigabit-level speeds. The deployment of fibre optic is still at an early stage, the number of subscriptions per 100 inhabitants ranging from 1.4 in Azerbaijan to 13.4 in Georgia (World Economic Forum, 2019[52]). An estimated EUR 4-14 billion in investments would be needed to reach a 100% fibre coverage across the region (EU4Digital, 2021[53]). Countries are starting to prepare for the introduction of 5G networks, albeit at different speeds. Georgia, Moldova and Ukraine have included provisions to this end in their policy documents, while Belarus has set 5G as a priority in its State Programme for the Development of the Digital Economy 2021-2025, and has created a dedicated working group. Armenia and Azerbaijan have not yet reported specific policy measures on the topic. EU4Digital is also supporting this technology adoption: it is working with EaP countries to release 700MHz band from the current systems to assign it to international mobile telecommunications services, including 5G (EU4Digital, 2021[54]).

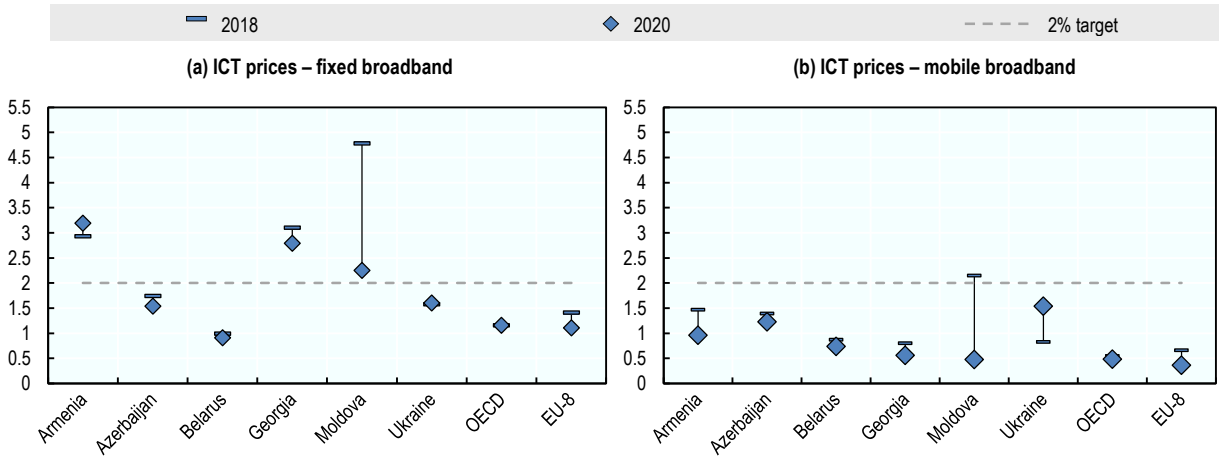
Affordability

Prices can pose a major barrier to broadband uptake and this is partly the case for EaP countries. In fact, limited affordability – together with lack of interest and skills – is one of the main drivers of low uptake, which in turn discourages investments in infrastructures and exacerbates digital divides, establishing a vicious cycle.

Despite the fact that, according to an interesting database comparing broadband prices worldwide, EaP tariffs appear among the cheapest in the world in absolute terms (Cable.co.uk, 2021[55]), tariffs expressed as percentage of gross national income (GNI) per capita show that broadband remains less affordable in the EaP than in OECD and EU countries. The ITU has set an international affordability target of 2% of GNI, at or below which an internet connection is deemed affordable. While EaP countries have reached the target for mobile broadband, fixed broadband is still above 2% of GNI in three countries, which could partially explain its lower uptake compared to mobile broadband. After an increase in 2015-2017, which was accompanied by a drop in the share of households having access to the internet, Moldova has made great efforts to reduce prices since 2017 (Figure 2.7).

Figure 2.7. ICT prices

% GNI per capita



Note: GNI = gross national income. Prices refer to a fixed-broadband basket with a monthly data usage of (a minimum of) 5 GB. Median values for OECD and EU-8.
Source: (ITU, 2021[46]).

EaP countries are also working at the regional level towards a reduction and harmonisation of prices. The six countries are currently preparing, together with the EU4Digital initiative, a regional roaming agreement that should be signed by the end of 2021. It is expected to set limits to roaming prices and to reduce them by 87%, while harmonising national regulatory frameworks and bringing them closer to EU standards (Box 2.1).

Box 2.1. Regional roaming agreement in the Eastern Partner countries

Background

The EU4Digital initiative has conducted several studies to assess the feasibility of harmonising and reducing roaming tariffs among EaP countries – a first one in 2017, which drew out some scenarios and options for a regional roaming arrangement (RRA) between the six countries. The conclusions were updated in another report in 2019, taking stock of the latest market developments and providing impact assessment, including implications of a regional agreement on national regulatory frameworks. It notably underlined that the financial impact of a common roaming space on mobile operators would be minor.

Regional Roaming Agreement

In 2019, following the confirmation of the EaP countries' commitment to sign a Regional Roaming Agreement, EU4Digital has started working on the preparation of the initiative, aiming at harmonising the international mobile roaming regulatory framework among countries and notably roaming prices. As a result, customers of mobile operators will be able to use their subscription without additional costs in any other EaP country. The countries are currently finalising national approval procedures to obtain the mandate to sign the agreement, and the official signing ceremony should take place during a regional meeting in December 2021, with the RRA entering into force on 1st July 2022.

Expected outcomes

The agreement is supposed to reduce roaming prices by nearly 87% by 2026. It should also bring national regulatory frameworks of EaP countries closer to EU standards through the harmonisation process.

Building a Common International Roaming Space between EU and EaP

EU4Digital has carried out a feasibility study on the possibility of establishing a common international roaming space between EaP countries and the EU member states. The legal analysis however concluded that only an internal market treatment or the accession to the EU would allow to establish such a roaming space, which could only take place at the individual country level since the EaP is not a body recognised under international law. Nonetheless, EU4Digital is still assessing options and the potential economic impact of such an EU-EaP agreement, collecting data from mobile network operators.

Source: (EU4Digital, 2021[56]). (EU4Digital, 2021[54]) (EU4Digital Facility, 2021[57]).

Market conditions and regulations for digitalisation

Ensuring competitive market conditions and clear regulations is pivotal for a healthy digital transformation. Sound rules and principles are needed to protect and safeguard consumers and infrastructures in the digital environment. At the same time, unnecessary regulatory barriers must be torn down to avoid hampering and slowing down digitalisation and innovation in general. The clarity brought by a sound regulatory framework can incentivise business to undertake their digital transformation.

Moreover, the harmonisation of digital market frameworks is a fundamental step to eliminate barriers to online services for citizens, public administrations and businesses, resulting in improved quality at better

prices and with greater choice. Bringing the legislation of EaP countries in line with EU standards offers substantial trade benefits, especially for cross-border trade (EU4Digital, 2021[26]).

This section will look into some regulatory aspects of the digital environment, going from National Regulation Authorities, e-commerce and e-signatures, to more advanced technologies. It will then focus on integration with the EU framework and conclude by providing an overview of issues related to digital security.

National Regulation Authorities

National Regulation Authorities (NRAs) play a fundamental role in the electronic communications sector. They promote competition in the provision of electronic communications networks and services by ensuring credible market entry as well as compliance with and enforcement of existing regulations. Therefore, they ensure that users derive maximum benefit from competition in terms of choice, price and quality, and contribute to the development of the market for electronic communications.

In the EaP region, only in four countries is it possible to identify an independent regulator. According to the Eastern Partnership Electronic Communications Regulators Network (EaPeReg), the existence of an authority meeting the requirements of NRA for electronic communications cannot be confirmed for Belarus, where the sectoral ministry still carries out the regulatory functions, or for Azerbaijan, where the Agency for Information Communication Technologies has recently been established under the Ministry of Digital Development and Transport. In all other countries, NRAs regulate the electronic communications sector (EaPeReg, 2017[43]) (see Table 2.2).

Table 2.2. National regulatory bodies in the EaP region

Country	Name
Armenia	**NRA** – PSRC - Public Sector Regulatory Commission
Azerbaijan	Agency for Information Communication Technologies under the **Ministry** of Digital Development and Transport
Belarus	**Ministry** of Communications and Informatization of the Republic of Belarus, and Operations and Analysis Center under the President of the Republic of Belarus
Georgia	**NRA** – ComCom - Communication Commission (former GNCC - Georgian National Communication Commission)
Moldova	**NRA** – ANRCETI - National Regulatory Agency for Electronic Communications and Information Technology
Ukraine	**NRA** – NCCIR - National Commission for the State Regulation of Communications and Informatization

Source: (EaPeReg, 2017[43])

In order for NRAs to be efficient and effective, their governance needs to comply with strict standards. According to the EU *Regulatory Framework for Electronic Communications*, the principles underpinning the operations of the NRAs are:

- independence: the NRAs must be legally separate from and independent of all organisations providing electronic communications networks, equipment or services;
- right of appeal: effective national mechanisms must enable any user or supplier of electronic communications networks or services who is affected by the decision of a NRA to appeal to an independent body; and
- impartiality and transparency: the NRAs must exercise their power in an impartial and transparent manner, and must also put in place mechanisms for consulting interested parties when they are considering taking steps which may impact heavily on the market.

The *Insights report on independence of National Regulatory Authorities in Eastern Partner countries* (EU4Digital, 2020[58]) provides an assessment of the independence of the EaP NRAs for electronic communications. In particular, legislative gaps were assessed with respect to some governance-related

aspects of the NRAs, as well as their powers and obligations. Based on the results of the report, the Armenian PSRC appears to be well established, although its independence may be further strengthened by ensuring availability of sufficient resources and competitiveness of the NRA in the labour market. In Georgia, on the other hand, the regulatory system is well aligned with the EU regulatory framework and the legal guarantees of the regulator's independence are established in the Constitution. Similarly, in Moldova the regulatory system is highly compatible with the EU regulatory framework. In Ukraine, although an NRA has been setup, it does not meet requirements of an independently functioning NRA and a substantial review of the regulatory system is required to bring it in line with EU legislation. While an independent regulatory body has not yet been established in Belarus and the sectoral ministry still carries out the regulatory functions, the Agency for Information Communication Technologies was established in Azerbaijan under the Ministry of Digital Development and Transport in October 2021 and will take up regulatory duties. While this represents a positive development with respect to the previous situation, where the regulatory functions fell within the ministry, it is still unclear to what extent the newly established regulator will meet the requirements of an independently functioning NRA.

E-commerce framework conditions

E-commerce markets in EaP countries have grown rapidly in recent years (as noted in the previous chapter). However, relatively small market size and limited integration with wider European e-commerce markets result in a number of bottlenecks that slow down the growth of the sector. For example, private delivery companies are not able to generate the same kind of economies of scale as in the larger European markets, which results in longer delivery times and higher fees to the customer. Similarly, debit and credit cards remain relatively uncommon, and payment in cash on delivery remains the preferred method in most EaP countries.

A recent study by EU4Digital assessed cross-border e-commerce in the EaP countries against an EU baseline, identifying key issues across the e-commerce ecosystem, the related legal frameworks, and standardisation aspects (EU4Digital, 2020[59]). In addition to small market size and limited financial inclusion, the assessment finds that legislative frameworks related to e-commerce platforms, parcel delivery, and consumer protection need to be further strengthened (for details, see Box 2.2). Clearer definition of the obligations of e-commerce providers and rights of customers would create a more transparent and reliable e-commerce environment, where firms and customers could operate on a more level playing field especially on e-commerce platforms.

Box 2.2. Common gaps for cross-border e-commerce in EaP countries compared to EU

Gaps in e-commerce ecosystem

Marketing, sales and payment: the use of global e-commerce platforms that operate in the EU is limited because of slow/expensive delivery, preference for cash-on-delivery and poor awareness. Local EaP e-commerce platforms engaging in cross-border e-commerce are not common for the same reasons.

Parcel delivery: because of limited market size, global private operators struggle to maintain high e-commerce volumes, which results in higher rates for the consumer. Delivery times are several days slower than in the EU, where delivery within 48 hours is common.

The EU 2021 e-commerce package: in July 2021, the EU introduced extensive reforms to the VAT and customs obligations for e-commerce to harmonise procedures related to cross-border trade. The package will include a one-stop-shop for VAT, elimination of a number of exemptions and new requirements to e-commerce platforms. Stakeholders in the EaP region remain largely unaware of the upcoming changes and only fragmented actions to prepare for the upcoming changes are taking place.

Gaps in the relevant legal frameworks

Platforms: there are only limited regulations of terms and conditions that transparently explain the parameters determining the ranking of goods within the search results on platforms.

Parcel delivery: limited regulation of postal security requirements regarding the provision of electronic advance data of distance sales and insufficient preparation for the EU VAT e-commerce package limit potential cross-border trade.

Consumer protection: limited regulation of misleading practices in paid advertisements, information requirements for distance contracts of digital content, and misleading omissions about consumer reviews of products reduce the transparency and reliability of local e-commerce platforms.

Gaps in e-commerce standardisation aspects

Digital postal services: limited standardisation of electronic advanced data semantic mapping of attributes of commercial single items that are compliant to the Universal Postal Union (UPU) – World Customs Organisation rules.

UN, EU, UPU technical standards: insufficient standardisation of rules regarding post, courier, express, parcel operations and customs agents that transport e-commerce items from a third country into the EU.

The UPU technical standards: limited standardisation of Electronic Data Interchange between customs authorities and postal operators on risk assessments.

E-commerce websites' trust mark: lack of national e-commerce trust mark certification schemes to authenticate that a platform has made commitments to comply with the code of conduct, guaranteeing ethical standards in the digital marketplace.

Source: (EU4Digital, 2021[60])

E-signatures

When companies move their operations online, one of the key challenges is to meet the legal and contractual obligations without physical paperwork. Electronic signatures can range from a simple photocopy of a physical signature to different levels of verified signature, where mathematical algorithms

are used to establish the identity of the signatory. A unique private key may be assigned to the signatory and stored solely by the user. A multitude of verification methods may be used from the verification of the signatory's identity through online banking to verifying the key with a physical card reader and, for example, national identity card.

All EaP countries adopted specific legislation to cover the use of electronic signatures in the early 2000s. Common electronic trust services, such as mobile ID, electronic ID, and timestamp services are implemented across the region. Electronic signatures are widely recognised as functionally equal to physical signatures. In most EaP countries, the verification of electronic signatures is tied to national identity cards. The legislative frameworks facilitate a flexible use of electronic documents and signatures in domestic markets but the lack of regionally harmonised standards or mutual recognition causes friction for cross-border trade operations. In the European Union, the eIDAS regulation distinguishes between three different levels of e-signatures: simple electronic signature, advanced electronic signature, and qualified electronic signature, which offers the highest level of data security and equivalence to physical signatures. Among EaP countries, only Moldova and Ukraine have harmonised their e-signature standards to be compatible with the EU eIDAS standards.

Table 2.3. Legal status of e-signatures in EaP countries

	Armenia	Azerbaijan	Belarus	Georgia	Moldova	Ukraine
Laws on electronic signatures	Law of the Republic of Armenia, 15 January 2005 No. ZR-40 "About the electronic document and the electronic digital signature" (amended on 29 March 2018).	Law of the Azerbaijan Republic of 9 March 2004 No. 602-IIG "About the digital signature and the electronic document" (amended on 11 November 2016).	Law of the Republic of Belarus of 28 December 2009 No. 113-Z "About the electronic document and the electronic digital signature" (as amended on 8 November 2018).	Law of Georgia On Electronic Signatures and Electronic Documents, 14 March 2008	Law of the Republic of Moldova of 29 May 2014 No. 91 "About the digital signature and the electronic document" (amended on 30 November 2018).	Law of the Republic of Ukraine on "Electronic confidential services", 5 October 2017 (amended on 14 January 2020)
Use of simple, unqualified electronic signatures	No	Yes	No	Yes	No	Yes
Qualified electronic signatures	Yes	Yes	Yes	Yes	Yes	Yes
Qualified remote signatures	No	Yes	Yes	Yes	No	Yes
Harmonisation with the EU eIDAS regulation recommendations (integrated EU framework for electronic signatures)	No	No	No	No	Yes	Yes

Source: Adapted from (EU4Digital, 2020[59]).

National policy frameworks related to advanced technologies

New digital technologies from artificial intelligence to blockchain are creating new opportunities for the private and public sector alike. While there is a wide consensus amongst technology researchers about their potentially transformative impact, the practical application of the new technologies is still at an early

stage. Many countries around the world have adopted dedicated national strategies to facilitate the diffusion of advanced technologies and to support their practical application. For example, the European Union has adopted a dedicated Blockchain strategy to build a pan-European blockchain architecture for public service applications of the technology, to build legislative frameworks defining criteria and recognition of blockchain-based applications, to increase funding for blockchain research and innovation, and to support education for relevant skills (European Union, 2021[61]).

Some EaP countries have also established dedicated strategies to support the use of advanced digital technologies and responsible agencies to guide policymaking. In Ukraine, the concept of digital economy and society development and action plan for its implementation for 2018-20 includes a section on the implementation of Industry 4.0.

Table 2.4. Dedicated national strategies to foster the uptake of advanced digital technologies

	Armenia	Azerbaijan	Belarus	Georgia	Moldova	Ukraine
Artificial intelligence	No	N/A	No	No	No	Yes
Blockchain	No	N/A	No	Yes	No	Yes
Big Data	Yes	N/A	No	No	No	Yes
Internet of Things	No	N/A	No	No	No	Yes
Quantum computing	No	N/A	No	No	No	No
Robotics	No	N/A	No	No	No	Yes
Smart cities	Yes	Yes	No	Yes	No	Yes
Virtual/Augmented reality	No	N/A	No	Yes	No	Yes
Responsible government body working on advanced digital technologies	Ministry of Transport, Communication and Information Technologies	Ministry of Digital Development and Transport; Centre for Analysis and Coordination of the Fourth Industrial Revolution under the Ministry of Economy	The Ministry of Communication and Informatisation; Operational Analytical Centre under the President of the Republic of Belarus	Georgian Innovations and Technologies Agency	No dedicated government body, but the e-Governance Agency is piloting several projects that utilise advanced digital technologies, e.g. blockchain, AI	The State Agency for eGovernance of Ukraine and the public association Hi-Tech Office of the Ministry of Economic Development and Trade.
Note			Some technologies are mentioned in the Strategy of Informatisation 2016 – 2022; Presidential decree No. 8, 2017 *On development of digital economy*; the State Program for Innovative Development 2021-2025, Program for social and economic development 2021-2025, and other industry strategies	The national strategy on Innovative Development and Innovations (2014) covers advanced digital technologies.		The Concept of digital economy and society development and action plan for its implementation for years 2018 – 2020 includes a section on the implementation of Industry 4.0

Note: The survey answers were submitted in 2019, Azerbaijan's answers were not made available to the public.
Source: the table is based on the answers provided by the EaP countries to the UN E-Government Survey 2020 (United Nations, 2020[62]).

Regional and EU integration

Integration with EU digital markets

In 2015, the EU Commission announced the EU Digital Single Market strategy (Box 2.3), to integrate national digital markets into a single European digital market by reducing barriers to cross-border digital trade and setting shared standards from parcel delivery to data security. The strategy is focused on three pillars: i) enhancing consumers' and firms' access to digital services across the single market, ii) creating an enabling environment and level playing field conditions for digital businesses to grow, and iii) increasing the growth potential of the European digital economy. In the *Council Conclusions on Eastern Partnership policy beyond 2020*,[8] the Council reiterated the importance of the digital transformation for EaP economies and the benefits they can derive from the Digital Single Market. For EaP countries, the integration with the European digital market presents a number of opportunities.

The creation of European wide standards across the digital economy simplifies the operational environment for firms in the EaP countries that seek to increase trade with EU markets. Instead of dealing with a number of fragmented digital markets, firms will benefit from increasing clarity and harmonisation across the EU. At the same time, the introduction of more stringent standards especially in digital security, trust services and e-commerce is likely to create additional burden for firms to comply with.

Still, the long-term benefits are likely to outweigh the compliance costs as the adoption of EU digital standards would enable firms in the EaP to access new markets. A widespread adoption of EU standards and legislative alignment with the EU digital market would strengthen customer protection and data security standards for EaP citizens, while also increasing the availability of European digital services and goods to EaP customers, which would mean higher competition and thus lower prices and more choice for customers in local digital markets (Iavorskyi et al., 2021[63]).

[8] https://www.consilium.europa.eu/media/43905/st07510-re01-en20.pdf

Box 2.3. The EU Digital Single Market strategy

The EU has branded the 2020s as Europe's digital decade and adopted a digital strategy to increase Europe's competitiveness. The strategy aims to ensure that European firms and customers can seamlessly access online goods and services across the single market in an environment of fair competition and high level of data protection. The strategy is focused on three key pillars:

- *Access – Access to online products and services for consumers and businesses*: to build an integrated e-commerce market that facilitates cross-border trade, the EU has revised its Payment Services Directive and adopted new rules on cross-border parcel delivery services. The new rules do not set caps on international shipping but they create a transparent system, where customers and governments can easily compare shipping rates and governments are mandated to review the fairness of shipping costs applied to the customer. At the same time, new rules will forbid unjustified geoblocking where foreign customers are prevented from buying goods. Similarly, new rules will seek to block the currently common practice of preventing customers' access to audio-visual digital services outside the country of purchase. To increase customer protection, the EU has introduced new directives that will require e-commerce platforms to inform their customers transparently of their rights and also label paid product placements when customers search for items.
- *Environment – Creating an enabling environment for digital networks and services to grow and thrive*: the EU is seeking to position itself as a leader in digital technology by setting industry standards in the regulation of emerging technologies from AI to 5G over internet of things to cloud computing.
- *Economy and Society – Maximising the growth potential of EU's digital economy*: in the EU, 47% of the adult population lack sufficient digital skills even when 90% of jobs are expected to require digital skills in the near future. The EU has set ambitious goals to reduce the share of school children with inadequate digital skills and created a digital skills and jobs platform, which enables EU governments to share best practices and toolkits to enhance the quality of teaching digital skills. In another policy area, the EU is reducing barriers to the transfer of non-personal data to enable digital companies to grow.

Source: (EU4Business, 2021[64])

Among EaP countries, Ukraine has already made the integration with the EU digital markets a priority and taken concrete steps to facilitate integration. The EU-Ukraine summit in October 2020 stressed the importance of digital markets for EU-Ukraine integration. The two sides discussed the gradual implementation of the EU Digital Single Market *acquis* as an integral part of the Association Agreement (European Union, 2020[65]). The meeting was followed by a joint plan to co-operate on the approximation of trust services[9] in Ukraine to EU standards, paving the way for eventual mutual recognition of electronic trust services, which would greatly reduce non-tariff barriers to cross-border digital trade (European Union and Government of Ukraine, 2021[66]). One study estimated that improved digitalisation of the Ukrainian economy and integration with the EU digital markets could significantly boost trade between EU and Ukraine and contribute to stronger growth in Ukraine (See Box 2.4).

[9] Trust services include services with legal validity such as eSignatures, time stamping, electronic seal, electronic delivery, legal admissibility of electronic documents, and website authentication (European Commission, 2021[132]).

Box 2.4. Estimating the benefits of integration with the EU digital markets for Ukraine

Iavorskyi et al. (2021[63]) estimate the potential benefits for the Ukrainian economy if it successfully increases the level of digitalisation and integrates with European digital markets. The authors find that the current level of digitalisation is significantly lower than in EU economies. Ukraine has a high level of human capital but the use of digital technologies by local firms and the digitalisation of government services lag significantly behind EU members, including those in Central and Eastern Europe and the Baltic. The authors estimate that if the level of digitalisation was expressed as a value between 0 and 100 (from least to most digitalised), a one-point increase in the level of digitalisation in the Ukrainian economy would increase Ukraine's GDP by 0.42%.* Increasing the level of Ukraine's digitalisation to the EU average would raise Ukraine's GDP between 2.4% and 12.1%, depending on the level of integration with EU digital markets. The authors estimate that if Ukraine successfully implemented a high level of approximation with EU's digital standards and legislation, the trade between EU and Ukraine would increase significantly: Ukraine's exports to the EU could increase by 11.8-17% and EU exports to Ukraine by 7.6%-12.2% in turn.

Notes: (*) The authors calculated a *Digitalization Index* for 46 countries for the period from 2016 to 2018 that describes their digital development. The index is a composite indicator of five weighted components (Connectivity (25%), Human capital/Digital Skills (25%), Use of Internet Services by Citizens (15%), Integration of Digital Technology by Businesses (20%) and Digital Public Services (15%)).
Source: (Iavorskyi et al., 2021[63]).

Digital security and trust in the digital economy

A growing digital economy can bring significant benefits in terms of efficiency, innovation and opening up new business opportunities, but as more and more operations move online, citizens, governments and businesses also face ever-growing digital security threats. These differ in form and purpose, ranging from untargeted phishing campaigns to very sophisticated malwares (see Box 2.5). Such incidents can generate considerable economic and social losses – e.g. disrupting operations, damaging reputation and competitiveness, causing financial losses – and erode users' trust.

Box 2.5. Typology of digital security threats

Phishing

A disguised attacker communicates with the target to obtain sensitive information, e.g. usernames and passwords to infiltrate personal accounts or IT systems. The sophistication of phishing attacks ranges from untargeted mass campaigns faking e-commerce or other online services, to highly sophisticated spear-phishing emails, where the attacker purports to be an actual person from the target's organisation, e.g. IT support officer requesting confidential user information. Another common form used against companies is the so-called CEO fraud, where cybercriminals impersonate executives.

Malware

A malware is a malicious code. The term notably encompasses viruses, Trojans (malware looking like a normal software), spyware/adware (installed on a device e.g. when the user opens attachments), and worms. The technological sophistication of malware has greatly increased over the years: metamorphic malware completely rewrites its code with each additional propagated version of itself, making it extremely difficult for anti-malware software to detect threats.

Ransomware

This type of software encrypts the victim's access to data or IT system, asking for a ransom to unlock it. This form of digital extortion has become increasingly common and targeted. The Wannacry and NotPetya attacks for instance caused damages up to billions of dollars in 2017, affecting multinationals like Boeing, DHL, Honda, Renault, etc.

Distributed Denial of Service (DDoS)

DDos attacks seek to disrupt the availability of an online service by directing excessive traffic to the system, overwhelming the servers by leveraging a network of compromised devices called drones or zombies. The attacks are commonly used to extort money from the victims.

Cybersquatting

This growing threat to e-commerce businesses consists of registering or using an internet domain name similar to that of an existing business to profit from the trademark. The attacker then offers to sell the domain name to the trademark.

Two common vulnerabilities underlying all of the above are human errors and out of date software. For example, in the case of the notorious ransomware attacks in 2017, firms like Microsoft were able to respond to the threat with software updates in a few days.

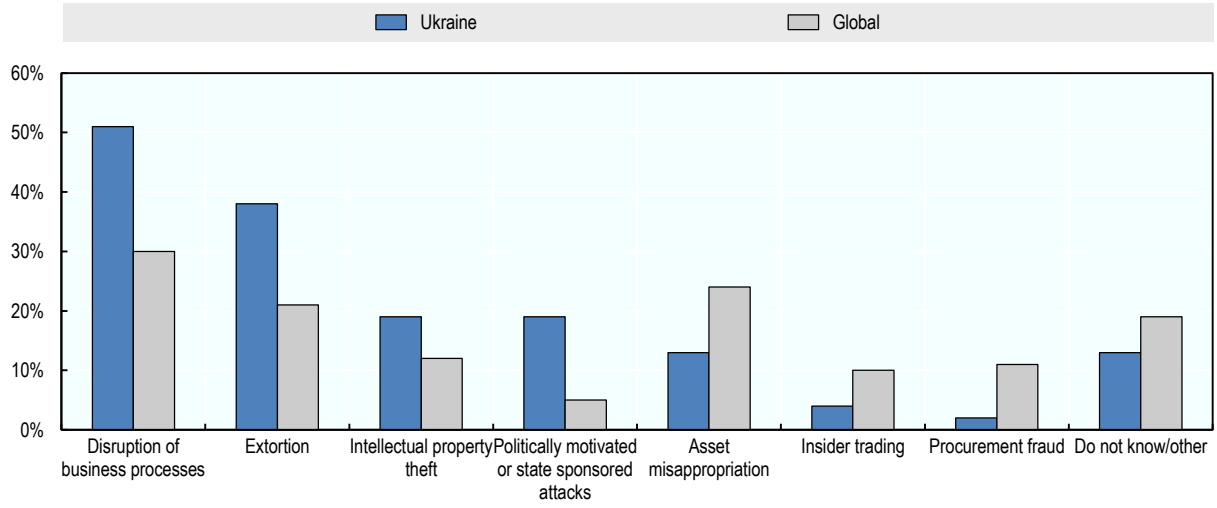
Source: Adapted from (OECD, 2021[6]), (OECD, 2020[67]) and (IT Governance, 2021[68]).

SMEs appear particularly vulnerable to these risks as they are often not fully aware of them and lack the resources to take adequate security measures (OECD, 2016[69]). The COVID-19 pandemic and the intensification of digital activities that resulted from containment and social distancing measures have led to a surge in attacks (OECD, 2020[70]), which further highlighted SMEs' vulnerability. For instance, many small businesses that switched to remote work did not use defence mechanisms such as Virtual Private Networks, multi-factor authentication processes or professional computers, which created additional exposure, as employees had to use their own, less secure, devices (OECD, 2020[71]).

Although EaP countries are not included in international databases that report on the frequency and type of digital security incidents, some evidence suggest that they are considerably exposed to these threats, albeit at different levels. In Ukraine for instance, the frequency of cybercrimes has increased in recent years: 31% of Ukrainian firms experienced cybercrime in 2018, up from 24% in 2016. Although the figures are in line with global averages, Ukrainian businesses were more likely to experience a disruption of business processes, extortion or intellectual property and theft as a consequence of cybercrime compared to firms surveyed in other parts of the world (Figure 2.8) (PwC, 2018[72]).

Figure 2.8. Typology of cybercrimes faced by Ukrainian firms

Percent of respondents to the survey, 2018



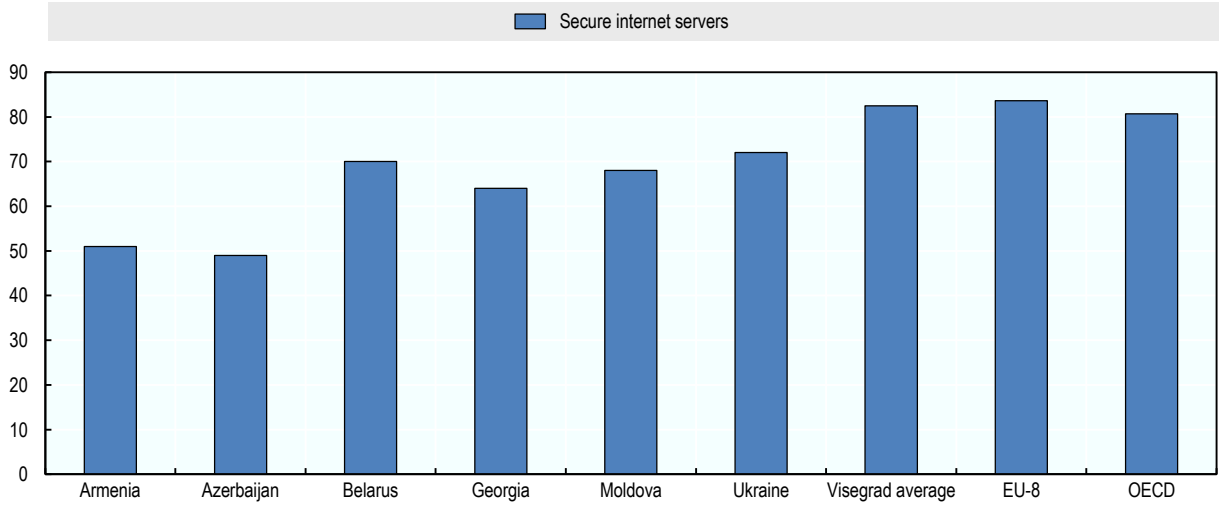
Source: Adapted from (PwC, 2018[72]).

In general, EaP countries show greater vulnerabilities, largely due to a smaller density in secure servers (Figure 2.9), and lower preparedness to counter digital security incidents. ITU's Global Cybersecurity Index 2020, which assesses countries' ability to face cybersecurity threats, ranks most EaP countries below Visegrád Group[10] averages. Ranked 40th out of 193, Azerbaijan stands out in that regard, with scores equivalent to or above those of the Visegrád countries'. However, the Index shows wide disparities across the region, with Belarus and Armenia in 89th and 90th positions, respectively (Figure 2.10) (ITU, 2021[73]).

[10] Czech Republic, Hungary, Poland and Slovakia.

Figure 2.9. Number of secure internet servers

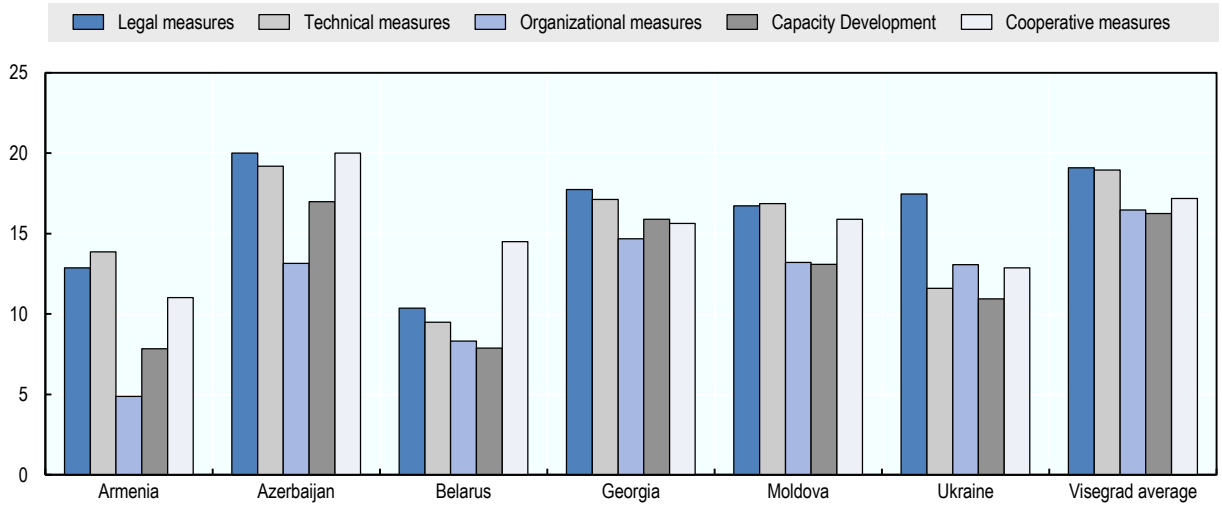
Normalised, 2019



Note: Secure servers correspond to the 'number of distinct, publicly-trusted TLS/SSL certificates found in the Netcraft Secure Server Survey'.
Source: (UNCTAD, 2020[74]).

Figure 2.10. EaP countries' scores in the Global Cybersecurity Index 2020, per pillar

Scale from 0 to 20



Note: **Legal measures** refer to the presence of legislations, regulations and other rules related to digital security; **Technical measures** to the existence of technical institutions and framework for digital security; **Organisational measures** to the presence of coordination institutions, policies and strategies at the national level; **Capacity Development** to research and development, education and training programmes, certified professionals and capacity building, and **Cooperative measures** to partnerships, cooperative frameworks and information sharing networks.
Source: (ITU, 2021[73]).

In order to minimise risks and manage attacks in the most efficient way, both governments and businesses have a key role to play. Improving digital security requires comprehensive policies covering at the same time digital security risk management, data privacy and consumer protection (on the latter, see above). This would not only increase economies' and societies' resilience to cyber incidents, it would help build

trust in the digital economy – both on the demand side, by protecting users, and on the supply side, as SMEs often lack confidence in digital tools and awareness of digital risks (OECD, 2016[69]).

Digital risk management

National policy frameworks governing digital security in EaP countries vary considerably. Georgia, Moldova and Ukraine have adopted dedicated strategies and action plans. In other countries, digital security objectives are defined either in strategies for ICT development (Azerbaijan), or in national security strategies (Armenia), but Azerbaijan plans to develop a National Strategy on Information Security and Cybersecurity for 2022-2027. Belarus adopted in 2019 an Information Security Concept, a policy document defining strategic objectives and priorities in that field.

All countries have at least one computer emergency response team (CERT)[11], but they differ in resources and scope: Armenia and Moldova do not have national CERTs – Armenia's CERT is a non-governmental initiative, while Moldova's only addresses threats directed at government services and structures. In the four other countries, national CERTs have been created and enable the reporting and monitoring of incidents, but they do not enjoy the same powers to investigate incidents or raise awareness. Moreover, according to a recent assessment, the funding and digital security expertise of the state bodies in charge of countering digital threats remain insufficient in all six countries (EU4Digital, 2020[75]).

EaP countries have started to develop legal and regulatory frameworks on digital security over the past years, but they mostly remain at a nascent stage (Table 2.5). Only Belarus, Georgia and Ukraine have dedicated cybersecurity legislation, while Moldova's 2009 *Law on preventing and combating cybercrime* sets some initial yet succinct provisions regarding the institutional framework and international co-operation. In the other countries, digital security issues are mainly covered by laws governing electronic communications and data storage. Cybersecurity standards in most EaP countries are based on international ISO and IEC 27000 standards. However, it should be noted that national minimum requirements on digital security are not mandatory for private firms except in Belarus and Ukraine, and, in most cases, there is no legal obligation to report cybersecurity incidents – which also makes monitoring more difficult. In Azerbaijan, a cybersecurity incidents report mechanism is envisaged in the draft of the National Strategy on Information Security and Cybersecurity for 2022-2027.

All EaP countries except Belarus have ratified the Budapest Convention on Cybercrime, which seeks to facilitate international co-operation on the investigation of cybercrime, and work towards implementing it, notably within the Council of Europe and EU's CyberEast project. However, as of June 2020, none of the EaP countries has harmonised its cybersecurity frameworks with the EU directive on security of network and information systems (NIS Directive).

In addition to the policy and legal frameworks, empowering EaP countries with digital security skills is essential to avoid incidents and build users' confidence in the digital economy. Many vulnerabilities stem from a lack of preparedness against digital incidents: in a recent survey of Ukrainian firms, for instance, most firms had not carried out any fraud risk or cyber vulnerability assessment (PwC, 2018[72]). In that regard, EaP countries have initiated a number of initiatives to raise awareness of individuals and businesses on digital security issues, such as trainings, workshops, cybersecurity exercises and dedicated events. Academic programmes on cybersecurity are also available, except in Georgia, which plans to develop some.

Finally, all countries take part in bilateral and regional cooperation initiatives. For instance, the GUAM (Organisation for Democracy and Economic Development), composed of Azerbaijan, Georgia, Moldova

[11] A computer emergency response team is an incident response capability which is usually responsible for preventing cyberattacks, monitoring them, and help react to them by providing technical assistance. It also contributes to awareness-raising through information/resources sharing and/or dedicated campaigns.

and Ukraine, has a working group on cybersecurity, while Armenia and Belarus are involved in bilateral initiatives only with non-EaP countries (United Nations Institute for Disarmament Research, 2021[76]). The six countries are involved in international co-operation activities, notably with the EU (EU4Digital), the United Nations and/or the OSCE. The ITU for example conducted regional cyberDrills exercises in several EaP capitals (ITU, 2021[80]). These annual capacity-building events enable countries to exchange on latest issues and trends, and include hands-on sessions during which participating countries have to come up with response plan to different incident scenario.

Table 2.5. Legislative frameworks governing digital security in EaP countries

	Armenia	Azerbaijan	Belarus	Georgia	Moldova	Ukraine
Dedicated cybersecurity legislation	No	No	Yes. Law on Information, Informatisation and Information Protection of 10 November 2008 No. 455-Z.	Yes. Law of Georgia on Information Security of 5 June 2012.	No	Yes. Law n°45 on the basic principles to ensure cyber security of 5 October 2017 (amended in 2020).
Signatory to the Budapest Convention on Cybercrime	Yes	Yes	No	Yes	Yes	Yes
Harmonisation with the European Union Directive on Security of Network and Information Systems	No	No	No	No	No	No
Legal requirement to report cybersecurity incidents	No	No	Only in case of breaches of confidential/classified information.	Only public sector operators of critical infrastructure.	Only electronic communication network operators.	Only State Information Resources' operators.
Mandatory minimum cybersecurity requirements defined at the national level	No Specific rules and obligations apply to the financial and banking sector.	Yes, mostly based on ISO/IEC 27,000 standards. Obligations apply to government bodies, essential service providers and private firms in the banking sector.	Yes, based on national and adaptations of ISO standards. Obligations apply to government bodies, essential services and critical infrastructure, and private firms.	Yes, mostly based on ISO/IEC 27,000 standards. Obligations apply to critical information infrastructure operators.	Yes, mostly based on ISO/IEC 27,000 standards. Obligations apply to public bodies and electronic communications operators.	Yes, mostly based on ISO and NIST standards. Obligations apply to public bodies and private firms.

Source: (United Nations Institute for Disarmament Research, 2021[76]), (Lexology, 2017[77]), (Lexology, 2020[78]), (EU4Digital, 2020[75]), (Legislative Herald of Georgia, 2012[79]).

Data privacy and protection to build trust

As the time spent online and the number of online transactions grow, users' personal data are being increasingly collected by providers of digital services, which in turn increases the vulnerability to breaches and personal data leaks. To manage such risks, EaP countries have adopted legislation on data privacy and protection (Table 2.6). However, most of these regulations appear outdated and are not in line with

the recent EU General Data Protection Regulation (GDPR). Only Belarus has adopted a new law in 2021, setting out some principles similar to the GDPR's (Pravo.by, 2021[81]), but the exemptions foreseen, for instance on consent requirements to process personal data, are very broad, which is likely to impede the effective protection of users' rights.

Table 2.6. Provision of electronic trust services in the EaP countries

	Armenia	Azerbaijan	Belarus	Georgia	Moldova	Ukraine
Laws on data privacy and protection	Law of the Republic of Armenia of 13 June 2015 No. ZR-49 "About personal data protection" (amended on 23 July 2019)	Law on Personal Data of 11 May 2010 No 998-IIIQ.	Law on Personal Data Protection of 7 May 2021 No 99-3 (to enter into force by end 2021) Law on Information, Informatisation and Information Protection of 10 November 2008 No. 455-Z	Law of Georgia On Personal Data Protection of 28 December 2011, No. 5669.	Law of the Republic of Moldova of 8 July 2011 No. 133 "About personal data protection".	Law of Ukraine of 1 June 2010 No. 2297-VI "About personal data protection" (amended several times, until 2021)
Legal requirement to notify data breaches	Yes. The processor has three working days to remedy to the violation, or, if impossible, has to destroy data.	No	No	No	Yes (decision No. 1123 of 14 December 2010 on the Security of Personal Data)	No Such obligations can however occur in contracts (e.g. commercial)
Electronic seals	No	Yes	Yes	Yes	No	Yes
Website authentication certification certificates	No	Yes	No	No	No	No
eID	Yes	Yes	No	Yes	Yes	Yes
Mobile ID	Yes	Yes	Yes	Yes	Yes	Yes
Timestamp services	Yes	Yes	Yes	Yes	Yes	Yes
Validation services	Yes	Yes	Yes	Yes	Yes	Yes
Preservation services	No	Yes	No	No	No	Yes
Remote signing services	No	Yes	Yes	Yes	No	Yes

Source: (DataGuidance, 2021[82]), (EU4Digital, 2020[59]), (EU4Digital, 2020[83]), (Pravo.by, 2021[81]), (Lex.justice.md, 2010[84]).

Changes are underway in several countries. Ukraine's government submitted a draft law on personal data protection to parliament in June 2021 to align with the GDPR. Moldova had prepared draft amendments in November 2018, which are still under discussion, and Georgia's State Inspector's office is currently working on a set of changes to the Personal Data Protection Law to implement the GDPR. Many differences between EaP and EU frameworks thus remain: for instance, businesses are not required, except in Belarus, and in some cases in Ukraine, to appoint a data protection officer, and the penalties foreseen in case of violation are generally less stringent than in the EU.

Furthermore, most EaP countries do not have strict requirements to report data breaches either to customers or to law enforcement. On the one hand, this creates an environment where SMEs can operate digital services more easily, without the burden of cumbersome technical requirements. On the other hand, the absence of stricter requirements contributes to an operating environment where customers do not necessarily trust businesses to take sufficient measures to protect their data. This can be especially harmful to SMEs that are seeking international growth opportunities and need to respond to more stringent digital security and data protection requirements, for example in the EU.

Way forward

Connectivity and physical infrastructure

In line with the OECD *Recommendation on Broadband Connectivity* (OECD, 2021[85]), EaP countries should accelerate the deployment of high-speed broadband at affordable prices and bridging connectivity gaps by:

- **Boosting competition and private investment**. To this end, EaP governments could consider promoting co-investment and infrastructure sharing. By enabling network operators to access existing infrastructure on non-discriminatory and competitive conditions, such measures would reduce costs for providers, incentivising them to expand coverage and offer services at lower prices. Simplifying administrative procedures can also facilitate the roll-out of infrastructures. Moreover, legal and regulatory frameworks for connectivity should be regularly reviewed to ensure their continued adequacy, and be discussed during multi-stakeholder consultations. Involving network operators, consumers, regulatory authorities, along with all levels of governments, on these topics would help ensure that all views are taken into account in the public decision-making process and that new laws and regulations are understood and accepted.
- **Fostering demand for quality broadband** by increasing individuals' and businesses' digital literacy and providing them information on available offers. In addition to the policy options to improve digital literacy outlined in Chapter 0, governments could consider measures to increase consumer rights and choice. This could be supported by eliminating information asymmetries and collecting and publishing open and reliable data on subscriptions, coverage and quality of service, thereby helping consumers make informed decisions while encouraging providers to improve network quality. In Korea, for instance, the National Information Society Agency has been monitoring the quality of broadband services and publishing results annually. This data-driven approach has fostered a continued increase in network quality, while strengthening competition by informing users, and helped reducing the urban-rural digital divide (OECD, 2021[50]). Finally, level-playing-field conditions, such as contract enforcement and alternative dispute resolution, can also help empowering customers.
- **Exploring options to expand the roaming agreements and establish a common international roaming space between EaP countries and the EU member states**. This would allow customers of mobile operators from EaP countries to use their subscriptions without additional costs in EU member states.

Market conditions and regulations for digitalisation

National Regulation Authorities

In order to promote competition in the provision of electronic communications networks and services, EaP countries should:

- **Ensure that NRAs are established and comply with standards established by the EU***:* Belarus should establish a regulatory body independent from the government. Overall, EaP countries should ensure NRAs' decision making is timely, impartial, and separated from operational functions. Moreover, stakeholders should be allowed to appeal against NRAs' decisions via clear and established appeal procedures and dispute resolution mechanisms. Finally, NRAs should be endowed with all the powers they need in order to perform their functions properly (e.g. powers to enforce regulation, to regulate market entry, to define and analyse relevant markets, to monitor radio frequencies, to solve customer complaints, to set universal service obligations, etc.) and clarity in regards to their obligations should be provided.

E-commerce

The development of the e-commerce sectors in the EaP countries has been fast but remains in a relatively early stage of development. To maximise the growth potential offered by the e-commerce sector to the region's SMEs, governments in the EaP region could consider a number of policy measures:

- **Strengthen regulatory frameworks governing consumer protection**: in accordance with the *OECD Recommendation on Consumer Protection in E-commerce*, more clearly defined obligations on e-commerce operators are fundamental. These should be based on core characteristics such as transparent and effective principles - e.g. on product descriptions; fair business, advertising and marketing practices; accurate and easily accessible online disclosures; clear and unambiguous transaction confirmation processes; easy-to-use and secure payment mechanisms; transparent and effective dispute resolution mechanisms; guaranteed consumer protection and digital security; and educated and aware consumers, government officials and businesses (OECD, 2016[86]).
- **Establish consolidated central distribution networks**: in order to reduce delivery times for domestic and cross-border delivery of commercial items, EaP countries should establish centralised warehouses, fulfilment and sorting facilities to enhance postal capacity for cross-border transportation.
- **Improve compliance with electronic payments**: EaP countries should assure the maximum consumer protection when using electronic payment on e-commerce platforms by for instance introducing liability for unauthorised payment, removing surcharges, and allowing for customer authentication.

E-signature

- **Align e-signature and trust services standards with EU standards to increase the potential for cross-border trade**: harmonisation with EU standards would help EaP businesses to seize business opportunities in the wider European markets and increase the potential for EU customers to purchase goods and services from EaP-based firms.

Digital security and trust

EaP countries need to:

- **Strengthen their policy frameworks for digital security**. In that regard, Azerbaijan should finalise its draft strategy and action plan on Information Security and Cybersecurity for 2021-2025, while Armenia should develop such strategy. Moreover, all countries could increase their technical response capacity, e.g. by creating a national CERT in Armenia and Moldova, as foreseen in Armenia's 2020 National Security Strategy and Moldova's Information Security Strategy. Existing CERTs could be enhanced with more power, human and financial means.
- **Harmonise legislation on digital security and data protection at the regional level and align it with the EU's NIS and GDPR, respectively.** EaP countries should further strengthen their legal frameworks, on the one hand to develop the security provisions for firms (e.g. incentivising them

to adopt a risk management approach), and on the other hand to better protect users' data, notably by introducing an obligation to notify data breaches.

- **Step up multi-stakeholder cooperation initiatives.** The COVID-19 crisis renewed the need to create multi-stakeholder ecosystems for digital security, which had already been highlighted as a key principle in the OECD 2015 *Recommendation on Digital Security Risk Management for Economic and Social Prosperity* (see Box 2.6). This would enable better information and resource sharing. To this end, EaP countries could foster multi-stakeholder cooperation through various initiatives – e.g. online platforms to provide information or report incidents; sector-specific partnerships to share information and best practices; or partnerships with internet service providers to help the detection and cleaning of infected devices. Governments have a key coordination role to play in that regard (OECD, 2020[71]).

Box 2.6. Key principles of the OECD *Recommendation of the Council on Digital Security Risk Management for Economic and Social Prosperity* 2015

This OECD recommendation provides guidelines for a risk management policy framework to tackle digital security issues. It notably makes a terminology shift from 'cybersecurity' to 'digital security', and emphasizes the economic and social importance of digital security risk management. The document includes the following eight key principles:

General principles

1. **Awareness, skills and empowerment**: All stakeholders should understand digital security risk and how to manage it.
2. **Responsibility**: all stakeholders should take responsibility for the management of digital security risk.
3. **Human rights and fundamental values**: All stakeholders should manage digital security risk in a transparent manner and consistently with human rights and fundamental values.
4. **Co-operation**: All stakeholders should co-operate, including across borders.

Operational principles

5. **Risk assessment and treatment cycle**: leaders and decision makers should ensure that digital security risk is treated on the basis of continuous risk assessment.
6. **Security measures**: leaders and decision makers should ensure that security measures are appropriate to and commensurate with the risk.
7. **Innovation**: leaders and decision makers should ensure that innovation is considered.
8. **Preparedness and continuity**: leaders and decision makers should ensure that a preparedness and continuity plan is adopted.

Moreover, the Recommendation includes further provisions for the design of national strategies, such as leading by example (adopting a comprehensive framework, setting up co-ordination mechanisms, establishing CERT/CSIRTs…), strengthening international co-operation and mutual assistance, engaging with other stakeholders and creating the conditions for them to collaborate in digital security risk management.

Source: (OECD, 2015[87]).

3 Skills for the digital economy

This chapter is dedicated to the human capital element of the necessary framework conditions for the digital transformation of companies, the economy, and society as a whole: skills. It describes the importance of skills for a successful digital transformation, highlights the state of play of digital skills in the Eastern Partner countries, and concludes with an assessment of the skills needed for the digital transformation of SMEs.

Introduction

The chapter sheds light on the human capital dimension of the digital economy, by looking at skills as a foundational element of a successful digital transformation of companies, the economy and society as a whole. It starts by highlighting the importance of skills and their effect on productivity, and delves into the taxonomy of the necessary skills for a digital world and for SMEs in particular. The focus then shifts towards the state of play of digital skills in the Eastern Partner countries, looking at the latest tools and trends in providing digital literacy through the education system, lifelong learning opportunities and the current state of measuring and forecasting such skills. The chapter concludes with an assessment of SME digital skills in the EaP and highlights latest government initiatives to foster these skills for a successful digital transformation.

The importance of skills for a successful digital transformation

Skills and productivity

Promoting a mix of skills, including broader socio-emotional and cognitive skills, is an indispensable component of digital transformation. With the increased automation of routine (and progressively more advanced) tasks, the nature of jobs is changing: on the one hand, the demand for skills that are easy to substitute is declining and will ultimately make some jobs redundant in the long run (OECD, 2019[14]). On the other, the demand for skills that are complementary to technology adoption, such as information processing, self-direction, problem solving and communication is increasing (OECD, 2017[88]).

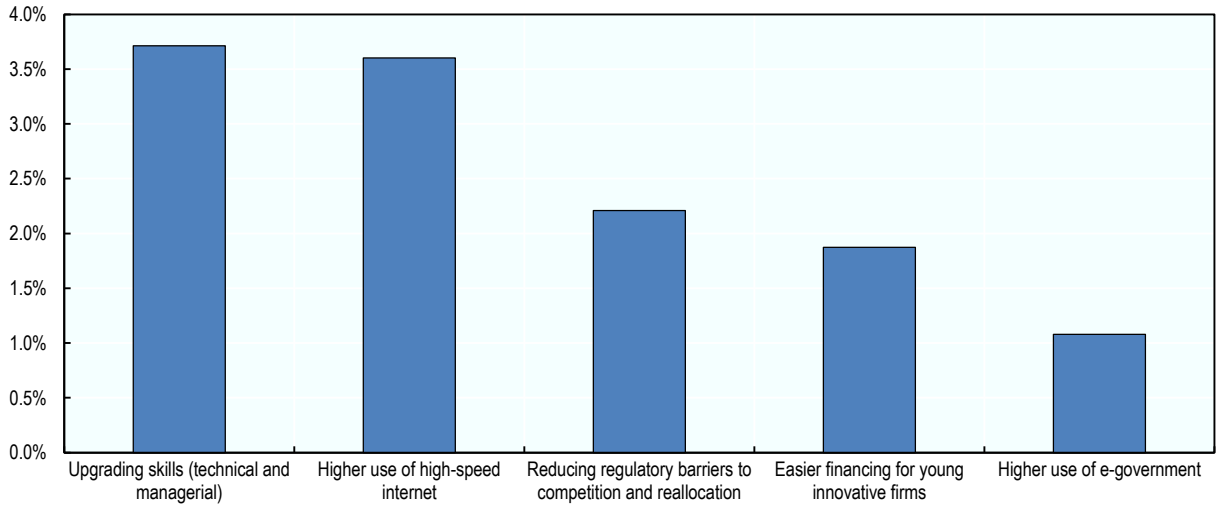
However, the use of internet coupled with a lack of skills can play a major role in the emergence or amplification of digital divides. People with higher digital proficiency levels tend to make better use of internet and online activities, using internet and other digital tools to expand their knowledge by, e.g., following massive open online courses (MOOCs), finding better jobs more easily and securing faster access to health care. In contrast, digital uses amplify existing inequalities if lower skilled people's main use of internet tends to be dedicated to easier functions, such as chatting and entertainment (OECD, 2020[67]).

The returns to appropriate digital skills are evident in terms of employability and participation in labour markets. Across the OECD, labour force participation rates among adults aged 25-65 are lowest for those with no experience in using ICT – less than half of the adults in this group participate in the labour force. By comparison, the participation rate was at 90% among adults who performed at the highest level of proficiency in using devices to solve problems (OECD, 2015[89]). Performing even at a very low proficiency level increased the likelihood of labour force participation by 29 percentage points, demonstrating the usefulness of digital skills, even at basic levels. More frequent use of ICT is also associated with higher wages, and workers with no experience in using ICT suffer a wage penalty (OECD, 2015[89]).

At the firm level, skills shortages in managerial or digital-related technical skills have also proven to reduce the benefits of digitalisation, especially among less productive firms. These firms tend to be less profitable, often lacking the financial resources and attractiveness to hire scarce skilled workers (Sorbe et al., 2019[13]). Conversely, investments into skills and training are positively associated with the adoption of digital technologies, and in turn with labour productivity. The OECD, which examines a range of structural and policy areas and their effect on productivity, finds that upgrading skills offers among the highest returns on firm productivity, overtaking areas such as access to finance and competition (OECD, 2019[14]), (Figure 3.1).

Figure 3.1. Effect of skills policies on productivity

Estimated effect on multifactor productivity of the average EU firm of closing half of the gap with best performing EU countries in a range of structural and policy areas, after 3 years.



Note: The effects correspond to the estimated productivity gains associated with greater diffusion of high-speed internet, cloud computing, and Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) software resulting from closing half of the gap with best EU countries in a range of structural and policy areas. "Upgrading skills" covers participation in training (for both high and low-skilled), quality of management schools and adoption of High Performance Work Practices (HPWP). Structural and policy indicators are measured circa 2016.
Source: (OECD, 2019[14])

By improving the skill sets of societies and building their digital competence, governments can ensure effective use of digital technologies, translating into better and more diversified employment opportunities, more productive firms, less inequality and ultimately better outcomes for all. In this regard, the EU recently launched an ambitious vision for the next decade with its 2030 Digital Compass, aiming at increasing trust in digital products and online services, helping citizens identify disinformation and fraud attempts, protecting citizens against cyberattacks, scams and fraud online, and helping children understand and navigate the online world. The 2030 Digital Compass aims at fostering digitally empowered and capable citizens, by targeting for 80% of the population to have at least basic digital skills by 2030 and offering its workforce more opportunities to acquire new specialised digital skills. (European Commission, 2021[90]).

A taxonomy of skills for the digital economy

Digital skills are lacking among adults in many OECD countries, with on average 26% not possessing any digital skills at all (OECD, 2019[14]). Fostering those skills from the beginning of formal education and following through with lifelong learning opportunities can play a key role in preparing societies for the digital transformation. Importantly, addressing gender gaps in so-called "STEM" studies (science, technology, engineering and mathematics) would also help, as women account for less than 20% of entrants into tertiary level computer science programmes in OECD countries (OECD, 2017[91]).

To design policies that bridge the digital divide and prepare for the digital transformation, policy makers should understand which types of skills help people get the most out of digital technologies, enable their diffusion and increase their impact on productivity. In this regard, four main categories emerge:

- **foundation skills** such as literacy and numeracy, enabling the development and acquisition of higher order cognitive skills needed for digital economy, which help individuals navigate through an environment of fast and ever-changing technologies, as well as increasingly long working lives;

- **generic digital skills** for all workers, related to the use of digital technologies for professional purposes such as accessing information online or using software;
- **advanced digital skills** for digital specialists (e.g. skills needed for the production of IT products and services such as programming, developing applications, managing networks); and
- **complementary skills** to work in a digitalised environment, including cognitive skills, interpersonal skills (information processing, self-direction, problem solving, communication), as well as managerial and organisational skills (OECD, 2017[88]); (Grundke et al., 2018[92]); (OECD, 2016[93]).

While foundation skills are typically acquired through the formal education system, on-the-job training on generic and advanced digital skills can benefit low-skilled workers in particular: while they are less likely to participate in training than high-skilled workers, training increases their productivity, reduces inequalities, and lowers the risk of job displacement due to technological disruptions (Nedelkoska and Quintini, 2018[94]).

As digital transformation generally requires changing business processes for which good management is key, sound complementary (including managerial) skills are associated with greater and more efficient diffusion of digital technologies (Gal et al., 2019[8]).

Skills for the digital transformation of SMEs

SMEs "digital by default" might be technologically more advanced by definition and have a clearer understanding of which type of skills are required to implement specific tasks of their business model. However, more "traditional" SMEs may find it difficult to grasp the potential of digital tools. For these SMEs, raising awareness of the benefits offered by digital technologies and helping translate this awareness into business strategies that are fit for their level of digital maturity is a good starting point for the digital transformation journey. This would also help SMEs develop a better understanding of the specific skills needed to support digital adoption (European Digital SME Alliance, 2020[95]).

However, SMEs typically face greater difficulties in attracting and retaining skilled employees compared to large firms, as they tend to lack the capacity and networks to identify and access talent, as well as to offer attractive remuneration and working conditions. They also offer fewer training and development opportunities, due to the lack of internal training or HR departments to organise and co-ordinate such initiatives, as well as lower levels of management skills to anticipate employees' skills needs (OECD, 2021[6]). Financial constraints related to training are also higher for SMEs, as they have fewer employees over whom to distribute fixed training costs and; less scope to release people from revenue-generating activities for training. They also tend to experience higher job turnover, which diminishes their willingness to invest in skills development when there is a risk that an upskilled employee will leave shortly after training. Public co-financing of trainings could be one of the solutions to incentivise SMEs in offering trainings.

From an SME perspective, it is useful to look at digital skills on two levels: i) SME managers and entrepreneurs, and ii) SME employees.

SME managers, building on their process and organisational skills, ought to rethink the digital transformation of their business in a holistic manner, looking beyond the simple adoption of technologies. Supporting a digital culture in the organisation, developing digital acumen and rethinking processes to reap the best opportunities out of new technologies are all crucial elements contributing to a successful digital transformation (Levy, 2017[96]).

Even though policies cannot directly influence good management practices, countries have tools to help build management skills in SMEs, starting with digital diagnostic tools to help SMEs analyse their current level of digital maturity and identify potential areas for improvement. Managers can then be directed towards targeted trainings, workshops, mentoring programmes and management coaching dedicated to topics such as digital business strategy, operating models, process management, leadership, governance

etc. This can be complemented by trainings on financial planning, including the ability to conduct risk assessments, as well as to provide relevant financial information in business plans and investment projects. The main challenge in this regard is the creation of a demand (and in turn a supply of high-quality services) for such services due to lack of awareness, time, lack of quality assurance, doubts of usefulness of the advice and at times limited ambitions for business development on the part of SME managers (OECD, 2021[6]).

At the level of SME employees, skills development through lifelong learning opportunities, including training and mentoring, should be embedded in the SMEs' digital transformation strategy. Fostering curiosity of employees about new technologies and having an inclusive approach, where employees feel as an integral part of the firms' (digital) culture, can only be beneficial in the long run for a successful and sustainable digital transformation (CapGemini, 2018[97]). However, with resources in smaller firms being scarcer, skills development is often poorly planned, and workers may tend to perceive the training offer as inadequate and unappealing, eventually losing interest in adult learning. Older adults may also lose interest in training if it does not lead to significant gains in the labour market, which is often the case, as employers offer little support to older workers seeking training (OECD, 2021[98]).

Various initiatives exist to develop employee skills: tax incentives (e.g. training costs deductible from profits), subsidy schemes (e.g. training vouchers for accredited institutions), local employer networks and associations (e.g. pooling investments in training for multiple enterprises), business linkages/cluster knowledge-sharing and innovative diffusion (Marchese et al., 2019[99]). Some governments also rely on intermediary bodies to organise subsidised trainings for groups of SMEs to shift the administrative burden as much as possible away from employers (OECD, 2021[6]), (OECD, 2019[100]).

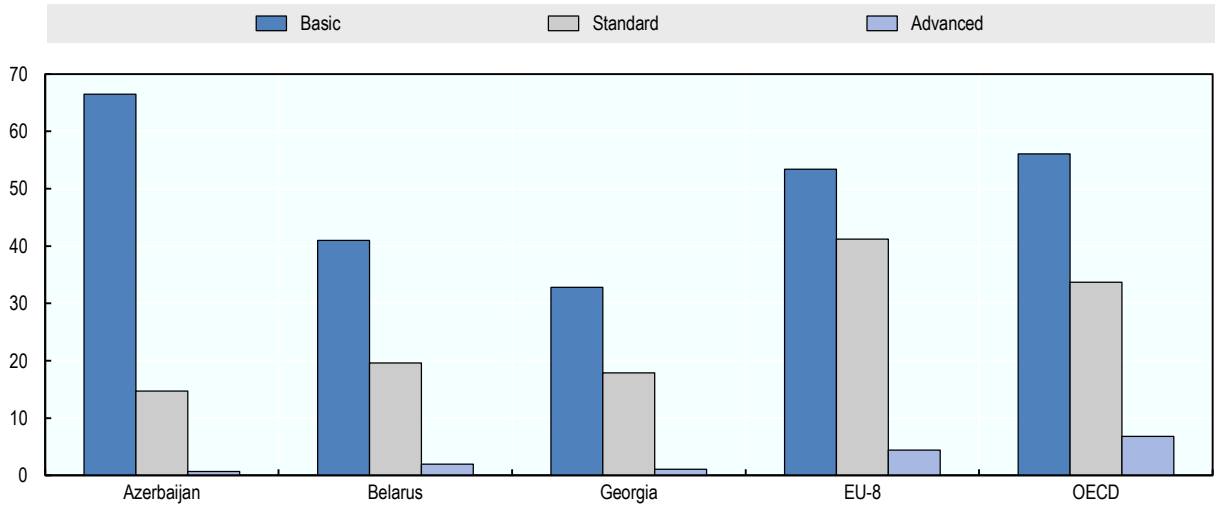
State of play of digital skills in the EaP

Digital skills in the general population

In general, ICT skills in EaP countries are well below those of OECD and EU-8 countries (Figure 3.2). No more than 25% of the population in Azerbaijan, Belarus and Georgia possesses at least "standard" skills, which is around half of the corresponding values for more advanced economies. A survey carried out by the Ukrainian Ministry of Digital Transformation presents a similar picture, finding that 53% of the Ukrainian population has lower than basic digital skills, with 15% not possessing any digital skills at all (Eastern Partnership Civil Society Forum, 2021[101]). According to the Caucasus Barometer Survey in 2019, the situation in Armenia is comparable with 34% of individuals lacking even basic digital skills (Caucasus Research Resource Center, 2019[102]).

Figure 3.2. ICT skills in the EaP countries

% of individuals by skill level (2019 or latest year available)



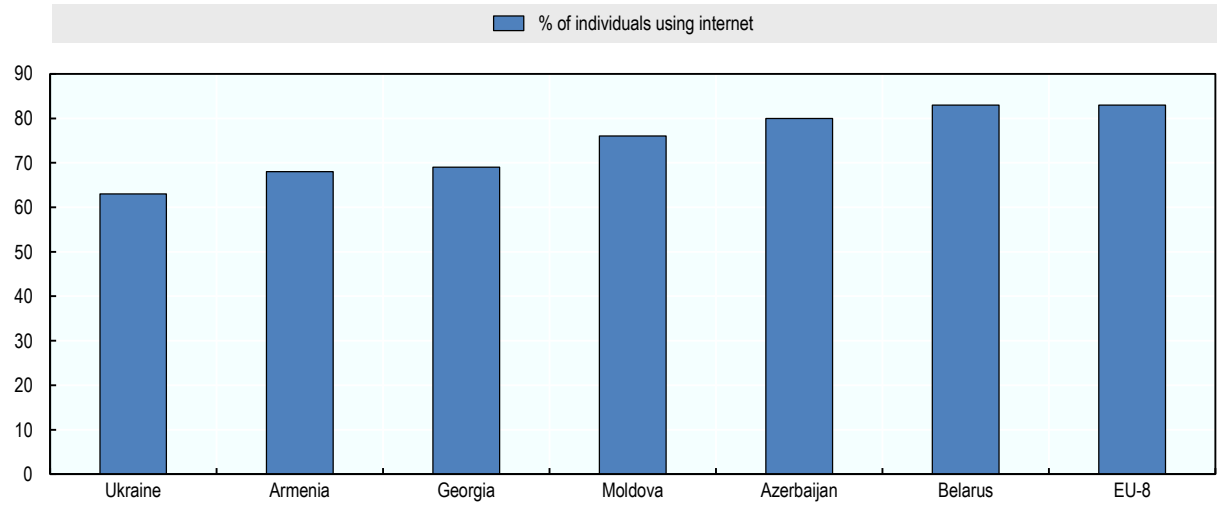
Note: EU-8: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia.
No data for Armenia, Moldova and Ukraine.
For each country, the value for **basic skills** is the average value of available recent data for the following four computer-based activities: copying or moving a file or folder; using copy and paste tools to duplicate or move information within a document; sending e-mails with attached files; and transferring files between a computer and other devices. For **standard skills** - the average value of available recent data for the following four computer-based activities: using basic arithmetic formula in a spreadsheet; connecting and installing new devices; creating electronic presentations with presentation software; and finding, downloading, installing and configuring software. For **advanced** skills - the value for writing a computer program using a specialised programming language.
Source: (ITU, 2021[103])

This is demonstrated by the lower use of internet compared to EU-8 countries (Figure 3.3), and especially an even smaller percentage of individuals using internet to buy goods or pay bills. This in turn represents a great challenge to SMEs who are going through a digital transformation, trying to embrace digital technologies to sell their goods through websites and e-commerce platforms – they would need to rely on buyers that are able to use those technologies. Paying vendors online is a part of the experience, which is currently also lacking (Figure 3.4).[12]

[12] These data show the pre-COVID19 state of play regarding the use of digital financial services in the EaP countries and should therefore be handled with caution.

Figure 3.3. Individuals using internet in the EaP countries

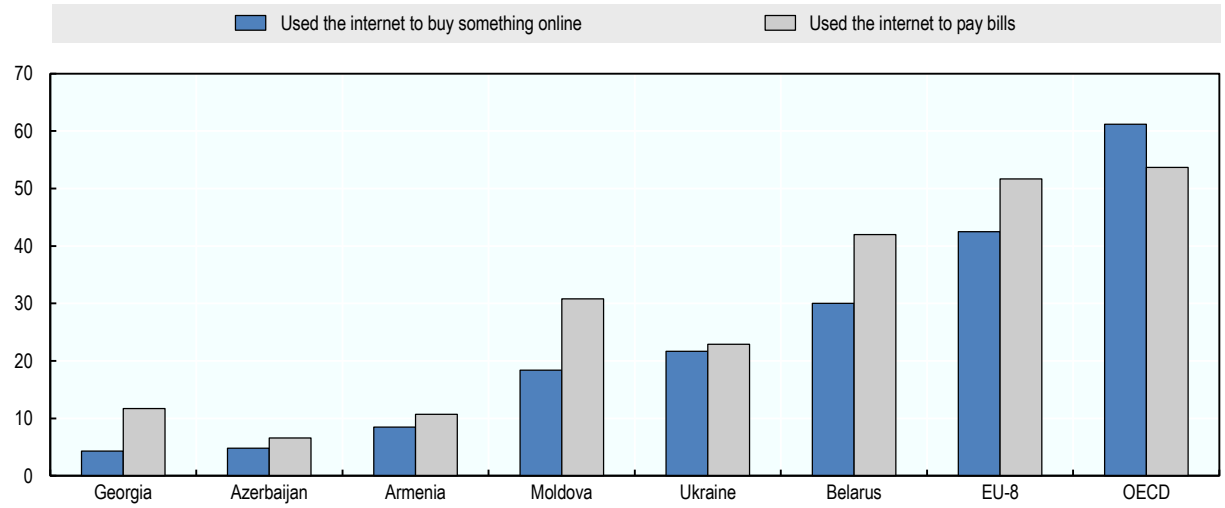
% of population (2019 or latest year available)



Note: EU-8: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia
Source: (ITU, 2021[46])

Figure 3.4. Use of digital financial services in the EaP countries

% aged 15+ (2017)



Note: Respondent was asked to think about the use of internet in the past year; EU-8: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, and Slovenia.
Source: (World Bank, 2017[24])

Studies based on the World Bank STEP survey data on workers in urban areas also show that nearly two-thirds of workers are at medium risk[13] of losing their jobs due to automation, while the high risk of automation varies from around 4% in Georgia and 11% in Armenia to about 22% in Moldova. This could

[13] Medium risk: 30-70% of probability of automation; High risk: probability higher than 70%.

be due to differences in economic structures, often cited among the main reasons for different trends in automation. Indeed, in Moldova almost 20% of the urban labour force are involved in agriculture, fisheries and mining, which have the highest risk of automation. By contrast, nearly 70% of the urban workforce in Georgia and Armenia are involved in other services sectors, which show the lowest exposure to automation risk. In addition, countries with a larger share of jobs in manufacturing will show a higher average susceptibility to automation. Another factor is the degree of sophistication of production, which leads to a different occupational composition in sectors (and different employment shares of occupations) (ETF, 2021[104]). This trend could create a significant negative effect in EaP countries' labour markets, from job polarisation to increasing income inequality as a result of losing many medium-skilled jobs.

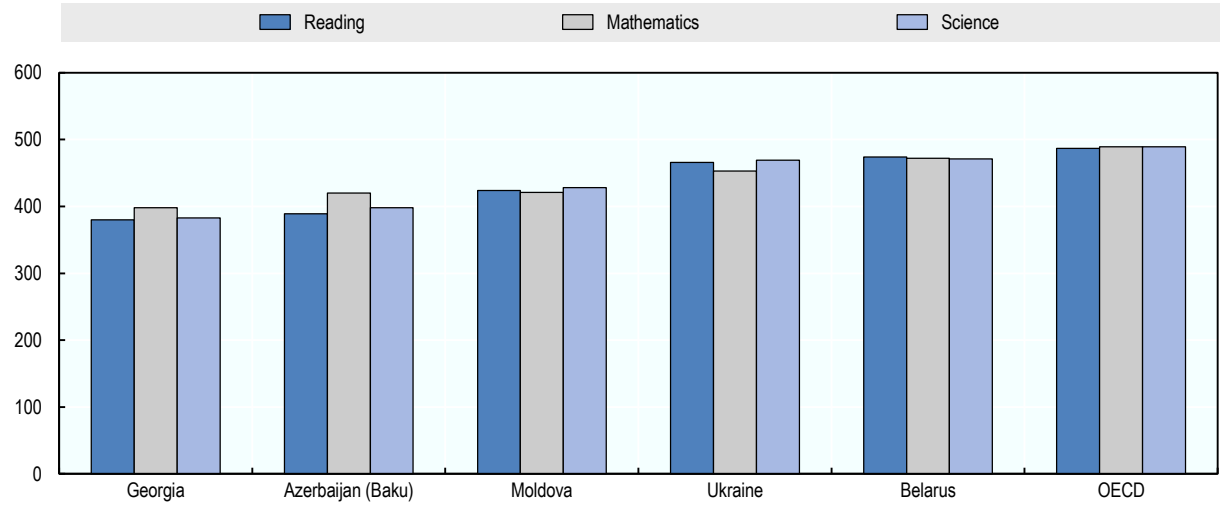
This projection suggests that workers in the EaP need to be better equipped with digital, as well as socio-emotional skills to protect them from becoming redundant at work and help them transition to other jobs in the future, less at risk of automation, which is also in line with the recent OECD findings (OECD, 2019[105]).

What do education systems offer?

The foundations for skills are laid in schools, starting with primary education. However, with rapidly evolving technologies, it is difficult for school curricula to stay up to date on which skills and competencies matter: Overly specialised digital skills tend to become obsolete and curricula are rarely flexible enough to allow for ongoing changes (OECD, 2020[106]). An emphasis on foundational (literacy and numeracy) and complementary skills would therefore be more strategic, enabling the development of a wider set of skills in the future and increasing the probability of moving from a simple use mostly for information and communication purposes, to a more diversified and complex use of internet (e.g. e-finance, learning and creativity) (OECD, 2019[105]). Foundational skills in EaP countries, and particularly in the South Caucasus, however, lag behind the OECD average, as demonstrated below by the PISA scores for reading and mathematics (Figure 3.5).

Figure 3.5. Students' performance in PISA

2018



Note: Score out of 600 points. No data for Armenia.
Source: (OECD, 2018[107])

When it comes to comprehensive digital literacy policies, these are still in their infancy in EaP countries, with only Georgia, Moldova and Ukraine having a dedicated educational framework for fostering digital

skills from initial schooling onwards. Such frameworks would be important in order to create synergies between different line ministries (Education, Labour, and Economy) to equip future workers with the needed skills for a digital economy. In many OECD countries, the responsibility for the promotion of digital literacy falls primarily to national education ministries, which determine the extent to which ICT skills are included in the curriculum. Broader national digital strategies and policy documents may also promote the introduction of ICT skills and technologies in schools, which is primarily the case for EaP countries (Table 3.1).

Table 3.1. Main national policy documents to promote digital skills through the education system

	Framework documents fostering digital skills in the education system	Specific focus on skills	Institution in charge of digital technologies for teaching/learning	Selected initiatives
Armenia	Digitalisation Strategy 2021-2025 (2021)	Modernising qualifications and educational programmes (initial and continuous); increasing the number of students and the quality of education.	National Centre for Educational Technologies – responsible for creating educational ICT environment and inclusion of secondary, VET and HEIs into the network	
Azerbaijan	1) Strategy on Development of Education (2013); 2) Strategic Roadmap for Development of Telecommunication and Information Technologies (2016); 3) Law on General Education (2019).	1) Creation of education infrastructure compatible with ICT-based and distance education; expanding access to digital education resources; 2) Envisages converting schools into 'e-schools'; offering ongoing ICT courses for teachers and improving evaluation of ICT skills; 3) Emphasis on the development of ICT skills in secondary education.	1) Education System Digitalisation Department – single education information platform for all levels of education; applies ICT at all levels of education; manages and uses public funds; 2) ICT Application and Training centre.	**Ministry of Education + Algoritmika project** (2017): develops algorithmic thinking, logic, project development skills, coding, and programming. Increases level of student's computer literacy, drawing attention to high-tech professions. In 2019/2020 – 70 000 students involved through 123 general schools. **Ministry of Education project "STEAM"** (2019): increases cognitive abilities by enabling secondary school students to use ICT equipment and develop 21st century skills.
Belarus	1) Strategy of Informatisation 2016-2022 (2016); 2) Conceptual approaches to the development of the education system up to 2020 and for the prospect of 2030 (2017); 3) State Programme for the Development of the Digital Economy and Information Society for 2021-2025 (2021). 4) Program of Social and Economic Development of the Republic of Belarus 2021 - 2025	1) Importance of 'information culture' for all levels of education; 2) Key tasks – digital transformation of the education sector, incl. enhancement of ICT structure of educational institutions and deployment of multimedia platform; 3) Improving ICT and lifelong learning skills of all participants in general education; priority: e-education; development of an online education platform to improve digital literacy of the population.	1) Main Information and Analytical Center of the Ministry of Education of the Republic of Belarus provides training to ICT users 2) Sectoral ICT qualifications council under the administration of the High-Tech Park – monitors the need for personnel in the ICT sector; develops proposals to improve the quality of staff training, including the legal NQF and interaction between education system and employers; develops mechanisms for the assessment and certification of qualifications; 3) ICT resource centres based in regional secondary schools established in every region.	**Programming - Second Literacy (2016 - Programming from Grade 2:** elective classes to study Scratch programming starting from the second grade. **New textbooks on computer science** for Grade 7 (2017) **Informatics without a socket (2019):** pre-school children are taught elements of mathematics, to develop logical thinking and algorithmic skills, **National Children's Technopark (2020)**: an educational institution aimed at supporting talented students to develop their STEM skills, through innovative activities.
Georgia	1) Unified strategy for Education and Science 2017-2021 (2017); 2) New School Reform (2018); 3) National Broadband	1) Upon completion of general education, students should have basic knowledge of and practical experience in ICT usage,	Education management information system (EMIS) under Ministry of Education. Provides an ongoing learning experience	GITA's ICT skills development programmes; **World Bank's GENIE project** launched in 2016: incl. developing digital skills among

	Framework documents fostering digital skills in the education system	Specific focus on skills	Institution in charge of digital technologies for teaching/learning	Selected initiatives
	Development Strategy 2020-2025 (2020); 4) Unified Strategy for Education and Science 2022-2032 (forthcoming).	sufficient for pursuing their studies or for future jobs; 2) Development of digital skills in general education – integration of digital technologies into teaching and learning; 3) Promotes digital skills development and supports use of broadband through education and co-ordination with academia.	for all students, including those in remote areas, using Microsoft 365 to run virtual classes, pre-recorded lessons, and real-time communication and collaboration among teachers and between teachers/ students.	general population esp. in rural and remote areas (also trainings for local SMEs); **GeoLab:** IT training centre for young people interested in ICT, providing regular training courses in programming, gaming, coding, graphic design.
Moldova	1) Education Code (2014); 2) Development Strategy for the Information Technology and Digital Ecosystems Industry for 2018-2023 (2018); 3) MoU between Ministry of Economy, Ministry of Education, Association of ICT companies and Tekwill ICT Training and Innovation Centre on the 'Development of Digital skills, IT and STEM throughout life' (2020).	1) Digital competences as one of the key competences in national curricula, as well as definition of the concept of lifelong learning; 3) Provides for the development of digital teaching support and equipment for the introduction of digital education at all levels of school – harmonising ICT education in Moldova with current labour market requirements.	1) ICT Centre of Excellence – responsible for harmonisation of curricula (for students and teachers) and qualification exams, as well as provision of continued education for ICT teachers. 2) National Qualification Frameworks Department of Ministry of Education developed qualification standards for all IT professions in 2018.	**The Tekwill Academy**, in partnership with Oracle and ISD, offers a Java fundamentals training programme for knowledge of basic programming concepts; **StarNet**, biggest internet provider in Moldova, offers courses for young people and adults at Academy Plus for programming in C++, Java, PHP, game design and web design based on an accredited programme.
Ukraine	1) Law on Education (2017); 2) Digital Agenda for Ukraine (2020); 3) Concept for the Development of Digital Competences until 2025 (+Action Plan) (2021)	1) Endorsed the New Ukrainian School concept, with mandatory digital competence in primary and secondary education; 2) Actions towards the digitisation of education using digital and online learning in education and training; 3) Identifies ways to overcome challenges for development of digital competences in Ukrainian society; lays the foundations for creating a national strategy for digital competencies.	1) Ministry of Education and Science 2) Ministry of Digital Transformation	MoU between **Ministry of Education and Science and ICT school child social project**, covering the development of a new curriculum on informatics, use of modern teaching methods, requirements for textbooks and school digital equipment, training of IT teachers and preparation of future teachers; The Ministry of Digital Transformation established two portals in 2020: i) **Diia.Digital education** https://osvita.diia.gov.ua/, facilitating access of individuals and legal entities to digital education and the development of digital competences; and ii) **Diia.Business** https://business.diia.gov.ua/en, including a National Online School for Entrepreneurs to improve the skills of Ukrainian entrepreneurs and SMEs

Source: Adapted from (ETF, 2020[108]); Responses to fact-finding questions sent to EaP countries in June 2021; EU4Digital website

However, challenges in policy implementation arise as strategies, laws, concepts and action plans on digitalisation do not always complement each other, with a tendency to start from scratch by each institution due to a lack of communication between relevant bodies. Good practice examples from OECD countries,

such as the Technology Pact Denmark, could provide a model for inclusive collaboration between various line ministries, as well as private sector representatives, research and education institutions, to jointly elaborate a comprehensive and relevant strategy and address the digital education needs of society as a whole (Box 3.1).

Box 3.1. Danish Digital Growth Strategy and TechnologyPact Denmark

The Danish TechnologyPact was established in 2018 through a partnership of several line ministries (Education, Labour, Economy), building on the Danish Digital Growth strategy, which aims to foster digital literacy in the population and increase the interest of Danes in STEM, making Denmark a digital frontrunner. The TechnologyPact council consists of 19 representatives from government, business, educational institutions and research organisations; the secretariat of the Pact is run by the Danish Foundation for Entrepreneurship.

TechnologyPact has been established to bridge current and future recruitment gaps within STEM subjects, by ensuring that the Danes' STEM competencies are raised all the way through lifelong learning initiatives and projects, meeting the acute recruitment problems faced by Danish companies, but also ensuring that the next generation is interested in pursuing STEM education. Today, more than 120 projects are part of the TechnologyPact portfolio.

Specifically, TechnologyPact's work must contribute to fulfilling a number of objectives, which have specific goals:

More people should be interested in STEM

- 1 mln people (out of a 5 mln people population) must have participated in some of the TechnologyPact's initiatives by 2020 (done)
- 350 companies should be engaged in TechnologyPact by 2020 (done)

More people must be educated within STEM

- 20% more Danes must complete a STEM education in 10 years
- 20% more Danes must complete a STEM vocational training in 10 years

Upskilling the workforce

- The STEM competencies of the workforce must be among Europe's highest
- No significant recruitment challenges of STEM workers in 10 years

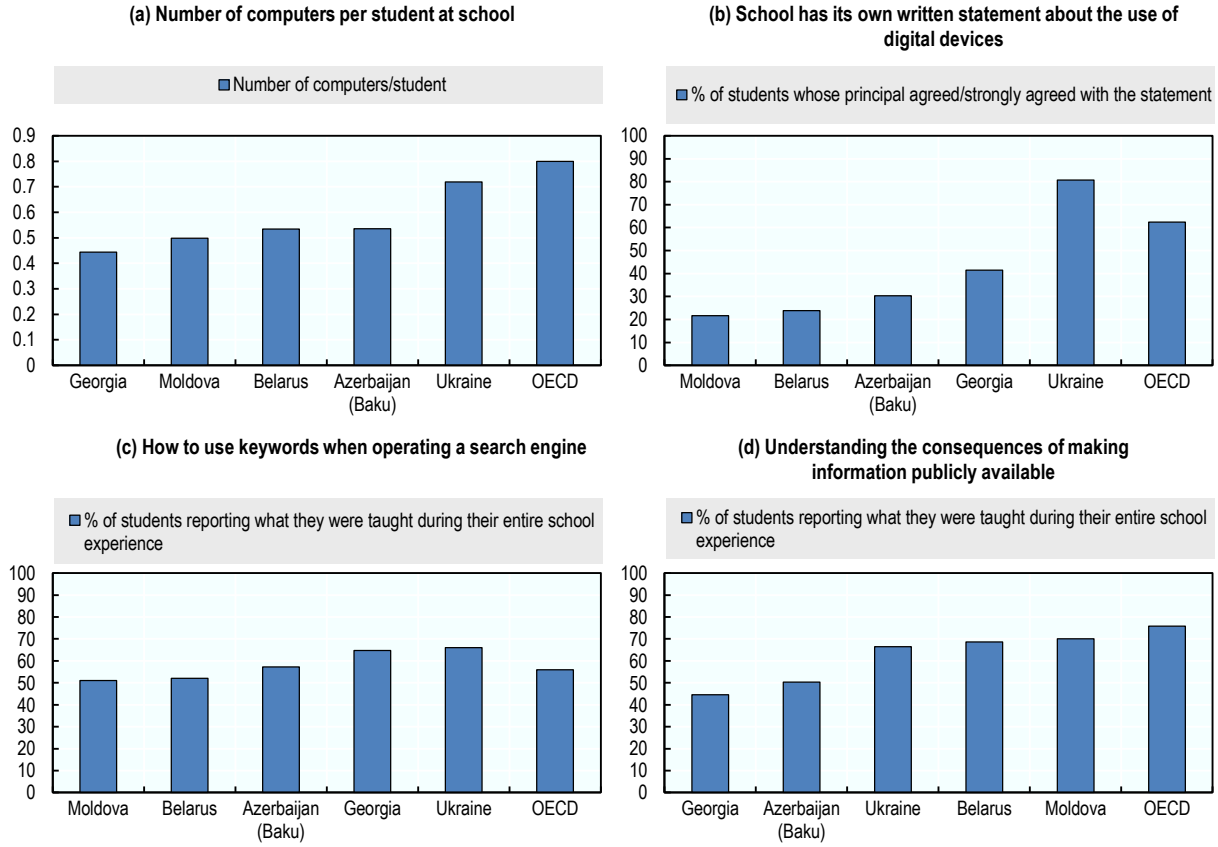
Source: (Teknologipagten, 2021[109]) (last accessed in August 2021)

Digital tools and teaching trends in the education system

Schools in EaP countries lag behind the OECD average when it comes to the use of digital devices and teaching digital literacy (Figure 3.6, panel (a) and panel (b); (OECD, 2018[107])). Although computers are used more frequently and most schools are connected to internet (ETF, 2021[110]), PISA data show that the opportunity to learn digital literacy skills at school is still limited. While a similar number of 15-year-old students from EaP countries and the OECD area reported having been taught the basics, such as "how to use keywords when using a search engine", students from the Caucasus lag when it comes to cybersecurity, such as "understanding the consequences of making information publicly available" (Figure 3.6 panels (c) and (d)).

Figure 3.6. Digital tools and opportunity to learn digital literacy skills

2018



Note: No data for Armenia.
Source: (OECD, 2018[107])

Digital technologies have the potential to enhance education outcomes through innovative ways of teaching and to mitigate school failure. This has been especially important during the COVID-19 pandemic and prolonged periods of school closures. However, this requires not just investing in the right infrastructure and devices, but first and foremost in teachers' digital competence with pedagogical intent and teaching/learning practices to make the best of existing technologies (OECD, 2021[111]).

In EaP countries, rather than developing nationwide online learning solutions and strategies to integrate digital devices for the whole education system, it is often the initiative of individual teachers/staff members bringing innovations to their schools. Up until now, there have been no systematic approaches in the EaP countries to capitalise on these practices and scale them up (ETF, 2021[110]).

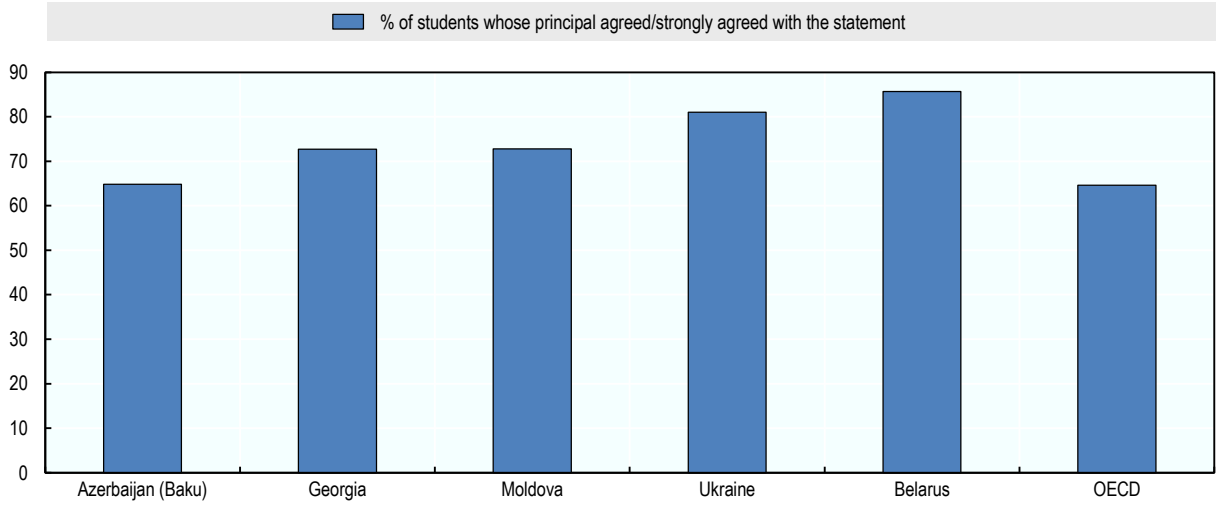
However, teachers in all EaP countries appear to be prepared to integrate digital devices in instruction according to their principals. While the shares of students taught by such teachers are higher than in OECD countries, this may also reflect the different standards to which principals refer when assessing teachers' preparedness[14]. These skills should be mobilised to foster more future-oriented education systems

[14] This information should be handled with caution, as it is based on principals' reports, and hence, there is a potential gap between what principals report and what teachers actually think themselves, but also in terms of what principals

(Figure 3.7). Listening to teachers' voices by including them in consultations when elaborating new curricula will be essential to provide a better teaching and learning experience for all.

Figure 3.7. Teachers have technical / pedagogical skills to integrate digital devices in instruction

% of students whose principal agreed/strongly agreed with the statement above, 2018



Note: No data for Armenia
Source: (OECD, 2018[107])

When it comes to tertiary education and the STEM /ICT courses offered in the EaP, there are some options for students in higher education or VET programmes to access relevant knowledge. A number of business schools are offering compulsory IT courses, VET institutions have mandatory modules dedicated to digital competencies, and the number of ICT programmes in university have been increasing in all countries in the past years.

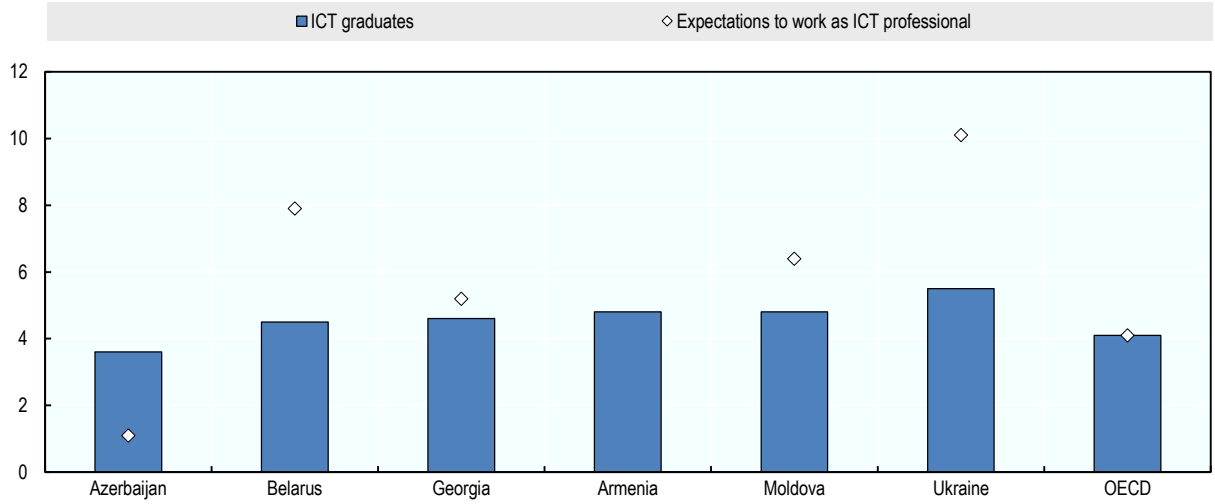
For example, in order to promote quality higher education in STEM and ICT, Georgia, with financial support from the Millennium Challenge Corporation, established the San Diego State University Georgia to offer internationally accredited STEM bachelor's degrees, including programmes such as computer engineering and science. Digital skills are also integrated into various programmes offered by Georgian higher education institutions.

Despite average ICT graduate numbers (in line with OECD countries), current 15-year old high-school students in EaP countries show more interest in working as ICT professionals in the future than their peers in OECD countries. It would therefore be important to capitalise on this interest and continue fostering students' curiosity, raising awareness for ICT professions in and outside of school (Figure 3.8).

compare their situations to. If principals in some countries have low expectations of their teachers because, for instance, ICTs are only used for simple practices in the classroom and teachers seem to perform those well, principals may well find that teachers have the necessary skills to integrate certain devices. However, in other countries, which are more advanced in the digital transformation of education systems, principals may consider that teachers are not prepared as they are not ready to use more complicated devices, such as e.g. Artificial Intelligence solutions.

Figure 3.8. ICT graduate rates and expectations to work as ICT professionals

%, 2019 or latest available



Note: Students expecting to work as ICT professional at 30 y.o. (% of 15 year olds). No data for Armenia.
Source: (UNESCO Institute for Statistics, 2019[112]) -Percentage of graduates from tertiary education graduating from ICT programmes (2019; 2017 for Belarus); (OECD, 2018[107]).

Lifelong learning opportunities

Continuous training and learning throughout all stages of life play a very important role in the digital economy. A strong emphasis on adult skills development – embracing the growing diversification and flexibility of learning pathways, training programmes and skills certification – is essential for supporting transitions between jobs and sectors. This is especially true when it comes to SME employees keeping up to date with ever evolving digital technologies and staying relevant in the job market.

Flexible learning systems need to be both lifelong – accessible to all at any age – and life-wide, promoting and recognising learning acquired outside of formal education systems. The term “lifelong learning system” covers the whole range of policies and institutions providing adults with a range of options to continue learning and preparing young people to adapt to changing skills requirements (OECD, 2019[105]).

Lifelong learning is gaining traction in OECD and EaP countries alike, including frequent mentions in policy documents and an increasing number of digital skills promotion initiatives available for the entire population (Table 3.2). Some countries are only starting to regularly collect comprehensive data on digital literacy (such as Ukraine); additionally, Ukraine has established a freely accessible online platform including online courses and self-assessments to increase the level of digital literacy in the population, while Belarus plans to implement a similar initiative in its Digital Development State Program 2021-2025. Others conduct awareness campaigns, for instance through digital skills coalitions, aiming to provide a more inclusive and structured approach to the development of digital skills in the population. Four out of six EaP countries have now established such national coalitions, which are, supported by EU4Digital, helping various stakeholders (government, companies, social partners, education providers, non-profit organisations) co-ordinate activities related to digital skills development, raise awareness and share best practices between all countries (including EU members) that have established National Digital Skills Coalitions.

Table 3.2. Main government initiatives in EaP countries to promote digital skills among the general population

	Main government initiatives to promote digital skills among the general population (outside the education system)	National Digital Skills Coalitions*
Armenia	In 2016, private-sector companies initiated and funded the establishment of the "real school" educational and cultural foundation, which is currently operating as a pilot project in four Armenian cities. The main goal of the foundation is to provide graduates, via a four-year programme for the 15–21 age group, with the necessary knowledge and technical skills to pursue various opportunities in the high-tech industry. The National Training Fund (NTF) establishes and implements adult learning and education policy, including co-ordination, operation, organisation and support for non-formal and informal education. According to its mandate, the NTF is positioned to oversee the validation of non-formal and informal learning outcomes, drawing on international expertise. The Tumo Centre for Creative Technologies (currently one centre in Yerevan and three in the regions) provides free IT training for 12 to 18-year olds and helps 19 to 26-year-olds specialise in particular areas by providing targeted web-based training in animation, website, games development and movie creation. Participants' online portfolio grows with every activity and workshop they complete, which can be shown to future employers or universities.	Yes (2017)
Azerbaijan	The Ministry of Digital Development and Transport operates the "Information-Communication Technologies Application and Training Centre", providing training and ICT application services to the population and businesses. In 2017, the Centre created an "E-Government" project to provide digital skills training to young people, including four certification programmes: certified trainings (Microsoft, Cisco, Oracle, CompTIA); professional trainings (MS Office, Project Management, ICT Network/System, Programming); corporate trainings (digital skills and other programmes); and ICT lab organised corporate training programmes. In 2019, the amount of students in the Centre exceeded 1,000. The Innovation and Digital Development Agency (recently established through the reorganization and merger of the National Nuclear Research Center, the Innovation Agency and the High Technologies Research Center), also run by the Ministry of Digital Development and Transport, offers STEM courses to children and students. The courses teach participants fundamental skills in robotics, science, technology, engineering, chemistry, math, programming, and digital art. The Agency was established by the decree of the President of Azerbaijan with the purpose of ensuring sustainable development and competitiveness of the economy and the expansion of Azerbaijan's ICT sector.	Yes (2021)
Belarus	Within the framework of the State Programme "Digital Development of Belarus" for 2021 - 2025, the Ministry of Communications and Informatisation initiated the development of an educational platform to increase the digital literacy of the population, ensuring accessible training opportunities for in-demand competencies in the labour market. The educational platform will provide online courses, prepared with the participation of leading IT experts, segmented by age, profession and thematic focus (e.g. smart industry, smart cities, digital agriculture etc.). It will also contain a test to self-assess progress in the development of digital skills, taking into account the complexity of the chosen courses, as well as include an electronic certificate for the completion of trainings. User feedback and a rating system for completed courses will also be introduced. Additional training already exist, such as the ones delivered by the National Traffic Exchange Centre on information security and e-government. Belarus High-Tech Park is actively providing trainings to children and youth in the area of digital technologies. Some of these courses are specialised and have been developed in collaboration with the universities' departments hosted on the High-Tech Park's premises. Since 2019, it has also been publishing a yearly guide "IT-applicant" with all the information on university courses in the field, as well as a guide for IT-specialty students to guide them in their professional choices.	Own DSC (2020)**
Georgia	The GENIE project aims to implement a collaborative skills strategy to improve the digital skills of Georgian professionals in line with the economic and digital strategies of the country. An ICT training programme launched by GITA will start with a pilot phase aiming to train 500 IT specialists, which will be followed by a larger scale phase to accommodate the training of 2,500 IT specialists. Overall, the whole programme aims to train 3,000 participants by March 2023 in the most demanded IT skills. The Digital Governance Agency also undertakes large-scale awareness raising initiatives, including providing information to the public and training public officials to promote the use of digital government and electronic services. Since 2019, to promote lifelong learning and personal / career development, the educational system of Georgia allows recognition of learning outcomes achieved outside of formal education (within the framework of non-formal education) at the level of vocational education. This also includes ICT related professions. In times of COVID-19 school closures, the Ministry of Education and Science set up alternatives to distance learning via computers/internet to bridge digital divides. For example, "Teleskola", a TV schooling programme, was launched jointly with public broadcasting channels.	No

	Main government initiatives to promote digital skills among the general population (outside the education system)	National Digital Skills Coalitions*
Moldova	The Tekwill hub, part of the Technical University of Moldova, was established with the support of USAID. The Tekwill Academy, in partnership with Oracle and ISD, offers a Java fundamentals training programme. The online course allows participants to gain knowledge of basic programming concepts and to learn the current practices used in the IT industry. Content is licensed by the Oracle Workforce Development Programme and includes theoretical and practical lessons with a mentor, video lectures, e-books, quizzes, and team projects.	No
Ukraine	As part of recent reforms, in 2020, Ukraine set up a national online platform Diia.Digital education, containing over 50 digital literacy educational programmes and a digital literacy test "Tsifrogram". In addition, a network of 2,000 offline digital education hubs have been built throughout the country, with another 4,000 being added to the network. The aim is to teach 6 million Ukrainians digital literacy by 2024. In early 2021, a Concept for the Development Digital Competences 2025 and its Action plan where approved by the Cabinet of Ministers, with the objective to lay the foundations for creating a national strategy for digital skills and competencies in society, contributing to the development of the digital economy and e-democracy. Ukraine was also the first country in Europe to launch a free computer skills training module "International Computer Driver's License" – a certification that allows people to demonstrate their computer skills via an international standard.	Yes (2019)

Note: *National Digital Skills Coalitions, an EU4Digital initiative, are helping various stakeholders (government, companies, social partners, education providers, non-profit organisations) in the EaP countries to co-ordinate activities related to digital skills development, raise awareness and share best practices between all countries (also EU member countries). Guidelines for setting up such Coalitions can be found here.
** Belarus established its own Digital skills coalition, supported by the Baltic Internet Policy Initiative and the Eastern Partnership Civil Society Forum.
Source: Responses to fact-finding questions sent to EaP countries in June 2021

Better recognition and signalling of skills acquired throughout life through on-the-job experience, online tutorials and non-formal learning would provide people with incentives to continue learning and help employers to recruit the right people, by offering insights into the workers'/job-seekers' knowledge, their cognitive, social and emotional skills (OECD, 2019[105]). Connecting those new learning environments into a coherent learning system and properly recognising them, for instance via reliable assessments of skills and evolving online certifications, would support their portability to other jobs and sectors. This is particularly relevant for advanced digital skills development among IT specialists, where there is a tendency to pay less attention to formal education while focusing on practical skills, which could be gained through non-formal or informal learning (ETF, 2021[113]).

Measuring & forecasting ICT skills

In general, scarce data and measurement, including a lack of regular forecasting / anticipation exercises to estimate the needs of ICT workforce in the future hampers an efficient development of digital skills in the population. Without skills needs anticipation surveys, information on the jobs of the future are lacking, leading to a suboptimal investment in education initiatives, impeding a more efficient development of skilled workers and contributing to a skills mismatch in the labour market.

Since 2016, the EU4Digital Initiative's digital skills thematic area aims to improve the legislative, regulatory and methodological framework conditions for digital skills and competences by, among other things, defining a Methodology for Measuring and Forecasting Digital Skills Gaps. As part of this project, EU4Digital has conducted an assessment of digital skills gap measurement and forecasting approaches, benchmarking available indicators in the six EaP countries against indicators collected by EU member states, such as for the Digital Economy and Society Index.

Findings show that the extent to which EaP countries measure digital skills in their populations varies considerably. In general, indicators on ICT in Education and Use of Internet Services are those measured the most. The lowest number of measured indicators on average is observed in the Integration of Digital Technology Dimension. Overall, Belarus, Ukraine and Georgia measure more than 50% of the benchmarked indicators, while Armenia and Moldova measure less than 30% (Table 3.3). However, most

measurement methodologies are not aligned with EU practices. Therefore, the measurement of many benchmarked indicators, while important in assessing national-level skills measurement practices, does not imply easier adoption of common EU measurement methodologies.

Table 3.3. Number of benchmarked indicators measured by country

Dimension	Armenia	Azerbaijan	Belarus	Georgia	Moldova	Ukraine	**Total** nb of indicators in benchmark
Use of internet services	4	6	6	6	2	6	6
Human capital	0	4	3	4	0	1	4
Internet usage purpose	2	7	14	11	0	16	18
Integration of digital technology	1	1	10	6	2	10	17
ICT in Education	4	3	4	3	4	5	6
ICT in Workforce	4	3	4	3	0	2	5
Total	15	24	41	33	8	40	56

Source: (EU4Digital, 2020[114])

None of the countries have implemented regular national-level digital skills forecasting. However, EaP countries perform quantitative and/or qualitative labour force forecasting, which can support the analysis of skills gaps based on workforce deficits or surpluses. Only Azerbaijan has implemented a regular quantitative labour force forecasting model. Most other countries currently rely on labour force surveys and one-off surveys or research to analyse future ICT workforce needs. Moreover, qualitative mechanisms for assessing labour force needs are also employed, for example, by involving sectoral experts in the definition of requirements for the education sector. However, overall skills intelligence and industry involvement in the definition of skills and labour force needs for education should be strengthened across the region.

A systematic approach to measuring and forecasting digital skills aligned with EU policies and methodologies such as DESI and Eurostat surveys, has not been implemented in EaP countries. However, all countries have expressed an interest in aligning their existing methodologies to EU practices and have indicated the intention to expand measurement of different digital skills indicator categories.

To implement a common method successfully, EaP countries need policy-maker commitment and a clear co-ordinating authority; expert engagement and training of stakeholders, including those involved in data collection; availability of financial and human resources for implementing nationwide surveys.

The Estonian OSKA programme could serve as an inspiration for such skills anticipation techniques (Box 3.2).

Box 3.2. Skills anticipation exercises – OSKA Estonia

OSKA, the Estonian anticipation and monitoring system for labour and skills demand, analyses the needs for labour and skills necessary for the country's economic development over the next 10 years. It aims to cover all sectors of the economy in five years, continuing in a 5-year cycle with a forecast horizon of 5-10 years.

For this purpose, OSKA sets up sectoral expert panels consisting of employers, educational institutions and policy makers, who oversee and validate the survey results collected by OSKA from statistical quantitative data, as well as from qualitative personal interviews and group discussions. The relevant sectoral expert panels also keep an eye on the implementation of recommendations made on the basis of the conclusions of the survey.

Quantitative analysis builds on data from relevant registers and surveys (EHIS, the Labour Force Survey, the Population and Housing Census, sectoral surveys, EKOMAR, etc.) as well as on the forecasts of labour requirements prepared by the Ministry of Economic Affairs and Communications.

Further information on employment, skills and qualifications is collected from personal interviews with sectoral experts and from group discussions. The interviews examine future economic trends and the resulting changes in the needs for workers, skills, education and training in each sector, and provide input with suggestions for improving qualifications. Sectoral expert panels also assess labour requirements in quantitative terms and training capacities broken down by key professions.

An OSKA general report on changes in labour requirements, labour market developments and the trends influencing them over the next 10 years is prepared annually. The implementation of OSKA is overseen by the Co-ordination Council, which annually submits an overview of the state of play regarding labour market and skills and its proposals to the Government through the Ministry of Economic Affairs and Communications.

Source: (OSKA, 2021[115])(last accessed in August 2021)

SME digital skills in the EaP

SMEs should adopt a dual perspective on digital skills, related to both i) the ability of SME managers and entrepreneurs to drive the digital transformation of their businesses, and ii) to the skills of SME employees to successfully operate new digital solutions.

A digital transformation requires managers to ask themselves many questions about which digital solutions could improve a company's operations and about how to manage data, organise logistics/orders, conduct online advertisements, and create an image across online platforms and social media. They must also think about hiring and upskilling staff (and themselves) to use digital technologies as efficiently as possible. There are also new threats arising with an increased digital presence of SMEs, such as cybersecurity risks (above), with SMEs having a lower understanding and thus tending to invest less in their digital security (OECD, 2021[6]).

In general, scarcer knowledge of the available technologies, uncertainty about their use and benefits, as well as challenges in formulating their own needs and incorporating this into the firm's strategy, all lead to a lower propensity of SMEs managers to adopt new technologies (OECD, 2020[67]). The traditional access to finance barriers, coupled with organisational inertia, represent additional hurdles, which are especially relevant for smaller businesses.

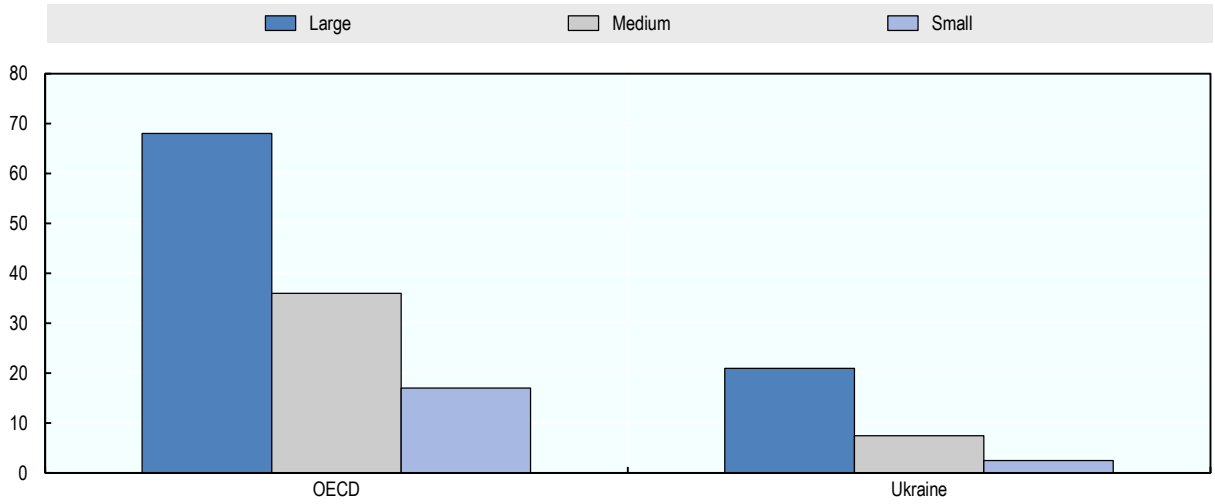
Adequate digital skills among SME employees are the other necessary condition for a comprehensive digital transformation. The Digital Economy and Society Index (DESI) shows that more than 70% of businesses in the EU report a lack of staff with adequate digital skills as an obstacle to investment. The picture is similar in the EaP, where, for instance, a recent survey run among 400 SMEs in Belarus shows that one of the top three barriers to incorporating new technologies into their business is the lack of qualified specialists. This is the case for all sectors, except for IT-sector firms, where the lack of qualified specialists represents the main challenge (BEROC, 2020[116]). In Ukraine, a recent survey among 130 CEOs shows that low digital literacy also ranks amongst the top three barriers to a successful digital transformation: 41% of CEOs assess the level of digital literacy of their employees as moderate, while 13% consider it low (European Business Association Ukraine, 2021[117]).

In addition, a survey shows that 25% of Belarusian firms do not offer trainings to their employees, and when they do, it is mostly for specialists and not for managers or employees in general (BEROC, 2020[116]).

Providing training opportunities to SMEs becomes therefore especially important, also in light of the fact that larger companies tend to offer more trainings to their employees, creating an additional gap compared to SMEs (Figure 3.9). While large firms are around three times more likely than small firms to offer ICT trainings to their employees in OECD countries, the ratio in Ukraine is eight to one.

Figure 3.9. Business providing training to develop ICT skills

%, 2019

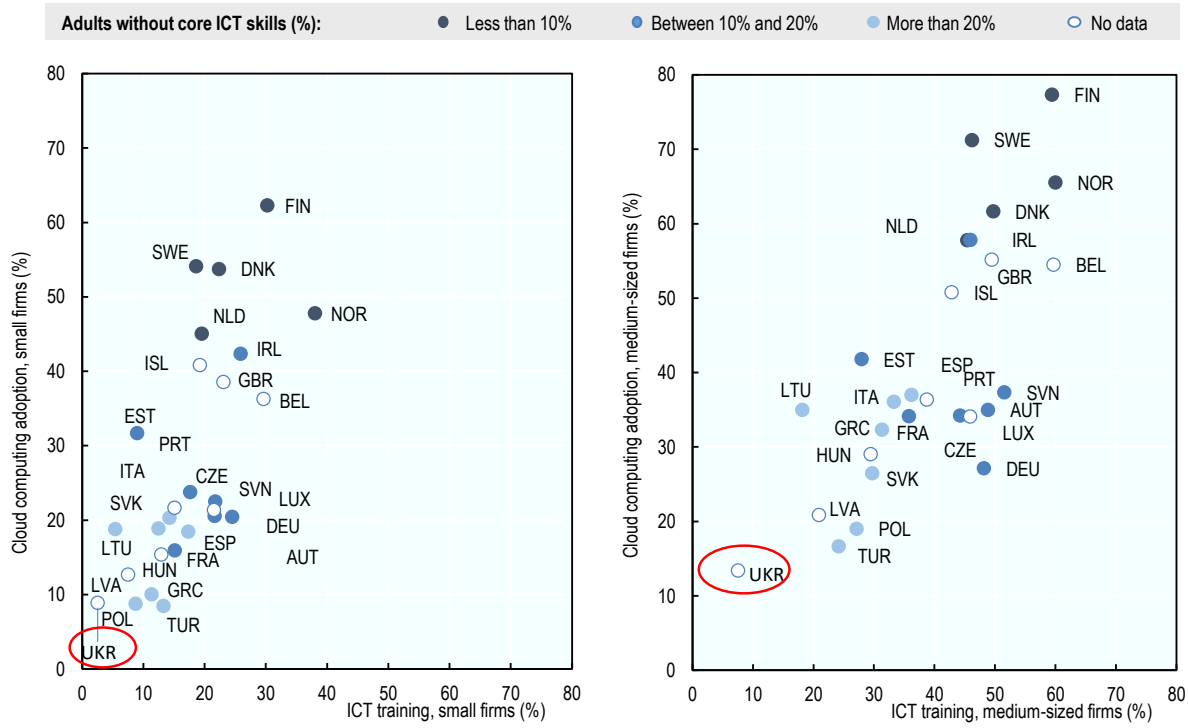


Note: Only Ukraine has data available broken down by enterprise size class.
Source: (OECD.Stat, 2019[118]); (UkrStat, 2019[119])

To make the case for training even stronger, the figure below shows evidence of a correlation between the offer of ICT training and the adoption of digital technologies. OECD countries and Ukraine, where firms more actively offer ICT training, show higher business adoption rates of e.g. cloud computing (Figure 3.10).

Figure 3.10. Smaller firms provide less ICT training to staff and delay their digital transition

%, 2018 or latest available



Note: % of businesses providing ICT training to their employees by enterprise size class (x-axis) and use of cloud computing services (y-axis)
Source: adapted from (OECD, 2019[16]).

EaP countries have started offering digital skills training opportunities for entrepreneurs, but these appear to be *ad hoc* initiatives, rather than institutionalised activities of an SME agency or other enterprise support organisations, with the exception of Moldova and Azerbaijan (Table 3.4). Digital maturity assessments, which represent a first crucial step in providing SME managers with an understanding of their needs and possible digital solutions for their firms, are currently only being proposed by ODIMM (Moldova's SME agency).

Table 3.4. Main government initiatives to promote digital skills among entrepreneurs

	Main government initiatives to promote digital skills among entrepreneurs
Armenia	Established in 2002 with World Bank support, Armenia's Enterprise Incubator Foundation (EIF) is a public-private partnership in which government bodies, international organisations and private enterprises from the high-tech sector participate with the aim of supporting the development of the ICT sector in Armenia through legal and educational reforms, the creation of funding schemes for start-ups, individualised consulting for ICT companies, and workforce development through educational and skills initiatives. Its business support services include strategy development and advice on technology adoption for companies in a wider range of sectors. Similarly, the Vanadzor Technology Center is a partnership between the EIF, the Government of Armenia and the World Bank assisting technology-oriented entrepreneurs with business start-up and acceleration, consultancy, mentoring, marketing, and computer-science educational programs in co-operation with technical universities.
Azerbaijan	The Small and Medium Business Development Agency of Azerbaijan operates as a public legal entity under the supervision of the Ministry of Economy. The agency provides non-financial SME support mostly through the network of SME Development Centres across the country, which are tasked with providing training and consultancy support for SMEs with an objective to improve management practices, foster SME skills (incl. digital skills) and provide targeted advisory and consulting services depending on the need. The Centre for Analysis and Coordination of the Fourth Industrial Revolution under the Ministry of Economy was established by the Decree of the President of the Republic of Azerbaijan dated January 6, 2021. The Centre is responsible for the coordination of activities and initiatives in the field of Digital Economy and 4IR. One of the Centre's goals is rapid digital transformation of companies and enterprises in Azerbaijan. The mentioned Centre also hosts the Azerbaijani Affiliate of the World Economic Forum's Fourth Industrial Revolution Centres' Network.
Belarus	No government sponsored initiatives targeted at promoting the digital transformation of SMEs currently exist in Belarus. The State Programme "Small and Medium Entrepreneurship" for 2021-2025 however aims at promoting the use of ICT within companies and industries notably through skills. As for non-governmental initiatives, these are mostly run by technology parks in support of their residents, as well as private businesses offering support to their local ecosystems. A notable example thereof is InKata Technopark, which provided advice in 2020 to residents for the development, implementation and maintenance of information and analytical systems for the digitalisation of production facilities implementing modern IT technologies such as BigData, AI and IoT. Most of these technology parks receive state support, such as tax exemptions. The Belarusian Robotics & AI association for instance also works on fostering the introduction of digital technologies in various sectors.
Georgia	Georgia is currently offering ad-hoc initiatives to entrepreneurs through established institutions and/or policy tools. For example, the government has established a network of technology parks and innovation centres, operating based on a one-stop-shop-principle, promoting innovation and entrepreneurship by providing access to physical co-working space, high technology equipment for prototyping, access to business incubation and acceleration programmes, knowledge, and education generation. The network is focused on the development of technologies and the innovation ecosystem in Georgia. The Log-in Georgia Project is promoting the use of broadband-enabled digital services, by providing training and capacity building programmes to entrepreneurs across the country to foster the uptake of digital financial services and e-commerce, e-learning and telemedicine, as well as online e-government services. Since May 2019, private companies can implement short-term TVET training-retraining programs and provide a state recognised certificate. There are IT companies, which have independently or in collaboration with educational institutions designed their own learning programmes, such as courses on social media marketing, graphic design, web programming.
Moldova	Moldova is currently the only EaP country proposing a rather comprehensive and institutionalised approach to SME digital transformation, including offering skills development programmes and advisory services to entrepreneurs. An entrepreneur interested in the digitalisation of their business can go through the following steps in order to benefit from ODIMM's services: 1) digital maturity test; 2) based on the results of the test, targeted capacity building and trainings in 5 different modules, tackling 19 topics; 3) access to business vouchers for further advice.
Ukraine	A National Online School for Entrepreneurs was launched at the initiative of the Ministry of Digital Transformation within the national project for SME development Diia.Business, offering several educational online courses covering digitalisation topics such as "e-document management for entrepreneurs", "Transfer of business processes online", "Promotion on social networks – boost with Facebook Bootcamp" etc. Ukraine is also considering to establish a network of 24 certified business innovation centres (as included in the Government Priority Action Plan on Economic Recovery 2020-2022). The initiative should allow to form a system of comprehensive support for ICT innovation and digitalisation of SMEs, providing access to knowledge, markets, infrastructure and funding sources. The "Partnership Offers" section of the Diia.Business website offers entrepreneurs more than 60 discounts, promotions and free opportunities from Diia.Business partners, including online services, training programmes, paid consultations and access free opportunities.

Source: Responses to fact-finding questions sent to EaP countries in June 2021

Way forward

Digital skills in the population

Empowering individuals with the relevant skills for the digital world is critical to enabling them to participate fully in their countries' economic, social and cultural life now and in the future. The evolving nature of the

digital economy requires individuals to rapidly adjust to shifts in demand for skills and changes in technology. Combined with good foundation skills and social and emotional skills, digital literacy is essential for inclusion in the digital economy and society.

However, the use of technology for learning and skills development as part of the solution to increase digital literacy among the population has not yet reached its full potential in EaP countries. As a first step, connectivity and internet adoption play an essential role (Chapter 2), followed by the need to integrate technology innovatively in teaching and learning, introducing technologies as part of a comprehensive approach that aligns them with curricular needs, and includes regular teacher training and high-quality ICT support. Use of technology will also depend on the extent to which innovation in the EdTech sector is encouraged and sustained, as well as on the trade-offs governments face when investing into ICT.

Moving forward, EaP countries could:

- **Strengthen their policy frameworks and governance systems to promote digital skills from early childhood onwards**. Most EaP countries do not yet have dedicated policy frameworks in place and are lacking comprehensive and co-ordinated approaches driven by cross-governmental digital education strategies, with scattered initiatives implemented by different institutions and agencies. Involving all relevant stakeholders in the elaboration of a framework/strategy, ranging from Ministries of Education, Economy and Labour to Finance would be important, as the approach must be a comprehensive one in order to develop lifelong learning initiatives and reach citizens of all age groups (see Box 3.1 for a good practice example).
- **Conduct regular digital skills needs assessments**, accompanied by skills needs anticipation exercises. None of the EaP countries is currently conducting such exercises/surveys in a regular manner, impeding a more efficient development of human resources and contributing to a skills mismatch in the labour market. An inclusive approach to skills needs assessments would be needed to ensure an accurate representation of the current state of play of digital skills across the population (e.g. involving various line ministries, business associations and academia), as well as being able to most accurately predict the needs of the labour market in the future (see Box 3.2 for a good practice example).
- **Use digital technologies to bridge educational and geographical divides.** The benefits of digitalisation have been mostly concentrated in cities and high-tech regions. COVID-19 has only exacerbated this rural-urban divide. Digital technologies, as well as open education and MOOCs can help bridge those divides by providing access to education in remote areas, as well as offering high-quality education and training resources to teachers in schools. In this way, digital technologies can mitigate inequalities due to an absence of high-quality teachers in some remote areas, a lack of training opportunities or a lack of access to information, provided schools and students have proper access to internet and devices, and the necessary skills to rely on those as well. However, in case of limited internet connectivity, countries should propose alternative, non tech-based solutions (e.g. learning foundational and complementary skills through TV such as Georgia's "Teleskola" initiative; radio channels etc.), ensuring students do not miss out on education due to technical reasons.
- **Encourage public-private partnerships** to broaden access to digital devices in schools. As seen above, schools in the EaP countries are half as equipped with devices as OECD countries. Tax incentives could be proposed to larger and digitally advanced businesses offering to equip schools with relevant materials and devices, employing students for internships or even proposing targeted trainings to teachers on the digital devices that schools are implementing.
- **Involve teachers when elaborating strategies and frameworks for digital skills in educational curricula**, as it will be up to the teachers to implement them and their feasibility assessment would be required. This also raises the issue of providing opportunities for continuous

professional learning for teachers, to bring them up to speed with the best possible use of digital technologies for teaching and learning.

- **Recognise digital skills acquired through various channels and learning environments.** This will foster portability of qualifications acquired e.g. through non-formal training provision, on-the-job learning and online tutorials, and incentivise job mobility by connecting these environments into a coherent learning ecosystem**.** Initiatives such as e-portfolios (online demonstrations of a user's competencies) and Youthpass (EU-wide recognition instrument for non-formal learning) could be considered to support and upgrade skill recognition.

Digital skills for SMEs

EaP governments should consider measures to equip SME managers and employees with relevant skills that enable them to assess their businesses' shortcomings, to navigate the plethora of tools available and choose the best digital solutions to improve their business, as well as embedding this vision into their firms' strategy and culture. A set of specific policy measures to accelerate the digital transformation of SMEs is provided in Chapter 0.The additional recommendations below, targeted towards digital skills development, can also be taken into account.

- **Raise awareness among SME managers of the different types of trainings available**. SMEs often do not have the time and knowledge to navigate the plethora of training opportunities available, even more so now that such trainings are also being offered online, some for free and often without any quality assurance. SME agencies in EaP countries could take the lead in informing SMEs of credible training options (e.g. based on digital maturity assessments, see Ch.3); rating platforms embedded in the agencies' websites could also help find the best and most appropriate trainings/initiatives for SMEs.
- **Rely on local ecosystems and communities,** consisting of key partners in industry (larger firms and other more digitally advanced SMEs); intermediaries (clusters, sectoral associations, chambers of commerce), education providers and the public sector, to access relevant skills and promote exchange of best practices:
  - SME agencies could take the leadership of such an ecosystem, to map the players and initiatives; co-ordinate trainings; provide funding for ecosystems to finance expert exchanges and develop public-private collaboration.
  - Large firms offering platforms where smaller companies operate (e.g. Microsoft, Google, and Amazon) have a **big tech responsibility.** They could therefore be incentivised to provide trainings to smaller companies, including practical insights on the most effective ways to leverage the digital services offered by their platforms.
  - **SMEs could be encouraged to experiment with digital technologies** by investing in dedicated facilities (e.g. Digital Innovation Hubs, Box 4.5). In this respect, the network of intermediaries in the digital ecosystem can be instrumental, as incubators, tech parks and cluster associations are in regular contact with businesses, understand their needs through their wide SME client base and have broad experience in what works particularly well (and what doesn't) in different kinds of SMEs. This also applies to independent consultants, playing a central role in providing training and guiding the enterprise digitalisation journey – tendering training contracts, setting up a database and introducing a certification/rating system could all be part of the solution for a better provision of services to SMEs.
- **Measure the impact of skills development programmes/ trainings,** aiming to offer the best possible support with the needs of the SME at the core. This could form the basis for quality labels and/or certification mechanisms for a better quality assurance of trainings.

Beyond teaching SME employees how to use specific digital technologies, digital skills development policies should aim at enhancing the digital autonomy of managers and employees, and incentivising them to lifelong learning.

4 Supporting the Digital Transformation of SMEs

This chapter concludes the report by exploring current institutional and policy settings for SME digitalisation in the six EaP countries and by presenting a “blueprint” for EaP countries to design the building blocks of policy instruments to respond to SME needs and facilitate their digital transformation.

Introduction

This chapter explores the current institutional and policy settings for SME digital transformation in the six EaP countries. It investigates both the nation-wide strategies and policies specifically targeted at SME digitalisation as well as other policy instruments and initiatives outside the scope of all-encompassing strategic documents. It finally provides a "blueprint" for EaP countries, presenting recommendation to design the building blocks of policy instruments to respond to SME needs and facilitate their digital transformation.

Institutional and policy settings for SME digital transformation in the Eastern Partnership

Given the multi-faceted nature of digital transformation described in Chapter 1, creating sound digitalisation policies requires a whole-of-government approach. To this end, National Digital Strategies (NDS) are a common instrument across OECD countries to define policy priorities, set objectives and outline actions for implementation in a wide range of areas relevant for the digital transformation of societies. Multi-stakeholder co-operation from the very early stages of strategy development can bring tangible benefits: it increases the level of ownership of the strategy, allows for smoother implementation, enhances the legitimacy of the policies that are implemented and can lead to overall better outcomes (OECD, 2020[67]).

In the EaP region, Armenia (Digitalisation Strategy 2021-2025), Azerbaijan (Strategic Roadmap for Development of Telecommunications and Information Technologies) and Moldova (Digital Moldova 2020) have adopted full-fledged NDSs, although it is important to note that for Azerbaijan and Moldova these expired in 2020, and governments have not yet approved successor or follow-up documents. Nevertheless, in Azerbaijan, in accordance with the framework "Azerbaijan 2030: National Priorities on the social-economic development", a strategy on economic and social development including SME digitalisation is being elaborated. Belarus has recently approved a state support programme dedicated to the digital development of the country for 2021-2025, which is largely comparable to an NDS. In Georgia, the Ministry of Economy and Sustainable Development is currently working on a "Long-term national strategy for the development of digital economy and information society", while in Ukraine policy objectives and measures promoting the digital transformation are included in five different national strategies (Table 4.1).

The existing national digitalisation strategies in EaP countries are quite heterogeneous in scope. In Azerbaijan, policy objectives are narrowly focused on connectivity issues, the development of e-government services and the development of the ICT sector. Some measures are envisaged to support the development of digital culture and awareness, the development of digital skills among students, the general population and entrepreneurs, and the adoption of digital solutions by enterprises in non-ICT sectors. In Armenia, on the other hand, the strategy includes dedicated priority directions for the digitalisation of the economy, and sectors beyond ICT, and society, with a strong focus on digital skills.

Georgia and Ukraine have in some form embedded digitalisation-related objectives in other strategic policy documents not primarily concerned with digitalisation. For example, Ukraine includes digitalisation-specific objectives in five national policy documents: the National Strategy for creating a barrier-free space in Ukraine up to 2030, the Concept for the development of digital competencies, the State Strategy for Regional Development for 2021-2027, the National Strategy 2030, and the Strategy for digital transformation of the social sector.

Table 4.1. Overview of national policies for digitalisation in EaP countries

	Armenia	Azerbaijan	Belarus	Georgia	Moldova	Ukraine
Does a **comprehensive National Digital Strategy** (NDS) exist?	**yes** *Digitalisation Strategy 2021-2025*	**yes** *Strategic Roadmap for Development of Telecommunications and Information Technologies*	**yes** *State programme for to the digital development 2021-2025*	no	**yes** Digital Moldova 2020	no *(digitalisation objectives in 5 separate national strategies)*
Does the NDS include specific **policy actions for non-ICT sectors**?	**yes**	no	**yes**	n/a	no	**n/a**
Are there **other national strategies promoting digitalisation**?	**yes**	**yes**	**yes**	**yes**	**yes**	**yes**
Is **SME digitalisation** embedded in the SME Development Strategy?	**yes**	no	no	**yes**	no	no
What is the **main institution responsible for digitalisation agenda**?	Ministry of High-Tech Industry	Ministry of Digital Development and Transport	Ministry of Communication and Informatisation	Ministry of Economy and Sustainable Development	Ministry of Economy	Ministry of Digital Transformation

Source: OECD fact-finding questionnaire (June-August 2021)

All EaP countries have adopted SME development strategies, typically with the aim of increasing SMEs' productivity, competitiveness and innovation. However, only Armenia and Georgia have introduced specific actions to promote SME digitalisation, even though neither of them has identified dedicated KPIs related to the adoption of digital solutions by SMEs. There clearly remains ample room across the EaP region to step-up the role of SME strategies and action plans to improve SME access to finance, innovation networks, and skills with the objective to boost the digital transformation of SMEs.

Responsibility for digitalisation policy often falls under the ministries responsible for innovation and telecommunication markets, and, with the exception of Ukraine's Ministry of Digital Transformation, EaP countries do not have ministries responsible solely for the digitalisation agenda. In Belarus, the Ministry of Communication and Informatisation currently plays a key role in the implementation of digitalisation-related state programmes along with the Ministry for Economy and the Ministry for Industry, and it is foreseen to evolve it into a full-fledged Ministry of Digital Development. In Georgia and Moldova, the Ministry of Economy and Sustainable Development and the Ministry of Economy respectively are in charge of digitalisation agenda. In Armenia, the Ministry of High-Tech Industry develops and implements policy in the areas of communication, information technology and information security. In Azerbaijan, the Ministry of Digital Development and Transport oversees the implementation of the ICT Roadmap.

While it is important that these institutions have the ownership of the digitalisation agenda and set digital transformation as one of their priorities, it is crucial that the national institutions responsible for education, SME policy, public-service delivery, and social and labour affairs also have the opportunity – and the mandate – to shape the design of and implement the digitalisation agenda.

Current initiatives for SME digitalisation in the Eastern Partner countries

While the existence of dedicated strategic policy frameworks can provide the institutional backing and a medium-term perspective to any policy instrument, initiatives to support SME digitalisation may also be introduced outside the scope of all-encompassing strategic documents. Indeed, this is a fast-changing

environment and policy measures in favour of SME digitalisation are being considered by governments in many countries with different breadths and intensities, especially in the wake of the “big push” to digitalise businesses brought about by the COVID-19 pandemic.

This section aims to map the current state (as of September 2021) of policy instruments used by enterprise support agencies in EaP countries to accelerate SME digitalisation and serve as a starting point for a policy dialogue with national policy makers on the priorities going forward.

Armenia

Enterprise Armenia has recently been established as the main enterprise support agency in the country, building on the experience of previous institutions such as SME DNC and the Investment Support Centre. While its main focus is on investment promotion/aftercare and export facilitation, its mandate includes supporting and financing local SMEs. The palette of services offered to SMEs, however, seems rather limited, and no mention is made on the agency’s website of dedicated programmes to support SME digitalisation.

Other initiatives and platforms exist in the country providing a wide range of services to facilitate the digitalisation of businesses in Armenia. Chief amongst them is the Enterprise Incubator Foundation (EIF), one of the largest technology business incubators. Established in 2002 with World Bank support, EIF is now a truly public-private partnership in which government bodies, international organisations and private enterprises in the high-tech sector participate with the aim of supporting the development of the ICT sector in Armenia through legal and educational reforms, the creation of funding schemes for start-ups, individualised consulting for ICT companies, and workforce development through educational initiatives.

While EIF’s traditional focus is on companies operating in the IT sector, its business support services include strategy development and advice on technology adoption for companies in a wider range of sectors. Furthermore, EIF’s matching grants programmes primarily target start-ups in high tech fields as a supporting mechanism for the creation and growth of knowledge-intensive enterprises in Armenia, but they are also available to encourage companies active in traditional sectors to adopt new technologies.

Similarly, the Vanadzor Technology Center is a partnership between the EIF, the Government of Armenia and the World Bank assisting technology-oriented entrepreneurs with business start-up and acceleration, consultancy, mentoring, marketing, and computer-science educational programs in co-operation with technical universities.

Azerbaijan

In Azerbaijan, existing governmental initiatives focus mostly on informational support for SMEs, provision of training and consultancy services, and financial support through grants and loans with preferential interest rates.

SMBDA, under the supervision of the Ministry of Economy, provides support to SMEs mostly through the network of SME Development Centres, which are tasked with providing non-financial support, such as trainings and advisory services for SMEs with the objective of improving management practices and SME skills, including digital skills. While SMBDA does not provide a targeted programme supporting adoption of digital solutions by SMEs from non-ICT sectors, digitalisation is embedded into the existing training and consulting support programmes. The SMBDA also supported the establishment of an e-commerce platform, www.kobmarket.az, for SMEs to sell their products and services.

In 2018, Azerbaijan established the Innovation Agency under the supervision of the then Ministry of Transport, Communication and High Technologies, now Ministry of Digital Development and Transport . Its main objective is to promote the production of innovative and high-tech products and services under

the "Made in Azerbaijan" brand[15], as well as to create conditions for existing local brands to enter international markets and adopt digital solutions such as robotics, cloud computing, and artificial intelligence.

While SMBDA is primarily focusing on non-financial support, the Agency also operates a grant mechanism to award SMEs with grants of up to AZN 10 000 (EUR 5 000). The grants are awarded following the assessment by an independent expert panel (Innovation Agency of Azerbaijan, 2021[120]).The Innovation Agency provides financial support for innovative projects, including for commercialising research, as well as for acceleration programmes such as “Idea to Business” and “Fast Track”. In terms of additional financial support, the Entrepreneurship Development Fund operating under the Ministry of Economy provides, through commercial banks, loans to SMEs at preferential interest rates (5% p.a.). In the first half of 2021, the Entrepreneurship Development Fund provided financing for 560 companies, of which 510 operate in the agricultural sector. The Fund started to implement a new strategy, which identifies financing priorities until 2023, including telecommunication projects and SME digitalisation.

Belarus

No government-sponsored initiatives targeted at promoting the digital transformation of SMEs currently exist in Belarus. The State Support Programme “Digital Development of Belarus 2021-2025”, as well as the State Scientific and Technical Programme “Cybersecurity 2021-2025” contain a few policy instruments to promote the adoption and use of digital technologies by SMEs, such as direct financial support schemes (e.g. grants and vouchers businesses can apply for; funding for the creation of software and for the implementation of innovative projects via the purchase of technical equipment implementing industry 4.0 technologies from the Universal Service Fund of the Ministry of Communication and Informatisation), as well as indirect financial support, such as tax incentives for the residents of the High Tech Park in Minsk. The State Program “Small and medium entrepreneurship” for 2021-2025 also aims at supporting the digitalisation of SMEs. The programmes have been recently approved – results are therefore not available yet and no concrete initiatives have been put in place, also due to a lack of a co-ordinating body responsible for the development and implementation of policies in the area of digital transformation.

Moreover, the Ministry of Economy in collaboration with the Korean Development Institute has established a sector specific programme: “Intellectual Support for the Organisation of Digital Transformation of the Belarusian Industry”, which provides comprehensive guidelines for the adoption of digital technologies in the manufacturing industry. The project has been considered successful by Belarussian authorities; the Ministry and Korean institutions have therefore announced a new initiative for the years 2021/2022 that will aim at collecting and implementing the best practices in the digitalisation of the industrial sector.

However, no SME agency had been established, yet, and no co-ordinating body responsible for digital transformation is in place. The Ministry of Communication and Informatisation is currently handling some aspects of the co-ordination, but has developed a draft Decree, according to which a new full-fledged co-ordinating state body should be created on the basis of this Ministry – the Ministry of Digital Development and Communications. Concerning financial support, the Belarusian Innovative Foundation coordinates the support to promote innovation in the country, including the development of high-tech products.

Most non-governmental initiatives are run by technology parks to support their residents, as well as private businesses offering support to their local ecosystems. These technology parks benefit from state support – about EUR 15 million was allocated to technoparks and technology transfer centers in 2019. A notable example thereof is InKata Technopark, which provided services in 2020 to residents for the development, implementation and maintenance of information and analytical systems for the digitalisation of production facilities implementing modern IT technologies such as Big Data, AI and IoT. The High-Tech Park offers

[15] www.made.az/en

preferential conditions such as corporate tax exemptions to start, develop and run IT and high-tech businesses. The number of firms benefitting from it went from 22 in 2017 to 284 in 2020. The Park not only creates jobs, but it also allows residents to work from anywhere in the country, thereby fostering regional development.

Georgia

Georgia's support for SME digitalisation is mostly delivered by the Georgian Innovation and Technology Agency (GITA). The latter has developed, throughout the years, several initiatives to this end, but they remain largely dedicated to innovative start-ups and "digital-by-default" firms. GITA has notably being developing an ecosystem consisting of 22 fabrication laboratories (so-called "fablabs") where individuals can find resources and test ideas; three technology parks acting as one-stop-shops for tech entrepreneurs and offering technological, educational and professional resources; two innovation centres (mini-tech parks); and three university-based innovation laboratories focused on skills development and event organisation. These infrastructures cover not only Tbilisi, but also several Georgian regions, and they should be further developed through the National Innovation Ecosystem (GENIE) project, a comprehensive initiative featuring the IBRD and GITA to develop the digital economy. Moreover, digital start-ups are also encouraged to scale up through dedicated financing tools offered by GITA, such as the "matching grants" programme implemented since 2018.

By contrast, agencies' support for the digital transformation of "traditional" firms, i.e. outside of the IT sector, remains scarce and scattered across different stakeholders. For example, SMEs can access trainings to develop digital skills (mostly on e-commerce) implemented by Enterprise Georgia, GENIE (Broadband for Development initiative), or the Georgian Chamber of Commerce and Industry (GCCI), and an upcoming World Bank project should widen the offer. Overall, Georgia lacks a comprehensive approach to SME digitalisation. The two enterprise support agencies do not yet offer dedicated advisory services and financial support for "traditional" SMEs willing to digitalise, and little is made to raise awareness of the benefits of the digital transformation. There is also no one-stop-shop where entrepreneurs can easily find dedicated resources and advice to progress in their digital transformation.

Moldova

Moldova is currently the only EaP country proposing a rather comprehensive approach to SME digital transformation through financial and non-financial instruments provided with the support of the European Union under ODIMM's SME Digitalisation Programme. In particular, SMEs can benefit from the following types of support:

- A *digital maturity test* provides a self-assessment online platform to assess SMEs' level of digital maturity. The test evaluates the level of online presence, e-commerce, transport and logistics, client services and process digitalisation. Each of the topics contain specific questions to find out more details about the company's use of platforms, what type of customers they have and what information they rely on. Based on the results of the questionnaire, SMEs are classified as either low/beginner in their digitalisation process, medium/intermediate or advanced. The results of the assessment allows SMEs as well as ODIMM to determine which areas of business require more intervention and would benefit from business vouchers and training.
- *Capacity building and trainings*. Based on the result of the digital maturity tests, ODIMM offers training in five different modules: i) online presence, ii) e-commerce, iii) customer service, iv) digitalisation of processes, and v) transport and logistics.
- *Financial support*. To complement the initiatives described above, the programme also offers financial support components providing i) business vouchers for further advice and consulting up

to MDL 20 000 (EUR 960), and ii) grants up to MDL 200 000 (EUR 9 600) to cover expenses related to digitalisation (most often costs related to hardware purchase).

In addition to the SME Digitalisation Programme, ODIMM is also managing a network of 11 business incubators offering training and support for start-ups and growth-oriented SMEs.

Complementing the support provided by ODIMM, Moldova IT Park aims to improve competitiveness of Moldova IT sector by providing a comprehensive organisational platform and a single tax of 7% on the sales revenue for all its residents. In 2019, there were more than 500 active residents, making it one of the most successful IT sector support initiative in Moldova. In addition, Tekwill – Centre of Excellence of the ICT sector in Moldova – provides training, networking opportunities and information support for IT companies. Moldova's entrepreneurs can also rely on a growing number of start-up support organizations, including Start-up academy Chisinau, Generator Hub Chisinau, iHub.

Ukraine

The enterprise support infrastructure in Ukraine has recently undergone an important overhaul, with the discontinuation of the SME Development Office and the establishment of the Entrepreneurship and Export Promotion Office (EEPO) in 2021 on the basis of the previous Export Promotion Office. EEPO's website is now integrated in the broader Diia.Business portal. The agency is also expanding a network of physical Entrepreneurs Support Centres throughout the country (six established as of September 2021).

The digital transformation is one of EEPO's stated areas of work. A particular reference is made to what appear to be important building blocks of the agency's support for SME digitalisation, including: creating a strategy for digitalisation of SMEs in accordance with the SME strategy, creating tools for digital business diagnostics for SMEs, offering services to improve SME operations through CRM-systems, creating step-by-step guidelines for SMEs on how to go online.

A comprehensive programme for SME digitalisation is not yet available in Ukraine. However, a wide range of "soft" services focusing on understanding the company's digital maturity and obtaining initial advice to start a company's digital transformation are offered online, such as the free consultations with experts on "digital marketing and digital transformation for small business". Additional offline expert consultations are available in a small selection of Entrepreneurs Support Centres.

To improve the skills of Ukrainian entrepreneurs and SMEs, the Ministry of Digital Transformation of Ukraine, in partnership with other organisations, launched a National Online School for Entrepreneurs within the National project for SME development *Diia.Business*, currently operated and supported by EEPO. The National Online School for Entrepreneurs offers several educational online courses covering digitalisation topics such as "e-document management for entrepreneurs", "Transfer business processes online", and "Social Media Promotion". In addition, EEPO is collaborating with Google to offer training modules on specific topics such as "Fundamentals of digital marketing" and "Online business development for tourism".

A wide range of financial support services for SMEs are available in Ukraine, from the successful 5-7-9% "soft loans" programme, to the participation in established EU-financed initiatives such as COSME, Horizon 2020 and Eureka. While these could be used to finance certain digitally oriented initiatives by SMEs, dedicated financial support services for digitalisation have not yet been developed.

A wide network of over 70 science/technology/industrial parks and over 40 innovation centres/incubators exists in Ukraine (UNECE, 2021[121]), which could be considered by EEPO to maximise its impact and reach to deliver services to the wide SME community. UNIT.city's innovation park, for instance, is a large incubator for innovative start-ups, but also offers prototyping facilities and innovation consulting programmes to explore global trends and ideas for new business areas.

Regional overview and emerging trends

Taken as a whole, EaP countries currently have only limited initiatives that explicitly address the digital transformation of SMEs through their main enterprise support agencies. A full-fledged programme for SME digitalisation that is actively promoted, operational and high on the agenda of enterprise support agencies is only available in Moldova, with ODIMM's pilot programme for SME digitalisation. However, certain interesting trends emerge across the region (Table 4.2), which could serve as a reference and highlight priorities for future work of policy makers in the EaP countries:

- Among the individual components of possible support for digitalisation that are starting to appear in the portfolio of SME agencies, training programmes are the most common, as they incorporate an increasing number of educational modules to build the digital skill of entrepreneurs and SME employees, mostly in the area of e-commerce and digital marketing.
- Expenditures on digital equipment are also becoming eligible to receive financial support through the already established grants, vouchers and subsidised loans programmes offered by SME agencies, although dedicated instruments to finance the digital transformation of SMEs are mostly lacking across the EaP region.
- More advanced "soft" services such as digital self-assessment tools or sector-specific digital plans are not offered by enterprise support agencies in the EaP region (with the exception, to some extent, of Moldova and Ukraine). While they require a more in-depth expert knowledge of trends, challenges and opportunities for adopting digital technologies at the industry level, they could help SMEs prioritise their investment and better navigate the universe of available digital technologies.

Overall, the enterprise support agencies of Moldova and Ukraine appear to be further ahead in the design and provision of support instruments for digitalisation to the large segment of "traditional" SMEs. Ukraine's experience, in particular, is worth mentioning since the evolution of EEPO's services is taking place within the broader context of the improved interaction between government, citizens and businesses enabled by the functionalities of the innovative online "Diia" ecosystem (Diia.Digital Education, Diia.Business, Diia.City).

Azerbaijan and Georgia have well-established agencies with proven track records and long-standing programmes supporting SMEs, and face a clear opportunity to evolve their palette of services and provide dedicated initiatives for the digital transformation of SMEs beyond the segment of high-tech start-ups.

The SME agencies of Armenia and Belarus appear to be lagging in their efforts to provide tailored support to SME digital adoption. However, both countries offer interesting evidence of the important role that other (non-government) actors in the ecosystem of digital transformation, such as tech parks (state-supported in the case of Belarus) and incubators, can play, with their ability to reach a large audience of beneficiaries and the expertise to complement financial support with a mix of mentoring and training initiatives.

Table 4.2. Overview of SME digitalisation initiatives in the EaP by main enterprise support agencies

	Armenia	Azerbaijan	Belarus	Georgia	Moldova	Ukraine
National enterprise support agency	Enterprise Armenia	SMBDA	Belarusian Fund for Financial Support of Entrepreneurs	Enterprise Georgia / GITA	ODIMM	Entrepreneurship and Export Promotion Office
Starting year	2021	2017	1992	2014	2007	2021
Dedicated programme for SME digitalisation	n.a	n.a	n.a	n.a	Support tool for digitalisation of SMEs	n.a
Overall support for SME digitalisation	○	◔	○	◔	◑	◑
Digital self-assessment	no	no	no	No	**yes**	**yes**
Sector-specific digital plans	no	no	no	No	no	no
Financial support for digitalisation	no	**yes**	no	**Yes**	**yes**	no
Training for digital skills	no	**yes**	no	**Yes**	**yes**	**yes**
Advisory for SME digitalisation	no	**yes**	no	No	**yes**	**yes**
Other actors in the ecosystem for digital transformation	Enterprise Incubator Foundation (focus on IT) Vanadzor Technology Center	Innovation and Digital Development Agency (2021) Azerbaijan Business Development Fund (Entrepreneurship Development Fund of Azerbaijan) (2021) High-tech parks Barama Innovation / Entrepreneurship Centre Symbiosis Technical Business Incubator Innoland – Incubation & Acceleration Center	High-Tech Park Additional technoparks (e.g., InKata, Infopark, and the Brest Science and Technology Park), including in regions	5 Techparks and Innovation Centres 3 University-based Innovation labs Network of 22 FabLabs	11 Business Incubators Moldova IT Park	Over 70 science/ technology/ industrial parks (e.g. Synergy science park) Over 40 innovation centres / incubators (e.g. UNIT.city innovation park)

○ Not started ◔ Low ◑ Medium ◕ Advanced ● Best practice

Source: Desk research and findings from SME agency survey and fact-finding questions circulated to EaP counterparts in H1 2021

Recommendations for EaP policy makers: a blueprint for accelerating SME digital transformation

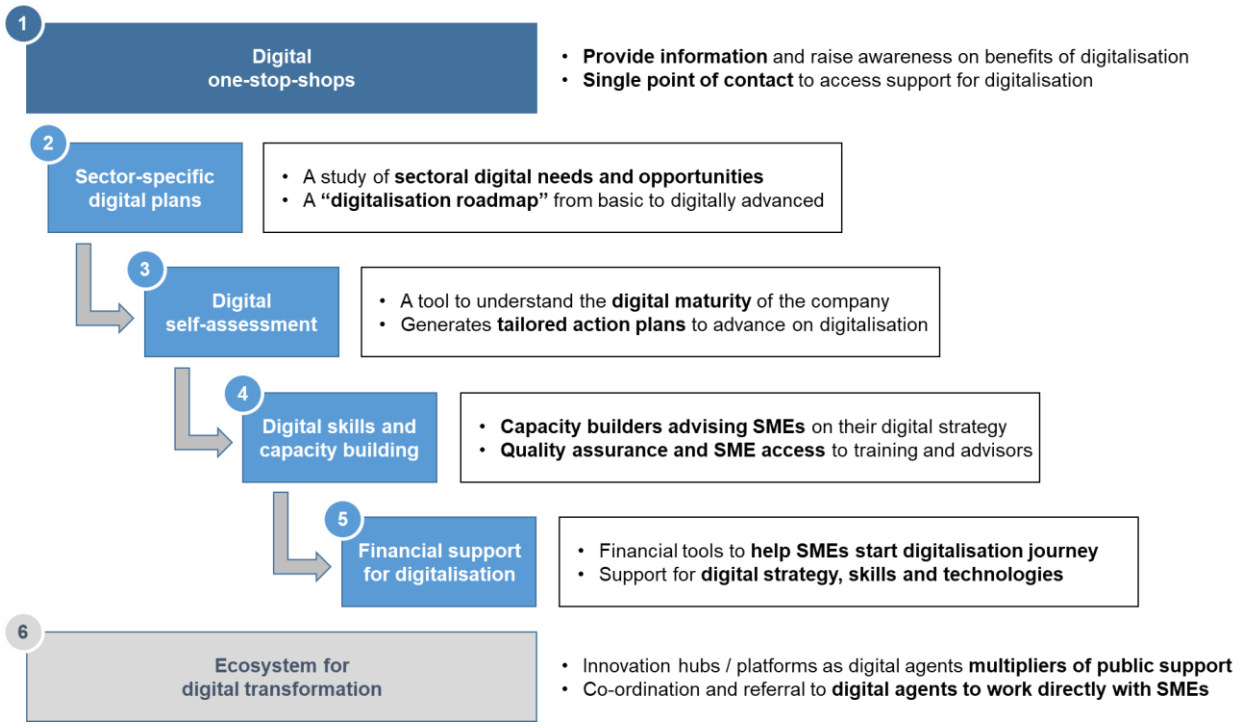
EaP policy makers can play a pivotal role in guiding and supporting the digital transformation of SMEs in all industries, helping them overcome the size-related barriers that hamper their access to information, finance, training and quality advisory to progress in their digital transformation journey.

Corroborated by a case-study analysis of established international best practices, this section introduces a "blueprint" to design the policy instruments to respond to SME needs and facilitate their digital transformation. The recommendations revolve around identifying an implementing agency – typically the national enterprise/SME support agency – and giving it a strong mandate to act as a "digital one-stop-shop" for businesses willing to advance their digital transformation.

In particular, enterprise agencies can support SMEs in developing and implementing a digital transformation strategy starting by (i) guiding them through an assessment of their digital maturity; (ii) developing sector-specific digital plans outlining a "digitalisation roadmap" from digital basic level to digital maturity; (iii) facilitating access to quality training and advisory services; and (iv) providing financial support to address SMEs' lack of resources to finance their digital transformation (Figure 4.1). Lastly, policy makers should leverage the expertise and facilitate the co-ordination with the ecosystem of existing innovation centres, networks and platforms for the digital transformation.

While all SMEs could benefit from the services and initiatives described below, those that are yet to get started or are in the initial phases of their digital transformations are likely to be the main beneficiaries of the enterprise support agencies and should be considered as the principal targets of the policy initiatives presented in this section.

Figure 4.1. A policy maker's blueprint to accelerate SME digital transformation



Source: OECD analysis

Enterprise support agencies as digital one-stop-shops

Enterprise support agencies should embrace the role of "digital one-stop-shops": a single point of reference for businesses seeking public support to digitalise. This could be added alongside the more traditional areas of intervention (i.e. entrepreneurship development, export promotion, access to finance), but a dedicated effort to allocate adequate human and financial resources within the agency should be considered. Likewise, this "new" mandate should be reflected in policy documents (e.g. SME strategies and action plans) and given appropriate visibility in communication materials and initiatives, starting with the agency's corporate website and social media profiles, and vis-à-vis other government bodies supporting the digital transformation process.

Digital one-stop-shops should act as first implementers of digital transformation policies set by national governments. An important objective of this role will be to stimulate SME's demand for digitalisation and match them with suppliers of financial and non-financial support services. In addition to the more targeted policy instruments described in detail in the sections below, the digital one-stop-shops should be key providers of information about the digital transformation. In doing so, they should consider the following:

- **Perform studies on the state of digital maturity of different sectors**. Certain sectors of the economy may already be at an advanced stage of digital transformation, while others may be lagging, while presenting great opportunities to digitalise. A macro-analysis of the state of digitalisation of different sectors could be performed to establish a baseline and identify sectoral priorities for delivering state support programmes in a context of limited resources. To understand the level of digital maturity of an industry, surveys could be conducted on representative samples of businesses to collect information on a series of indicators capturing both the depth of digital culture as well as the adoption of digital solutions in different business areas (e.g. customer relationship, communication, production, inventory management, business processes).
- **Raise awareness of the benefits of the digital transformation of their businesses**. SMEs are often unaware of the many benefits deriving from the digital transformation and may not fully recognise the incentives to invest in the digitalisation process. Therefore, digital one-stop-shops should take responsibility for educating SME managers about the positive impact of the adoption of digital technologies. Expert webinars and success stories featuring business owners could be presented to encourage the development of a digital culture and illustrate the practical implications of digital solutions.
- **Maintain an observatory of digital solutions and a database of trusted digitalisation experts.** This should present trends on the digital transformation and digital solutions for SMEs available in the market, so as to keep entrepreneurs updated on recent digital developments. In addition, the digital one-stop-shop should offer a list of providers of training, consulting services, and digital solutions, for SMEs to learn about the availability of advisory and technology services of trusted quality (see "Digital skills and capacity building" below).
- **Clearly present information on existing support programmes for the digital transformation.** Digital one-stop-shops should be the first point of contact to learn about public support programmes available to SMEs. This should clearly present the list of opportunities to obtain financial and non-financial support, eligibility criteria and application procedures. To increase reach, enterprise support agencies should inform their current and past beneficiaries of the available programmes for SME digital transformation.
- **Co-ordinate resources and refer to other actors in the ecosystem for digital transformation.** Existing stakeholders in the ecosystem for digital transformation (e.g. business associations, digital innovation hubs, competence centres, incubators) can be appropriate providers of support services, complementing the activities under direct management of traditional enterprise support agencies. Digital one-stop-shops should advertise the existence of other actors in the digital ecosystem to SMEs, leverage their expertise and consider them "digital agents" to deliver the services to accelerate SME digitalisation whenever appropriate.

Sector-specific digital plans

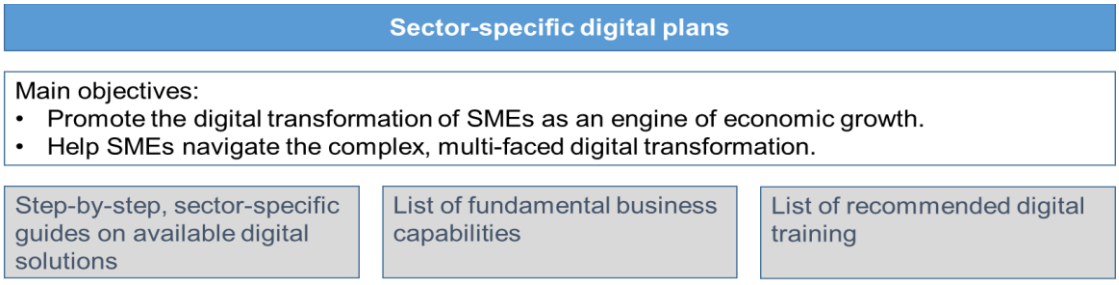
The complexity of the digitalisation process associated with the small capacity and resource constraints of SMEs can make it very difficult to get started on the digital transformation, prioritise strategic decisions, changes to business plans, and related investment in human resources and technologies. The whole process is made even more complicated by the fact that different enterprises have different needs, depending not only on their stage of digital transformation but also on the industry in which they operate.

The business case for the adoption of specific digital technologies may differ depending on the sectors in which companies operate. Moreover, depending on the industry's digital maturity level, the mix of recommended digital tools used during the digital transformation process will differ. For these reasons, to develop relevant digital adoption programmes, it is necessary to have segmented information on technology needs by sector of activity. A small restaurant that has yet to begin its digital transformation and has yet to be exposed to digitalisation and its benefits has very different digital needs from a medium-sized company operating in the cybersecurity sector that has already implemented some digital solutions.

In this regard, policy makers should adopt a sector- and function-specific approach that promotes the most relevant tools for each business (OECD, 2021[6]). They can guide SMEs by providing **step-by-step, sector-specific recommendations on available digital solutions.** These guidelines outline a "digitalisation roadmap" from digital basic level to digital maturity, explaining the benefits of each digital instrument. The first step could include solutions to get digital-ready and provide a list of basic requirements to streamline operations and optimise resources. The second step could include solutions to connect businesses and expand the market, and the third stage could include solutions for intelligent and data-driven businesses. For example, a digitalisation roadmap for a provider of food services could include digital/online food ordering solutions and digital payments in the first step, the adoption of B2B e-marketplace and e-procurement systems in the second step, and finally the employment of kitchen robots and Predictive Ordering System powered by AI in the last step. In order to maintain its relevance, the roadmap will have to be updated over time as the digital transformation of the industry progresses and new technologies are introduced. To make sure that business develop their digital culture alongside technology adoption, these guidelines should be complemented with:

- **A list of fundamental business capabilities.** The roadmap can highlight the fundamental business capabilities needed by the SME to thrive in their digitalisation journey. For example, depending on the sector, these could include data analytics, digital marketing, AI and programming, and more.
- **A list of recommended digital trainings.** The roadmap should also include recommendations on specific digital training needed by the enterprise. The list should include not only trainings offered by the SME agency, but also those offered by other certified providers in the broader ecosystem for the digital transformation – including consultants, innovation centres, digital innovation hubs, universities, and incubators – possibly among those pre-approved for financial support.

Figure 4.2. Sector-specific digital plans building blocks



Source: OECD analysis

A good example of this approach can be identified in Singapore's Infocomm Media Development Authority's (IMDA) *SMEs Go Digital* programme (see Box 4.1).

Box 4.1. Singapore's *SMEs Go Digital* initiative

Established in 2017 by the Infocomm Media Development Authority (IMDA), the SMEs Go Digital initiative aims to help SMEs fully reap the potential of digital technologies and build a stronger digital culture. Since its launch, over 75,000 SMEs have adopted digital solutions based on recommendations from the programme. The main building blocks of the SME Go Digital initiative are:

Industry Digital Plans

Sector-specific Industry Digital Plans (IDPs) equip SMEs with a step-by-step guide on digital solutions and relevant training for their employees, tailored for their specific skill levels at different stages of their growth. IMDA also supports SMEs in following the recommendations of the IDPs with a list of pre-approved digital solutions that are market proven and cost-effective.

Self-Assessment Checklist

As a starting point, entrepreneurs can take a test to assess their level of digital readiness. The self-assessment test is structured as a list of yes/no questions, adapted by industry, with 18 different industries available at the moment of drafting. On the basis of the results of the tests, users receive personalised steps to take to further their digital efforts.

SME Digital Tech Hub

The SME Digital Tech Hub provides specialist advisory services on digital technologies to SMEs with more advanced digital needs. It has been established by IMDA and operated by the Association of Small and Medium Enterprises (ASME).

The SME Digital Tech Hub:

- provides advice on both basic and advanced digitalisation issues and on pre-approved digital solutions for which SMEs can access public funding,
- works with SME Centres/Trade Associations to help connect SMEs to ICT vendors and consultants,
- conducts workshops and seminars to help SMEs build their digital capabilities.

Pre-approved solutions and Productivity Solutions Grant

The initiative also selects some pre-approved solutions to improve productivity that are supported under the Productivity Solution Grant (PSG). The PSG was launched on April 2018 and supports the adoption of pre-scoped IT solutions, equipment and consultancy services, aligned to the industry roadmaps.

Source: (IMDA, 2021[122]; IMDA, 2021[123]; Singapore, 2021[124])

Digital self-assessment

The level of digital maturity can vary considerably across enterprises in a given industry, as businesses with different levels of digital readiness usually coexist. Therefore, in order to be able to identify the best digital solutions for each business and the relevant steps for their adoption, an important step for all businesses undertaking a digital transformation is to assess their current degree of digital maturity.

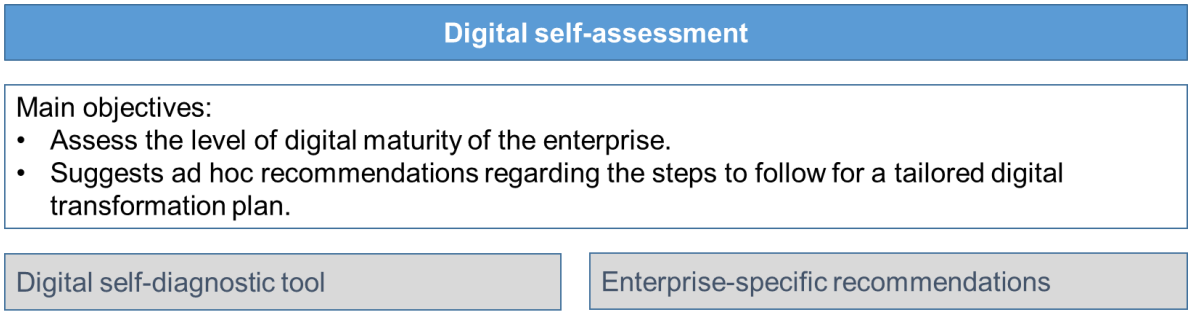
Depending on the different degree of maturity established by the self-assessment, businesses may receive targeted digital plans outlining the itinerary to advance from one level of digital maturity to the next. This

will help managers rethink the firm's strategy and understand which processes could be improved, which digital technologies to adopt and how to develop their own skills and those of their employees.

In this respect, policy makers can support SMEs by providing:

- **A platform for a digital self-diagnostic tool.** The digital self-assessment questionnaire could include a list of yes/no questions aimed at evaluating how digitally mature a business is. It is a self-test that an entrepreneur can take autonomously. A website can be the most convenient and user-friendly option, as it will be accessible remotely to all interested entrepreneurs. This tool should investigate the different areas of operations and business functions common to many sectors (e.g. HR, customer relationship, sales, accounting, inventory, digital payment, production, marketing, logistics, accounting), as well as those that are more sector-specific (e.g. for the food and services industry, those could be restaurant layout optimisation using virtual reality, queue management systems, automatic reservation systems, digital/online food ordering).
- **Enterprise-specific recommendations.** Based on the outcome of the self-assessment, first recommendations for specific digital solutions and training can be provided. These can be a subset of the generic steps included in the relevant sector-specific digital plan.

Figure 4.3. Digital self-assessment building blocks



Source: OECD analysis

Among the EaP countries, Moldova is the only one already offering a similar tool: ODIMM in fact, offers a service that, based on the results of a digital-maturity test, suggests targeted capacity building and trainings. Ukraine's EEPO announced a similar initiative,[16] with, for the time being, a self-assessment for entrepreneurs available on the topic of personal data protection.

Digital skills and capacity building

SMEs should follow a digital strategy that identifies the competences required to ensure that technology adoption is sustained by a digitally competent workforce. Skills shortages can reduce the benefits of digitalisation and prevent the digital transformation from occurring altogether (see Chapter 0).

This type of digital capacity building can hardly be achieved with internal resources alone, but it needs collaboration or expert advice. Unfortunately, though, SMEs often find it hard to understand their training needs and opportunities, navigate the different consulting options and may not be able to afford the advisory and consulting services available in the market.

[16] https://business.diia.gov.ua/en/selftesting

For these reasons, SME agencies should intervene to bridge these gaps and make sure SMEs can obtain all the support and training they need in order to develop and implement their digital strategies. Policy makers should therefore consider the following measures:

- **Facilitate access to a reliable network of certified consultants and advisors.** SME agencies could identify and train consultants and advisors and set up quality assurance/certification mechanisms to provide SMEs with a qualified network of digital experts. In identifying the local consultants and issuing the certification, the agencies should pay particular attention to their specific areas of expertise, as well as how to design support schemes that facilitate SME access to these advisors. The advisors should then be able to guide SMEs through their digital transformation strategy, and evaluate needs and opportunities to digitalise on different business areas (Box 4.2). Finally, governments could go one step further by financing, in part or whole, the services offered by the certified consultants (see below). In this regard, an interesting example is offered by Singapore's SME Digital Tech Hub and by KMU.DIGITAL (see Box 4.1 and Box 4.4).
- **Tailored training opportunities for the digital transformation**. SME agencies should ensure training opportunities are made available to enterprises undertaking the digital transformation process. The training should meet SMEs specific needs and in particular should match guidelines from the sector-specific digital plans (see above) and the outcome of the digital self-assessment (see above).

Box 4.2. Advising SMEs on their digital transformation strategies

In order to structure their support to SMEs starting their digital transformation, external advisors could consider needs, opportunities and impact of digital technologies on the following business areas:

Strategy and digital culture. The digital transformation should be addressed at the core of the SME's business objectives and strategic planning, as well as its culture and organisational values. The main benefits of the digitalisation of the business strategy are increased transparency, improved communication with employees, better operational model, increased agility and faster decision making.

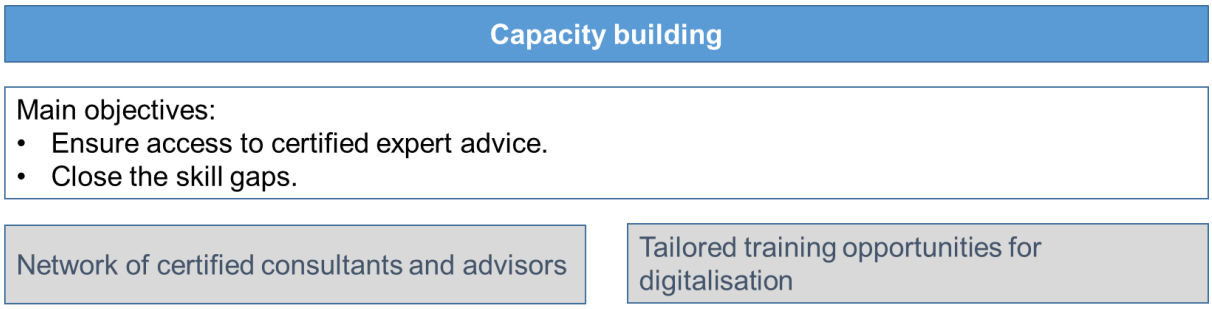
Customer Relationship. The relationship with the customer should be at the centre of the digitalisation process. Business should exploit digital tools to improve customer experience, knowledge and engagement. The main benefits of the digitalisation of the customer relationship are increased retention, reduced customer churn rate, increased brand awareness, better demand segmentation and targeting, improved conversion funnel, improved customer experience.

Organisation and talent. Enterprises should embrace new ways of work offered by digitalisation. The main benefits of the digitalisation of the enterprise's organisation and developing digital talents are increased employee satisfaction, agility, lower employee turnover rate, improved company culture, better preparedness to economic changes, effective human capital management, and talent retention.

Products and services. Digitalisation brings novel techniques of doing business, adding value to the customer based on new knowledge acquired through digitally collected data. The main benefits of digitalising products and services are improved production process, wider catalogue and faster sales funnel, improved supply chain, time optimisation, cost reduction, and access to new markets.

Technology. Digital technologies are a centrepiece of a successful digital transformation. Digital devices and instruments can simplify employees' work and reinforce the potentials of business operations. The main benefits of adopting digital technologies are reduced costs, greater flexibility and innovation, improved service levels, improved resilience to external threats.

Figure 4.4. Digital skills and capacity building blocks



Source: OECD analysis

A good example of a programme offering access to a network of consultants and to tailored training opportunities is represented by the Chilean *Digitaliza tu pyme* (Box 4.3).

Box 4.3. Digital transformation support to Chilean SMEs

Digitaliza tu Pyme is a platform designed by the Ministry of Economy, Development, and Tourism of Chile that provides a package of digital tools and learning material to Chilean SMEs to increase their sales, lower their operating costs and improve their relationship with customers and suppliers, using digital technologies.

The platform is intended to offer guidance and support to SMEs in their digital transformation process by providing them a wide range of events, workshops, trainings and tools, as well as a network of allies that participate to a number of initiatives for the adoption of digital technologies.

The program is designed as a process in three phases. The first phase is dedicated to raising awareness among SMEs about all the benefits of digitalisations, the second phase is focused on the acquisition of digital skills and tools, and the third phase aims at the practical implementation of technological solutions and their integration into the business' production processes.

The platform also offers a "Digital Check-up" tool, which is an online test that allows SMEs to know the level of digital maturity of their SME and covers, through various questions, seven dimensions of the business (see above).

Source: (Ministry of Economy, Development, and Tourism of Chile, 2021[125])

Financial support for the digital transformation

One of the main obstacles for SMEs in their path to digitalisation is the scarcity of resources to invest in their digital transformation process. Lack of funds presents a particular problem for SMEs, as ease of access to finance is typically correlated with firm size. The smaller the company, the more difficult it is to tap external financing options (OECD et al., 2020[126]).

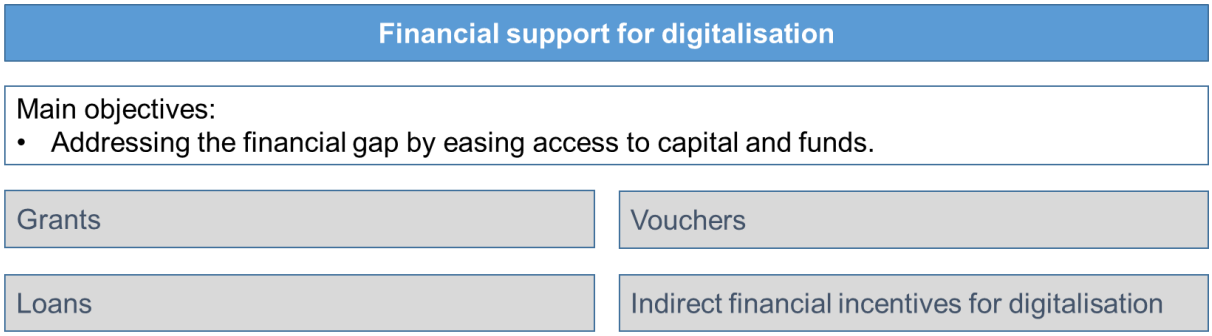
Policy makers should consider a palette of different financial support instruments to help SMEs overcome monetary barriers and start their digital transformation journey:

- **Grants.** Enterprise support agencies can ensure SMEs have access to grants for the purchase of digital products and services. A good practice is to design such subsidies as "matching grants", requiring a co-payment by the SMEs to ensure a minimum level of private investment and risk-

taking in the digitalisation process. Examples of good practices are provided by Singapore and Austria (see Box 4.1 and Box 4.4).

- **Vouchers** to incentivise SME managers to reach out for support in terms of mentoring, counselling and training. When offering such incentives, ensure quality of training is met by developing quality labels/certification for approved and efficient training schemes. Alternatively, only propose such incentives if training and advice are provided by previously accredited institutions (see above). A similar solution have developed by Austria (see Box 4.4) and Korea (see Box 4.6).
- **Loans.** Governments should facilitate SMEs access to loans by offering guarantees and counter-guarantees to finance investment in digital transformation processes to selected financial intermediaries to increase their incentives to lend to SMEs. One way to quickly achieve this would be to make expenditures in digital technologies eligible for the already existing programmes making it easier to access bank financing.[17]
- **Indirect financial incentives for digitalisation.** Another option to stimulate private investment in digital technologies and capabilities consists in indirect financial incentives such as accelerated depreciation schemes, allowing an extra-amortisation on the purchase of certain eligible "digitally oriented" tangible assets and human resources. While these incentives operate through the tax system, SME agencies could increase awareness of such options among their community of beneficiary SMEs. An example of this kind of instrument is provided by Italy's *Impresa 4.0* National Plan).

Figure 4.5. Financial support for digitalisation building blocks



Source: OECD analysis

[17] An interesting example is given by COSME, the EU programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises. One of the financial instruments adopted by COSME as part of the efforts to facilitate SMEs access to finance is represented by the Loan Guarantee Facility (LGF). Part of the COSME budget is devoted to funding guarantees and counter-guarantees for financial intermediaries to help them provide more loan and lease finance to SMEs. This facility also includes the securitisation of SME debt-finance portfolios.

Box 4.4. Austrian SMEs can seize the opportunities of digitalisation with KMU.DIGITAL

In 2017, the Federal Ministry for Digital and Economic Affairs (BMDW) established the KMU Digital initiative in cooperation with the Austrian Chamber of Commerce. The program aims to support SMEs digital transformation in all its phases, from the design of the strategies to their implementation.

The mission of KMU Digital is to improve the competitiveness of SMEs and contribute to the development of Austria as a robust business environment. This objective is pursued by:

- Training and certifying local consultants, technology companies and agencies to give a neutral overview over the market for necessary services and infrastructure. The contacts of such experts are then collected into a public database.
- Providing SMEs with products and services that are mostly funded, neutral and transparent, easy to apply for and obtain, and suitable for different levels of knowledge and needs. They are aimed at:
  - Promoting advice (funded for up to EUR 3,000 per enterprise):
    - The "Status and potential analysis" initiative enables SMEs to carry out a structured analysis of the current situation in the field of digitisation together with a certified consultant. These services are subsidised for 80% of their cost.
    - The "Strategy consulting" initiative systematically supports SMEs in finding strategies for the implementation of a specific change in their process. These services are subsidised for 50% of their cost.
  - Promoting implementation: new (tangible and intangible) investments that have to be capitalised as well as related services from external providers (e.g. programming activities and software licenses) that are directly related to the investment project are eligible for funding. Costs for these (cloud) software licenses can be funded for a maximum of 12 months during the project period. The grant amounts to a maximum of 30% of the eligible costs (max. 6,000 euros), whereby the project volume must not be less than 3,000 euros and not exceed an amount of 30,000 euros.

KMU Digital receives funding from the federal government, represented by the BMDW. The Austrian Chamber of Commerce (WKO) is responsible for implementation of advisory funding.

Since its establishment, KMU Digital has supported around 15,000 digital transformation projects. In March 2020, a survey of funding recipients confirmed an overall high level of satisfaction. It also indicated that 74% of SMEs advised have implemented improving measures based on consulting and advice, and 83% expressed intent to continue digitalising in the future.

KMU Digital was positively highlighted by the EU Commission in its "Country Report Austria 2019", noting its positive impact on SMEs in Austria. The program also attracted international interest: several EU member states have requested information about the KMU Digital via the European business association SMEunited.

Source: KMU.Digital website (BMDW and WKÖ, 2021[127])

Ecosystem for the digital transformation

Enterprise support agencies are not the only actors supporting SME development. Around SMEs there exists a multitude of agents and stakeholders that can assist in the digitalisation process. This network is composed of incubators, high-tech parks, digital innovation hubs, universities, and similar "innovation

agents". These are private or public structures, not necessarily profit-driven, that can provide a range of support to all SMEs that intend to innovate and undertake their digital transformation.

In order to leverage these structures, maximise their impact, and multiply public support to boost SMEs digitalisation, policy makers should nurture the digitalisation ecosystem by:

- **Co-ordinating the network of "innovation agents".** In order to optimize resources and avoid duplication of initiatives, SME agencies should monitor the ecosystem of digital transformation and keep abreast of all the running initiatives offered to SMEs. They should act as facilitators of joint activities (training on digital skills, workshops on sectoral strategies for digitalisation), and encourage peer-learning and general knowledge spill-overs. For instance, incubators and tech parks could invite some of their most successful resident companies to share their experience with digital adoption and act as mentors with less digitally mature SMEs.
- **Maximising the impact of existing structures.** Once enterprise support agencies have provided SMEs with the instructions and some of the tools to navigate their digital transformation process, they could go one step further and direct SMEs towards "innovation agents" that offer relevant services of proven quality and can assist the enterprises in their digital transformation. For instance, structures such as the European Digital Innovation Hubs can allow SMEs to experiment with new technologies in manufacturing.

Box 4.5. European Digital Innovation Hubs

European Digital Innovation Hubs (EDIHs) are one-stop-shops that help companies overcome digital challenges and become more competitive. As part of the Digital Europe Program – focused on bringing digital technology to businesses, citizens and public administrations –, their objective is to stimulate the broad uptake of Artificial Intelligence, High Performance Computing (HPC) and Cybersecurity as well as other digital technologies by industry (in particular SMEs and midcaps) and public sector organisations in Europe.

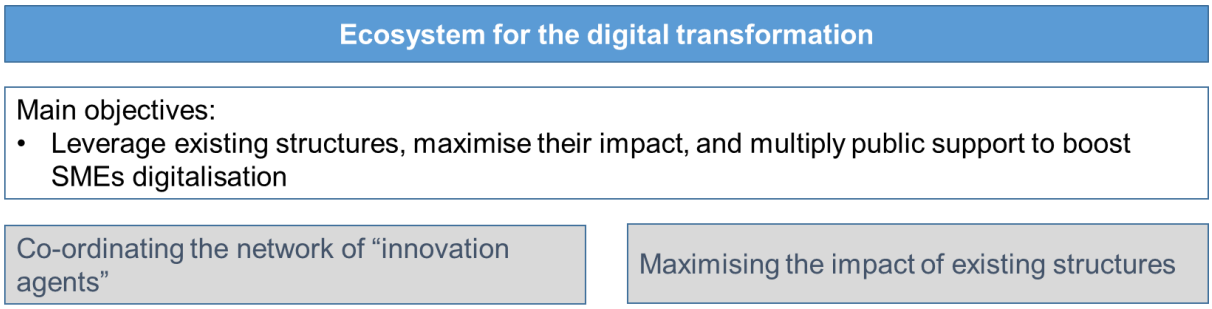
EDIHs are formed by co-ordinated organisations with complementary expertise, with a not-for-profit objective to support companies and the public sector in their digital transformation by providing access to technical expertise and experimentation. More specifically, they offer services such as:

- **test before invest** services, including digital maturity assessment, demonstration activities, customisation, testing and experimentation with digital technologies (software and hardware), knowledge and technology transfer.
- **skills and training** services, to support the acquisition of advanced digital skills. These include hosting or providing of training, boot-camps, traineeships, as well as supporting the implementation of short-term advanced digital skills training courses and job placements programs.
- **support to find investments**, including support the use of InvestEU and other relevant financing mechanisms, in close co-operation with the foreseen InvestEU Advisory Hub and the Enterprise Europe Network (EEN).
- **innovation ecosystem and networking**. The services of the EDIHs should be complementary to and not replace existing (commercial) services of e.g. training suppliers or ICT companies. Through the function "Innovation ecosystem & Networking", a hub works also as a broker and matchmaker between needs of certain companies and possible suppliers.

The EDIHs are selected from a list of hubs designated by the Member States and their capacity will be increased by the Digital Europe Programme.

Source: (European Commission, 2021[128])

Figure 4.6. Ecosystem for the digital transformation building blocks



Source: OECD analysis

Box 4.6. Lowering barriers to digital adoption by SMEs through voucher subsidies – the case of Korea

To allow SMEs to experiment digital services while also responding to urgent needs during the pandemic, the Korean Ministry of SMEs and StartUps (MSS) set up a digital services voucher programme, which subsidises SMEs' uptake of digital services with conditional grants. SMEs can use up to KRW 4 million (EUR 2 900) to acquire services, where the businesses need to bear 10% of the total cost.

Beneficiary businesses can spend the vouchers among pre-selected service vendors and platforms designated by the Ministry, for services including e-signature tools, cybersecurity software, videoconferencing solutions and on-line training. Teleworking parents also have the option to spend the voucher on childcare-related platforms, such as on-line education platforms for students and childcare provider matching platforms. The distribution of the vouchers began in September 2020, with the programme planned to continue throughout 2021.

The objective of the programme is to offer SMEs the opportunity to try and test digital technologies at low cost. The programme connects SMEs to domestic providers better able to offer services tailored to domestic businesses' needs in comparison to large international providers. At the initial stage, the Ministry issued calls for tender opened to ICT SMEs providing digital services or operating digital platforms, with preference for interoperability enabled services. The list of certified providers is made public on an on-line platform, where SMEs interested in using digital services can search the products offered and apply for the voucher programme. The businesses can also make payment of the service on the platform, with the remaining 90% subsidised by the government. Selection of beneficiaries is made on a rolling basis, with the goal to support up to 80 000 SMEs.

While eligibility requirements are rather generous for SMEs, the Ministry continuously monitors the use of the programme and adjusts its conditionality to prevent its misuse. For example, suppliers are not allowed to conduct anti-competitive practices such as tie-in sales and price-fixing activity, and voucher recipients are required to use the granted amount within 8 months.

Source: (Bianchini and Kwon, 2021[129])

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Digital technologies have spread rapidly in recent years and found new applications in many dimensions of our societies, whether in health, education, communication, the business sector or the delivery of government services. The COVID-19 pandemic has further accelerated these trends, and digital solutions have helped households, firms and the public sector cope with repeated lockdowns and continue their operations. In the process of digital adoption, small and medium-sized enterprises (SMEs) face a clear opportunity to introduce fundamental changes to the way they do business, experiment with new technologies and ultimately increase productivity. Nevertheless, digitalisation comes with its own specific set of challenges, such as widening inequalities caused by digital divides, and there is an important role for policy in creating an enabling environment that helps SMEs succeed on their digital journeys.

This report analyses the current state of digitalisation in the Eastern Partner countries and presents a "blueprint" for policy makers to design the building blocks of policy instruments to support the digital transformation of businesses in the Eastern Partner (EaP) countries. It has been developed in the context of the "EU4Business: From Policies to Action" project with funding from the European Union, Poland and Romania.

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