Improving Framework Conditions for the Digital Transformation of Businesses in Kazakhstan

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Foreword

The COVID-19 pandemic and its economic consequences served as a stark reminder of the importance of reforms to the legal and policy environment for the private sector's ability to generate jobs and growth. In Kazakhstan, such reforms are needed to underpin the country's ambitious digitalisation agenda, as well as the creation of new trade corridors, the construction of new and sustainable infrastructures, and the realisation of decarbonisation commitments. These priorities must now be addressed in the more unpredictable external environment resulting from Russia's large-scale aggression in Ukraine.

A digitalisation pioneer in the region, Kazakhstan has recognised the potential of digitalisation to support long-term growth and has, since 2018, pursued comprehensive national strategies for digitalisation. The *Digital Kazakhstan Strategy*, set to end this year, has been successful in developing a comprehensive digital governance system and in starting to create the legal and regulatory conditions for the digital transition of Kazakhstan's economy. However, unresolved infrastructure and regulatory challenges still limit the effectiveness of policymakers' efforts, while highly variable absorptive capacities of firms and public sector agencies create demand-side barriers to digital uptake, reducing the effectiveness and inclusivity of the government digitalisation agenda.

In particular, for small firms, while digitalisation has the potential to help them overcome size-related structural disadvantages and increase their growth and innovation performance, their digital transformation still requires further efforts. Addressing remaining gaps in relation to reliable access to broadband services, quality and affordability of networks and services, and digital security can also increase Kazakhstan's attractiveness at a time where Belarusian, Russian, and Ukrainian IT companies are increasingly considering Central Asia for relocation. Improving the digital framework conditions in the country might not only support the digital transition of Kazakh firms, but also encourage permanent settlement of foreign IT companies which in turn can foster innovation and competitiveness of the Kazakh IT sector and economy.

An OECD-led public-private Working Group, co-chaired by the Ministry of Digital Development, Innovation and Aerospace Industry, has been created at the beginning of 2022 to help support the analytical work of the OECD, and design relevant policy recommendations for the digital transformation of firms in Kazakhstan. It has brought together representatives of government, public and non-governmental institutions, business associations, and think tanks.

This note was developed in consultation with the government, members of the Working Group, the private sector, and development partners, and has benefitted from the contributions of experts from Estonia, Korea, Latvia, and the OECD Secretariat.[1] The note assesses access, quality and affordability of digital networks and services, barriers to private investment in the digital transformation of the private sector, and the digital protection needs of businesses in Kazakhstan, and develops recommendations for further progress. The note will be discussed and peer reviewed in the OECD Eurasia Competitiveness Roundtable. For on overview of the methodology underlying this peer-review note, please refer to the dedicated section p.44.

Acknowledgments

This note summarises the monitoring work carried out by the OECD Eurasia Competitiveness Programme (ECP) as part of the OECD Central Asia Initiative. The work was completed in consultation with the government of Kazakhstan, funded by the European Union (EU), and co-ordinated on behalf of Kazakhstan by then First Vice-Minister of Digital Development, Innovation and Aerospace Industry, Mr Zhaslan Madiyev, whose support and involvement were particularly appreciated.

This report was prepared under the guidance of Mr Andreas Schaal, Director of the OECD Directorate for Global Relations and Co-operation, and Mr William Tompson, Head of the OECD Eurasia Division. The project was managed by Mr Grégory Lecomte, Head of the Central Asia Unit.

The author of this report is Ms Amélie Schurich-Rey, Economist and Policy Analyst, OECD Eurasia Division. Valuable analytical support was provided by Mr Dylan van de Ven, Junior Policy Analyst in the OECD Eurasia Division. Ms Anna Chahtahtinsky and Ms Elisa Larrakoetxea, Programme Administrators in the OECD Eurasia Division, provided unfailing administrative and logistical support. Mr Anatoly Kavada provided excellent translation services for which we are grateful. Thanks are also due to Ms Madina Nurakisheva, local consultant to the OECD, for her continuous support on the ground. The report was reviewed by Ms Anita Richter, Acting Head of Division and Senior Policy Analyst, Mr Umur Gökçe, Economist and Policy Analyst, and Mr Ali Fuad Turgut, Policy Analyst in the OECD South East Europe Division.

The project would not have been possible without the continuous support and dialogue with representatives of ministries and state agencies, the private sector, business associations, international organisations, non-governmental organisations and other stakeholders. The OECD would like to express its gratitude to Ms Karlygash Akhmetova, then Head of the International Organisations and Regional Co-operation Division of the Department of International Relations, Mr Altynbek Aitymbetov, Director of the Department of International Relations, Ms Assel Moldabekova, Counsellor to the Minister, Ms Nazgul Bazhayeva, Director of the Department of Digital Transformation, and Mr Arman Kenzhegaliyev, Head of Office at the MDDIAI. The OECD is also grateful to the Agency for Competition Protection and Development, the Ministry of Industry and Infrastructure Development, the Ministry of Justice, and the Ministry of Trade and Integration of the Republic of Kazakhstan.

Representatives of the private sector and business associations provided useful inputs during numerous discussions, and in particular, we are grateful to the Agrarian Credit Corporation, the Association of Broadcasting Operators of Kazakhstan, the Astana International Financial Centre (AIFC), Baiterek, the Chamber of Commerce, the Development Bank of Kazakhstan, the Digital Kazakhstan Association, KazakhExport, the Entrepreneurship Development Fund (DAMU), the Industry Development Fund, Kazakh Invest, Kazyna Capital Management, KazAgroFinance, QazTrade, and Zerde.

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Abbreviations and acronyms

AIFC	Astana International Financial Centre
CIS	Commonwealth of Independent States
DAMU	Entrepreneurship Development Fund
DigitEL	Digital Era Lifestyle programme
EBRD	European Bank for Reconstruction and Development
ECP	Eurasia Competitiveness Program
ERI	Economic Research Institute
EU	European Union
FDI	Foreign direct investment
GDP	Gross domestic product
GDPR	General Data Protection Regulation
GNI	Gross national income
GVC	Global value chain
ICT	Information and communication technology
IMF	International Monetary Fund
IPR	Intellectual property rights
IT	Information technology
ITC	International Trade Centre
ITU	International Telecommunication Union
KPI	Key performance indicator
KZT	Kazakh tenge (currency)
MDDIAI	Ministry of Digital Development, Innovation and Aerospace Industry
NDS	National digital strategy
NSO	National statistical office
OECD	Organisation for Economic Co-operation and Development
PPD	Public-private dialogue
PPP	Purchasing power parity
PPPs	Public-private partnerships
SME	Small and medium sized enterprise
SOE	State-owned enterprise
UNDP	United Nations Development Program
USD	US dollar (currency)
VAT	Value added tax
WG	Working Group
WTO	World Trade Organisation

Executive summary

Prior to the COVID-19 pandemic, Kazakhstan experienced sustained economic growth, supported by an ambitious reform agenda aimed at increasing the contribution of the private sector to economic development, promoting the diversification of employment, output and exports, and enhancing Kazakhstan's participation in regional and international value chains. However, the full benefits of these reforms have not yet materialised, as Kazakhstan's private sector remains underdeveloped, and the economy remains largely dependent on commodity exports. The pandemic further exacerbated these structural challenges and highlighted the persistence of infrastructure bottlenecks and complex regulatory systems that have further weakened growth.

Digitalisation can support Kazakhstan's diversification agenda

Digitalisation can help advance the country's diversification agenda, by contributing to private sector growth and competitiveness. For firms, regardless of size, to engage successfully in their digital transformation, adequate regulatory frameworks and quality infrastructure are important framework conditions: effective regulatory conditions can increase the quality and affordability of access to digital infrastructure, while well-functioning ICT infrastructure can ensure sustained digital diffusion among businesses. Open competition in the telecom sector and whole-of-government approaches to digital infrastructure development are essential to supporting the digital uptake of firms.

The digital transformation of Kazakhstan's economy started a few years ago. In 2013, the country was one of the first in the region to adopt a digital programme as part of its economic policy, developing a comprehensive digital government system and starting to create the legal and regulatory conditions for the digital transition of the national economy. However, the digital uptake of businesses remains limited, as only 11% of firms report using digital technologies, and the number could be even lower for small firms. Access and quality of current digital infrastructure, changing regulatory frameworks, and digital security issues appear among the main barriers to firms' ability to go digital.

This report presents an analysis of the elements in the legal and operational environment that hold back firms' digital transformation in Kazakhstan. Based on recent OECD work, it assesses challenges and develops policy recommendations to support the digital uptake of the private sector in three main areas:

- infrastructure and physical access, focusing on firms' access to quality digital infrastructure;
- investment for additional digital networks and services deployment, focusing on competition in and investment attractiveness of the telecom sector; and
- firms' readiness to withstand new challenges created by the digital age, focusing on their digital culture and the adequacy of the business regulatory framework in the digital age.

Key issues for firms include infrastructure access and quality, competition in the telecom sector, and a fragmented regulatory framework

The *Digital Kazakhstan Strategy* launched in 2018 and set to end this year, has been successful in developing a comprehensive digital government system and starting to put in place the legal and regulatory conditions for the digital transition of the Kazakh economy. However, the pre-requisites for the digital transformation of Kazakh firms, especially SMEs, remain below potential due to the following

Remaining digital connectivity gaps, in terms of mobile internet quality and low coverage in several rural and small urban areas, impede firms' adoption of digital technologies.

- These are related to persistently high regulatory and economic barriers in the telecom sector, which prevent deployment of new infrastructure.
- Finally, the regulatory framework for businesses is not evolving in line with the new needs and challenges created by the digital age.

1 Setting the scene

Since 2018, Kazakhstan has undertaken substantial efforts to advance the digital transformation. Despite ambitious programmes and initiatives, digital uptake within the private sector, and among the smallest firms especially remains below potential. While the internet has become widely accessible across the country and e-government services have developed rapidly, supporting firms' digital uptake requires addressing remaining gaps in digital framework conditions. This chapter discusses the broader context supporting reforms for the digitalisation of the private sector in the country. It concludes by describing three main barriers in the digital framework conditions: internet quality and connectivity, competition and investments in the telecom sector, and adequacy of the regulatory and policy framework for firms in the digital age. Each dimension is discussed individually and accompanied by policy recommendations in the following parts of this report.

Kazakhstan has been pursuing an ambitious reform agenda, but private sector development remains below potential

Continued reform efforts resulted in robust economic growth, making Kazakhstan the wealthiest country in Central Asia

Kazakhstan experienced growth from 2000 to 2022, largely driven by large FDI inflows into the primary sector, after the transition recession of the 1990s. Real gross domestic product (GDP) remained positive, except in 2020, and grew at an average annual rate of 6% in 2000-21 (IMF, 2022[1]). However, the trend rate of growth is declining, as growth recovered to levels below pre-slowdown levels following the Great Recession in 2008, the drop in global commodity prices in 2014-15 and the first year of the COVID-19 pandemic (Figure 1.1).

Figure 1.1. Real GDP growth

Source: (IMF, 2022[1])

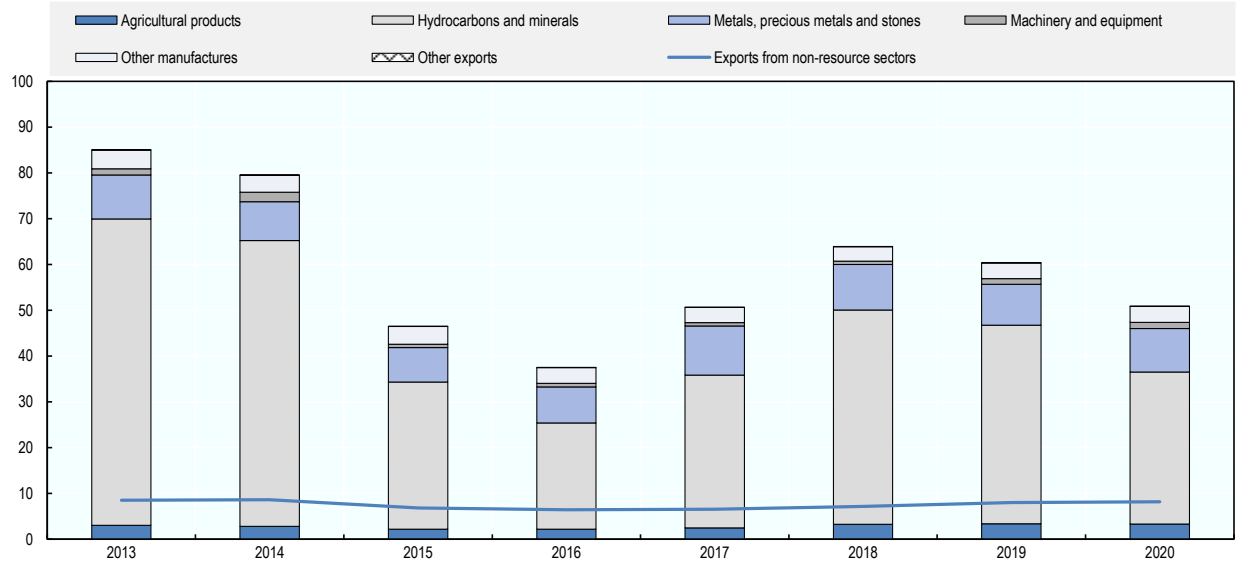
Nonetheless, GDP per capita in current USD has risen by 12.2% since 2000, making it the highest across Central Asia (IMF, 2022[1]). After a contraction in real GDP of 2.6% in 2020, economic growth resumed in 2021 thanks to continued fiscal expansion, strong consumer credit growth, and reduced COVID-19 restrictions (World Bank, 2022[2]; OECD, 2021[3]). If growth was forecast to accelerate in 2022 and 2023, supported by higher oil prices, fiscal stimulus and sustained recovery of private consumption, significant downside risks remain due to COVID-19 infections and the twin effects of the war in Ukraine and the international sanctions imposed on Russia (EBRD, 2022[4]; IMF, 2022[5]). Vulnerabilities could emerge from supply chain disruptions, and risks of secondary sanctions effects, given Kazakhstan's significant trade, investment, and migration linkages to Russia (World Bank, 2022[2]; EBRD, 2022[6]; OECD, 2022[7]).

Over the past two decades the government has made incremental progress toward its goal of diversifying the country's economy by improving its investment climate, raising the competitiveness of non-extractive sectors, limiting the role played by state-owned enterprises (SOEs), and levelling the playing field for the private sector (OECD, 2017[8]; OECD, 2020[9]). However, much remains to be done and recent performance highlights the need for steps to strengthen productivity growth and private-sector development, in particular. The government's commitment to sustained reforms will be key for the economy to weather the current uncertain times. The expected relaunch of the privatisation programme, halted due to the COVID-19 crisis, is an encouraging sign, supported by the recent creation of an independent competition agency and efforts to improve the governance of state-owned enterprises (IMF, 2021[10]).

The private sector remains underdeveloped, particularly the SME sector

Hydrocarbon and mineral resources remain the backbone of Kazakhstan's economy, as demonstrated by the persistently high share of net FDI inflow to the extraction sector, which received around 70% of total inflows between 2016 and 2020 (Central Bank of Kazakhstan, 2022[11]). If Kazakhstan's regional development strategy has given positive results in enabling the realisation of agglomeration benefits and raising productivity in non-extractive sectors in the regions of Almaty and Nur-Sultan, growth outside these two agglomerations is still driven mainly by resource extraction (OECD, 2020[12]). The share of fossil fuels and the energy sector has remained stable at around 72% of goods exports since 2013 (OEC, 2022[13]), and generated 17% to Kazakh GDP in 2019 (IMF, 2022[14]). Adding mineral products, metals, and chemicals, these have represented about 90% of exports over the past decade (Figure 1.2).

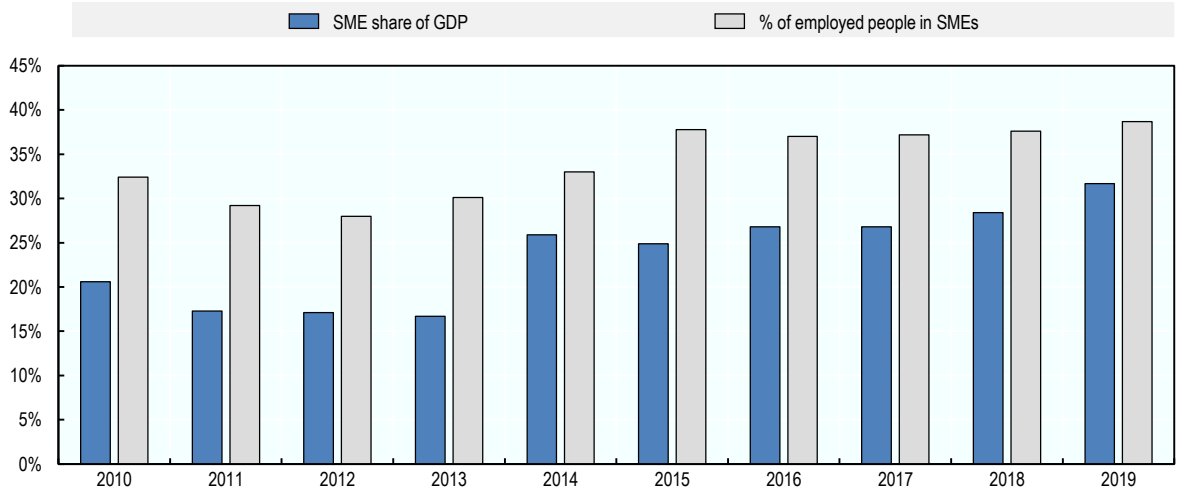
Figure 1.2. Export decomposition in Kazakhstan (bn USD)



Source: (Observatory of Economic Complexity, 2022[15])

This economic concentration leaves Kazakhstan vulnerable to commodity price shocks, while it also contributes to (as well as reflects) the persistent underdevelopment of the private sector, in particular of SMEs (OECD, 2021[3]). While the SME share in GDP increased from 20.6% in 2010 to 31.7% in 2019, the increase in SME employment has been more moderate, from 29.9% in 2010-2013 to 36.9% in 2014-2019, which remains below regional peers such as Azerbaijan, where SMEs accounted for 43.7% of employment in 2019 (OECD, 2020[9]).

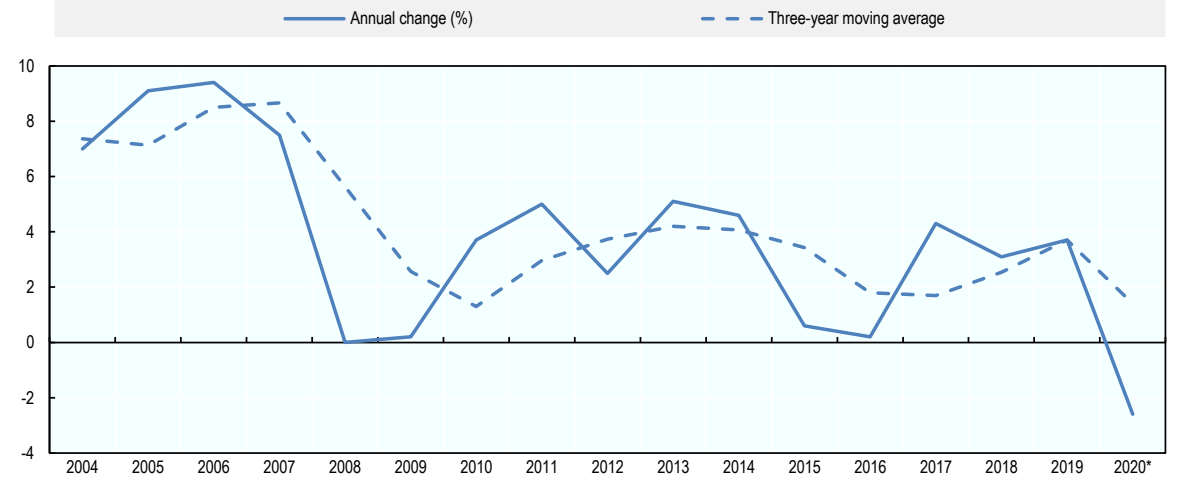
Figure 1.3. SME contribution to GDP and employment



Source: (National Statistics Bureau, 2022[16]); (DAMU, 2020[17])

Government efforts to develop the services sector, where SMEs represent a large share of businesses, have resulted in a 6.5% growth of the sector's share of value added between 2015 and 2019, the largest increase of all sectors. However, services still represent only about 11% of total exports (ADB, 2021[18]), and labour productivity growth has been on a downward trend since the early 2000s (Figure 1.4), reflecting the relatively low contribution of the manufacturing and services sectors to output growth. The COVID-19 pandemic also had a substantial negative impact on the sector, and SMEs (EY, 2020[19]), with estimates suggesting that about 300,000 SMEs stopped working nation-wide in 2020, while in Almaty alone, 80% of entrepreneurs suspended their activities that same year, especially in the trade, tourism, and catering sectors (OECD, 2020[20]).

Figure 1.4. Evolution of economy-wide labour productivity in Kazakhstan



Source: (Bureau of National Statistics, 2022[21])

The digital transformation of firms can strengthen private sector growth and competitiveness

Digitalising SMEs can make Kazakhstan's economy more resilient

Digitalisation can support the country's diversification agenda, by supporting private-sector growth and competitiveness. In particular, it can help small firms overcome size-related structural disadvantages and improve their growth and innovation performance, as digital technologies enable small firms to reach a wider customer base and to grow without massive investments in tangible assets. SMEs are an important source of employment and have the potential to contribute to value-added growth through innovation and by playing a key role in large firms' supply chains. However, they seem to not yet fully benefit from the gains digitalisation can offer. Recent OECD research shows that lagging digital uptake of SMEs is strongly associated with gaps in productivity, scaling up, innovation and growth, which contribute to inequalities among firms, and, in turn, among people and places. Closing the SME digital gap can improve productivity performance and help reduce place-based inequalities, but it requires policy makers to support firms' digital transformation (OECD, n.d.[22]).

Improving the framework conditions for digitalisation of the private sector can advance Kazakhstan's long-term diversification and growth agenda. During the first year of the COVID-19 pandemic, many Kazakh firms moved their business operations online, which helped dampen the negative effect on the economy (World Bank, 2022[23]; OECD, 2021[3]). However, the country's digital infrastructure came under severe strain over that period, while the regulatory environment and processes of public agencies presented significant impediments to business operations and the delivery of e-government services, as recognised by the president in April 2020 (OECD, 2020[20]; Government of Kazakhstan, 2020[24]). Addressing infrastructure access and quality issues, as well as regulatory barriers, could also help Kazakhstan attract and retain IT firms looking to relocate as a result of Russia's large-scale aggression in Ukraine and the international sanctions on Russia and Belarus. The relocation of successful IT firms might trigger technological and knowledge spill-over effects.

The digital transformation of the private sector can support other dimensions of the longer-term reform agenda

Kazakhstan could leverage the digital solutions implemented during the pandemic to build a coherent approach to digitalisation underpinning its other reforms. In particular, policy-makers should ensure that digital service delivery addresses existing short-term infrastructure issues and absorptive capacity**,** and that the regulatory framework supports the private sector's digital transformation. Looking at the future, digitalisation can further support reform in three major areas to reinforce long-term growth and regional integration: trade connectivity, the green transition, and the legal environment for business. These priorities are aligned with the Roadmap for Recovery agreed during the 2020 EU-Central Asia Dialogue on Partnership for Prosperity and the EU-Central Asia Economic Forum in 2021 (European Commission, 2021[25]).

First, digitalisation can support connectivity through trade facilitation reforms such as greater regulatory alignment, simplified customs procedures and regional co-operation, and can help Kazakhstan's private sector and export-oriented firms realise their potential (OECD, 2021[3]). This is all the more important at a time when the isolation of Russia provides further impetus to the need for Kazakhstan to integrate its supply chains and logistics with other regional partners (OECD, 2022[7]).

Second, digitalisation can support further improvements to the legal environment for business and investment, especially for SMEs, for which reliable implementation of regulations and greater automation of business procedures are essential for growth. Despite reforms covering issues such as intellectual property, licensing, permits, and firm creation, Kazakhstan's ranking in the OECD Regulatory

Restrictiveness Index remains significantly higher than the OECD average, while the OECD Product Market Regulation Indicators show the country's regulatory stance to be less friendly to competition than most economies covered (OECD, 2021[3]; OECD, 2022[26]).

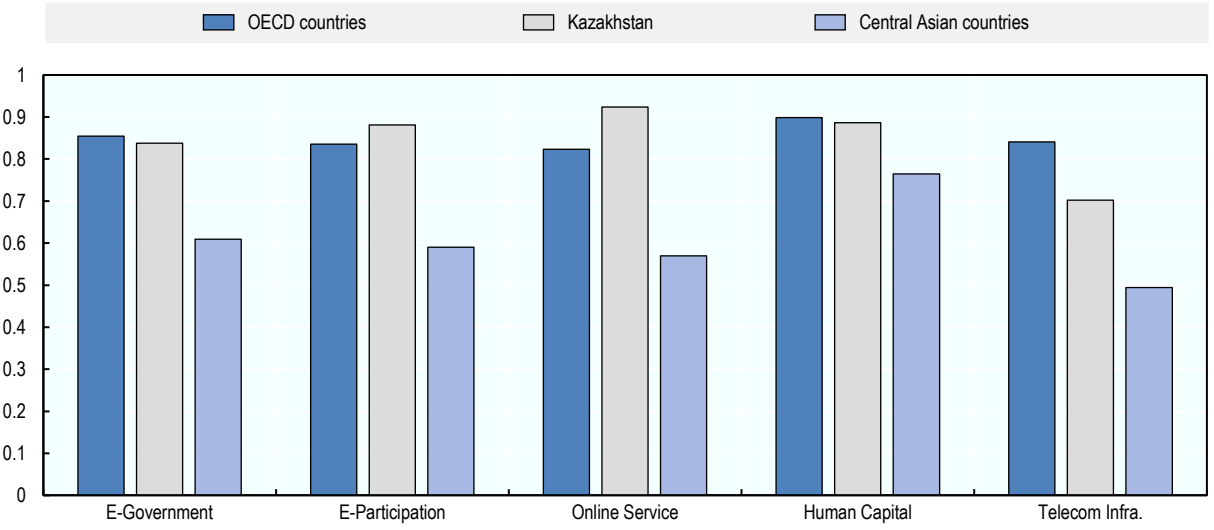
Finally, despite its ambitious national and international commitments to carbon neutrality, Kazakhstan, along with Turkmenistan, produces more than twice as much CO2 per PPP dollar of GDP as the OECD average. The carbon intensity of GDP has fallen by 80% since the mid-1990s, but progress in recent years has slowed and Kazakhstan must accelerate decarbonisation to meet its international commitments and domestic reform targets. Indeed, if CO2 per PPP dollar of GDP has fallen from 0.66 in 2012 to 0.42 in 2019, it remains above the level of upper-middle income countries (0.46 in 2012 and 0.36 in 2019) and high income countries (0.19 in 2019) (World Bank, 2022[27]). Digitalisation can help mobilise private investment in the transition to a greener growth model and help the country reach carbon neutrality by 2060 (OECD, 2021[3]).

The focus in recent years has been on digital infrastructure and e-government services

Since the launch of "Informational Kazakhstan 2020" programme in 2013, the government has made digitalisation a priority in its diversification agenda (Government of Kazakhstan, 2017[28]). This first digital strategy focused on the development of ICT infrastructure and online public administration systems to facilitate business activity (egov.kz, 2021[29]) and has been successful in developing country-wide connectivity. As a follow-up, the five-year "Digital Kazakhstan" initiative, launched in 2017, aimed at increasing the private sector's use of digital tools to support economic growth through targeted programmes in the agricultural, energy, transport, and e-commerce sectors (see Box 1 and 2) (Digital Kazakhstan, 2022[30]). The initiative also developed additional sub-programmes, targeting digital innovation (launch of the Astana Hub International Technology Park in 2018) and cybersecurity ("Cybershield Kazakhstan"). In early 2022, the government launched "Digital Era Lifestyle" (*DigitEL*), its third five-year digitalisation programme, with a focus on quality and safe internet, using ICT businesses as a growth lever, and further digitalising the services sector (Republic of Kazakhstan, 2022[31]). DigitEL targets include an ICT share of GDP of 5%, compared to 4% in 2020, and the strategy anticipates greater involvement of the private sector, as over 70% of the programme is to be funded through private investments.

Kazakhstan's digital competitiveness has improved. For instance, it moved to 32nd place in 2021 compared to 38th in 2018 in IMD's Digital Competitiveness Ranking (IMD, 2022[32]), reflecting a change in e-government practices, business models, and society faster than other economies of the region. In particular, Kazakhstan performs well in the UN e-Participation and Online Service Indexes for human capital and e-government, while the infrastructure index highlights remaining bottlenecks (Figure 1.5) (UN, 2020[33]). The digital economy has also been on the rise, even if numbers remain modest: ICT services represented 7.9% of all services rendered by SMEs in 2020, compared to only 3.3% in 2015, and ICT-related services grew almost five times more than non-ICT services over the same period (Bureau of National Statistics, 2022[34]). This growth is also reflected in a highly dynamic and productive SME landscape. Since 2015, the number of specialised SMEs has increased almost twice as fast as non-ICT SMEs (respectively 117.9% and 59.8%), even if their share in the economy remains small, increasing from 5.2% to 6.9% of all SMEs since 2015 (Bureau of National Statistics, 2022[35]).

Figure 1.5. Kazakhstan's digital performance



Source: (UN, 2020[33])

Remaining gaps in the legal and operational framework conditions are impeding the digital transformation of firms in Kazakhstan

However, outside the ICT sector, the digital uptake of firms, especially the use of digital tools and services, remains very limited. The issue is most acute for SMEs, which face higher barriers to their digital uptake than their larger counterparts do. Weaknesses in digital framework conditions, in particular in relation to access to quality digital infrastructure, adaptation capacity to changing regulatory frameworks, and management of digital security and privacy issues are part of the explanation.

Barrier 1: Connectivity and infrastructure gap

While Kazakhstan's efforts to develop its digital infrastructure have translated into widely accessible and affordable internet, quality and rural coverage remain issues. Although broadband internet latency and speed have improved each year since 2017, bandwidth capacity decreased in 2019 and has stalled since (EIU, 2022[36]). In addition, small firms in Kazakhstan mainly use mobile internet, whose quality in terms of speed has declined in recent years, contributing to a persistently low uptake of digital technologies by firms and wide regional disparities to the detriment of rural and small urban areas.

Barrier 2: Competition and FDI attraction in the telecommunications sector

In Kazakhstan, quality and coverage issues in digital infrastructure are closely related to high infrastructure rollout costs due to low population density and long distances. Addressing the connectivity gap for rural areas and developing future-generation infrastructure with higher network density needs will require additional investments the sector currently lacks. Persistently high regulatory and economic barriers in the telecom sector indeed seem to favour low levels of competition and result in both domestic and foreign investment levels below expectations. The regulatory environment also favours incumbents and restricts foreign investment, which reduces the sector's attractiveness to both domestic and foreign investors (OECD, 2022[26]; US Department of State, 2021[37]).

Barrier 3: Digital regulatory framework and digital security

In Kazakhstan, efforts to adapt the legal and policy framework for firms, in particular in relation to personal data and trust standards, have begun. However, the pace of change and simplification of the regulatory environment remain too slow not to create additional barriers for firms, especially because of frequent and partial amendments to legislation. In addition, despite recent cyber security policies, such as the 2015 informatisation law and the *Cybershield Kazakhstan* programme (Government of Kazakhstan, 2015[38]; Government of Kazakhstan, 2022[39]), the digital culture of businesses remains low and only a few private sector-led digital security management initiatives exist. At the same time, cyber security threats have been on the rise in recent years and firms remain poorly equipped to manage them (CABAR, 2019[40]). This is particularly detrimental to the digital uptake of small firms.

Improved digital infrastructure, competition in the telecom sector, and protection against digital risks can support the digital transformation of firms in Kazakhstan

This peer-review is aimed at identifying ways to address the remaining gaps in the framework conditions for the digital uptake of firms in Kazakhstan following on from the 2018-22 Digital Kazakhstan Strategy, with a focus on three dimensions: (i) addressing the remaining digital connectivity gaps across the country; (ii) improving competition and attracting investment in the telecom sector; and (iii) strengthening digital security and data protection for firms. In co-operation with the government of Kazakhstan, the private sector, and other international organisations, the OECD identified barriers to progress along these dimensions and developed policy recommendations to strengthen the framework conditions for the digital uptake of firms in Kazakhstan.

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2 Address remaining digital quality and connectivity gaps

Recent digitalisation efforts in Kazakhstan have supported development of a widely accessible and affordable internet. However, existing infrastructure limits the digital uptake of firms, as the quality of internet remains below the levels required for business usage, while coverage remains low in some rural and small urban areas. Policy so far has not resolved these issues, and there is insufficient data on firms' digital use and needs. The regional public sector could play a central role in addressing these gaps by taking a leading role in the monitoring of digital infrastructure rollout and quality, for instance by developing and financing high-speed local networks, and systematically collecting data on business digital use and needs to ground policy-making.

Challenge 1: The quality of mobile internet has deteriorated recently, while broadband connectivity remains limited in rural and small urban areas

Successive national connectivity plans have resulted in a fairly advanced and affordable network of ICT infrastructure

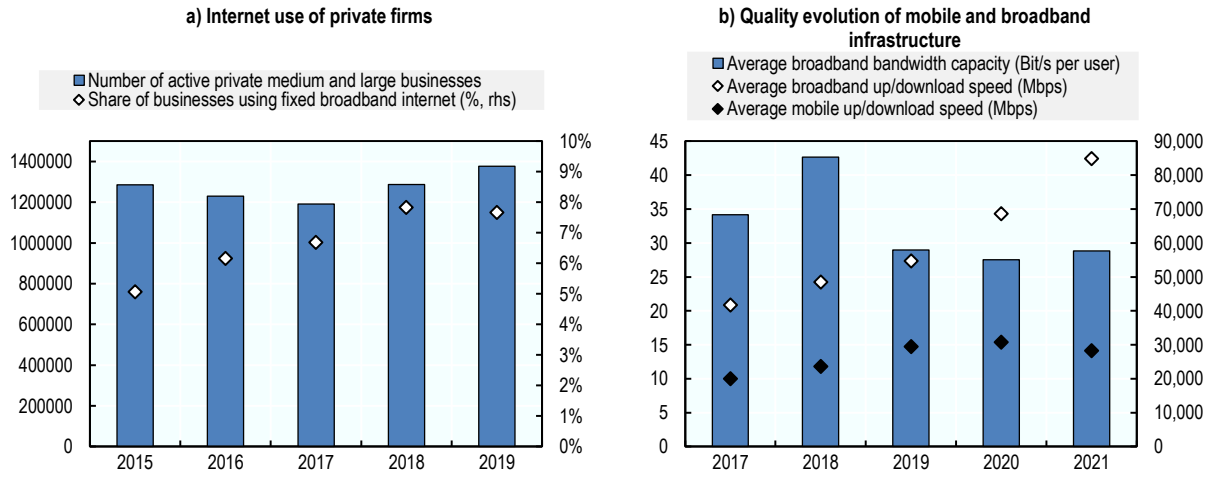
Since the early 2000s, successive national connectivity plans have succeeded in developing a fairly advanced network of ICT infrastructure providing affordable and quality access to internet in most of Kazakhstan's urban centres. In terms of access, nearly universal mobile coverage has been in place since 2015 at least, with the population covered by 2G or higher networks reaching 98% in 2019, while access to broadband internet remains more modest (ITU, 2022[1]). Internet access has also become widely affordable across the country, with fixed and mobile subscription costs falling in recent years; they are now well below the UNESCO's affordability target of 2% of Gross National Income (GNI) per capita. Fixed subscription costs stood at 0.85% of GNI per capita in 2020, compared to a 2.3% average for the Commonwealth of Independent States (CIS), while mobile subscriptions costs are among the lowest in the world at 0.33% of GNI per capita, compared to 1.0% in CIS countries and 2.6% globally (ITU, 2022[1]; ITU, 2021[2]; Cable, 2022[3]). Improvements have also been made on the quality front, with about three quarters of the population covered by 4G internet in 2021, while the download and upload speeds of broadband lines have doubled on average since 2017 (EIU, 2022[4]). Digital connectivity at large has also progressed in Kazakhstan, with a significant reduction in the rural-urban connectivity gap[1], with 89% of the rural and 91% of the urban population having access to broadband networks in 2019 (ITU, 2022[5]).

Gaps in terms of network quality and speed mainly affect rural areas

While fixed internet is a key driver for SME digitalisation, broadband uptake in Kazakhstan remains low compared to OECD countries. Broadband subscriptions per 100 households rose only slightly, from 13.1 in 2015 to 13.8 in 2021, compared to 33 on average in high-income countries (ITU, 2022[5]; OECD, n.d.[6]). Though there are no data available on small businesses specifically, only 7.8% of medium and large enterprises reported having access to fixed broadband internet in 2020 (Figure 2.1), while 48% of small business indicated having a website in the latest World Bank Enterprise survey, compared to almost 90% for large businesses (World Bank, 2021[7]). Access to fixed broadband internet varies widely among regions, ranging from 4.3% in Aktobe Region to 15.2% in neighbouring Atyrau. In 2019, the number was even lower (5.9%), with the recent increase being presumably at least partially due to the effects of COVID-19. As a result, only 11% of medium and large enterprises reported using digital technologies in 2020, and while no data is available for SMEs, OECD interviews suggest that the numbers could be even lower for the latter (National Statistics Office, 2022[8]).

This trend might suggest persistent gaps in broadband quality and access. One reason might be a persistent urban-rural network quality divide: while high-quality fixed broadband subscriptions have an average upload and download speed of at least 206.6 Mbps, the remaining 46% of subscribers have access to less than 10 Mbps (EIU, 2022[4]; ITU, 2022[5]). Since existing telecom infrastructure is primarily located along main highways and in densely populated urban areas, high-quality fixed broadband is concentrated in very large urban areas, leaving the rest of the country to work with lower quality internet (UNESCAP, 2020[9]). However, even within large urban centres, OECD interviews indicated that internet speeds can remain below the levels required for business usage (FCC, 2022[10]).

Figure 2.1. Internet use of firms, and quality of available networks



Note: In 2021, fixed broadband average speed stood at 55 for upper-middle income countries, and 113 for high-income countries, while the mobile broadband average speed stood at 25 and 51 respectively.
Source: (DAMU, 2020[11]) (Bureau of National Statistics, 2022[12]) (EIU, 2022[4]; ITU, 2022[5]).

As a result, OECD interviews confirmed that mobile hotspots and linked mobile devices have become the primary source of internet access for the majority of the population and of small businesses. However, doing so constrains the ability of firms to further advance their digital uptake, as mobile internet is less adapted to the levels of data and digital technology usage associated with business operations (FCC, 2022[10]). In addition, progress in improving mobile network quality has stalled since 2019, with the 2021 mobile up- and down-load speeds slightly deteriorating on average compared to 2019 (Figure 2.1), indicating increasing strain on the mobile sector which could further impede small firms' digital uptake.

Recommendation 1: Kazakhstan can mobilise the regional public sector to improve quality and coverage of mobile and fixed networks

Despite substantial efforts to build a large network of ICT infrastructure, firms, especially the smallest among them, remain marginal users of internet and digital services. Kazakhstan has started to address these issues, but could do more to bridge the connectivity gap. In particular, the regional and local public sector (e.g. *Akimats* or *Maslikhats* at the *oblasts* or district level) could be mobilised to develop (i) an evaluation process for digital infrastructure needs, rollout and quality, and, where needed, (ii) high-speed "municipal networks", in co-operation with other public or private actors.

Bridging connectivity gaps is a matter of access, affordability and quality. If the two former have been addressed rather successfully in Kazakhstan, the quality of connections remains variable and sometimes below the speeds required for business applications. The same is true for mobile internet. The government could develop an integrated evaluation process to assess digital infrastructure rollout and quality. First, this would require defining key performance indicators (KPIs) to set a minimum level of digital coverage and quality. The indicators should be user-needs based, and combine a qualitative and quantitative approach. Once these are defined, and regularly reviewed, data should be collected on a regular basis, from both operators and end-users (households and businesses), and analysed by the competent authorities at the regional and central level to adapt policies where needed (Box 2.1). For instance, the Ministry of Digital Development, Innovation and Aerospace Industry (MDDIAI) and Atameken, the National

Chamber of Entrepreneurs, could review, on a quarterly or semi-annual basis, internet quality gaps and related business needs and challenges. Given that rural and small urban areas usually have a unique set of issues associated with their low density and distance to core network facilities, the KPIs could be adapted regionally, requiring close co-operation and co-ordination between the central, regional, and municipal levels of government.

Box 2.1. Data-driven regulation in the telecom sector to improve network quality and coverage

In 2016, Arcep, France's communication regulator, initiated data-driven regulation for the sector. Arcep created three map-based websites, "Mon réseau mobile" (My mobile network), "Carte Fibre" (Fibre access maps) and "Ma connexion internet" (my internet connection), complementing the regulator's traditional toolkit, and providing end-users with up-to-date digital connectivity information.

- Information contained in these websites comes from performance tests carried out by Arcep itself, as well as data and feedback provided by local and regional authorities, operators, and businesses.
- Arcep has supported the emergence of third-party measuring and testing tools, making its data and "Regulator's toolkit" available online, with a view to incorporating their findings into the information available on "Mon réseau mobile". In 2020, four local authorities and the French national rail company had conducted such measurement campaigns.

Assessing coverage gaps across France has therefore become easier, and the large stakeholder engagement created by the initiative, especially at the local level, allows for a quick translation into policy action.

Source: (OECD, 2021[13]; Arcep, 2020[14]).

In Kazakhstan, as in many OECD countries, beyond network quality, a coverage gap persists mostly between urban and small urban and rural areas. Narrowing this gap is critical to strengthening the overall economic development of these regions and the competitiveness of their small firms and entrepreneurs. Since the "last-mile" connectivity initiative has not been successful so far in connecting these regions, their municipal or regional governments, in co-operation with local interest groups and citizen-led initiatives could facilitate, build, operate or finance high-speed networks, compensating for the absence of operators. Across the OECD area, such municipal networks have been successful in extending connectivity in regions where deployment by national communication companies was lacking or deemed unprofitable; they have contributed to increased competition, and therefore lower prices, in areas where coverage was partially provided by national operators (Mölleryd, 2015[15]) (Box 2.2). However, institutional framework conditions, in particular open competition in the telecom market, have proved an important enabler of such bottom-up initiatives in OECD countries such as Mexico, Sweden, the UK, and the US (OECD, 2021[13]).

Box 2.2. Municipal and community networks in OECD countries

In rural and remote areas, municipal community co-operatives have been formed to build fibre networks in Sweden, Finland, the United States and other OECD countries.

Sweden's high fibre take-up was enabled by a wide deployment of municipal networks since the liberalisation of the communication market in the mid-1990s, covering entire municipalities, serving homes and businesses and connecting cell towers. Their business model relies on open networks where municipalities act as physical infrastructure providers offering wholesale access to retailers on a non-discriminatory basis. Across the OECD, other models exist, characterised by vertically integrated telecommunication operators present both in wholesale and retail markets.

In Finland, a non-profit municipality-owned fibre network ("Sunet") connects 55 villages in the rural western part of the country. The network is used by a variety of private-sector service providers to offer connectivity packages to consumers. Sunet has also been successful in lowering the barrier to entry for service providers, thereby supporting competition, by billing consumers directly a fixed fee for the network's maintenance instead of charging for providers' access to its infrastructure. It has been financed through a bank loan guaranteed by the local municipalities, coupled with a contribution from the national government.

In the United States, North Dakota, among the country's most rural and sparsely populated state, had better speed fibre access rates in June 2020 than the current average level in both rural and urban areas nationwide. Key to this success was the Dakota Carrier Network (DCN), a consortium of small, independent rural companies and co-operatives that purchased the rural exchanges of the incumbent telephone company in the late 1990s to form a state-wide umbrella organisation that covers 90% of the state's land area and 85% of its population. The development of its fibre network has been funded by the federal state through the Broadband Technology Opportunities Programme (BTOP).

Similar networks have also been deployed in the United Kingdom (Broadband for the Rural North) and Mexico, and rely mainly on a mix of streamlined regulatory approvals at the local level (which reduces costs), voluntary work contributed by local residents, and funding support from the government.

Source: (OECD, 2021[13]).

Challenge 2: Lack of data on business use of internet and related needs limits the development of policies to support firms' take-up of digital technologies

Kazakhstan has developed data-driven policies to improve network quality and coverage

Over recent years, Kazakhstan has increasingly turned towards data-driven policies, especially to improve the quality and coverage of digital infrastructure networks. For instance, under the NDS, citizen-reporting platforms have been created as a monitoring tool for minimum internet speed requirements imposed on operators in remote rural and small urban areas (Government of Kazakhstan, 2017[16]). The online platform gathers complaints about internet quality and is linked to the Interdepartmental Commission on Radio Frequencies and local state telecom authorities. It verifies connection quality and fines telecom operators immediately should quality fall below the minimum threshold.[2] OECD interviews indicate that the system has enabled the improvement of internet connection quality, especially in Kazakhstan's border areas, which face the lowest quality. OECD interviews further find that the MIID also developed monthly public-private dialogue (PPD) with the Council of Operators since 2020, where the owners of main

telecommunication infrastructure and towers and large business associations discuss infrastructure bottlenecks and challenges. However, neither regional governments nor small last-mile operators are part of such meetings, which limits their effectiveness in gathering the relevant actors – national and local operators, regional authorities, and the private sector – to address often highly localised issues.

In addition, one of the main objectives of the current NDS, DigitEL, is the development of data-driven government by 2025. The "attentive and effective state" initiative aims at creating a unified data collection process to ground policy decisions, including the development of user feedback for public services, and more importantly the automatic collection and treatment of data relevant for policy-making. However, in its current state, the initiative only targets industrial data to be monitored by the public revenue committee (Government of Kazakhstan, 2021[17]). If proven effective, the initiative could be expanded in the coming years to new sectors, where it could thereby serve as an important tool for gathering data about the digital needs and use of businesses.

More systematic and comprehensive data collection about business needs and challenges could help improve provision of digital connectivity and usage

Kazakhstan's digital strategies have succeeded in creating a wide and effective network of e-government services and the conditions for developing data-driven government. However, during the interviews conducted by the OECD, the lack of systematic and comprehensive data collection about the needs and challenges of businesses in relation to their digital uptake, beginning with access to quality and affordable ICT infrastructure, was repeatedly mentioned.

Atameken and other business associations gather some qualitative data on business digital needs and challenges, but Kazakhstan has no systematic and comprehensive data collection on firms' access to and use of the internet. The Statistical Office collects some data on internet use of medium and large-sized industrial enterprises, without collecting information on businesses active in other sectors or from SMEs. Digital indicators are mainly collected for individuals, leaving aside important information such as business subscriptions to mobile and fixed internet (National Statistics Office, 2022[8]). Similarly, the digital one-stop-shop (OSS) "Government for Business" launched early this year aims at creating a direct interaction channel between the government and SMEs (Government of Kazakhstan, 2021[17]). The portal provides entrepreneurs with access to public services and support measures of government entities, such as Atameken or DAMU, and access to digital commercial systems, though it does not provide an opportunity for businesses to report and seek advice on the barriers or challenges they might face in their digital transformation.

In addition, beyond the monthly gatherings between the MIID and large operators on infrastructure challenges mentioned above, no public-private dialogue mechanisms exist involving all stakeholders in the digital infrastructure sphere. Consequently, a gaps assessment at the regional or national level is missing. Where it does exist, it is *ad hoc* and generally through the lens of operators. This represents a significant limitation on efforts to foster the digital uptake of firms, as on the demand side businesses lack an important channel to discuss and report issues to business associations and local and central governments, while the public sector has a hard time analysing precise evolutions and determining best policy actions to support firms in their digital journey.

Recommendation 2: Improve data collection on firms' digital usage and needs and develop data-driven support policies on that basis

In order to address the remaining digital quality and connectivity gaps, Kazakhstan could (i) regularly and systematically collect data on firms' use of digital infrastructure and services and the barriers they face; (ii) develop regular public-private dialogue (PPD) mechanisms at national and regional level to discuss the

state of digital infrastructure; and (iii) generalise the use of data-driven public sector approaches to support the digital transformation of firms.

Accurate data are essential to effective policy-making. National statistical offices (NSOs) in OECD and partner countries regularly collect (on a quarterly and annual basis) data pertaining to the basic access to and use of internet and digital tools by businesses, including as access to the internet, mobile and broadband subscriptions, and use of digital tools. In addition, they provide detailed data by firm size, sector of activity and location, allowing for the detection of connectivity and digital uptake gaps between small, medium and large enterprises. Kazakhstan's NSO could develop similar systematic data collection, to supplement its data on digital and SME topics. Atameken or other business associations could also build on their existing networks to conduct regular surveys of firms, especially SMEs, to gather qualitative data on their use of digital infrastructure and services as well as their experience and the barriers they face in doing so. The introduction of regular PPD mechanisms, at both national and regional levels, would complement such an approach, by offering a regular platform for exchange between central, regional, and municipal authorities, large operators on the supply side, and end-user private sector representatives on the demand-side. For instance, Atameken could head such an initiative and liaise with the *Akimats* or *Maslikhats* at the *oblasts* or district level, the MDDIAI, and the Association of National Telecom Operators. Such a systematic dialogue mechanism would ensure the government is up to date on the needs of the private sector and can adapt its policies accordingly.

Once developed, comprehensive data collection on business use and needs in relation to the digital transformation could inform policy-making and monitoring to support infrastructure rollout and the digital transformation of firms. Kazakhstan could expand the data-driven public sector strategy laid out in the DigitEl programme to telecom infrastructure, while defining a data governance model fitting the specific needs of both the sector and of small firms (Government of Kazakhstan, 2021[17]).

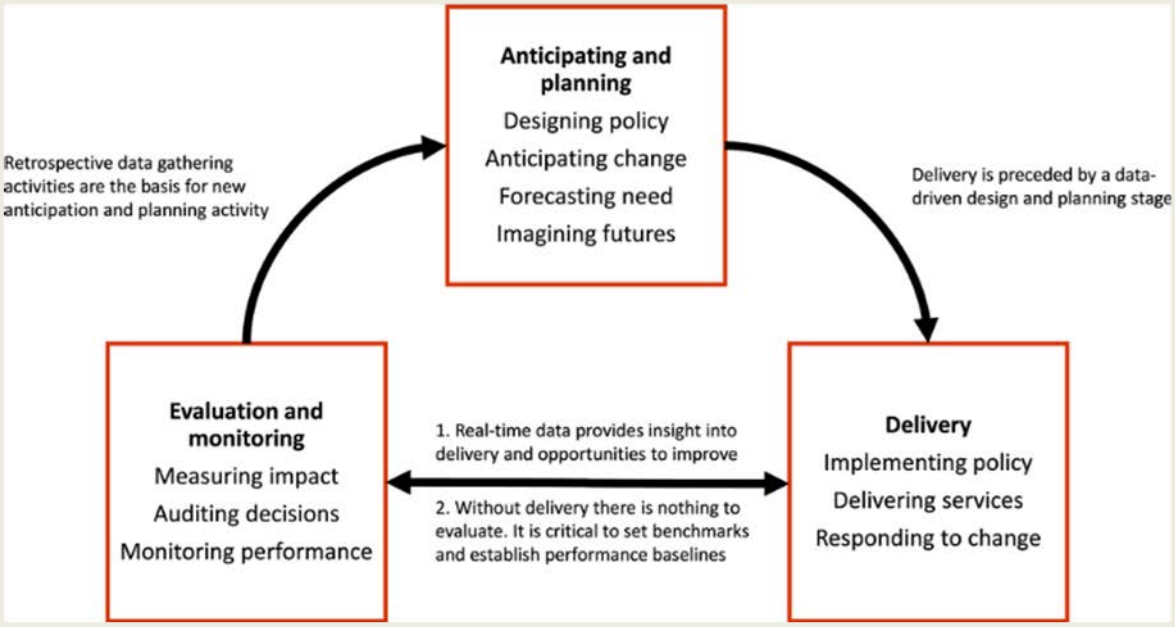
Box 2.3. Collecting firm-level data to inform policy on business digital services and infrastructure

Applying data to generate public value

For data to support effective policy-making, OECD research indicates the importance of a sound governance structure, built on an iterative three-step cycle: (i) anticipatory governance, (ii) design and delivery, and (iii) performance management:

- The anticipation and planning phase requires understanding the type of data needed and how they can be used in policy design. This phase is therefore an opportunity to anticipate changes and needs for both data and policy. Data sources cover both new qualitative and quantitative data, and data generated through the evaluation of previous policies.
- The delivery phase consists in the implementation of analytical tools and the definition of effective performance measurements to be able to read the collected data and apply any resulting insights to amend policies and activities where needed.
- The final phase is evaluation and monitoring to measure the impact and performance of policies, based on insights from data generated through the "delivery" phase.

Figure 2.2. Generate public value through data-driven public sector approaches



Source: (OECD, 2019[18]).

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Notes

[1] The term “connectivity gap” refers to gaps in access and uptake of high-quality broadband services at affordable prices in areas with low population densities and for disadvantaged groups compared to the population as a whole (OECD, 2021[13]).

[2] At the time of writing, a new draft law is under consideration to increase the liabilities of the operators in case of low or deteriorating network quality.

3 Improve competition in and investment attractiveness of the telecom sector

Persistently high regulatory and economic barriers in the telecom sector result in levels of competition and investment below expectations, while Kazakhstan would need more investments in the sector to densify its network of digital infrastructures. In particular, the economic concentration of the sector and the absence of dedicated investment support measures prevent smaller, “last-mile” operators from entering the market. Establishing an independent regulator for the telecom sector and developing a targeted investment attraction strategy for the deployment of next-generation communication networks, including a further simplification of the investment environment for infrastructure, could enhance the sector’s investment attractiveness and meet the digital infrastructure deployment demand.

Challenge 3: A high degree of concentration in the telecom sector slows improvements in digital infrastructure

Kazakhstan has begun demonopolising the telecom market

Kazakhstan's telecom sector is dominated by three main operators sharing the fixed market, two of them also present in the mobile market. The state-owned *Kazakhtelecom* remains the most important operator, on both fixed and the mobile segments, as it owns 90% of total fixed infrastructure and more than two-thirds of the mobile market. However, the government has initiated some demonopolisation reforms in recent years.

Following Kazakhstan's accession to the WTO in 2015, the government lifted a monopoly on the provision of 4G services in the telecom sector, under which only the Altel company, a subsidiary of *Kazakhtelecom*, had the right to provide 4G services. Since early 2017, all three mobile telephone providers have been allowed to get licenses on existing and new 4G frequencies (Samruk Kazyna, 2016[1]). In March 2021, *Kazakhstan Transtelecom*, a fixed broadband network operator and former subsidiary of the state-owned rail firm, was privatised. This followed a gradual process initiated in 2014, when the company was first included in a list of strategic assets for privatisation, before 49% of its shares were sold in 2015, followed by a second sale (26% of shares) in 2018 (Government of Kazakhstan, 2014[2]; Kazinform, 2015[3]).

In 2021, recognising the important role of small operators in bridging the "last-mile" connectivity gap, OECD interviews indicate that the government also initiated steps to demonopolise that segment of internet provision. While this reform should enable small operators to enter the mobile market, it remains unclear whether it aims at fostering end-to-end infrastructure competition, or if it is to allow for infrastructure sharing. In the first case, different operators, both new and incumbents, would compete with their own networks, while in the latter, small operators would use the infrastructure of incumbents but provide services to market segments that remain outside the current network, i.e. mainly in rural and small urban areas.

In the framework of this reform, the government has also announced that *Kazakhtelecom* will sell one of its two mobile operators in 2022, which would result in essentially three independent operators in the mobile market by the end of the year (Government of Kazakhstan, 2022[4]). In addition, the government set up a special Commission on demonopolisation **in** early 2022, with the main goal of reviewing and proposing amendments to the current legislation applicable to the telecom sector. The Commission is composed of the Ministries of Infrastructure Development and Justice, relevant public institutions, such as the Competition Authority, and representatives of the private sector. However, achieved results have not been communicated so far and it is unclear if the partial privatisation of *Kazakhtelecom*'s mobile operators will results from the Commission's activities.

Changes to the regulatory framework could facilitate faster extension of networks and quality improvements

Despite these recent efforts, the telecom sector remains characterised by a regulatory environment that favours incumbents. As a result, new operators struggle to enter the market, and access to infrastructure and tariffs remains highly unequal for small providers, which prevents quality increases across the network.

The three main operators are connected to international mainline internet and operate on both the business-to-business and the business-to-consumer segments. As a result, smaller operators do not have the possibility to compete with their own infrastructure on the fixed market, nor their networks on the mobile one. Instead, they use the infrastructure of the larger operators. OECD interviews suggest that the terms on which larger operators grant access to smaller ones are non-transparent and that pricing policies vary widely, distorting competition at the retail level. In particular, *Kazakhtelecom*'s monopolistic situation over

fixed and mobile infrastructure results in unequal access to infrastructure and tariffs for smaller providers. While in theory the "last-mile" connectivity programme enables smaller operators to take part in the planning and development of new infrastructure where coverage is absent or below the levels set by the NDS, OECD interviews indicated that only incumbents are effectively allowed to participate so far. For instance, recent auctions for the construction of fibre optic communications lines in selected rural regions were allocated to *Kazakhtelecom* and *Transtelecom*. This trend might be indicative of the existing policy barriers in the sector, which operate to the detriment of new entrants.

Current legislation and regulatory requirements impose additional high costs on operators, which tend to favour incumbents. In particular, each operator has to ensure the compatibility of its telecom network and equipment with the Systems for Operative Investigative Activities (SORM) architecture, allowing law enforcement and intelligence agencies to obtain direct access to data on commercial networks (Government of Kazakhstan, 2022[5]). Network and equipment also need to be made accessible to a monitoring facility for analysis, and providers must provide storage for the intercepted data (CLFR, 2015[6]). During interviews conducted by the OECD, these requirements were cited as one of the main barriers for the entry of new operators due to the high costs they impose on potential entrants.

The lack of specific sectoral regulation further limits the possibility to address these issues. Indeed Kazakhstan has no independent regulatory authority for the sector, while the Competition Authority as well as the Committee on Regulation of Natural Monopolies under the Ministry of National Economy are entrusted only with competition matters, without having a mandate for economic regulation (Government of Kazakhstan, 2022[7]; Government of Kazakhstan, 2022[8]). While a dedicated department exists for telecommunications and communications in the Competition Authority, OECD interviews indicated that staffing is very low, with only one person working full-time on telecommunications. The Authority also authorised *Kazakhtelecom* to buy a 75% stake in *KCell*, the country's largest mobile phone operator, resulting in the company owning two-thirds of the mobile market since 2018, suggesting *de facto* very low anti-trust powers (Financial Times, 2018[9]). In addition, industry associations and an ICT Committee within Atameken are not involved in regulatory activities either, while only two out of the ten employees of the demonopolisation committee work specifically on the telecom sector, and their mandate is limited to improving market conditions for last-mile operators.

Recommendation 3: Create an independent regulator for the telecom sector

Recent OECD research shows that reforms to promote competition and investment in the telecom sector (see below) have been essential drivers of infrastructure deployment, and fundamental to bridge digital divides of both a geographical and quality nature (OECD, 2021[10]; OECD, 2021[11]). In particular, there is evidence of complementarity between liberalisation and regulatory independence in driving a sustained pace of technology adoption, both at the level of society and businesses (ICC, 2007[12]).

Indeed, the cost structure of telecom markets, due to high investment needs and high fixed costs, as well as other barriers to entry, results in monopolistic structures if left unregulated. Across OECD countries, regulation has been used to foster competition, reduce prices and extend the coverage of broadband and mobile networks. In particular, the creation of an independent sectoral regulator is a central tool in the hands of policymakers to ensure wide access to and quality of internet, enhance firms' competitiveness, and increase investment in the sector (OECD, 2021[10]). Kazakhstan could set up such an agency for economic regulation of the telecom sector, to complement current demonopolisation reforms, support improved internet coverage and quality, and attract investments to the sector.

If in theory the division of roles between sectoral regulation and competition policy is strict, the actual allocation of roles between sectoral regulators and competition authorities varies over time and depends on country-specific conditions (OECD, 2021[10]). Since Kazakhstan is in the early stages of the demonopolisation of the telecom sector, it should consider a clear allocation of roles between the sectoral

regulator, which should be the only competent authority for economic regulation (*forward-looking*), and the Agency for Competition, still entrusted with competition regulation (*backward looking*), when creating the former. If the regulator were entrusted with the mandate to organise the market *ex ante*, it would support the demonopolisation process through the prevention and regulation of market failures.

In addition, when establishing such a regulator, it is crucial to ensure the conditions for its independence, *de jure* and *de facto*, from both the government and the sector it regulates to allow for effective and impartial regulation. In practice, this requires entrusting the regulator with a clear mission statement, the human and financial means to fulfil its mandate, and clear staffing rules to prevent undue influence (Box 3.1).

Box 3.1. Pro-competitive reforms in the telecom sector support competitiveness

Conditions for the effective independence of a sectoral economic regulator

Sectoral regulators are public bodies helping to ensure access to and quality of key public services, facilitate infrastructure management, and enhance market efficiency. They operate at the interface of public authorities, the private sector and end-users, requiring them to behave and act objectively, impartially, and consistently, without conflict of interest, bias or undue influence. Independence of sectoral regulators is defined in reference to both the political power and the regulated operators:

- The former requires avoiding competing interests between general policy objectives and those of sectorial regulation, as well as distortions linked to private interests and the shareholder State.
- The latter refers to the need for regulators to avoid the risk of capture through regulated operator(s), either because of proximity with the regulated businesses, influence of pressure groups (both historical operators and new entrants), or asymmetry of information.

In practice, the regulator's *de jure* and *de facto* independence relies upon:

- The clarity of its role, with a clear mandate allowing for a forward-looking stance and clear definition of the market it regulates. The mandate should also be stable over time.
- The financial and human means to fulfil its mandate, for instance through a plurennial budget, and power to recruit its own staff from a diverse pool of qualified candidates.
- The independence of its leadership, with transparent rules for appointment and dismissal.
- Transparency and accountability rules across all staff and leadership such as clear rules on the nature of employment accessible upon leaving the regulator and safeguards against lobbies and pressure groups (for instance through collegial structures, and clear rules for relations with market players and in particular SOEs).

The example of Mexico's telecom regulator

Before 2013, the Mexican telecom sector was highly concentrated, and its sectoral regulatory agency had limited capacity to execute its mandate: the agency's commissioners were selected by the Government and operated in a weak legal environment with limited sanctioning and implementation powers. The 2013 constitutional reform created the Federal Institute of Telecommunications (IFT), a strong and independent regulator for the telecommunication and broadcasting sector:

- IFT became fully independent and the sole economic regulator for the telecom sector, as it has been separated from the Communications and Transportation Ministry, and a three-step selection process (involving academia, the President and the Senate) of IFT Commissioners ensured independence of its staff.

- IFT was granted wide sanctioning power and tools over firms. In particular, it has been granted automatic jurisdiction over any firm owning more than 50% share in radio, TV, cellular, fixed-line phone, internet, or cable TV markets, as well as jurisdiction to target firms on a case-by-case basis if they possess substantial market power. Sanctioning tools have also been increased, and include 6% of revenue gained in Mexico for first offences, 12% for repeated ones, order to divest assets, and revocation of concessions.
- In order to fulfil this new enlarged mandate, the agency has been granted additional human and financial means. Today the agency has about 700 employees, seven permanent commissioners, as well as technical evaluation committees, dedicated judges trained in telecom matters, and specialised courts to treat sanctions. Finally, the judiciary has also been reformed so that the agency's rulings cannot be blocked in court.

Source: (OECD, 2016[13]; OECD, 2021[11]; OECD, 2017[14]).

Challenge 4: Regulatory and economic barriers constrain financing below the level required to "future proof" digital infrastructure

Efforts to improve the investment environment have made ICT a promising sector for investment

After a boom in the early days of independence, the telecom sector gradually lost some attractiveness to investors in the mid-2000s, in particular due to the mounting investments required to compete with incumbents, chief among them *Kazakhtelecom* (Samruk Kazyna, 2016[1]). Since Kazakhstan's WTO accession in 2015, efforts to improve the business environment have made ICT again a promising sector for investment, especially for companies from, *inter alia*, Turkey, Sweden, and the Netherlands. In 2020, the total ICT market represented about 3.0% of GDP, two-thirds of which was made up by the telecom market and one-third by the information technology market; revenues stood at about USD 2bn, among which internet represented 38% and mobile communications 26% (U.S. International Trade Administration, 2022[15]). The COVID-19 pandemic acted as a catalyst for citizens and business to switch to internet-based services, and the sector has therefore gained renewed attention from domestic and international investors alike, particularly in relation to the upgrade and extension of existing fixed and mobile networks, the rollout of 5G mobile communications technologies, and digital technologies to be used for developing e-government services, smart transport, urban infrastructure, financial sector applications, and the Internet of Things (IoT) (U.S. International Trade Administration, 2022[15]).

For domestic investors, investment opportunities in the sector have expanded, especially in relation to service provision to remote and under-served areas. Under the government's last-mile connectivity plans, small operators are granted some benefits, including exemption from customs duties, exemption from value added tax on the import of raw materials, and state in-kind grants for the provision of high-quality internet in rural areas (Government of Kazakhstan, 2016[16]). However, as indicated by the sub-sectors of interest to investors, the quality upgrade of networks serving main population centres is also a central element both for the digital competitiveness of the private sector and for the further growth of the ICT sector. Currently, the government offers certain tax breaks to large operators if they provide high-speed internet in rural areas. Given the capital-intensive nature of the sector, access to capital is critical to ensuring the deployment and expansion of a robust network, and FDI can play a significant role in addition to domestic investment (ICC, 2007[12]). Kazakhstan's obligations in relation to its WTO accession include the removal of the rule limiting non-residents to ownership of no more than 49% of any telecom company, excluding mobile operators, but no particular time frame has been set for this removal (Samruk Kazyna,

2016[1]). Currently, a government waiver is still required for foreign investors wishing to acquire more than 49% of shares in a telecom company, as well as limits to foreign ownership for the announced partial privatisation of *Kazakhtelecom*'s mobile operator (Baker McKenzie, 2022[17]).[1]

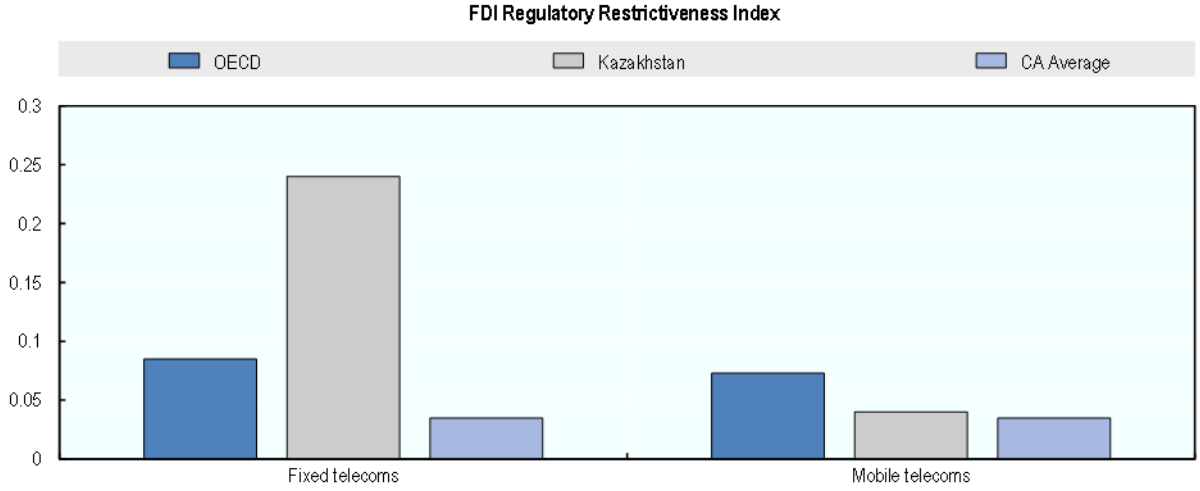
Remaining regulatory and financial barriers remain prohibitive, especially for small "last-mile" operators

Despite improvements to the investment framework and the renewed attractiveness of the sector for domestic and foreign investors, OECD interviews indicated that Kazakhstan's communication networks fall short of the investment level needed to bridge the connectivity gap for rural and small urban areas, as well as to upgrade the quality and densify the network in urban centres. Expanding communication networks to rural and remote areas requires indeed high levels of investment, as the "last-mile" segments are more costly to cover due to their distance to core network facilities. In addition to the financial challenge, the provision of last-mile fixed connections requires a broad deployment of high-speed "middle mile" infrastructure. As for mobile, the economic challenges often relate to ensuring sufficient backhaul capabilities to the mobile cell sites, as well as efficient spectrum management (OECD, 2021[11]).

On the quality front, the issues are similar: fibre or other high-speed networks that are physically closer to the end user lead to increased internet speed across all access technologies; this represents an important challenge for those located in more remote places. 5G deployment in particular will require consequent network densification (OECD, 2021[11]). On both issues, investment as well as the regulatory frameworks are key to unlocking network expansion. In particular, economies without barriers to investment benefitted from greater and longer-term commitment by investors as well as new management approaches, technology, and skills transfer, driving telecom network expansion (ICC, 2007[12]).

Regarding investment, high regulatory barriers for electronic communications as measured by the OECD Product Market Regulation (PMR) Index, as well restrictions on FDI in the sector, could account in part for the failure to attract the investments needed to extend and upgrade fixed communication infrastructure. Kazakhstan is indeed much more restrictive than both the OECD and Central Asian averages (Figure 3.1). For the PMR, Kazakhstan had the most stringent regulatory barriers to competition of any other country under review, more than three times the OECD average (OECD, 2018[18]).

Figure 3.1. FDI regulatory restrictiveness



Note: CA average includes data for Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan. A score of 0 indicates the country is more open, 1 more closed.
Source: (OECD, 2022[19]).

As incumbents hold a quasi-monopoly over cable ducting, additional infrastructure investments, for instance for fibre optic cables, prove very costly and difficult for smaller operators. In addition, if the latter benefit in theory from equal access to infrastructure owned by *Kazakhtelecom* and other larger players, OECD interviews indicated that in practice only a small number of operators share elements of infrastructure, mainly in the mobile sector. Risks of changing contracting terms and tariff increases from large operators seem to be the reasons. High network use and deployment costs are thereby cited as one of the most important and prohibitive barriers for smaller operators operating on the last-mile segment. Co-investment or co-deployment in broadband access networks could be an alternative, as it is authorised by the law on communication regulating the sector (Government of Kazakhstan, 2022[5]; Baker McKenzie, 2022[17]). That said, OECD interviews indicate that their use is highly limited, that there is no policy support in that field, and that private initiatives rarely occur. From an FDI perspective, the 49% limit on foreign ownership in telecoms also puts foreign investors at a disadvantage, as illustrated by two out of the three foreign operators leaving Kazakhstan since 2016 (Samruk Kazyna, 2016[1]). Finally, beyond some benefits to last-mile operators, neither the government nor the country's investment promotion agency (IPA), Kazakh Invest, provide targeted investment support or policy support to attract new operators, whose entry could accelerate the expansion of coverage and network densification.

On the regulatory front, OECD interviews also indicated that licensing procedures for telecom services and infrastructure remain a barrier for many small operators, while spectrum management does not meet current needs. All digital telecom services and infrastructure development are subject to mandatory licensing, issued by the Telecommunications Committee of the Ministry of Digital Development, Innovation and Aerospace Industry. For mobile internet, the Committee also issues permits to use radio frequencies allocated by the Interdepartmental Commission on Radio Frequencies (Baker McKenzie, 2022[17]; Government of Kazakhstan, 2014[20]). OECD interviews indicated that the procedures for spectrum licensing remain cumbersome and below demand. In particular, if according to the Law on Communications, frequencies are allocated based on tenders, the Telecommunications Committee is also authorised to allocate frequencies without such auctions. In addition, permits are granted for one year, requiring annual renewals, with notification periods that are reported to be very short and unpredictable (Government of Kazakhstan, 2022[5]). This compounds the financial barriers, including high capital outlays, and unattractive rural market segments preventing new operators for entering the market. The government announced a simplification of procedures for issuing mobile spectrum licences and enforcing frequency compatibility standards earlier this year, though it seems to be mainly aimed at preparing a new licence auction for 5G (Government of Kazakhstan, 2022[21]).

Recommendation 4: Develop an investment attraction strategy for last-mile connectivity and next generation communication networks

A sound regulatory and institutional framework is central to expanding digital connectivity and quality, since private actors undertake the vast majority of the investment required for ICT infrastructure development. Across the OECD, policies that reduce barriers and costs of network deployment and provide incentives to invest have been widely used to support connectivity deployment (OECD, 2021[11]). Likewise, Kazakhstan could develop a three-step investment attraction strategy for the sector to support the further densification and quality upgrade of its ICT infrastructure, thereby paving the way for quality upgrade of current and deployment of next generation communication networks.

Building on the recent achievements in streamlining and simplifying the investment framework, as well as the licensing procedures for many sectors (OECD, 2020[22]), Kazakhstan could further improve the enabling environment for infrastructure investments. In particular, introducing harmonised procedures for operators to get all necessary permissions (e.g. permits and licenses) for high-quality network development would enable Kazakhstan to increase the speed of deployment. Since smaller operators usually have fewer resources devoted to regulatory matters, they can benefit most from such reforms, allowing improved

network coverage in the last-mile segment and densifying the network. In addition, the government could also streamline the procedure for obtaining permits and licenses for spectrum use and rights of way, to reduce network approval and construction times.

However, instances remain where private investment might not meet the need for infrastructure deployment, coverage and quality, and where the government may be better placed to take a longer-term and broader view of returns. As discussed above, connectivity gaps can indeed arise in areas where the business case for private investments is weak, while the levels of investment needed for densifying infrastructure networks remain sometimes below expectations. In these instances, the government could invest alongside private actors, for instance through public-private partnerships (PPPs) to share the risks associated with the creation, development and operation of an infrastructure asset. In particular, regional governments in Kazakhstan could assess on a regular basis the needs for digital infrastructure renovation or rollout (especially for high-speed networks). Once these needs are identified, the policy relevance as well as the business case of the projects should be assessed to evaluate whether private investment alone would be sufficient to cover for it. Should the business case not be appealing, the government may choose to support the project either through full public investment or through alternative risk-sharing approaches. This evaluation is crucial both to make the best use of public funds, as well as to avoid crowding-out private investment, and should be done in close collaboration with the MDDIAI, the MIID, operators and private sector representatives.[2] To ease the process even further, the relevant line ministries could develop a set of standardised alternative approaches (e.g. PPPs, co-investments) on which local governments can draw.

Finally, Kazakhstan could also develop targeted investment incentives, especially for small “last-mile” operators in rural and small urban areas (Box 3.2). Some incentives already exist, though a more ambitious strategy could be developed by providing both direct financial incentives (e.g. through reverse auction mechanisms) as well as regulatory and advisory support during all phases of an infrastructure development project. As it is done in the majority of OECD countries, where 83% of investment promotion agencies (IPAs) actively promote ICT connectivity infrastructure as one of their priority areas for investment, KazakhInvest could be entrusted with this mandate, and actively look for and accompany domestic and foreign investments to the sector (OECD, 2021[23]).

Box 3.2. Investment attraction strategies to support digital infrastructure rollout

Examples of policies to close connectivity divides in rural and small urban areas

Many OECD countries have recognized the need to ensure the delivery of high quality broadband services at symmetric speeds across their territory as a prerequisite to support the business environment in rural and small urban areas, and level the playing field with urban firms. If investment promotion and infrastructure deployment remain overarching policies, tailored initiatives can be used, independently or in combination with other approaches, to close remaining connectivity divides.

- Demand aggregation models increase certainty for investors and operators, in areas where the rollout of broadband networks might appear economically unviable: demand is co-ordinated and bundled upfront by signing up customers in advance, which secures the commitment of local users (households and businesses) to the operator's services before he deploys its network.
- Public-private partnership (PPPs) initiatives share the risks associated with the creation, development and operation of a digital infrastructure asset between governments (national or subnational) and private actors. Most of PPPs in the OECD have been designed as open access networks, so that public funding (e.g. preferential loans or subsidies) promotes competition.
- Public funding is used as a second-best policy across OECD countries, to address remaining connectivity gaps despite policies promoting competition and private investment. Financing of connectivity expansion mainly derives from national broadband plans, and comes usually in the form of state aid, dedicated funds, market mechanisms (e.g. competitive tenders and reverse auctions), or voucher programmes for the last-mile connections.

Source: (Mölleryd, 2015[24]).

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Notes

[1] Restrictions on foreign participation include (i) a full ban on the management or operation of the main lines of communication without the creation of a legal entity and of a control centre (for infrastructure quality) on the territory of Kazakhstan; (ii) a maximum 10% participation of physical and legal persons in the management or operation of the operator; and (iii) a maximum of 49% participation in the operator.

[2] For instance, Sweden conducts prior market analysis to identify not commercially attractive areas, and once these are detected, public consultations of the planned financed expansions are held with private operators to ensure that these plans do not crowd-out a planned commercial development.

4 Adapt the regulatory and policy framework for firms to new digital challenges

Kazakhstan has started to adapt the legal and policy framework for firms to the digital age, in particular regarding personal data and trust standards. However, the slow pace of change combined with frequent and partial amendments to laws, creates additional complexity for firms. In addition, most firms are poorly equipped to manage digital and cyber-security threats. The government has therefore a role to play to support the digital transformation of firms by easing the regulatory environment for firms in relation to digital topics and by developing public tools to raise both the awareness and capacity of firms to manage their digital security risks.

Challenge 5: The pace of adaptation of the regulatory framework to digital issues creates new barriers for firms

Kazakhstan has worked to adapt the legal and policy framework for firms to new challenges brought by the digital era

The digital transformation of governments, businesses and society relies as much on technological innovations, which enables new practices to emerge, as on the trust in the digital economy, which incentivises actors actually to go digital. The regulatory framework has a central role to play in ensuring the quality and adaptability of laws and regulations to the needs and challenges created by emerging digital technologies and uses, such as misappropriation of data or infringement of property and privacy rights. This is of particular importance to support the digital transformation of SMEs, as they are disproportionately affected by inefficiencies in institutions and regulatory frameworks (OECD, n.d.[1]).

In recent years, Kazakhstan has made noteworthy efforts to adapt the legal and policy framework for firms to new digital challenges, in line with its efforts to advance the digital transformation. On the data front in particular, Kazakhstan has been regularly amending its legal framework to gradually move toward the privacy and security standards set by the European Union's General Data Protection Regulation (GDPR) (Government of Kazakhstan, 2013[2]; Government of Kazakhstan, 2017[3]). As part of these efforts, the government created the Information Security Committee under the MDDIAI, mandated with the implementation and monitoring of compliance with the Law on Data Protection (Government of Kazkahstan, 2022[4]). Though the objective was to create a Data Protection Agency following the GDPR model, the Committees' mandate so far focuses mostly on technological solutions to data issues, rather than on legislative and implementation aspects for data protection issues (CAISS, 2020[5]). The new legislative framework also imposes obligations on companies to appoint a data protection officer to ensure internal compliance with the Law, notify the Committee about data breaches, and carry out data protection impact assessments before engaging in any activity requiring the collection and handling of data (Dentons, 2021[6]).

In addition, the government has recognised the need to involve the private sector to adapt regulations in line with new needs created by the digital transformation of businesses and commercial practices. For instance, the process of amending the laws on data and consumer protection, the civil and the copyright code, and the patent law on issues of "cybersquatting" issues for intellectual property rights (IPR) protection all involved both inter-ministerial discussions and consultations with private sector representatives, chiefly represented by Atameken and business associations.

However, the pace of change and simplification of the regulatory environment remains slow and raises new barriers for firms

Despite these reforms, OECD interviews indicate that the regulatory environment is not yet conducive to the digital uptake of firms, as it fails to anticipate and answer the needs of firms, leaves out important aspects of the digital operation of businesses, including e-commerce, and remains difficult for firms to navigate and authorities to implement. Data protection offers a relevant illustration. OECD interviews indicate that successive amendments to the Law on Data Protection have resulted in additional technical requirements that can prove cumbersome for firms, especially for smaller ones, reducing their incentive to operate digitally, without increasing trust from businesses or consumers, because the amendment process has been perceived as opaque and poorly advertised.

More generally, OECD interviews indicated that the pace of change of the regulatory environment remains too slow to adapt efficiently to emerging technologies and the challenges they create for businesses, and too fragmented for firms and public authorities to implement, therefore raising new barriers. For instance, since 2016, the Law on Data Protection has been amended at least five times, while at the time of writing

a new set of amendments relating to data management and data ownership are being drafted and discussed. Business representatives told the OECD team that despite formal involvement of Atameken and other representative associations, they remain poorly aware of the objective and content of the successive amendments. In the cases when they are aware, they indicated that only a small number of provided recommendations were taken into account in the final versions of the law. This has also been echoed by international organisations specialised on the topic (CAISS, 2020[5]; Portulans Institute, 2021[7]). In addition, Kazakhstan remains below the adequacy level of personal data protection as defined by the EU GDPR (CNIL, 2022[8]).

In a similar vein, the regulatory framework governing IPR has not yet been adapted to digital-specific challenges, such as cybersquatting or liability for the sale of counterfeits products on online platforms. While OECD interviews indicate that the Ministry of Justice is aware of this issue, it is unclear whether actual discussions on adapting the IPR protection framework to the digital era have started.

Finally, Kazakhstan is missing a dedicated law on e-commerce and online platforms, which is among the fastest expanding sectors in Kazakhstan and in which a vast majority of SMEs are active. Indeed, general aspects on these matters continue to be regulated by the 2004 law on trading activities (Government of Kazakhstan, 2004[9]), in combination with the laws on consumer rights, digitalisation, and protection of personal data for targeted issues. As a result, many firms are not aware of changes in requirements or opportunities related to their digital operations, which further complicates their operating environment and acts as a disincentive to turn their operations digital. OECD interviews suggest that part of this complexity arises from the regulatory and institutional frameworks themselves, where the responsibilities for e-commerce, data, consumer and IPR protection, and other legal issue are scattered among various ministries and public agencies, each responsible for sub-elements of a law and its implementation.

Recommendation 5: Adapt and streamline the regulatory framework for firms to accompany their digital transformation

The scale of change and scope of Kazakhstan's digitalisation ambitions point toward several challenges for businesses. First, ensuring that the adaptation of the regulatory framework to new needs created by the digital operation of firms does not create a fragmented, incoherent and contradictory operational environment. Second, ensuring that data is regulated in such a way that it allows firms to develop new business models without creating digital security vulnerabilities. The government therefore has a central role to play in maintaining the legal and judicial frameworks within which public administration and markets operate, refraining from the misappropriation of data and infringement of property and privacy rights.

In particular, Kazakhstan could undertake a regulatory review in consultation with the private sector to update all laws relevant to the digital transformation of firms, starting with consumer and data protection, IPR, and e-commerce (Box 4.1). For each topic, the government should aim to consult first with the private sector to gather firm input on the current challenges and gaps in the regulatory framework that prevent them from going fully digital. Formal PPD mechanisms, involving representatives of the private sector such as Atameken and sectoral business associations can be used to that effect, paying close attention to ensure that SMEs are included in such dialogues. Atameken and smaller business associations could support SME participation upfront through dedicated outreach, training and coaching to make their case effectively, as well as offsetting some of the costs for attendance (e.g. *per diems* or fuel allowances).

Once these inputs are gathered, the government should translate them into changes to the concerned laws, taking care to consolidate all changes into one single and coherent piece of legislation. The use of "one-in, X-out" or regulatory guillotine approaches, such as those adopted in several OECD countries, could facilitate the removal of obsolete regulation and contribute to regulatory offsetting (OECD, 2017[10]). However, the use of such approaches, focusing on the quantity of regulations, should not prevent focusing

on the impact and quality of regulations that can only be achieved through regular discussions with the private sector and monitoring (Trnka and Thuerer, 2019[11]).

From a broader perspective, on the data protection front, Kazakhstan could also strengthen its regulatory and institutional framework, moving closer to the European Union's GDPR standards. In particular, establishing a genuine data protection agency could help raise awareness and improve data protection practices for businesses and individuals alike. This would require separating the Information Security Committee from the MDDIAI, to become an independent public authority mandated with supervising the application of the data protection law (European Commission, 2022[12]). The new DPA should be granted investigative and corrective powers to handle complaints, and should provide expert advice on data protection compliance to businesses. On that matter, Kazakhstan could enhance its co-operation with the EU within the framework of the Enhanced Partnership Agreement and the EU Central Asia Strategy.

Box 4.1. Adapting the regulatory framework for businesses to new digital needs

The example of the EU e-Commerce Directive and the Digital Services Act

The e-Commerce Directive, adopted in 2000, provides the basis for digital regulation of trade in the EU single market. Besides basic requirements on mandatory consumer information, steps to follow in online contracting and rules on commercial communications, it also covers more complex matters, including competition.

In 2015, the European Commission has recognised that the digital landscape had undergone profound changes since the early 2000s and raised new challenges for firms, for instance in relation to online intermediaries. The Commission therefore launched a regulatory review to update the digital regulatory framework, ensuring that the fundamental rights of users are protected and that businesses benefit from a level playing field.

- Two public consultations were launched, involving consumers, public authorities, non-governmental organisations, SMEs and other relevant stakeholders for digital matters. Discussions aimed at assessing whether EU rules on e-commerce were still up to date and identifying new challenges faced by European citizens and businesses when buying online.
- Expert groups have then been set-up to discuss issues in the application of the Directive, as well as emerging issues in the area of e-commerce.
- On that basis, in December 2020, the Commission published the proposals for the Digital Services Act, complemented by the Digital Markets Act, a single new set of rules applicable to the digital space across the EU.

Source: (European Commission, 2022[13]; European Commission, 2022[14]).

Challenge 6: A lack of digital culture among firms leaves them vulnerable to digital security risks

Digital security has become a policy priority in recent years

Since 2017, as the digitalisation of the economy has progressed rapidly, Kazakhstan has also started developing digital security policies to reduce the country's vulnerability to cyber threats (Government of Kazakhstan, 2017[15]). In particular, the government launched the Cybersecurity Concept until 2022 ("Cyber Shield of Kazakhstan"), aimed at developing a cybersecurity sector in the country, which was practically non-existent in 2016 (Government of Kazakhstan, 2017[16]). The initiative covered the building blocks of such a strategy, starting with (i) the creation of a national register of trusted digital software and IT products to reduce reliance on foreign solutions; (ii) enhanced international co-operation with internationally recognised private digital security providers and international organisations active in the domain to build local capacity; and (iii) the development of a digital culture for the general population and the training of cybersecurity specialists. Some of the targets of the initiative have been further included in the objectives of the Digital Kazakhstan programme. This year, the government announced the launch of the Cybershield 2.0 programme, incorporating new challenges and aspects of the digital transformation in Kazakhstan, especially on the liberalisation and inclusion of the private sector, law enforcement, security, and defence sectors.

The strategy has been successful so far in creating a cyber-security landscape in the country. On the institutional front, the National Security Council, the Council for Cybersecurity, the Information Security Committee under the MDDIAI and an industry information security centre covering the country's financial sector were created (ITU, 2021[17]). However, OECD interviews indicate that the current institutional architecture can lead to co-ordination issues, while businesses remain poorly aware of the initiatives implemented. Kazakhstan has been actively seeking to expand international co-operation, in particular with the International Telecommunication Union (ITU), and through its involvement in the fourth industrial revolution working group of the World Economic Forum (WEF).

On the private-sector front, several companies are now dealing with cybersecurity issues, and are co-operating with the government to protect critical digital infrastructure, especially on e-government websites. In particular, the Centre for analysis and investigation of cyber-attacks (TSARKA) is operating the "BugBounty" platform, allowing the detection of digital vulnerabilities and cyber threats (TSARKA, 2022[18]). However, OECD interviews indicated that so far only e-government services and large businesses have used this service, as the fee remains prohibitive for SMEs who are also less aware about the existence of the initiative even if SMEs operating in the IT and e-commerce sector might benefit most from such services. The Computer Emergency Response Team (KZ-CERT) has also been created in recent years with a broader mandate, to collect and analyse security incidents reports, and provide consultative and technical assistance to all types of users, including SMEs, in prevention of cyber threats (Computer Emergency Response Team, 2022[19]). In addition, the Information Security Committee under the MDDIAI has been active in providing annual grants and retraining programmes for the unemployed to develop cyber security competencies. According to the Ministry's data, so far 3 000 people have received annual grants to study cyber security, while more than 36 000 people have been retrained in the last six years (Box 4.2).

Box 4.2. Developing cyber security competencies: the example of Kazakhstan's "Cyber Shield"

In 2017, Kazakhstan has adopted the "Cyber Shield" programme to support the development of a digital economy in the country through the development of a legal basis for and a culture of cybersecurity. Public-private working groups have identified several challenges in this regard, in particular insufficient awareness among citizens about cybersecurity threats; a shortage of information security professionals; inadequate information protection infrastructure; risks associated with the provision of electronic public services; and neglect information security requirements by most public and private organizations.

The Committee on Information Security has been implementing the state policy on cybersecurity, with a specific focus on the above-mentioned challenges. Since 2016, the Committee has been most successful in developing a pool of cybersecurity experts across the country, notably by providing grants to study cybersecurity, and free of charge retraining for unemployed to develop cyber-security competencies:

- About 3000 5-year stipends are granted every year for studies related to information and cybersecurity. For instance, in 2021, 2632 scholarships have been granted.
- Retraining for unemployed at the Presidential Academy of the Republic of Kazakhstan. In 2021, the programme accounted for 5921 graduates.

Source: (Government of Kazakhstan, 2022[20]).

However, businesses remain ill-equipped to manage digital security risks

The digital culture of the private sector and its ability to manage digital risks appears to be a central missing link in Kazakhstan's recent digital efforts, following from the rapid development and digitalisation across the country over the past decade, and an absence of policy attention on the matter (CAISS, 2020[5]). The focus of recent efforts on digital security has indeed been directed mainly at state and related entities, such as SOEs in so-called "strategically important" industries. For instance, none of the five dimensions of the Digital Kazakhstan programme addresses issues of data protection or the promotion of digital culture among the general population and firms. Programmes that are aimed at building digital awareness and skills to deal with security risks under the Cyber Shield programme have mostly focused on public servants (Government of Kazakhstan, 2017[21]). As a result, the level of awareness of and the ability to deal with cyber threats of the population and business remains very low, leaving them vulnerable to rising threats (CABAR, 2022[22]). For instance, a recent report of Kazakhstan's banking sector revealed a high level of ignorance of basic digital security recommendations across all levels of staff (Deloitte, 2021[23]).

Businesses and SMEs in particular are vulnerable to these threats, constraining their growth and competitiveness perspectives. For instance, phishing attacks have been rising over recent years, especially in relation to popular services and mailings on behalf of second-tier banks, postal organisations, trading platforms, and online stores. Given that most small enterprises in Kazakhstan only use basic digital tools, such as email services and online sale platforms, they are at the forefront of these attacks. The use of malicious software is also on the rise, about 2500 incidents related to this threat were reported to, and processed by, the National Computer Incident Response Service KZ-CERT in 2020, a 6% increase compared to 2019 (Government of Kazakhstan, 2021[24]). Beyond these, and despite the lack of precise and recent data, OECD interviews confirm that targeted attacks remain a big threat to Kazakh businesses. This problem was already flagged in 2016 by Kaspersky Lab, which found that 39% of Kazakh companies had lost access to business information as a result of cyber-attacks and that each corporate computer in the country had been subjected to an average of 13 malware attacks during the first half of 2016 (Kazakhstan Today, 2017[25]). By 2019, improvements remained limited, as Kaspersky Lab found that 92%

of organisations in Kazakhstan had been exposed to an external cyber-attack at least once, while 66% of companies faced internal threats to information security (Kaspersky Lab, 2021[26]). Interviews conducted by the OECD also indicated that the trend seems to have been on the rise since the pandemic, as many more businesses have turned parts of their operations online.

OECD interviews indicate that, as in many OECD and partner countries, a majority of business in Kazakhstan do not have digital security risk management practices, even at the most basic level, and are not necessarily aware of the benefits of integrating them into their business processes. For instance, many businesses do not have a dedicated person in-house, do not seek information from external sources, and do not tend to have formal procedures in place to detect intrusions. Only a few businesses, mainly large ones, are using the services of security consultancies, as the price of these initiatives remains high for smaller businesses to be able and willing to use them. In particular, if the mandate of KZ-CERT covers the provision of consultative and technical assistance to users in prevention of cyber threats, and their website indicates specific measures for SMEs (Computer Emergency Response Team, 2022[19]), OECD interviews suggest that few SMEs are aware of this service and have actually used it.

Recommendation 6: Build firms' awareness of, and capacity to manage, digital security risks

Enabling SMEs to be more aware of and effectively manage digital risk is crucial for them to make the most of the opportunities offered by the digital transformation (OECD, 2015[27]; OECD, n.d.[1]). For Kazakhstan's digital strategy to reach its targets of a secure and digital society, building a digital culture and equipping firms with the tools to manage their digital security risks will be essential. Doing so would require encouraging the adoption of better digital security practices among SMEs through dedicated public utilities, supporting the supply and use of business solutions to and by SMEs, and integrating SME policy considerations in the Cyber Shield strategy.

Many governments across OECD and partner countries have increasingly developed certification schemes, security standards and enforced personal data protection regulation to support businesses at large on the digital security front. However, SMEs are the most vulnerable firms in these respects, and specifically designed initiatives to raise their awareness and build their competences in digital security remains essential. Kazakhstan could expand the advisory and training offer for firms on digital security risk management offered by KZ-CERT. This could involve dedicated agencies (e.g. DAMU or Atameken), thereby following the practices of many OECD countries where SME agencies have taken a leading role to initiate a change in culture and practices of small businesses and equip them with the tools to manage their digital security risks (Box 4.3). The offer of advisory services could be developed either within agencies to provide SMEs with information about digital security risks and training tools (online and offline) to integrate such practices in their business processes, or by creating a register of certified external consultants SMEs could reach out to. All available support should be made easily accessible on the website of the implementing agency and publicised to ensure actual use by SMEs. Alternatively, or in complement, all advisory services and tools could also be made available on the "Government for Business" website.

On the demand side, the government should support preferential access to these services, to ensure wide uptake by small firms, and it could consider cost-sharing options via either DAMU or a dedicated budget line under the new phase of the Cyber Shield. For instance, training and advisory services could initially be provided either free of charge or at a subsidised rate, as SMEs often find it difficult to obtain the funding needed. Since trust in the quality of the services provided might also be limited in the beginning, vouchers or tax breaks for SMEs can also support the creation of a private market for advisory services. The government could leverage the experience of SMEs that are already actively using digital risk management practices in order to create networks of good practices and expertise. On the supply-side, Kazakhstan

could also design similar incentives for developing business solutions that could help SMEs improve digital security risk management, as well as adapting regulations to support the production of more secure digital products.

Finally, Kazakhstan could integrate SME digital security considerations either in the new phase of the Cyber Shield initiative, or directly as part of the next iteration of the NDS. In line with the 2015 OECD Recommendation on Digital Security Risk Management for Economic and Social Prosperity, doing so is essential to integrate SME-specific needs in strategy design and implementation, and minimise especially governance failures between digital security agencies and SME policy instances (OECD, n.d.[1]).

Box 4.3. Governments can support the digital culture of the private sector

Governments can support the improvement of the overall level of digital security in markets by acting on (i) the supply-side to encourage businesses to offer existing/novel digital security solutions, (ii) the demand-side to encourage businesses adopt better digital security risk management practices, (iii) the digital culture and cybersecurity skills of the population and businesses at large.

- On the supply-side, digital security solutions have mostly been encouraged by the development of regulations to enhance "security by design" or "privacy by design" features in IT products, and financial incentives as well as cluster ecosystems to develop new digital security technologies.
- On the demand-side, policies aim at setting rules and guidelines for data management, reducing information asymmetry for adopters of digital security products, and enhancing business capacity to manage their digital risks. In the first two instances, changes to regulation and legislations as well as the setting of security standards and procedures are the most widely used policy instruments. For the last, most OECD countries have entrusted their SME agencies to develop business advisory services and informational resources.
- Building digital culture and skills for cybersecurity has been mainly achieved through the provision of educational material and trainings, awareness campaigns on digital security risks and good practices, and the building of a knowledge base on digital security risks through Computer Emergency Response Teams (CERT).

Selected examples of SME-specific tools

- As a part of its 2020 Cyber Security Strategy, the Australian Cyber Security Centre has been mandated to offer both guidance on *what* SMEs should be doing, and on *how* they should implement a digital security strategy, with tailored toolkits (e.g. digital maturity assessments), matchmaking between digital security providers and SMEs, and grants available at each step of the process.
- The Belgian Federal Public Service for the Economy, SMEs, Middle Classes and Energy also offers an online set of resources to inform and assist SMEs in digital security matters, including documents on undertaking risk assessments, key principles for ensuring digital security, what to do in the event of an incident and a glossary of key technical terms.
- In Germany, the SME Go-Digital initiative launched in 2017 by the Federal Ministry for Economic Affairs developed a digital one-stop-shop where SMEs can receive diagnostic and targeted training programmes on digital security, with a reimbursement of 50% of the costs of the training.
- Chile's National Cybersecurity Policy includes the design of a large-scale cybersecurity campaign to promote the implementation of awareness and dissemination programmes in partnership with the private sector.

Source: Adapted from (OECD, n.d.[1]; Belgian Federal Public Service for the Economy, SMEs, Middle Classes and Energy, 2018[28]; Government of Chile, 2018[29]).

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5 Way forward

Since 2013, Kazakhstan has been developing an ambitious digitalisation agenda. However, a large number of businesses, particularly SMEs, have not yet started their digital transformation. This report has assessed the remaining gaps in the digital framework conditions that would allow firms to do so and developed some actionable policy recommendations in cooperation with the government of Kazakhstan.

Address the remaining internet quality and connectivity gaps

Over recent years, the efforts made by Kazakhstan to develop its digital infrastructure have translated into widely accessible and affordable internet. However, existing infrastructure seems to hold back a broad digital uptake of firms across the country for two main reasons: small firms mainly use mobile internet, whose quality in terms of speed has not progressed in recent years, while low coverage remains in several rural and small urban areas. Policymaking also suffers from a lack of data on firms' digital use and needs.

Mobilising the regional public sector to improve digital connectivity along three main dimensions could help address these constraints. First, to develop an integrated evaluation process of digital infrastructure rollout and quality, especially in rural and small urban areas, through the use of key performance indicators, and regular data collection from both operators and end-users. Second, to develop high-speed networks financed by local governments or public bodies, which compensate for market failures where private investments are not deemed profitable. Finally, to develop systematic data collection on business use and needs in relation to the digital transformation, and feed it into the policy-making cycle.

Improve competition in and investment attractiveness of the telecom sector

Highly concentrated with a regulatory environment favouring incumbents, the telecom market is difficult to enter for new operators, and access to infrastructure and tariffs remain highly variable for smaller last-mile connectivity providers. In addition, the sector suffers from a lack of investments to develop next generation digital infrastructures. This weighs even heavier for smaller operators, which do not benefit from dedicated investment support measures despite being an essential link in densifying networks.

While the demonopolisation of the telecom market has started, best practices from OECD countries show that the single most important pro-competitive reform is the creation of an independent economic regulator. Kazakhstan could benefit from the creation of such an agency with an autonomous and sufficient budget, a clear mandate, and staffing rules that prevent from undue influence. An investment attraction strategy with targeted financial and regulatory investment incentives could help prepare for the deployment of next generation communication networks, and further streamline the investment environment for infrastructure.

Adapt the regulatory and policy framework for firms to new digital challenges

Finally, while efforts have been made to adapt the legal and policy framework for firms to new challenges created by the digital age, the pace of change remains too slow and scattered to support firms in their digital transformation. This is true on content, but also on the process, where frequent and partial amendments to laws are creating additional complexity for firms. A regulatory review in consultation with the private sector to update all laws relevant to the digital transformation of firms, starting with data protection and IPR would be an important step towards improving their framework.

In addition, despite recent cyber security policies, the digital culture of businesses remains low across the country, while cyber security threats have been on the rise over recent years and firms remain poorly equipped to manage them. Only a few digital security management initiatives exist, primarily private sector driven and coming at a considerable cost, especially for small firms. Kazakhstan needs to develop public tools to raise both the awareness and capacity of firms to manage their digital security risks, by expanding a targeted advisory and training offer. We also suggest developing preferential access schemes to these services, for instance through cost-sharing options to ensure the widest reach of these initiatives.

Table 5.1. Suggested implementation timeline

Recommendations	Indicative implementation timeline		
	Short-term <1 year	Medium-term 1-3 years	Long-term >3 years
Address the remaining digital quality and connectivity gaps			
Mobilise the regional public sector to improve the quality and coverage of internet networks			
Develop data-driven policy for digital services and infrastructure rollout			
Improve competition in and investment attractiveness of the telecom sector			
Set-up an independent national regulator for the telecom sector			
Develop an investment attraction strategy for next generation communication networks			
Adapt the regulatory and policy framework for firms to new digital challenges			
Strengthen the legal and policy frameworks for digital IPR and data protection			
Develop targeted tools for firms on digital security risk awareness and management			

Source: OECD analysis (2022).

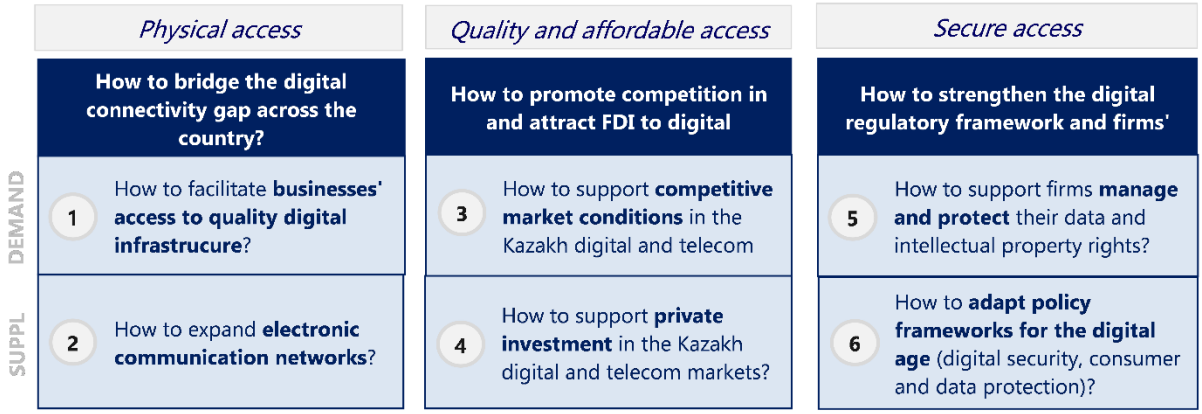
Annex A.Methodology

Overview of the OECD monitoring framework

In the framework of the Central Asia Competitiveness IV Project co-financed by the European Union, the OECD ECP and the government of Kazakhstan established an OECD-led Public-Private Working Group, co-chaired by the Ministry of Digital Development, Innovation and Aerospace Industry to review framework conditions for the digital transformation of the private sector in Kazakhstan. The Working Group (WG) brought together representatives from the government of Kazakhstan, SMEs, business associations, and other development partners. The OECD ECP, with contributions from international experts and peer reviewers from OECD member countries, carried out analysis, data collection and consultations with stakeholders in Kazakhstan to assess and develop recommendations for institutions and policies needed to support the strengthening of framework conditions for the digital uptake of firms in Kazakhstan following the "Digital Kazakhstan" strategy.

The note built on the extensive corpus of OECD work on digitalisation and SMEs, and developed a country-specific assessment for Kazakhstan. The analysis focused on three main elements for ensuring sound framework conditions for private sector digitalisation: (i) the remaining digital connectivity gap across the country, (ii) the state of competition and investment attraction in the telecom sector, and (iii) the state of digital security and data protection for firms. For each dimension, the OECD has assessed the current state, identified challenges and priority areas for policy action, and discussed possible drivers for implementation.

Figure A A.1. Analytical framework for the peer-review on framework conditions for the digital transformation of the private sector in Kazakhstan



Source: OECD analysis (2022).

The peer-review exercise relied on a continuous dialogue between the OECD, the government of Kazakhstan, the private sector, and international partners, including through working group meetings(Table A A.1) and several bilateral consultations in 2022. In particular, the OECD has used a

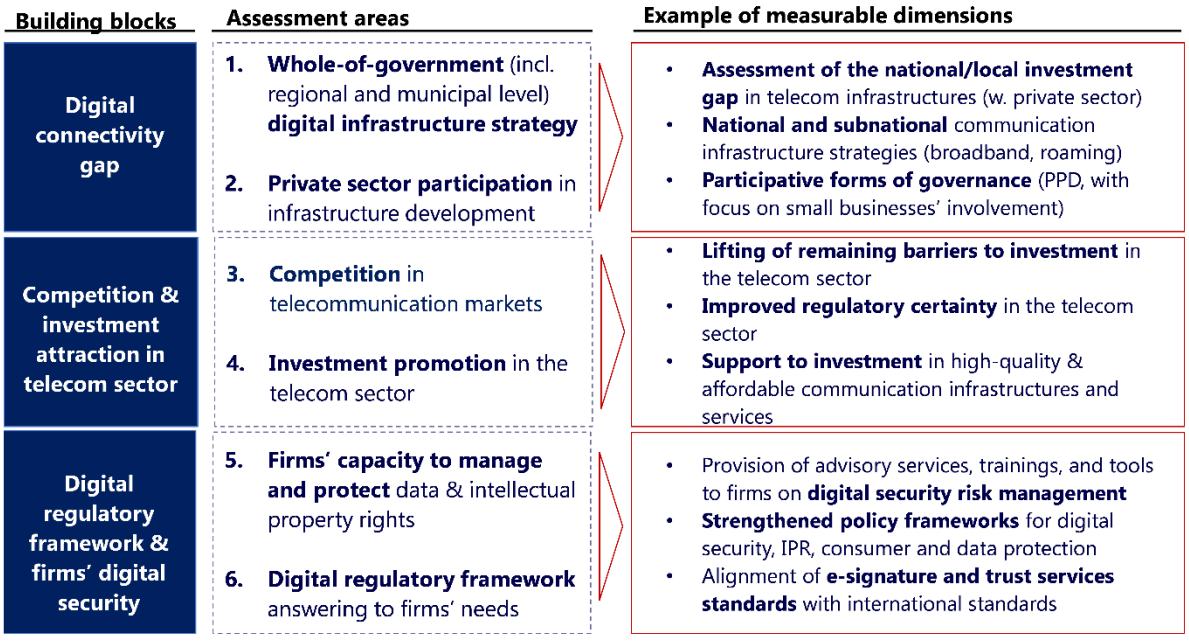
series of questionnaires, data requests and collection, analysis of existing surveys and interviews, to collect data and information.

Table A A.1. List of OECD public-private working group meetings

Agenda of meetings	Key participants	Date
First WG: Launch event and discussion of methodology, initial findings and priorities	Ministry of Digital Development, Innovation and Aerospace Industry, Economic Research Institute, Digital Kazakhstan Association, Astana International Financial Centre, Atameken, Kazakh Invest, Estonian Association of Information Technology and Telecommunications, World Bank, ITC, EBRD	7 Avril 2022
Second WG: Discussion of preliminary findings		25 May 2022
Third WG: Discussion of final assessment and draft recommendations		21 September 2022

The assessment framework is the central tool for the OECD peer-review, and to suggest recommendations based on measurable policy actions. Each of the three dimensions of the framework have been broken down into several measurable policy areas.

Figure A A.2. Example of policy dimensions used in the OECD peer-review analysis



Source: OECD analysis (2022).

For each policy dimension, data has been collected using desk research, questionnaires (see below) and interviews with key stakeholders from the public and private sector in Kazakhstan Table A A.2) as well as with actors from the development community, the international business sector, and key institutions in OECD countries. Complementing the interviews, detailed questionnaires and data requests have been sent to the Ministry of National Economy, the Ministry of Digital Development, Innovation and Aerospace Industry, the Ministry of Industry and Infrastructure Development, the Ministry of Agriculture, the Ministry of Trade and Integration , QazTrade, the National Association for Communication and Digitalisation, the National Telecommunication Association of Kazakhstan, the Association of Television and Radio Broadcasting Operators of the Republic of Kazakhstan, the Digital Kazakhstan Association, the Agency for Protection and Development of Competition of Kazakhstan (Department of Transport and Communication), Kazakh Invest, DAMU Entrepreneurship Development Fund, the Economic Research

Institute, Atameken, the International Chamber of Commerce of Kazakhstan, the Astana International Financial Centre, and Zerde, the National Infocommunication Holding.

Table A A.2. Selected list of interviews conducted by the OECD during the 2022 peer-review

List of interviews conducted with key public and private stakeholders in Kazakhstan

Institution	Date
Association of Television and Radio Broadcasting Operators of Kazakhstan	21 April 2022
Digital Kazakhstan Association	21 April 2022
Astana International Financial Centre (Technical Hub)	21 April 2022
Zerde National Infocommunication Holding	21 April 2022
Atameken and International Chamber of Commerce of Kazakhstan	22 April 2022
DAMU Entrepreneurship Development Fund	22 April 2022
Kazakh Invest	22 April 2022
Baiterek Holding	22 April 2022
Economic Research Institute	25 April 2022
Ministry of National Economy	25 April 2022
Agency for the Protection and Development of Competition of Kazakhstan (Department of Transport and Communications)	25 April 2022
Ministry of Agriculture	25 April 2022
QazTrade	26 April 2022
Ministry of Trade and Integration	26 April 2022
Ministry of Industry and Infrastructure Development	26 April 2022
Information Security Committee	26 April 2022
Ministry of Trade and Integration	11 May 2022
Ministry of Trade and Integration (Digitalisation Department)	11 May 2022
Ministry of Digital Development, Innovation and Aerospace Industry (Counsellor to the Minister)	11 May 2022
Ministry of Justice	11 May 2022

This draft report has been peer reviewed and endorsed in the OECD Eurasia Competitiveness Roundtable in March 2023, a policy network that brings together high-level representatives and technical experts from Eurasia countries, OECD members and partner organisations.

OECD questionnaire addressed to the Ministry of Digital Development, Innovation and Aerospace Industry of Kazakhstan to support the peer-review on framework conditions for the digital transformation of the private sector

Box A A.1.Background

The OECD, with the financial support of the European Union, has launched a peer review on framework conditions for the digital transformation of the private sector in Kazakhstan.

As the Digital Kazakhstan Strategy launched in 2017 is set to end this year, the review will support the government in addressing the remaining gaps in the framework conditions for the digital uptake of firms in Kazakhstan. Three main dimensions will be considered: (i) bridging the digital connectivity gap across the country, (ii) improving competition and attracting investment in the telecom sector, and (iii) strengthening digital security and data protection for firms. The OECD will assess and develop recommendations for institutions and policies needed to support the digital transformation of Kazakh firms.

A draft version of the peer-review note will be discussed at Ministerial level during the OECD Eurasia Competitiveness Roundtable at OECD Eurasia Week in June 2022, and the final report launched.

Box A A.2. Glossary

Digital Strategy

A national policy or agenda across several Ministries to develop a country's digital economy and society.

Policy or sector-specific strategy

A course or principle of action adopted or proposed by the government or the legislature. This includes sector-specific strategies such as digital security strategy, IoT strategy, etc.

Policy instruments

Direct financial support (e.g., grants, vouchers, etc.)

Indirect financial support (e.g. tax relief, preferential loans, etc.)

Please attach source documents (English or Russian) and provide hyperlinks, if available.

Institutional and policy framework on digitalisation for businesses

On the national digital strategy

1. Does Kazakhstan have a **National Digital Strategy** (NDS)?
    - Key policy objectives
    - Details on budget and time frame
    - Previous NDS (if any) and results?

2. Is the **NDS**:
    - A standalone strategy
    - Part of a broader national strategy (e.g. innovation strategy).
    - The digital economy objectives and planned policy actions are scattered across multiple policy documents (e.g. SME development strategy, ICT strategy, broader economic development strategy)

3. What are the **main policy objectives** of your NDS? (Please consider all relevant strategies when identifying digitalisation priorities and planned policy actions).
   Please rank priority from 1 (low) to 10 (high), and provide details on the ensuing policy actions.
    - Develop telecommunication infrastructure
    - Enhance internet governance
    - Promote digital uptake by individuals
    - Promote digital uptake by businesses
    - Enhance digital government
    - Foster innovation in digital technologies
    - Develop skills for digital transformation
    - Enhance data governance
    - Improve digital security
    - Enhance consumer protection online
    - Other not mentioned

4. Does Kazakhstan adopt **guidelines/standards/formal or legal requirements** for the following digital government domains? (Yes/No)
    - Digital signature
    - Digital identity
    - Cybersecurity
    - eProcurement
    - Interoperability
    - Open data
    - Data sharing and re-use
    - Digital inclusion
    - Once only principle
    - Digital by design services

5. Does Kazakhstan's NDS set **targets**?
    - Please provide details on the targets / indicators / baseline / current state

On the institutional framework

6. Which **institutions, actors, mechanisms** are responsible for the following:
    - Lead the development of NDS
    - Contribute inputs to NDS
    - Co-ordinate implementation of NDS
    - Implement NDS
    - Monitor implementation of NDS
    - Evaluate NDS

7. How do you ensure **co-ordination among different bodies for the development and implementation** of the NDS?

8. Is there a **budget** associated with your NDS?
    - Yes No
    - Please provide details on the budget (planned, allocated, or spent, as applicable) and time frame

9. Could you provide us an overview of the **current institutional landscape** (names and mandates of responsible ministries and agencies)? In particular:
    - Which institution(s) is (are) in charge of the **development** of national and subnational (e.g., regional/ municipal, etc.) communication infrastructure strategies?
    - Which institution(s) is (are) in charge of the **implementation** of national and subnational communication infrastructure strategies?
    - Which institution(s) is (are) in charge of the **monitoring** of national and subnational communication infrastructure strategies?
    - Could you detail the mandate and work plan, in particular pertaining to digitalisation of businesses and SMEs, of **DAMU Entrepreneurship Development Fund**?
    - What is the role and mandate of the **Ministry of Digital Development, Innovation and Aerospace Industry** in relation to digitalisation support for businesses?
    - How does the Ministry of Digital Development, Innovation and Aerospace Industry co-ordinate work with other agencies and ministries:
        - With the Ministry of Industry and Infrastructural Development for digital infrastructure?
        - With the Ministry of National Economy for digital support to businesses?

10. What is the role and co-operation with **Atameken and other business associations**?
    - Has the private sector been consulted during the development and implementation of the *Digital Kazakhstan Strategy* (NDS)?
    - Does the implementation plan of the NDS include formal **public-private dialogue** (**PPD) mechanisms?**
    - Are there formal **PPD mechanisms** on digital topics for businesses, for example with the Chamber of commerce and Industry?
    - Do **Atameken or other business associations** identify businesses needs in relation to digital infrastructure (accessibility, use, quality, affordability)?

Digital uptake of businesses under the recovery package

11. Did your country adopt digital government solutions to improve services to businesses in response to the Covid-19 pandemic? If yes:
    - Could you provide us with an updated overview of all **support measures taken during the COVID-19 pandemic to support business (and especially SMEs) move their activities online**?

- Could you detail us (if any) the **measures that were planned/implemented to support companies going digital** under the 2020-2021 recovery plan? What is the foreseen **timeline**? Which **agencies/ Ministries** will be in charge of planning and implementation?

Digital connectivity

12. Does Kazakhstan have (a) **national connectivity plan(s)** (e.g., a national broadband plan / policy to develop high-speed access network)? If yes, please specify:
    - Name
    - Main objectives
    - Budget and time frame
    - Does the plan include:
        - Government investment in infrastructure?
        - Fiscal incentives to providers of broadband networks?
        - Specific provisions regarding the deployment of fibre and/or 5G?
    - Performance targets (e.g. minimum download speed Mbps, % of population/businesses/schools/rural population covered)
    - Previous plan/strategy (if any) and results?
    - Does the plan include regional/ sub-national connectivity targets?

13. Are **national/local assessments of the investment gap in telecom infrastructures** carried out regularly? If yes:
    - Please indicate the responsible agency(ies)
    - Is the private sector involved in these assessments (e.g., through PPD mechanisms)?
    - Could you please share with us the results of the most recent assessment(s)?

14. Could you please share (*if any*) the **roadmap (strategy) for ICT infrastructure development** in Kazakhstan?
    - *If any*, are regional and municipal (cities) involved in the development of the **roadmap (strategy) for ICT infrastructure**?

15. Is the **private sector taking part in infrastructure development and planning**?
    - If yes, have formal participation mechanisms (PPD, multi-stakeholders discussion mechanisms, etc.) been established?

16. Could you please detail the **roadmap for country-wide broad bandwidth access for businesses** included in the *Digital Kazakhstan* programme?
    - Could you please share **data on the evolution of bandwidth coverage and access** for firms since 2018?

17. Could you please detail the **roadmap for country-wide 4G cellular network coverage** as part of the *Digital Kazakhstan* programme?
    - Could you please share **data on the evolution of 4G coverage and access for businesses since 2018**?

18. Could you please detail the **ICT cluster strategy** as part of the *Digital Kazakhstan* programme?
    - Could you please detail the **network infrastructure and platforms**, and the **advisory services** clusters offer to participating firms?
    - Could you please share **data** on the number of clusters, the number of participating firms (large and SMEs), the services provided?
    - Can you share with us, *if any*, the **results of surveys of business use and assessment of services offered in these clusters**?

Use of digital technologies by businesses

19. What are the main government initiatives / programmes promoting SME digitalisation in Kazakhstan?

- Name of the initiative
- Launch year
- Objectives
- Main activities
- Impact

20. Does Kazakhstan have policies to **promote the use of digital technologies by businesses** (e. g. ICT goods, software, cloud computing, Artificial Intelligence, big data, e-commerce, etc.)?
    - Yes/No
    - Please provide details on the policies:
        - Description
        - Objectives
        - Implementing/ responsible body
        - Are these initiatives described in official government policy documents? If yes, could you please share relevant links and documents?
    - Which of the policy instruments below apply to the policy described above?
        - Direct financial support (e.g. vouchers for the purchase of ICT goods or services, grants for ICT-related R&D, etc.)
        - Indirect financial support (e.g. tax incentives on ICT investment, loans at a prefer ential rate, etc.)
        - Nonfinancial support (e.g. training on digital technologies, business information, c ounselling, trade shows, etc.)
        - Regulations and statutory guidance (e.g. e-invoice standards, e-payment regulations, data authority, etc.)

21. Are there other **initiatives led by non-government actors** to promote digitalisation of SMEs? (incubators, accelerators, clusters, centres of competence, innovation centres). Please provide detail on the following:
    - Name of the initiative
    - Launch year
    - Objectives
    - Main activities
    - Impact

Improving competition and attracting foreign direct investment (FDI) in the telecom sector

On the regulatory framework

22. Does Kazakhstan have an independent **National Regulation Authority (NRA) for the telecom sector**? If yes:
    - Please detail its mandate, staffing and budget
    - How does the NRA work with the Competition Authority of Kazakhstan?

23. Does Kazakhstan have a **specific legal/regulatory framework for the telecom and digital sector**? If yes:
    - What are its main features?
    - What provisions does it include?

24. What are the **main legal/ regulatory provisions an investor willing to invest in communication networks must abide by**? Please detail.

25. Is **information about public assets in the telecom sector** publicly available? Yes/No. Please detail.

26. Does Kazakhstan have a **regulatory framework for public-private-partnerships (PPPs)** in the telecom infrastructure sector? Yes/No. Please detail.

27. Does Kazakhstan have/ provide **specific programmes and/or subsidies for the development of telecom infrastructure networks in rural and/or remote areas**?

On support to investment

28. Has the government set out **specific measures to boost competition and to drive infrastructure rollout** (e/g., broadband or fibre) in the digital telecom sector?
    - *If any*, please detail the measure(s).

29. Has Kazakhstan developed **measures to encourage investment** in high-quality and affordable communication infrastructures and services? If yes:
    - Please detail the measure(s).
    - Is it carried out through Kazakh Invest? If not, please indicate the responsible agency(ies).

30. Does Kazakhstan provide **state aid** for investment in broadband deployment?
    - *If any*, please detail the measure(s).

31. Does Kazakhstan allow or **infrastructure sharing for communication networks**? Yes/No. Please detail.

32. Does Kazakhstan allow or encourage for **co-investment, or "joint deployment" of broadband networks**? Yes/No. Please detail.

33. Has Kazakhstan developed (or intends to develop) a **plan to ease the legal/ regulatory requirements and measures** for investment in communication infrastructures (e.g., no investor screening, simplified permit granting procedures, reduced approval and construction times, etc.)? Yes/No. Please detail.

Strengthening digital security and data protection for firms

34. Does DAMU, or another agency:
    - Offer **training programmes** to entrepreneurs and SMEs employees on **digital security risk management**? Do quality labels and/or certification mechanisms for such trainings exist?
    - Offer **advisory services** to businesses on **digital security risk management**? If yes:
        - Is the staff of the agency providing **directly advisory and training services or are they outsourced to private advisors**?
        - How is the advisory staff in dedicated agencies hired and trained?
        - Has a **network/ observatory of advisory services** been set-up to provide advice and tailored training services at the request of individual companies?
            - If yes, who is in charge of the network?
            - Is it free of charge?
        - **How many** SMEs/ firms have benefitted from advisory and training services over the past years?
        - Does a programme of **advertising and outreach** regarding the advisory and training services offered by the relevant agencies exist? (e.g., a "single window")?
    - Provide **financial support** (grants, vouchers, subsidised loan programmes, etc.) to entrepreneurs and SMEs to reinforce their digital security risk management (e.g., trainings, digital equipment, etc.)?
    - Conduct regular consultations and surveys on the **digital security risk faced by the private sector**?

On digital security

35. Do you have a **national digital security strategy for businesses** or plan to introduce one? If yes, please specify:
    - Name
    - Main objectives

- Budget and time frame
- Does the plan include:
  - Main pillars
  - Previous plan/strategy (if any) and results?

36. What other policy initiatives does your country have regarding **digital security and risk management for businesses**?
    - Legal framework/regulations – if yes, do they cover:
    - Phishing/spam/malware
    - Cybersquatting/bad faith in user registration/CEO fraud
    - Awareness-raising activities (if yes, please specify)
    - Trainings (if yes, please specify)

37. Who is responsible for **designing and implementing cybersecurity policies**? Please detail.

38. What are the **initiatives** (bilateral, regional, and international) to foster co-operation on cybersecurity issues?

39. Could you please detail the **"cyber shield"** policy:
    - Main objectives
    - Budget and time frame
    - Does the plan include:
      - Main pillars
      - Previous plan/strategy (if any) and results?

On data and intellectual property rights (IPR) protection

40. Does Kazakhstan have a **legal/regulatory framework for e-commerce**? If yes:
    - What are its main features?
    - What provisions does it include on e-payments?

41. Does Kazakhstan have a **legal/regulatory framework for online data protection**? If yes:
    - What are its main features?
    - What provisions does it include on e-payments?

42. Has Kazakhstan a specific **legal/regulatory framework for online IPR protection**? If yes, what are its main features?

43. Are businesses using an e-commerce platform legally obliged to comply with a **legal framework on online consumer protection and/or with online information disclosure rules**?

44. Does a **supervisory authority** monitor:
    - E-commerce platforms that process personal data? (please specify)
    - Compliance with the regulatory framework on data protection (*if any*)?

45. What **legal/regulatory framework and/or standards does Kazakhstan have for trust services** (e.g., e-signatures)?
    - What are their main features?
    - What provisions does it include on e-payments?
    - Are they aligned with international standards?

46. Does your country have **dedicated regulations on advanced technologies** (e.g. AI, blockchain, big data, IoT, etc.)? If yes, what is the main goal of these regulations?

47. What are the co-operation initiatives (bilateral, regional, international) to foster regulatory harmonisation on these topics? Please specify.

Improving Framework Conditions for the Digital Transformation of Businesses in Kazakhstan

In recent years, Kazakhstan has developed a comprehensive digital government system and begun to create the legal and regulatory conditions for the digital transformation of the country's economy. The digitalisation of the private sector requires further improvements in framework conditions, such as reliable access to broadband services, quality and affordability of networks, and digital security for businesses.

Based on recent OECD work on digital framework conditions, this report examines the legal and operational environment that is holding back the digital transformation of private firms in Kazakhstan. The report suggests three sets of actions: (1) addressing the remaining Internet quality and connectivity gaps, notably by mobilising the regional public sector to improve the quality and density of networks, and by expanding the inclusion of the private sector in the policy-making process; (2) improving competition in, and the investment attractiveness of, the telecom sector by setting-up an independent national telecom regulator, and by developing a targeted investment attraction strategy to prepare for deployment of next-generation communication networks; and (3) adapting the regulatory and policy framework for firms adapting to new digital challenges and raising their awareness of digital security.

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