MINISTRY OF ECONOMY AND FINANCE OF THE REPUBLIC OF UZBEKISTAN

UNDP

DIGITAL ECONOMY OF UZBEKISTAN

The State of Digital Entrepreneurship and Artificial Intelligence

The study is conducted within the framework of the joint project of the Ministry of Economy and Finance of the Republic of Uzbekistan and the United Nations Development Programme (UNDP) "Empowering the Youth to Embrace the Digital Economy and Digital Entrepreneurship," financed by the Swiss Agency for Development and Cooperation (SDC).

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FOREWORD

Ilhom Norkulov

First Deputy Minister of Economy and finance of the Republic of Uzbekistan

On behalf of the Ministry of Economy and Finance of the Republic of Uzbekistan, I would like to express my sincere gratitude to all the partners and contributors involved in the development of the report titled "Digital Economy of Uzbekistan: The State of Digital Entrepreneurship and Artificial Intelligence." This report was produced under the framework of the UNDP joint project "Empowering the Youth to Embrace the Digital Economy and Digital Entrepreneurship," with the invaluable support of the Swiss Agency for Development and Cooperation.

Uzbekistan's digital economy is advancing rapidly, with the Information and Communications Technology (ICT) sector increasingly playing a pivotal role in driving GDP growth in recent years. The Digital Uzbekistan – 2030 Strategy is serving as a catalyst for substantial investments in digital infrastructure and e-government services. Nonetheless, several challenges remain, including limited digital literacy in rural areas, an underdeveloped ICT regulatory framework, and low levels of private sector participation.

This report underscores the necessity of addressing these gaps, fostering inclusive digital growth, and supporting small and medium-sized enterprises (SMEs), women entrepreneurs, and rural communities. The digital entrepreneurship ecosystem in Uzbekistan is expanding, particularly in fintech; however, sustainable growth will require more robust support systems and enhanced gender diversity.

We look forward to further strengthening this collaboration between Uzbekistan and UNDP, together with all our esteemed partners, as we continue to advance decent work, sustainable livelihoods, and an inclusive digital economy that ensures no one is left behind.

Akiko Fujii

Resident Representative
United Nations
Development Programme
(UNDP) in Uzbekistan

On behalf of the United Nations Development Programme (UNDP) in Uzbekistan, I would like to extend our sincere gratitude to all those who contributed to the preparation of this report. This study was conducted within the framework of the UNDP project "Empowering the Youth to Embrace the Digital Economy and Digital Entrepreneurship," with the generous financial support of the Swiss Agency for Development and Cooperation.

We would like to express our deepest appreciation to the Ministry of Economy and Finance, the Ministry of Digital Technologies, and the Digital Economy Research Center (DERC) for their invaluable support throughout this study. Their collaboration has been crucial to the success of this comprehensive research, providing essential support, insights, and access to data that enabled a rigorous and meaningful analysis.

We would also like to acknowledge the contributions of UNDP expert Ms. Eileen Trenkmann, who was responsible for the development of the research, survey questionnaires, and data collection methodology.

This collaborative effort has been instrumental in advancing our understanding of digital entrepreneurship and the broader digital economy in Uzbekistan, and we look forward to continuing our partnership as we work towards a more inclusive and sustainable digital future.

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This report was prepared within the framework of the UNDP project "Empowering the Youth to Embrace the Digital Economy and Digital Entrepreneurship" with the financial support of the Swiss Agency for Development and Cooperation. It was prepared by the United Nations Development Programme (UNDP) in Uzbekistan, the Inclusive Growth Cluster.

We extend our deepest gratitude to the Ministry of Economy and Finance, the Ministry of Digital Technologies and the Digital Economy Research Center (DERC) for their invaluable support throughout the study. Their collaboration was instrumental in the successful execution of this comprehensive study, providing us with the essential support, insights, and access necessary to conduct a thorough analysis.

The research, survey questionnaires and data collection methodology were prepared by UNDP expert Ms. Eileen Trenkmann.

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ABBREVIATIONS

ADB	Asian Development Bank
ADSL	Asymmetric Digital Subscriber Line Technology
AI	Artificial Intelligence
API	Application Programming Interface
B2B	Business-to-Business
B2C	Business to Consumer
B2G	Business-to-Government
CAGR	Compound Annual Growth Rate
CCA	Central Asia and Caucasus
CDGAE	Government Delegate Commission for Economic Affairs
CRM	Customer Relationship Management
C2C	Consumer-to-Consumer
EBRD	European Bank for Reconstruction and Development
ERP	Enterprise Resource Planning
EU	European Union
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
GII	Global Innovation Index
GIZ	Gesellschaft für Internationale Zusammenarbeit GmbH
GNI	Gross National Income
GP	General Partners
GPU	Graphic Processing Units
GVA	Gross Value Added
ICT	Information and Communication Technologies
IT	Information Technology
IP	Intellectual Property
ITU	International Telecommunication Union
KOICA	Korea International Cooperation Agency
KPI	Key Performance Indicators
LLaMA	Large Language Model Meta AI
LLM	Large Language Model
MDT	Ministry of Digital Technologies
MID	Ministry of Innovative Development
MIIT	Ministry of Investments, Industry and Trade

ML	Machine Learning
MoIT	Ministry of Industry and Technology
MoU	Memorandum of Understanding
NAPP	National Agency of Perspective Projects
NCAI	National Council for AI
NGO	Non-Governmental Organisation
NLP	Natural Language Processing
OECD	Organisation for Economic Co-operation and Development
ROI	Return on Investment
R&D&I	Research, Development and Innovation
SAFE	Simple Agreements for Future Equity
SDG	Sustainable Development Goals
SME	Small and Medium Enterprises
SOE	State-owned Enterprises
STEM	Science, Technology, Engineering and Mathematics
SWOT	Strengths, Weaknesses, Opportunities and Threats
TUIT	Tashkent University of Information Technologies
UI/UX	User Interface/User Experience
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VAT	Value Added Tax
VC	Venture Capital
VET	Vocational Educational Training
WIPO	World Intellectual Property Organisation
WIUT	Westminster International University in Tashkent

1. EXECUTIVE SUMMARY

Economy of Uzbekistan

Uzbekistan has maintained stable growth since 2017, driven by economic reforms that liberalised markets and improved governance. In 2023, Gross Domestic Product (GDP) grew by 6%, fuelled by strong external demand, rising consumption, and investment. However, the current account deficit widened due to higher imports and reduced remittances linked to the Russian Ruble's depreciation. The government aims for upper-middle-income status by 2030, requiring 10% annual GDP per capita growth.

Uzbekistan's economy remains dependent on natural resource exports, particularly gold. The service sector continues to expand, increasing its Gross Value Added (GVA) from 41.6% to 43.4%, with information and communications services experiencing the highest growth at 24.2%. The labour market reflects these shifts, with the highest employment growth in percentage recorded in the information and communications sector and support services.

Despite these developments, Uzbekistan still struggles with a slow rate of new business creation and state-owned enterprises (SOEs) dominance. Recent privatisation efforts, such as the February 2024 reform, aim to reduce state control and boost investment. Environmental sustainability is also a concern, with inefficient water use in agriculture and natural gas mismanagement threatening long-term stability. To sustain progress, Uzbekistan must deepen reforms, strengthen the private sector, and invest in human capital and sustainable development.

Digital Economy

Uzbekistan's digital economy has experienced significant growth, with the Information & Communication Technology (ICT) sector contributing 2.1% to GDP in 2023. By 2024, the number of companies operating in the information and communication sector reached 10,551. The IT Park, a key driver of industry development, now hosts over 2,500 companies, with ICT exports more than doubling from USD 140 million in 2022 to USD 344 million in 2023. However, the country continues to rank low globally in ICT service exports and imports, reflecting its limited international competitiveness.

The government is advancing digital transformation through the "Digital Uzbekistan – 2030 Strategy", allocating USD 2.5 billion to digital infrastructure. E-government services have expanded, placing Uzbekistan 57th globally, yet adoption rates remain low. The digital divide persists, particularly in rural areas, where internet access and digital literacy are limited. While mobile internet penetration is increasing, 4G coverage remains concentrated in urban areas. Despite these efforts, the ICT regulatory environment remains underdeveloped, as reflected in Uzbekistan's 133rd ranking out of 134 countries in the Network Readiness Index (2023).

The ICT sector has seen notable workforce expansion, with employment rising from 62,200 in 2020 to 87,800 in 2023. Information Technology (IT) education is also growing, with 21 universities and 14 foreign-affiliated programmes offering ICT degrees, yet women account for only 11% of IT students. Initiatives such as "One Million Uzbek Coders" have enhanced digital skills, but a shortage of experienced professionals – particularly senior specialists – remains a challenge. A 2021 IT Park survey found that 62% of companies faced difficulties in hiring IT specialists, citing a lack of qualified candidates, insufficient practical experience, high salary expectations, and high turnover rates.

Digitalisation in Uzbekistan's business sector is progressing, though unevenly. Many firms face challenges related to data accessibility, awareness, and resource allocation, limiting broader adoption. However, the COVID-19 pandemic accelerated digital transformation, with 51.2% of firms adopting or expanding digital platforms in 2021 – the second-highest rate among 79 economies analysed. Digitalisation has been led by the banking and financial services sector, which remains predominantly state controlled. Private firms have only recently started investing in digital technologies, focusing primarily on basic functions.

To sustain digital progress, Uzbekistan must accelerate SOE privatisation, expand high-quality internet access – particularly in underserved areas – and enhance digital governance. Strengthening private sector participation by supporting SMEs, improving digital and financial literacy – especially in rural communities and among women – and aligning IT education with industry needs will be critical to fostering a more inclusive and competitive digital economy.

Deep Dive: Digital Entrepreneurship Ecosystem

Uzbekistan's digital entrepreneurship ecosystem is expanding, with fintech emerging as the leading sector. Since 2018, the number of start-ups in Central Asia has grown sixfold, exceeding 6,000 by 2023, with Uzbekistan accounting for approximately 1,200. However, only 50 to 100 of these start-ups operate sustainably. Women remain significantly underrepresented, comprising just 2% to 5% of founders.

Despite various government strategies, decrees, and resolutions aimed at fostering start-up growth, the ecosystem continues to face challenges, including limited funding, inadequate mentorship, and a shortage of skilled talent. Government-backed organisations provide critical support, yet venture capital (VC) remains in its infancy, with total investment doubling to USD 6.3 million in 2023 but still lagging behind regional peers such as Kazakhstan, which secured USD 80 million in 2024. Regulatory gaps persist, with no comprehensive Start-up Law, minimal tax incentives for investors, and the absence of a legal framework for alternative financing mechanisms such as crowdfunding and convertible loans.

The broader support ecosystem is expanding but remains fragmented. Organisations such as IT Park, C-Space, Plug and Play, and Startup Garage provide valuable resources, yet many start-ups are either unaware of these programmes or have not engaged with them. University-based incubation efforts are underdeveloped, while corporate involvement is minimal. A recent resolution aims to encourage corporate venture engagement, but participation is largely restricted to SOEs with over 50% government ownership.

A survey of Uzbek start-ups revealed that most are in early-stage development, with 55% operating for 1-3 years. 70% cite funding as their top challenge, followed by customer acquisition (40%) and scaling (35%). Despite their tech focus, start-ups prioritise business and financial skills over technical expertise. Most Uzbek start-ups are bootstrapped (50%). Regulatory hurdles, including complex tax processes, further hinder growth. 45% operate regionally or globally, but finding international customers remains difficult with more support needed for internationalisation. Despite these obstacles, 85% of start-ups express optimism about Uzbekistan's digital future.

To ensure sustainable growth, the government must enhance access to funding, improve mentorship and access to incubation programmes, introduce tax incentives for investors, and strengthen support for international expansion. Developing regional innovation hubs, and implementing alternative financing mechanisms will be crucial to fostering a dynamic and competitive digital economy.

Entrepreneurship Law Uzbekistan

Uzbekistan currently lacks a dedicated Entrepreneurship Strategy or Start-up Law, relying instead on a fragmented framework of policies, decrees, and resolutions. In contrast, Spain and Nigeria have established comprehensive Start-up Laws that foster a structured and holistic approach to start-up ecosystem development. Uzbekistan could benefit from adopting best practices from these countries by incorporating the following key provisions into a dedicated Start-up Law:

- **Define sector priorities** by integrating Spain's broad sectoral approach and Nigeria's focus on digital transformation, aligning with national economic goals and emerging technologies such as AI.
- **Establish a formal start-up labelling and certification system** to enhance transparency, provide structured incentives, and grant official recognition, potentially anchoring the process within IT Park.
- **Expand tax benefits and investment incentives**, such as capital gains tax exemptions and investment loss relief, to local and foreign investors.
- **Strengthen the legal framework and improve access to alternative financing instruments**, such as crowdfunding, convertible loans, and SAFE notes.
- **Develop a structured public procurement framework** to facilitate start-up participation in government contracts.
- **Attract international incubators and accelerators** by offering incentives for them to establish operations in Uzbekistan and bring global expertise.
- **Introduce sector-specific regulatory sandboxes** that enable start-ups to test emerging technologies in a controlled environment.
- **Implement phantom shares as an employee incentive mechanism** with tax benefits to help start-ups retain top talent.
- **Broaden Uzbekistan's start-up investment matching fund** to include local funds and investors, rather than limiting it to large foreign funds with high capital thresholds.
- **Establish a dedicated fund for start-up ecosystem development** to provide direct financial support to technology labs, incubators, and accelerators.
- **Strengthen regional entrepreneurship hubs** through public-private partnerships to ensure equal access to innovation support.
- **Create a National Network of Entrepreneurship Centres** to foster collaboration, knowledge sharing, and industry partnerships.
- **Enhance talent development and university-based incubation programmes** to bridge the gap between academia and entrepreneurship.
- **Introduce paid leave provisions for researchers and educators** to encourage academic entrepreneurship and knowledge transfer.
- **Develop a national research and innovation database** to facilitate collaboration between researchers and start-ups.
- **Integrate compulsory entrepreneurship education** into university and vocational training curricula, particularly in regional institutions.
- **Accelerate self-employment support programmes** to promote digital entrepreneurship and independent business ventures.

- **Expand trade incentives and improve access to international acceleration programmes** by easing restrictive eligibility criteria.
- **Develop a dedicated platform for start-up internationalisation**, providing market insights, regulatory guidance, and trade opportunities.
- **Enhance Uzbekistan's start-up ecosystem branding and visibility**, including the launch of an English-language investment and start-up portal.
- **Introduce a digital nomad visa** to attract foreign entrepreneurs, remote workers, and investors.
- **Establish a national advisory forum for start-ups** to ensure continuous dialogue between policymakers, investors, and entrepreneurs.

Deep Dive: Artificial Intelligence (AI) Landscape

Uzbekistan is poised to harness the transformative power of AI, with projections estimating a USD 10 billion contribution to GDP and the creation of over 430,000 jobs by 2030. While many Central Asian countries lack national AI strategies, Uzbekistan launched its first AI Strategy in October 2024, positioning itself between risk-based regulatory models like the European Union's (EU) AI Act and more flexible approaches seen elsewhere. The adoption of the new AI Strategy has enhanced Uzbekistan's ranking in the Government AI Readiness Index, rising from 87th in 2023 to 70th in 2024. Moving forward, the country aims to strengthen AI development through policy reforms, infrastructure investments, sectoral integration, and capacity building. Key targets include achieving USD 1.5 billion in AI-driven software and services by 2030 and securing Uzbekistan's position among the top 50 countries in the Government AI Readiness Index.

A significant barrier to AI development in Uzbekistan is the lack of high-performance computing infrastructure. While data centre capacity has expanded in recent years, the country remains without the supercomputing capabilities necessary for advanced AI training and research. Recent investments, such as a strategic partnership with Saudi Arabia's DataVolt to establish green AI data centres, are intended to address this gap. Additionally, the government intends to establish supercomputing laboratories across multiple universities. However, data accessibility remains limited. Although open data initiatives have expanded, many datasets remain incomplete and lack analytical tools to maximise their utility. To improve data usability, the Ministry of Digital Technologies (MDT) is developing data lakes to aggregate large volumes of raw data, with 100 priority AI models identified for implementation.

In the area of AI education and research, Uzbekistan has made significant progress, with 16 higher education institutions now offering AI programmes, compared to just four a few years ago. The number of doctoral programmes in AI has also grown, yet a critical skills gap persists, hindering widespread AI adoption across both public and private sectors. In terms of AI research output, Uzbekistan ranked 70th out of 134 countries in 2023, placing it in the middle tier globally. To strengthen its AI ecosystem, Uzbekistan must increase industry-academia collaboration, enhance research funding and infrastructure and expand AI education to drive innovation and competitiveness.

AI adoption in Uzbekistan's private sector is growing, with 57.9% of surveyed businesses reporting that they have integrated AI into their operations, primarily in content creation, sales, and customer engagement. However, AI adoption is uneven, with many companies struggling due to a lack of skilled personnel (57.9%), data quality issues (47.4%), and high implementation costs (36.8%). Additionally, only 26.3% of businesses have sought external

AI consultation, citing cost concerns and a lack of available service providers. Despite these challenges, 79.9% of businesses plan to expand their AI adoption within the next 12 months, focusing on sales, marketing, and customer engagement. However, planned investment levels remain low, with 52.6% of businesses allocating less than USD 10,000 to AI adoption. To accelerate AI integration, the government must incentivise AI research and development (R&D), improve data accessibility, and establish AI consultancy networks.

Moving forward, Uzbekistan must focus on several key areas to ensure the successful implementation of its AI Strategy. Strengthening governance and regulatory frameworks will be crucial, particularly by establishing a dedicated AI oversight body to coordinate policy execution. Expanding AI computing capabilities and upgrading data infrastructure is essential for large-scale AI deployment. Education and workforce development must be prioritised by increasing funding for AI research, expanding doctoral opportunities, and enhancing AI curricula at universities. Additionally, AI adoption in businesses can be accelerated through tax incentives, partnerships between research institutions and private enterprises and direct support for AI-driven innovation. Finally, foreign investment and international collaboration should be further encouraged to position Uzbekistan as a competitive AI hub in the region.

Updated AI Strategy Uzbekistan

Uzbekistan launched its AI Strategy in October 2024, aiming to enhance AI adoption, improve governance, and boost the country's AI readiness ranking. However, several gaps remain in comparison to global best practices. In contrast, Germany, Egypt and Türkiye have established comprehensive AI strategies that foster a structured and holistic approach AI development. Uzbekistan could benefit from adopting best practices from these countries by incorporating the following key provisions into an updated strategy:

- **Align AI strategy with Sustainable Development Goals (SDGs)** to emphasise broader societal impact.
- **Develop robust data standards** to strengthen Uzbekistan's ability to formulate well-informed, evidence-based AI policies.
- **Diversify AI applications beyond state-dominated sectors** by prioritising high-growth sectors such as education and e-commerce.
- **Establish a National AI Ethics Council** or a similar body to oversee responsible AI development and monitor societal impact of AI, similar to Germany's AI Observatory.
- **Strengthen data privacy laws** and align them with global standards like General Data Protection Regulation (GDPR).
- **Develop regulatory sandboxes** to allow controlled testing of AI technologies before large-scale deployment.
- **Expand public-private research** collaborations to accelerate AI commercialisation by strengthening the role of the Digital Technologies and Artificial Research Institute as a multi-stakeholder platform or sector-specific collaboration and research.
- **Encourage private-sector AI adoption** by providing sector-specific financial and structural incentives for businesses, e.g. through voucher schemes.
- **Provide financial incentives and tax benefits for AI start-ups,** similar to Germany's, Egypt's and Türkiye's start-up focused AI initiatives.
- **Create platforms for showcasing successful local AI** solutions to encourage wider adoption.

- **Develop a national AI data strategy** to ensure structured, high-quality, and privacy-compliant data access.
- **Incentivise private-sector participation in data-sharing initiatives** to improve AI training datasets.
- **Promote regional AI infrastructure collaborations**, for instance with Kazakhstan, to share supercomputing resources.
- **Introduce lifelong AI learning programmes** for professionals at risk of job displacement, similar to Türkiye's workforce reskilling initiatives, and offer incentives like tax reductions and grants for employers investing in workforce training.
- **Develop** "**AI for Leaders**" **training** for policymakers to improve AI governance understanding.
- **Develop a standardised AI maturity model** to assess and monitor institutional progress in adopting AI technologies.
- **Develop a repository of AI challenges and use cases, as well as prize-based competitions** to encourage creative solutions for public administration.
- **Organise AI innovation challenges** to encourage public-sector AI adoption, similar to Türkiye's AI competitions.
- **Actively participate in global AI standardisation discussions** to align Uzbekistan's AI regulations with international norms.
- **Implement a multi-stakeholder AI governance model**, incorporating academia, industry, and civil society for continuous strategy refinement.

2. METHODOLOGY

Introduction to the Methodology

This chapter outlines the methodologies used to gather, analyse, and interpret data for the research. It describes the research design, data collection methods, sources, and the approach to data analysis that underpin the findings and recommendations across the different chapters of this report. The research aims to provide a comprehensive analysis of the digital economy with a focus on digital entrepreneurship and AI and their interaction in Uzbekistan, offering insights into their current status, opportunities, challenges, future growth potential, and providing comprehensive policy recommendations based on international best practices.

Research Design

The research employs a mixed-methods approach, combining both qualitative and quantitative data collection and analysis techniques. This approach ensures a holistic understanding of Uzbekistan's digital economy, particularly digital entrepreneurship and AI by drawing on the strengths of both methodologies.

- **Qualitative Approach**: This approach is used to explore and understand the broader context of the digital economy, the digital entrepreneurship ecosystem and the AI landscape. It includes interviews with industry experts, policy makers, government bodies, intermediary and financial organisations, and entrepreneurs, as well as a review of relevant policy documents, reports, studies and strategies.
- **Quantitative Approach**: Quantitative data is used to analyse the performance of the digital economy with a particular focus on digital entrepreneurship and AI. It includes general data on sector growth rates, market size, digital infrastructure indicators (e.g., internet penetration, length of fibre network), digital skills, among others, but also data relevant to the digital entrepreneurship ecosystem and AI landscape. Secondary data sources, including reports from international organisations (e.g., World Bank, International Telecommunication Union (ITU)), national statistics, and industry databases, as well as data collected through surveys of digital start-ups and businesses were utilised for this analysis.

Data Collection Methods

a) Primary Data Collection

Primary data was gathered through interviews and surveys targeting key stakeholders within the Uzbek digital economy. The following groups were identified and approached:

- **Government Officials and Policy Makers**: To gain insights into Uzbekistan's policy landscape, legal framework, and ongoing government initiatives supporting the digital economy, the digital entrepreneurship ecosystem and the AI landscape.
- **Intermediary Organisations:** To understand their opinions about the digital entrepreneurship ecosystem and the AI landscape and their service offerings to entrepreneurs and businesses.
- **Financial Actors:** To understand finance available for digital entrepreneurs and AI projects and their scope of involvement.
- **Academic & Research Institutes:** To gain insights into Uzbekistan's academic and research landscape, particularly in fostering skills for the digital economy, advancing research on the digital economy - especially in artificial AI - and supporting digital entrepreneurship.

- **Entrepreneurs, Start-ups & Businesses**: To understand the challenges and opportunities faced by entrepreneurs in Uzbekistan with regard to AI and digital entrepreneurship, as well as their perspectives on key issues such as access to finance, talent, and infrastructure.
- **Industry Experts**: To gather expert opinions on the current state of AI and digital entrepreneurship, and the digital economy in general, focusing on emerging technologies and market trends.

The semi-structured interview format allowed for in-depth discussions on key topics while ensuring comparability of responses. Surveys were designed to complement the interviews, providing quantitative insights into the digital entrepreneurship ecosystem (in areas such as access to finance, talent availability, and support structure) and the AI landscape (AI infrastructure, research & education, businesses, market demand, etc.)

b) Secondary Data Collection

Secondary data sources were critical in providing an empirical basis for analysing the performance of Uzbekistan's digital economy, digital entrepreneurship ecosystem and AI landscape. Key sources of secondary data included:

- **National Statistics**: Data from Uzbekistan's Statistics Agency, including economic indicators such as GDP, sectoral growth rates, internet penetration, and mobile phone usage, among others.
- **International Reports**: Data from international organisations such as the World Intellectual Property Organisation (WIPO) (Global Innovation Index), ITU, the Portulans Institute (Networked Readiness Index), StartupBlink (Start-up Ecosystem Report) on Uzbekistan's digital transformation, AI landscape, and digital entrepreneurship ecosystem.
- **Industry Reports**: Data from private sector sources such as market research reports, which provided insights into market size, investments, and the growth trajectory of various digital sectors.

Methodological Challenges and Limitations

While the methodology adopted for this research is robust, several challenges and limitations should be noted:

- **Data Availability**: There is a scarcity of relevant data providing insights into the AI and digital entrepreneurship ecosystem, particularly relating to AI adaptation rates, businesses engaged into AI, etc. Responses of survey's were limited but insights were used to arrive at a holistic picture of the landscape.
- **Stakeholder Access**: Access to certain high-level stakeholders, particularly within government agencies, was limited. In such cases, secondary sources and public documents were used to supplement the data.
- **Comparative Analysis**: The comparative policy analysis was somewhat constrained by differences in available data across countries, particularly for benchmarking AI and digital entrepreneurship policies. Adjustments were made to ensure comparability by focusing on key themes common across countries.

3. ECONOMY OF UZBEKISTAN

Uzbekistan's transition to a market economy is only just beginning

Uzbekistan has been on a stable growth path for the past eight years since 2017. Initial reforms swiftly deregulated the majority of prices, eliminated restrictive controls on businesses and trade, enhanced openness in governance, and eased measures that constrained individual choices and economic liberty. In 2023, Uzbekistan experienced a GDP growth of 6%, driven by strong external demand for its products and labour, robust domestic consumption, and increased investments. However, the current account deficit worsened, reflecting rising imports and reduced remittances, linked to the depreciation of the Russian Ruble.[1] [2]

Uzbekistan's growth path has been underlined by various reforms. In 2023, Uzbekistan adopted the National Development Strategy 2030, which aims to elevate the country to upper-middle-income status by the end of the decade. According to World Bank projections, achieving this goal will require an average annual real GDP per capita growth rate of 10%. While the initial phase of Uzbekistan's reforms has mirrored patterns observed among early reformers in Eastern Europe and East Asia, there has often been greater emphasis on the quantity of economic and social reforms than on the depth, quality of implementation, or measurable outcomes. As the government and stakeholders embark on more complex reforms, a stronger results-oriented approach will be essential. Reaching the 2030 target will also depend on advancing multifaceted reforms, including fostering a dynamic private sector, reducing state control in favour of market-driven mechanisms, prioritising investments in human capital, and building a sustainable development framework.[3]

Sector transformation underway

The country remains heavily reliant on natural resource exports, such as gold (30.7%), cotton yarn (8.26%), petroleum gas (5.53%), and refined copper (3.53%), which makes the economy vulnerable to fluctuations in global supply and demand, as well as volatile commodity prices.[4]

The service sector is the biggest contributor to the GDP in Uzbekistan. At the end of 2023, minor changes were noted in the sectoral structure of GDP with the service sector witnessing the biggest increase. The share of the service sector in the sectoral structure of GDP, measured by GVA, increased from 41.6% to 43.4%, while the share of agriculture, forestry and fisheries decreased from 24.9% to 24.3%, industry – from 27.0% to 26.1%, construction – from 6.5% to 6.2%. Within the service sector, the information and communications services saw the biggest increase with 24.2.[5]

This growth is also reflected in terms of employment per sector: The "Activities for the management and provision of support services" (69.8%) followed by the "Information & Communication" (65.4%) sector saw the highest total growth rate from 2010 to 2023 in terms of employment. Yet, the agriculture, forestry and fishery sector continues to see the highest numbers in terms of employment (3.34 million), followed by the manufacturing industry (1.66 million).

In terms of newly created enterprises by economic activity, the information and communication sector saw the biggest increase in 2023 with 27.8% followed by agriculture, forestry and

[1] EBRD (2024): Transition Report 2023-24: Transitions Big and Small

[2] World Bank (2024): The World Bank in Uzbekistan: Overview.

[3] World Bank Group (2022): Toward a Prosperous and Inclusive Future: The Second Systematic Country Diagnostic for Uzbekistan.

[4] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[5] Statistics Agency (2023): Socio-economic situation of the Republic of Uzbekistan.

fisheries (24.9%) and transportation and storage (22.1%). However, in terms of total numbers of newly created enterprises the trade sector (33,477) followed by industry (14,112) lead, while the information and communication sector (2,935) and the healthcare and social services provision sector have the lowest total numbers in terms of newly created enterprises.

In terms of attractiveness for foreign companies, the trade sector with 3668 foreign entities as of January 1, 2024, was leading, followed by the industry sector with 1668 foreign enterprises, the 'other' sector with 1578 foreign enterprises, the construction sector with 720 foreign entities and the information and communication sector with 704 foreign entities.[6]

In terms of export, gold continues to hold the biggest share with a value of USD 8153.8 million, followed by services (USD 5179.7 million) and industrial goods (USD 4058.7 million) in 2023. Imports were dominated by machinery and transport equipment (USD 14935.2 million), industrial goods (USD 6322.8 million) and chemicals and similar goods (USD 4864.5 million). Service imports only accounted for USD 2566.4 million.[7]

Progressing Private sector development

Uzbekistan has entered its eighth year of an ambitious market transition with a more open market economy developing. However, despite recent reforms, small and medium enterprises (SMEs) in Uzbekistan continue to underperform economically. SOEs dominate key sectors and benefit from protection against private competition, with state investment focused on high-growth sectors that generate fewer jobs. This has led to one of the lowest rates of new firm creation in the region, a disproportionately small SME sector, and relatively high unemployment compared to peers at similar income levels.[8] SOEs in Uzbekistan operate predominantly in sectors that are typically competitive, such as commercial banking, the production and sale of bread and wine, and hotel accommodation, as well as their downstream and ancillary industries. According to available data, there are 282 subsidiary SOEs operating under larger SOE conglomerate groups. It is estimated that 90% of these entities are active in highly competitive sectors, including wholesale and retail trade, food production, and textiles, with no clear economic rationale for state ownership.[9] Since 2016, a comprehensive series of reforms has been initiated to restructure and privatise SOEs. The most recent reform, issued in February 2024, titled "Privatisation of State Property", aligns with the "Strategy for the Management and Reform of State-Owned Enterprises for 2021-2025".[10] These initiatives seek to substantially reduce state participation in the economy to achieve a balanced level while promoting a more favourable investment climate.

At the same time, Uzbekistan's reliance on environmentally unsustainable practices poses significant risks to its social and economic future. The country is among the most dependent globally on water resources and natural gas. Despite these challenges, Uzbekistan ranks among the least efficient users of water and energy worldwide. Over 90% of the nation's renewable water resources are withdrawn, primarily due to inefficient, state-managed agricultural practices. Delayed adoption of green energy production risks locking the country into outdated technologies and investments that are costly to reverse, potentially cutting Uzbekistan off from lucrative export markets.[11]

[6] Statistics Agency (2024): Information about the demographics of enterprises and organisations.

[7] Statistics Agency (2023): Foreign Trade indicators of the Republic of Uzbekistan.

[8] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[9] World Bank Group & UK International Development (2023): Uzbekistan: Integrated State-Owned Enterprises Framework (iSOEF) Assessment.

[10] Lex.UZ (2024): Law of the Republic of Uzbekistan on Privatisation of State Property.

[11] World Bank Group (2022): Toward a Prosperous and Inclusive Future: The Second Systematic Country Diagnostic for Uzbekistan.

There is a growing recognition of the need for a thriving private sector to address these challenges, and institutional support for small businesses in Uzbekistan has been steadily increasing, as evidenced by a series of reforms. In September 2023, a decree was issued abolishing the use of tax gap coefficients for Value Added Tax (VAT) returns, marking a significant step towards more accurate and equitable tax collection. Previously, 70% of entrepreneurs regarded these mechanisms as unjust.[12] In January 2024, the government introduced a decree establishing a transparent entrepreneurial ranking system. Businesses with higher rankings benefit from exemptions from tax audits, expedited VAT refund processing – reduced to just one day – and other advantages, thereby enhancing their economic stability and fostering a more business-friendly environment.[13] Advancing ongoing reforms, fostering a vibrant private sector, and developing Uzbekistan's human capital within a sustainable framework will be pivotal in shaping the country's future.

[12] Daryo (2023): Summer VAT returns: Aid for low-income families in Uzbekistan.

[13] Lex.UZ (2024): Of the President of the Republic of Uzbekistan Decision on Measures to Introduce the Sustainability Rating of Business Entities.

4. UZBEKISTAN'S DIGITAL ECONOMY

4.1 GENERAL

The ICT sector is undergoing rapid transformation

The ICT sector in Uzbekistan has experienced significant transformation in recent years and is now considered a priority sector. In 2023, the information and communications sector contributed 2.1% to the national economy. Within this sector, communication services – encompassing wired and mobile communication, internet services, and related offerings – constituted the largest share of added value, accounting for 52.4%. The remaining 47.6% of added value in the sector came from activities such as publishing, computer programming, software development, and television and radio broadcasting.

The share of ICT services in the national economy reached 1.9% in 2023, up from 1.6% in 2021 and 1.8% in 2022.[14] The e-commerce sector has experienced the fastest growth in terms of GDP contribution, with a compound annual growth rate (CAGR) of 372% from 2017 to 2022. By 2022, its total contribution to the GDP reached 1.2%.

As of 2024, the total number of companies operating in the information and communication sector stood at 10,551.[15]

Uzbekistan continues to rank low globally in ICT service exports and imports

Despite recent positive developments, Uzbekistan continues to rank low in ICT service exports, placing 92nd out of 132 countries in the Global Innovation Index (GII) 2023.[16] The majority of ICT service exports comprised telecommunication services (approximately USD 194 million), followed by computer software services (USD 157 million), other computer services (USD 98 million), and other information services (USD 88 million).[17] A study assessing Uzbekistan's export potential in the ICT services sector revealed that IT Park residents reported exports totalling USD 344 million in 2023, a significant increase from USD 140 million in 2022. As of the third quarter of 2024, 936 companies out of 2,384 IT Park residents provided services to international markets.[18]

Uzbekistan also ranks low in ICT service imports, placing 101st out of 132 countries in the GII 2023. While this may reflect a preference for self-reliance and an emphasis on fostering local innovation, the country's overall software spending, at 0.2% of GDP, is relatively low, ranking 80th out of 132 economies.[19] This suggests limited demand for software, irrespective of its origin, and highlights the low levels of ICT adoption in Uzbekistan.

ICT employment is growing, yet ranks behind regional peers

In 2023, the information and communication sector employed 87,800 individuals. With a total growth rate of 65.4% from 2010 to 2023, it ranks as one of the fastest-growing sectors in terms of employment, following the "Activities for the management and provision of support services" sector, which experienced a growth rate of 69.8% during the same period.[20]

[14] Statistics Agency (2023): Socio-economic situation of the Republic of Uzbekistan.

[15] Statistics Agency (2024): Number of active organisations "Information & Communication"

[16] WIPO (2023): Global Innovation Index.

[17] Statistics Agency (2023): Export of ICT services.

[18] Infocom (2024): Study of the Uzbekistan's export potential in the field of ICT services.

[19] WIPO (2023): Global Innovation Index.

[20] Statistics Agency (2023): Distribution of the employed population by type of economic activity.

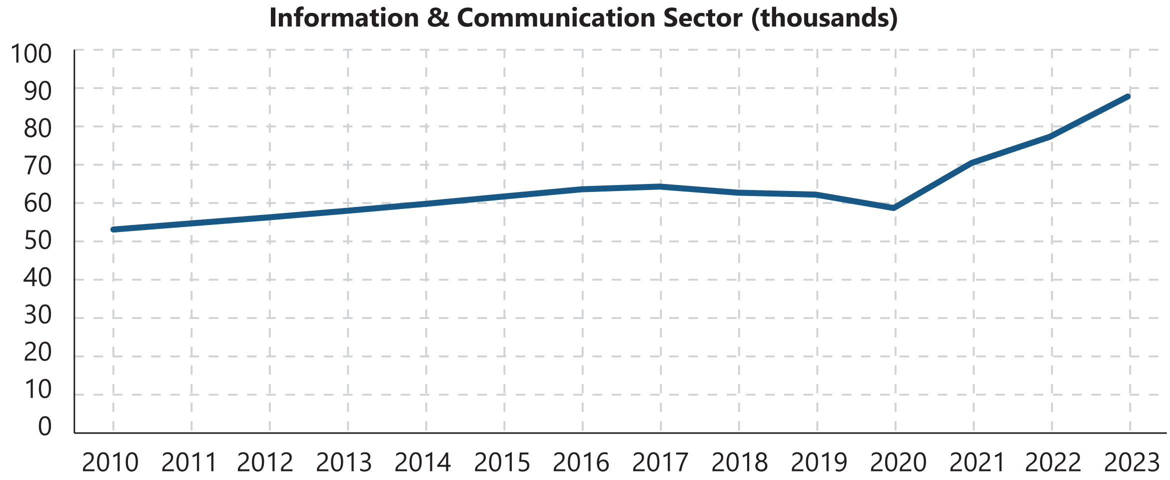

Figure 1: Growth of people employed in the information and communication sector (2010-2023) (Source: Statistics Agency)

For residents of IT Park Uzbekistan, the number of employees grew to 36,300, an increase of 10,000 compared to 2023, with 17,000 working in export-oriented companies.[21]

In 2023, the finance and insurance sector offered the highest average monthly wage, at approximately USD 1,100, followed by the information and communications sector, with an average of around USD 875 per month. In contrast, the health and social services sector had the lowest average wage, at about USD 248 per month.

In summary, Uzbekistan's ICT sector is undergoing substantial growth, contributing to an increasing share of the economy and seeing remarkable development in specific sub-sectors, such as e-commerce and IT services. However, the country continues to lag in global rankings for ICT service exports/imports and software spending, indicating that while the sector is expanding, it has yet to achieve its full potential in terms of international trade and technology adoption.

4.2 GOVERNMENT

Multiple strategies and decrees to advance the digital transformation agenda

In recent years, Uzbekistan has implemented multiple strategies and decrees to advance its digital transformation agenda which laid the foundation for the "Digital Uzbekistan – 2030 Strategy", developed in 2020. The "Digital Uzbekistan – 2030 Strategy" set forth over 280 digital transformation projects in various regions and industries to be implemented within two years. An estimated USD 2.5 billion was expected to be invested in digital infrastructure during this period.[22] The strategy focuses on five priority areas: digital infrastructure, the digital economy, e-government, the national IT sector, and IT education. While improvements have been seen in infrastructure and e-government services, other areas lag behind.[23] To support this strategy, a 2020-2022 roadmap was developed.[24]

[21] Infocom (2024): Study of the Uzbekistan's export potential in the field of ICT services.

[22] UNDP & Ministry for Information Technology and Communications (2022): Перспективные направления применения технологий искусственного интеллекта в Узбекистане (Promising Areas of Application of Artificial Intelligence Technologies in Uzbekistan)

[23] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[24] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

In 2019, Uzbekistan established the Tashkent Technology Park for ICT companies including branches in Samarkand, Bukhara and Fergana, offering various benefits and state support measures such as exemptions from VAT, social tax, income tax, reduced wage tax, custom payments and a newly introduced reduced tax of 5% on dividends to its residents.[25] According to representatives of the IT Park, the park currently hosts 2,500 resident companies, of which 625 are of foreign origin.

	Personal income tax	Other taxes	Unified social payment contribution	Custom payments on imported goods and service
Non-resident	12%	5-10%	15-25%	Yes
IT Park resident	7.5%	0%	0%	No

Figure 2: Tax benefits for IT companies (Source: Tashkent IT Park)

To promote exports and provide incentives for IT Park residents, several decrees have been enacted. The February 2024 resolution, "On Additional Measures to Promote the Export of Services in the Field of Digitalisation in the Country",[26] and the October 2024 resolution, "On Additional Measures to Support Enterprises Engaged in Export Activities in the Field of Digitalisation"[27], introduce a range of incentives. These include the extension of tax benefits until 2040, the implementation of export support programmes, and various other provisions aimed at fostering export growth of the digital sector.

Notable strives in the area of e-Government

Uzbekistan has made notable strives in the area of e-Government. In the GII 2023 it ranks 57th out of 132 countries in the category 'Government Online Services'.[28] The foundational legal framework for digital government development is in place, including laws such as "On Public Procurement", "On Electronic Government", "On the Openness of Public Authorities and Administration", "On Electronic Digital Signature", the "Personal Data Act", and "On Electronic Document Flow". Uzbekistan has also launched several key e-government initiatives, including the Single Portal of Interactive Government Services in 2013, which according to representatives of the Digital Government Project Management Centre now has 675 digitalised services, up from 307 in January 2022. While official sources set a target of 715 services, the e-Government Centre (Digital Government Project Management Centre) reported that the official registry currently includes 883 services offered by various ministries and departments.[29] Additionally, the OneID system, designed to simplify access to online services, enables users to access multiple services or government websites through a single account. During the USAID study, it was noted that the interoperability of the OneID system with ID card registers was implemented, and as of now, the system has 10.07 million users. Furthermore, an electronic payment system for unified public service payments has been introduced. UZINFOCOM is the main service provider for the digitalisation efforts of the government. Collaboration with the domestic private sector for the development of digital solutions for the government remains limited.[30] The uptake of online-services remains low,

[25] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[26] LexUZ (2024): On additional measures to promote the export of services in the field of digitalisation in the country.

[27] LexUZ (2024): On additional measures to support enterprises engaged in export activities in the field of digitalisation.

[28] WIPO (2023): Global Innovation Index.

[29] My.gov.uz (2024): my.gov.uz.

[30] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

particularly among women, who make up only 32% of users.[31] In a global comparison, Uzbekistan ranks 55th out of 134 countries in the "E-Participation" category of the Network Readiness Index.[32]

E-government progress and digital transformation within the government has been uneven, hampered by high turnover rates and limited inter-ministerial data sharing, which is often governed by bilateral agreements rather than cohesive policies. Additionally, there is varying understanding between civil servants about the benefits of digital transformation and ministries and agencies guard their mandates and show varying degrees of digitalisation. While progress is being made, some departments are facing significant backlogs, and the degree of digitalisation varies greatly from ministry to ministry. For example, the newly formed Agency for Innovative Development (formerly the Ministry of Innovative Development, MID), now integrated into the Ministry of Higher Education, Science and Innovation, reported 30% digitalisation, with over 20 ongoing projects. However, the agency emphasised the considerable effort required to transition all paper-based data to digital formats.

To tackle the challenges associated with digitalisation across various state entities, the e-Government Centre is also tasked with providing organisational and methodological support for e-government projects and coordinating the development of integrated information systems across government agencies.[33]

While the "Digital Uzbekistan – 2030 Strategy" underscores the importance of training government staff on digital transformation, and the MDT has highlighted available training programmes for government employees, resource constraints have reportedly impeded efforts to support digitalisation initiatives. Training opportunities are unevenly distributed across ministries, with larger state entities, such as the State Tax Committee and the Ministry of Finance and Economy, benefiting from more advanced IT infrastructure and employee training centres. Notably, significant capacity gaps persist, particularly in specialised skills such as data management.

Open data to increase government transparency and drive innovation

Additionally, the open data portal, data.egov.uz, was launched to provide public access to government information in the form of open data (refer to chapter 6 Deep Dive: Artificial Intelligence Landscape for further information). However, study by USAID has highlighted considerable resistance from government authorities regarding the practical implementation of open data. Additionally, many datasets are incomplete, creating barriers to their effective use. The absence of adequate tools for data analysis further limits the usability and reusability of the available open data.[34]

Despite efforts, ICT regulatory environment remains insufficient with lacks in cybersecurity and data protection legislations

Despite these efforts, the ICT regulatory environment remains insufficient as evidenced by the Network Readiness Index where Uzbekistan in the same category ranks only 133rd out of 134 countries in 2023. The centralised governance structure, heavy reliance on decrees, and the absence of integrated legal frameworks presents challenges in effectively implementing reforms. As a result, Uzbekistan ranks 102nd out of 134 economies in the 'Regulatory Quality'

31 USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

32 Portulans Institute (2023): Network Readiness Index.

33 E-Gov.uz (2024): Digital Government Projects Management Centre.

34 USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

category, reflecting the complexities in achieving consistent and comprehensive regulatory improvements.[35] [36]

The digital transformation agenda particularly faces challenges in cybersecurity, a critical issue not adequately addressed in the "Digital Uzbekistan – 2030 Strategy". Only in 2022 did the country enact specific legislation focused on cybersecurity. However, this legislation still requires full consolidation with provisions from various sector-specific laws. In 2023, an additional presidential resolution was issued, titled "On Additional Measures to Improve the System of Cybersecurity of Critical Information Infrastructure Facilities of the Republic of Uzbekistan" further seeking to improve cybersecurity.[37] [38]

The government has established a Cybersecurity Centre, which is overseen by the State Security Service of the Republic of Uzbekistan. However, the centre lacks sufficient high-level technical specialists, and its resources are primarily focused on safeguarding critical government infrastructure. This approach indicates that the government does not yet view cybersecurity as a broad societal issue, despite the centre's mandate to also provide consulting services to businesses and organisations.[39] In line with this, in 2023, Uzbekistan was among the top 10 countries attacked by miners and by level of local infection risk.[40] Additionally, it faced over 11.2 million cyberattacks.[41]

Low cybersecurity poses significant challenges to the effective implementation of the "Data Protection Law", enacted in 2019.[42] Uzbekistan only ranks 118th out of 134 countries in indicator 'Privacy protection by law content'.[43] The data protection law mandates that all personal data must be stored domestically and requires all ICT companies operating in the country to use locally registered servers. The newest amendment of the law allows data storage in a selected list of countries, which, however, has not been published yet.[44] With data remaining vulnerable to cyberattacks and the government unable to adequately safeguard it, the requirement for local data storage discourages ICT companies from investing in Uzbekistan. However, interviewees during the field research also noted that they anticipate a shift in the near future regarding the mandate for data storage in Uzbekistan.

While Uzbekistan has made strides in digital transformation through its "Digital Uzbekistan – 2030 Strategy", several challenges remain, particularly in cybersecurity, private sector collaboration, and comprehensive digital governance. In addition, the government lacks effective mechanisms for financing, planning, monitoring, and evaluating digital projects. Particularly the absence of baseline data on the current state of digital development hinders the effective monitoring and evaluation of implemented strategies and policies. Furthermore, sector-specific strategies continue to be missing. For instance, although the Ministry of Health was expected to issue a "Digital Health Strategy" by the fall of 2022,[45] it appears that this has not yet materialised.

[35] Freedom House (2023): Freedom on the Net 2023.

[36] Portulans Institute (2023): Network Readiness Index.

[37] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[38] Daryo (2024): Uzbekistan's web resources face over 11.2 mn cyber attacks in 2023.

[39] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[40] Kapersky (2023): Kapersky Security Bulletin 2023.Satistics.

[41] Daryo (2024): Uzbekistan's web resources face over 11.2 mn cyber attacks in 2023

[42] Lex.UZ (2019): Law of the Republic of Uzbekistan on Personal Data.

[43] Portulans Institute (2023): Network Readiness Index.

[44] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[45] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

RECOMMENDATIONS

1. **Strengthen Cybersecurity Framework**:
    - *Strengthen the cybersecurity legal framework to ensure robust protection of critical data and infrastructure. In light of increasing cyber threats, there is a need for more comprehensive legislation and stricter enforcement mechanisms to safeguard digital systems, particularly in sectors such as AI and big data. Additionally, investing in education and workforce development within the cybersecurity domain, alongside fostering the growth of businesses in this sector, can help address emerging challenges and improve overall cybersecurity resilience.*
2. **Encourage Public-Private Collaboration:**
    - *Foster stronger partnerships between the government and the private sector, especially domestic IT companies. The government should incentivise partnerships with private tech firms to drive innovation, promote sustainable digital solutions, and ease the transition to a digital economy.*
3. **Enhance Data Governance and Open Data Initiatives**:
    - *The government should prioritise enhancing the accessibility and usability of public data, fostering greater transparency, encouraging citizen engagement, and driving innovation within data-driven industries. Such efforts would not only support open governance but also stimulate economic opportunities.*
4. **Expand Digital Literacy and Government Capacity**:
    - *While training programmes for government employees are in place, resource constraints and resistance to change hinder digital transformation. Strengthening digital literacy among civil servants through continuous, targeted training programmes, particularly in specialised areas such as data management, will be key to overcoming these barriers.*
5. **Develop a Comprehensive Data and Monitoring Framework**:
    - *The absence of baseline data on the state of digital development in Uzbekistan has limited effective monitoring and evaluation of digital transformation efforts. The government should invest in developing a comprehensive data collection framework to monitor digital projects and ensure alignment with national objectives.*
6. **Support the Development of Sector-Specific Digital Strategies**:
    - *In addition to the national digital strategy, sector-specific strategies (e.g., digital health, digital education) need to be developed and implemented. These strategies will help address specific challenges faced by each sector, creating tailored solutions to enhance digital transformation.*
7. **Improve e-Government Services and Public Participation**:
    - *The low uptake of e-government services, especially among women, suggests that greater efforts are needed to ensure inclusivity. Public campaigns, along with user-friendly interfaces, can help increase participation. Incentives such as tax benefits or service discounts for online service usage could also be expanded.*
8. **Address Data Sovereignty and International Investments**:
    - *The requirement for local data storage, combined with weak cybersecurity defences, has deterred international investment in Uzbekistan's digital economy. A balanced approach to data sovereignty should be pursued, ensuring data security while attracting international tech companies to foster innovation and investment in AI and other advanced technologies.*

4.3 INFRASTRUCTURE, ACCESS & AFFORDABILITY

Significant progress in IT infrastructure development

Uzbekistan has made significant progress in developing its IT infrastructure in the last years and making the internet more accessible and affordable. A significant portion of the funds allocated under the "Digital Uzbekistan – 2030 Strategy" has been directed toward infrastructure development.

Currently, 99% of the population is covered by 2G, 90% by 3G, and 66% by 4G, though the roll-out of 5G remains limited to parts of Tashkent and each of the regional IT parks due to high investment costs and low demand. 4G is only available in large cities which account for 43% of the population.[46] The government has not initiated reforms related to spectrum allocation that are crucial for a successful, market-driven, country-wide 5G rollout.[47]

The expansion of network infrastructure has led to a rise in mobile subscribers, increasing from 20.3 million in 2013 to 30.2 million in 2022[48] (a CAGR of 5.3%), and the number of internet users grew from 6.07 million in 2013 to 27.2 million in 2022[49] (a CAGR of 19.1%). According to Datareportal, as of January 2024, the number of internet users had risen to 29.52 million.[50]

Internet speed rate is low compared globally

Despite these advancements, Uzbekistan ranks 74th out of 111 countries for median mobile download speed at 32.01 Mbps, and 82nd out of 162 for median fixed internet download speed at 66.77 Mbps – both significantly below the global averages of 56.09 Mbps and 93.94 Mbps, respectively, as of July 2024. Nevertheless, Uzbekistan's internet speeds are better than those in other regional countries like Tajikistan, Kyrgyzstan, and Kazakhstan.[51] However, the quality and reliability of internet connections remain poor, with users frequently experiencing disruptions.[52] [53]

In 2022, the ITU reported that a 5-gigabyte fixed-line broadband connection cost 1.71% of gross national income (GNI) per capita, while a 2GB mobile broadband subscription amounted to 0.85% of GNI per capita. The United Nations Broadband Commission for Sustainable Development considers internet affordable if it costs less than 2% of monthly GNI per capita.[54] However, businesses and organisations in Uzbekistan report that commercial internet packages are significantly more expensive, often 4 to 10 times higher than household packages, and have expressed concerns over the lack of affordable data storage and cloud services.[55]

RECOMMENDATIONS

1. Strengthen Broadband and Mobile Network Expansion:

- *Prioritise the rollout of fibre-optic and VDSL systems to replace outdated ADSL technology and expand 4G coverage to rural and underserved areas. Facilitate phased 5G deployment by addressing infrastructure gaps and encouraging pilot projects in key urban centres.*

2. Improve Internet Affordability and Service Quality:

- *Promote affordable commercial internet packages to support businesses and start-ups.*

[46] Freedom House (2023): Freedom on the Net 2023.

[47] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[48] MDT (2022): Number of mobile subscribers (thousands).

[49] MDT (2022): Total number of internet users (thousands).

[50] Datareportal (2024): Digital 2024: Uzbekistan.

[51] Speedtest (2024): Speedtest Global Index.

[52] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[53] Freedom House (2023): Freedom on the Net 2023.

[54] ITU (2023): The affordability of ICT services 2023.

[55] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

4.4 SOCIETY

Digital divide between urban centres and rural areas

Uzbekistan experiences a notable digital divide, with internet packages being more affordable in Tashkent compared to rural areas. Additionally, digital literacy and skills, including digital financial literacy, cybersecurity and data protection awareness, are low across the entire population.[56]

For many people in Uzbekistan, mobile internet serves as their primary or only internet access point, with Telegram being particularly significant – it is considered by many to represent the internet itself. Uzbekistan has the highest per capita usage of Telegram globally. [57]

According to the Economist Impact's Inclusive Internet Index 2022, internet access shows a 13.3% gender gap, with men accessing the internet at significantly higher rates than women.[58] A joint study by the UNDP's GDDA and the MDT reveals that 87% of women use the internet daily, primarily through mobile connections. However, internet usage decreases significantly in rural areas.[59]

Interestingly, contrary to the global average where more men own smartphones than women (a 15% gap in favour of men), smartphone ownership in Uzbekistan is higher among women. In urban areas, 90% of women and 85% of men own smartphones, while in remote areas, ownership rates drop slightly, with 84% of women and 80% of men owning smartphones.[60]

Social media usage in Uzbekistan accounts for 24.6% of the total population, with a year-on-year growth of 107%, driven in large part by Instagram, reaching 4.5 million users. Of these users, 37% are women (compared to a global average of 46.5%), and 63% are male (global average of 53.5%). This reflects a significant gender gap, with women social media usage below the global average, while usage among men exceeds it. In global comparisons, Uzbekistan's social media adoption is relatively low, aligning with countries like Kenya.[61]

RECOMMENDATIONS

1. Expand Internet Accessibility and Affordability in Underserved Areas:

- *Prioritise infrastructure investments to extend fibre-optic and mobile broadband coverage in rural regions, with targeted subsidies to reduce service costs and promote affordable mobile internet packages to cater to populations relying on mobile connections as their primary access point.*

2. Enhance Digital Literacy and Skills Development:

- *Launch nationwide initiatives focused on digital and financial literacy, cybersecurity, and data protection, with tailored programmes for women and rural communities.*

3. Bridge the Gender Gap in Digital Access and Usage:

- *Design women-focused campaigns to increase internet and social media usage, while promoting affordable smartphone ownership in underserved areas, and partner with social media platforms to amplify gender-inclusive content and provide incentives for women content creators.*

[56] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[57] Tbd.

[58] Freedom House (2023): Freedom on the Net 2023.

[59] UNDP & MITC (2022): Gender Digital Divide Assessment in Uzbekistan.

[60] Tbd.

[61] Datareportal (2024): Digital 2024: Uzbekistan.

4.5 EDUCATION & SKILLS

Digital education – A key priority for the government

The "Digital Uzbekistan – 2030 Strategy" recognises IT education as a key priority, aiming to enhance digital literacy across all educational levels.[62] However, the current institutional framework lacks alignment with private sector demands[63], and the outdated Soviet-era education system struggles to modernise curricula and expand the digital talent pool.[64] Gender disparities in digital skills remain significant, with women trailing men by nearly 24%. Specific gaps include basic digital skills (23%), standard digital skills (21%), and advanced digital skills (26%).[65]

In order to bridge these gaps several initiatives have been implemented. A presidential decree in 2020 initiated the establishment of specialised IT Centres across the country.[66] Field research sources indicate that 550 such centres have been established across Uzbekistan, with 70% located in regional areas.[67] Pricing of courses varies, depending on the duration and content of the courses offered.[68]

The IT Park has played a crucial role in advancing IT education and skills development in Uzbekistan in the past years. Among its initiatives, the IT Academy was established. The IT Academy has spearheaded various educational programmes such as the "One Million Uzbek Coders" project, launched in partnership with the UAE in 2019. This project has achieved significant milestones, including over 2.5 million registered participants and the issuance of 1.175 million certificates as of 2022.[69] In the project's second phase, the uzbekcoders.uz platform was launched in collaboration with Coursera, ensuring a sustainable and permanent learning offering.[70]

The IT Academy under the IT Park, which initially managed many IT education initiatives, saw its responsibilities recently transferred to the Digital Education Development Centre (https://edu.digital.uz), a state entity under the MDT. The corresponding platform offers detailed information on available IT Centres and courses, covering a broad spectrum of IT disciplines.

IT university education is expanding

University-level IT education in Uzbekistan has expanded, with 21 universities and colleges, and 14 foreign affiliate programmes offering IT degrees. Around 8,000 students graduate from IT programmes annually, with IT students making up 3.69% of the total student body.[71] StartupBlink even sees the number of graduated from IT studies at 25,000.[72]

Tashkent University of Information Technologies (TUIT) is the leading technical university, offering degrees in information security, ICT, software engineering, and more. TUIT produced the majority of IT graduates in Uzbekistan in 2021/2022, accounting for over 86% of all IT

[62] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[63] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[64] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[65] UNDP & MDT (2022): Gender Digital Divide Assessment in Uzbekistan.

[66] LexUZ (2020): On measures to further improve the education system in the field of information technology, development and integration of scientific research with the IT industry.

[67] E&Y et. All (2023): Assessment of the IT Market and Digital Entrepreneurship Environment in the Republic of Uzbekistan.

[68] IT Park (2024): IT Education.

[69] E&Y et. All (2023): Assessment of the IT Market and Digital Entrepreneurship Environment in the Republic of Uzbekistan.

[70] Agency for Strategic Reforms (2022): The results of the project "One million Uzbek coders".

[71] E&Y et. All (2023): Assessment of the IT Market and Digital Entrepreneurship Environment in the Republic of Uzbekistan.

[72] Startup Blink (2024): Global Startup Ecosystem Index 2024.

graduates (3217 graduates). Inha University in Tashkent, founded in 2014 in collaboration with South Korea's Inha University, follows closely behind with 1638 students graduating from IT-related courses. The university has strong links to international IT companies like SAP, Oracle, and Microsoft and hosts their own computer labs and R&D offices.[73] [74]

Other universities such as Amity University, Westminster International University in Tashkent (WIUT), and Turin Polytechnic University also offer IT degrees. Amity produced 389 graduates in 2022 specialising in IT-related fields.[75] The IT Park recently opened its own digital university with currently around 450 students, offering bachelor's and master's programmes in software engineering, with a focus on AI and specialisations in Solution Architecture, Cloud and DevOps, and Data Processing and AI.[76]

Graduates from these institutions are also mostly in demand. A survey of IT Park residents shows that 40% of graduates working in resident companies come from TUIT, 24% from Inha (Tashkent branch), and 15% from WIUT.[77]

Gender bias remains prevalent in IT education, with women making up less than 11% of IT students. Families are often less willing to invest in girls' IT education, steering them toward roles like data entry and graphic design rather than more advanced fields like coding and IT systems management.[78]

Growing need for skilled IT experts

The IT sector is growing and so are its numbers. In 2023, Uzbekistan's information and communication sector employed 87,800 people, a sharp increase from 62,200 in 2020. According to HH.uz, Uzbekistan's leading job market platform, over 10,000 IT-related vacancies were posted in 2023, with the highest demand for developers and programmers (31% of published job offers), computer designers (12%), and technical support specialists (7%). Followed by IT-analysts, project managers, system administrators, testers and information security experts. The highest-paid roles were programmers, followed by data analysts (data scientists) and designers.[79]

Despite growing demand, Uzbekistan faces a shortage of IT specialists. A 2021 IT Park survey revealed that 62% of respondents faced difficulties in finding and hiring IT specialists, citing key challenges such as shortages of qualified personnel, lack of practical experience, high salary demands, and high turnover. [80] A USAID study highlighted a particular shortage of software developers, especially Java developers, mobile app developers for iOS and Android, User Interface/User Experience (UI/UX) designers, and quality assurance specialists as well as information security professionals.[81] This shortage was confirmed by a survey of IT Park residents, who reported significant difficulties in finding experts for software development, DevOps, and business analysis. The most in-demand technologies were Java (72%), HTML/CSS/JavaScript (67%), and Python (51%). Additionally, mobile development for Android

[73] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[74] E&Y et. All (2023): Assessment of the IT Market and Digital Entrepreneurship Environment in the Republic of Uzbekistan.

[75] Tbd.

[76] ITPU (2024): IT Park University.

[77] E&Y et. All (2023): Assessment of the IT Market and Digital Entrepreneurship Environment in the Republic of Uzbekistan.

[78] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[79] Spot (2024): Over 80% of vacancies for IT professionals do not require a diploma.

[80] E&Y et. All (2023): Assessment of the IT Market and Digital Entrepreneurship Environment in the Republic of Uzbekistan.

[81] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

(46%) and iPhone (44%) was highly sought after.[82] Uzbekistan faces a critical shortage of specialists in AI, machine learning, and data science.[83]

Meanwhile, some institutions, like the WIUT, are responding to the growing demand for IT skills by developing targeted programmes, such as a master's degree in business intelligence and analytics that was developed following a skills needs survey it conducted among certain governmental agencies.[84]

To address this skills gap, IT companies have started their own training programmes, but these are limited in scope, focusing on coding and programming while lacking in areas like data science, cybersecurity, and machine learning.[85] A significant percentage of companies (50%) rely on internships to recruit and train talent, while 29% offer their own educational programmes.[86] Nevertheless, collaboration between the private sector and universities remains underdeveloped, and traditional firms are underinvesting in IT skills development.[87]

Given the shortage of qualified IT labour, attracting foreign talent is crucial. In 2021, 17% of IT Park survey respondents faced challenges in hiring foreign specialists due to complex and costly visa procedures.[88] To address this, the government introduced a relocation programme offering a 3-year IT visa and financial as well as non-financial incentives.[89] This initiative began showing positive results by June 2022 when companies no longer cited foreign recruitment as a challenge.[90]

RECOMMENDATIONS

1. **Modernise and Align IT Education with Market Needs:**
   - *Update curricula across educational institutions to align with private sector demands, focusing on emerging fields like AI, machine learning, and cybersecurity.*
2. **Promote Gender Equity in IT Education and Careers:**
   - *Launch targeted initiatives to increase women's participation in IT education, such as scholarships, mentorship programmes, and family-focused awareness campaigns highlighting the economic benefits of IT careers for women.*
3. **Foster Public-Private Collaboration in IT Training:**
   - *Strengthen partnerships between universities, private companies, and international tech firms to design practical training programmes and internship opportunities. Incentivise private sector investment in training initiatives, particularly for advanced IT skills, through tax benefits (training cost deductible from profits), vouchers and co-financing schemes.*
4. **Address Senior-Level Talent and Workforce Gaps:**
   - *Develop targeted programmes for upskilling junior IT professionals into senior roles, focusing on advanced specialisations.*

[82] E&Y et. All (2023): Assessment of the IT Market and Digital Entrepreneurship Environment in the Republic of Uzbekistan.

[83] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[84] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

85 USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[86] E&Y et. All (2023): Assessment of the IT Market and Digital Entrepreneurship Environment in the Republic of Uzbekistan.

[87] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[88] E&Y et. All (2023): Assessment of the IT Market and Digital Entrepreneurship Environment in the Republic of Uzbekistan.

[89] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[90] E&Y et. All (2023): Assessment of the IT Market and Digital Entrepreneurship Environment in the Republic of Uzbekistan.

4.6 BUSINESS

Lacking digitalisation of businesses in Uzbekistan

The digitalisation of businesses in Uzbekistan is progressing but remains uneven, with significant gaps in data, awareness, and resource allocation that hinder broader adoption. Technology uptake, particularly among SMEs, requires a mindset and skill set that many businesses in Uzbekistan currently lack. This trend is consistent with global findings that digital tool adoption correlates strongly with employees' ICT skills.[91]

A major barrier to understanding and fostering digitalisation in Uzbekistan is the absence of robust data on firms' digital literacy and specific needs. Without this baseline, initiatives to address private sector demands lack precision, reducing their effectiveness. This gap also limits policymakers' ability to forecast labour market needs, a critical aspect of workforce planning in an increasingly digital economy. The MDT has expressed an intent to conduct surveys on business digitalisation levels in key regions such as Tashkent, Samarkand, and Bukhara. However, no such studies have been conducted to date. The OECD highlights that data collection and management in Uzbekistan require significant improvement to support informed policy development and implementation. [92]

Policy incentives favour business residents of IT Parks

Current policy incentives favour businesses incorporated as IT Park residents, offering them tax benefits and training opportunities. However, these advantages largely exclude smaller firms and sole proprietors outside of the IT Park. For most firms, the lack of targeted support discourages investment in digital transformation.[93]

However, the COVID-19 pandemic accelerated digitalisation among businesses in Uzbekistan. In 2021, Uzbekistan reported the second-highest percentage of firms (51.2%) adopting or expanding digital platforms among 79 economies analysed. Monthly sales via digital platforms also grew, surpassing regional averages. Despite this progress, SME adoption of digital tools lags behind larger firms: adoption remains to a large extent confined to basic services. Only 26% of formal private firms in Uzbekistan have their own websites, compared to the European and Central Asian Average of 63%.[94]

Digitalisation in Uzbekistan has been led by the banking and financial services sector, which remains predominantly state-owned. Private firms have only recently begun investing in digitalisation, initially focusing on basic enterprise functions like resource planning, distribution, and procurement. Advanced tools, such as CRM systems, are still underutilised.[95]

Strides in digitalisation but inadequate planning of ICT integration in business operations

While some firms have made strides in digitalisation, Organisation for Economic Co-operation and Development (OECD) interviews revealed a recurring challenge: businesses often see digital tools as a quick fix and invest in expensive technologies without adequately planning their integration into business operations. This approach frequently results in mixed outcomes and lower-than-expected returns on investment.

[91] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[92] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[93] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[94] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

[95] OECD (2023): Digital Skills for Private Sector Competitiveness in Uzbekistan.

Uzbekistan's progress in digitalisation highlights the need for a more strategic and inclusive approach. Comprehensive data collection, targeted incentives for SMEs, improved regulatory frameworks, and practical training programmes are essential to bridge the gaps in adoption and ensure that digitalisation benefits businesses of all sizes across sectors.

RECOMMENDATIONS

1. **Enhance Data Collection on Business Digitalisation:**
   - *Conduct nationwide surveys on business digitalisation levels, particularly among SMEs, to assess digital literacy, technology adoption, and sector-specific needs.*
2. **Expand Digitalisation Incentives Beyond IT Park Residents:**
   - *Develop targeted tax incentives, grants, and subsidies for SMEs and sole proprietors investing in digital transformation. Introduce schemes like Digital Transformation Voucher supporting SMEs to leverage business advisory services for their digital transformation.*
3. **Promote Digital Skills Development for SMEs:**
   - *Create accessible and practical digital upskilling programmes for business owners and employees. Encourage partnerships between business associations, universities, and technology providers to offer structured training.*
4. **Develop digital transformation advisory services:**
   - *Develop a market for digital transformation advisory services through Training-of-Trainers approaches in partnership with business associations, universities and technology providers to help businesses plan the integration of digital tools into their operations.*

5. DEEP DIVE: DIGITAL ENTREPRENEURSHIP ECOSYSTEM

5.1 GENERAL

Growing digital start-up ecosystem with fintech leading and the greentech sector being underrepresented

Since 2018, the number of start-ups in the Central Asia and Caucasus (CCA) region has increased sixfold, growing from 1,000 to over 6,000 by 2023. Regional investors find fintech (30%), e-commerce (15%), agritech (15%), and edtech (10%) to be the most promising sectors.[96]

According to the Asian Development Bank (ADB), around 1,200 start-ups operate in Uzbekistan, predominantly in their early stages of development. However, there is no systematic mechanism in place to collect data on start-ups or to distinguish them from traditional businesses, as well as between technology-focused and non-technology enterprises.[97] The recent decree "On Measures for Further Development of Startup Projects and Venture Funding Ecosystem" aims to address this gap by introducing a formal definition of start-ups and mandating the creation of the Start-up Base (https://startupbase.uz/), a platform designed to provide comprehensive data on start-ups, partners, and investors.[98] While this initiative is expected to improve data collection and ecosystem transparency, stakeholders estimate that only 50 to 100 start-ups currently operate with sustainable business models and adopt innovative approaches.

In terms of industry focus, StartupBlink reports that Uzbekistan's start-ups are distributed across software and data (29%), e-commerce (19.4%), fintech (16.1%), edtech (12.9%), foodtech (9.7%), social & leisure (9.7%), and healthtech (3.2%).[99] A separate survey by UzVCA identifies fintech (30%), marketplace (27%), medtech (24%), edtech (18%) and Enterprise Resource Planning (ERP) (15%) as leading sectors.[100] While agriculture and healthcare have been prioritised for innovation, these sectors remain underrepresented in the start-up ecosystem. Yet, UzVCA sees a higher representation of start-ups in the medtech sector than StartupBlink. However, fintech dominates the start-up ecosystem in Uzbekistan and it is said that Uzbekistan has more than 60 start-ups in the field.[101] Despite the significant gap in cybersecurity, cybersecurity start-ups are virtually non-existent in Uzbekistan.[102] Ecosystem stakeholders, however, identify cybersecurity as a promising start-up sector, alongside agritech and energytech. Interestingly, unlike in other economies, the greentech sector receives minimal support and interest in Uzbekistan.

Underrepresentation of women founders in Uzbekistan

Women are significantly underrepresented, with only 2% of start-up founders being women, and only 11% of applicants to incubation and acceleration programmes. An analysis by TUZ Ventures and IT Park estimates women entrepreneurs at 14%, while Plug and Play highlighted less than 5% of women founders, indicating cultural norms, limited role models, and unequal

[96] Rise Research et. all (2024): Venture Capital in Central Asia and the Caucasus 2023.

[97] Zufarov, D., et. all (2023): Uzbekistan's Ecosystem for Technology Startups.

[98] LexUZ (2024): On measures for further development of start-up projects and venture funding ecosystem.

[99] Startup Blink (2024): Global Startup Ecosystem Index 2024.

[100] UzVCA (2020): Uzbekistan startup ecosystem overview.

[101] Dobrynin, V. (2023): The State as a Startup: How to Turn Uzbekistan into a Growing Fintech Hub.

[102] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

access to funding as significant barriers.[103] Stakeholders in the start-up ecosystem criticised the lack of a gender perspective in existing decrees and the newly established funds.

Uzbekistan's start-up ecosystem is developing but remains weak, particularly in access to funding, mentorship, and skilled labour. The start-up scene is primarily driven by government-backed organisations that lack experience and specialisation.[104] Start-up events primarily target younger audiences, further discouraging older entrepreneurs from entering the ecosystem. Start-ups in Uzbekistan often lack the experience and support to expand internationally. The number of start-ups and their survival rates remain low, indicating that the ecosystem needs stronger support mechanisms for sustained growth.[105]

RECOMMENDATIONS

1. Encourage Ecosystem Specialisation:

- *Promote specialisation among organisations to focus on specific stages of start-up development rather than duplicating efforts across all stages.*

2. Foster Inclusivity for Women Entrepreneurs:

- *Integrate a gender perspective into start-up policies, decrees, and funding frameworks and establish more targeted programmes, such as grants, mentorship, and networking opportunities, to support women entrepreneurs.*

5.2 GOVERNMENT

Entrepreneurship promotion is managed across two key ministries

The government has recognised the potential of start-ups, as evidenced by various strategies, decrees and resolutions that reflect its ambition in this area. To foster innovation and entrepreneurship, the MID was established in 2017. MID in its initial year launched three significant programmes: first, the Innovative Development and Innovative Ideas Support Fund; second, the establishment of the Centre for Advanced Technology, tasked to conduct incubator and accelerator programmes for start-ups; and third, the construction of the Yashnobod Innovative Technological Park, which offers tax incentives, preferential loans, land, and other opportunities for its tenants.[106]

In early 2023, the MID was integrated into the newly restructured Ministry of Higher Education, Science and Innovation and subsequently renamed the Agency for Innovative Development operating within the Ministry of Higher Education, Science and Innovation. Since the integration, the agency's activities have progressed at a measured pace, as representatives of the Agency indicated in October 2024 that they are in the process of defining the agency's new mandate and adapting to the restructuring process. Over the past five years, the Agency for Innovative Development reported supporting 381 start-up projects and allocating UZS 215.1 billion (approximately USD 16.7 million) in funding. In 2024, 114 start-ups were supported with grants. The Agency aims to increase the number of start-ups to 4,000 by 2030 while attracting USD 5 million in foreign investments. Additionally, it seeks to enhance start-up quality by 90%.

Additionally, MDT is involved in digital entrepreneurship. Under its auspices, the IT Park for enterprises producing software and information technologies was established in 2019.[107]

[103] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[104] Trenkmann, E. (2019): Startup Ecosystem Report Tashkent.

[105] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[106] Zufarov, D., et. all (2023): Uzbekistan's Ecosystem for Technology Startups.

[107] Zufarov, D., et. all (2023): Uzbekistan's Ecosystem for Technology Startups.

The IT Park provides a comprehensive array of programmes and support services for digital start-ups, actively collaborating with diverse stakeholders across the ecosystem.

While the MDT and the Agency for Innovative Development (previously MID) have been key government actors in fostering the start-up ecosystem, representatives from the Ministry of Economy and Finance have noted that oversight of the start-up ecosystem has recently been placed under their mandate. Additionally, the MIIT plays a role in the entrepreneurship ecosystem as the lead government entity responsible for drafting a legislation on alternative financing instruments.

Several strategies, decrees and resolutions govern the entrepreneurship ecosystem

In 2018, designated as the “Year of Support for Active Entrepreneurship, Innovative Ideas, and Technologies”, the “Innovative Development Strategy for 2019–2021” was introduced. Its primary objective was to position human capital as a central driver of innovation and global competitiveness. The strategy focused on enhancing the quality of education, ensuring its accessibility to the entire population, and fostering increased public and private investment in innovation.[108] Additionally, several decrees were issued in 2018 to support entrepreneurship and create a financing ecosystem:

- 2018 No. PF-5583 “On Additional Measures to Improve the Financing Mechanisms for Projects in the Field of Entrepreneurship and Innovation”[109]
- 2018 No. PP-3682 “On Measures to Further Improve the System of Practical Implementation of Innovative Ideas, Technologies and Projects”[110]
- 2018 No. PP-3697 “On Additional Measures to Create Conditions for the Development of Active Entrepreneurship and Innovative Activity”[111]

These three decrees collectively aim to enhance entrepreneurship and innovation in Uzbekistan through various means. In July 2022, the “Innovative Development Strategy 2022-2026” was approved to continue and expand the work of the preceding strategy. The new strategy seeks to increase the number of innovative start-ups to 1,437. It further aims to enhance the start-up ecosystem, encouraging start-ups to locate in technology parks and special economic zones while motivating the private sector to increase its interest in and co-finance scientific development. A network of innovative infrastructure projects will be implemented, including technological parks, technology transfer centres, innovation clusters, venture organisations, innovation centres, incubators, and accelerators.[112] It also allows local scientific organisations and enterprises the right to directly sign contracts with government agencies for the development of technologies; however, it does not specifically mention start-ups. Key provisions to foster procurement, which are likely present in other countries, remain absent across strategies, decrees and resolutions, except for some provisions outlined in the newest decree under the MDT (2024) “On Measures for Further Development of Start-up Projects and Venture Funding Ecosystem”, which grants commercial banks and SOEs with over 50% government ownership the authority to procure services from start-ups for IT

[108] Zufarov, D., et. all (2023): Uzbekistan’s Ecosystem for Technology Startups.

[109] LexUZ (2018): On additional measures to improve the financing mechanism for projects in the field of entrepreneurship and innovation.

[110] LexUZ (2018): On measures to further improve the system of practical implementation of innovative ideas, technologies and projects.

[111] LexUZ (2018): On additional measures to create conditions for the development of active entrepreneurship and innovative activities.

[112] LexUZ (2022): On approval of the strategy for innovative development of the Republic of Uzbekistan for 2022-2026.

system implementation and support, with contracts of up to UZS 500 million (approx. USD 38,500) per year, provided the SOE holds at least 5% equity in the start-up.[113]

In March 2024, the Cabinet issued the resolution "On Measures to Implement the Innovative Development Strategy of the Republic of Uzbekistan for 2024-2025". This roadmap incorporates various provisions from previous decrees, including initiatives to increase the commercialisation of start-up projects and the expansion of acceleration programmes within innovation centres at higher education institutions, technology parks, regional innovation centres, and business incubators. It also calls for the implementation of specialised training programmes at Youth Innovation Centres and Youth Technology Parks to equip small and innovative entrepreneurs with the necessary skills in entrepreneurship and business management.[114]

Additionally, 2024 was declared the Year of Support for Youth and Business, with plans to boost foreign investment, expand entrepreneurship opportunities, and enhance private property rights.[115]

Comprehensive support measures for the development of regional entrepreneurship ecosystems

Over the years, various decrees have also been implemented to support the development of entrepreneurship in the regions:

- 2018 Decision No. 832 "On Establishing the Youth Innovation Centre under the Ministry of Innovative Development of the Republic of Uzbekistan"[116]
- 2019 Decision No. 545 "On Organising the Activities of a Business Accelerator Training and Practical Centre in Syrdarya Region"[117]
- 2020 Decision No. 313 "On Measures for Organising Youth Technoparks in the Republic's Regions"[118]

Decision No. 832 outlines the establishment of the Youth Innovation Centre in the Fergana Valley. Decision No. 545 establishes a business accelerator in the Syrdarya region aimed at supporting start-ups and entrepreneurs. Decision No. 313 sets the framework for creating Youth Technoparks across various regions of Uzbekistan, which aim to provide young entrepreneurs with access to modern technology, resources, and training to develop innovative projects and promote youth-driven entrepreneurship. Over the years, 16 infrastructure entities have been established under the Agency for Innovative Development in Tashkent and the regions.[119] However, stakeholders within the start-up ecosystem have raised concerns about the quality of services provided by these institutions, noting that they are primarily managed by government personnel.

Strengthening the venture capital investment landscape

Furthermore, several resolutions from the Cabinet of Ministers were announced to improve the investment ecosystem:

[113] LexUZ (2024): On measures for further development of start-up projects and venture funding ecosystem.

[114] LexUZ (2024): On measures to implement the innovative Development Strategy of the Republic of Uzbekistan.

[115] UZDAILY (2024): 2024 declared as the year of support for youth and business in Uzbekistan.

[116] LexUZ (2018): On establishing the Youth Innovation Center under the Ministry of Innovative Development of the Republic of Uzbekistan.

[117] LexUZ (2019): On organising the activities of a Business Accelerator Training and Practical Center in Syrdarya region.

[118] LexUZ (2020): On measures for organising Youth Technoparks in the Republic's regions.

[119] Zufarov, D., et. all (2023): Uzbekistan's Ecosystem for Technology Startups.

- 2019 Decision No. 414 “On Approving the Regulations for Investment and Management Companies”[120]
- 2020 Decision No. 684 “On Organising the Activities of the UzVC National Venture Fund”[121]

Decision No. 414 outlines the regulatory framework for investment and management companies in Uzbekistan, specifying the rules for their creation, operation, and the standards they must meet, including transparency, risk management, and reporting obligations to ensure compliance and protection of investor rights. Decision No. 684 establishes the UzVC National Venture Fund, allocated under the MDT, which is intended to finance innovative and high-tech start-ups in Uzbekistan. Following this resolution, the UzVC National Venture Fund was launched in 2021 to finance start-ups.[122]

On October 14, 2024, another resolution, titled “On Measures for Further Development of Start-Up Projects and the Venture Funding Ecosystem”, was officially introduced by the MDT, though its release had originally been anticipated in May 2024.[123]

This new law outlines comprehensive measures aimed at fostering the development of start-up projects and the venture funding ecosystem in Uzbekistan, with a particular emphasis on attracting foreign venture investments and creating a sustainable digital start-up ecosystem. For the first time, the law clearly defines a start-up as an entity operational for 6 months to 7 years, with annual revenue not exceeding UZS 10 billion (approximately USD 830,000), having completed an incubation or acceleration programme, and possessing a business model based on digital technologies. Start-ups registered on a newly created platform (https://startupbase.uz/) will be eligible for various support measures, including matching investment funds of up to USD 100,000 for start-up projects that attract investments from foreign venture funds with assets under management exceeding USD 50 million. Other support measures include funding for international acceleration programmes with a track record of at least 5 years and investments of over USD 100 million, training courses in entrepreneurship, business management, corporate governance, patenting support, and collateral-free loans of up to UZS 300 million (approx. USD 25,000).

Additionally, the law establishes a new venture fund with a USD 10 million charter fund to finance digital technology start-ups through the IT-Park. The National Venture Fund, UzVC, will be reorganised into a ‘Fund of Funds’ to attract both local and international investors.[124]

Furthermore, the resolution proposes the creation of a Coordinating Council to oversee the development of the start-up ecosystem, monitor the implementation of measures outlined in the law, and approve annual ‘roadmaps’ for further improvement. The law also includes a roadmap for additional key measures, such as the development of draft legislation on ‘Alternative Investments’ to regulate relations for attracting local and foreign investments into start-up projects.[125] However, alternative financing instruments, such as equity-based crowdfunding and Simple Agreements for Future Equity (SAFE) notes, remain a significant gap in Uzbekistan’s start-up ecosystem. To address this issue, the latest resolution introduces a special legal regime aimed at facilitating investment in innovative and high-risk start-up projects. Under this regime, venture funds and start-ups with more than 50% state ownership

[120] LexUZ (2019): On approving the regulations for investment and management companies.

[121] LexUZ (2020): On organising the activities of the UZVC National Venture Fund.

[122] Kun.uz (2020): National Venture Fund UzVC to be established in Uzbekistan.

[123] LexUZ (2024): On measures for further development of start-up projects and venture financing ecosystem.

[124] LexUZ (2024): On measures for further development of start-up projects and venture financing ecosystem.

[125] LexUZ (2024): On measures for further development of start-up projects and venture financing ecosystem.

are granted several investment rights, including the ability to issue unsecured loans to start-ups for the development of new technologies and innovations, enter into convertible loan agreements, which allow the conversion of loans into equity shares at a later stage, and sign future capital agreements, granting the right to acquire equity in a start-up once it reaches a specific growth milestone or increases its authorised capital. This special regime thus paves the way for the introduction and testing of new financial instruments, such as SAFE notes and convertible debt, further expanding and diversifying financing options for start-ups in Uzbekistan. However, the legal framework for these instruments remains absent, with the MIIT responsible for drafting the necessary regulations. To support this effort, the MIIT has requested international assistance in developing the required legislative framework.

Despite a multitude of strategies, resolutions and decrees, gaps remain

While the new resolution marks a significant step toward attracting international capital and supporting the start-up ecosystem, several legislative gaps remain. Field research highlighted that despite the absence of provisions for alternative financing options, investor rights protection, and the alignment of contracting rules with the operational realities of start-ups and venture funds have not been sufficiently addressed yet. There is also a need to simplify procedures for closing companies, regulate investments in foreign companies and funds, and provide rules for capital increases, risk distribution, and risk insurance.[126]

Additionally, stakeholders noted gaps in the legal framework concerning General Partners (GPs) and Limited Partners (LPs), which could hinder the establishment of venture capital funds and private equity structures, creating ambiguity for investors, especially foreign ones, who rely on clear definitions of roles, risks, and profit distribution. Tax incentives for investors are another missing element in the ecosystem.

Moreover, while convertible debt is part of the regulatory sandbox outlined in the new resolution, it is limited to venture funds and start-ups with more than 50% state ownership, excluding other actors without state participation. Regarding the financing of acceleration and incubation support, the new law stipulates that organisations managing incubation and acceleration programmes may receive up to 50% reimbursement of their costs for hiring mentors and trainers, with a maximum cap of USD 50,000. However, it does not establish a comprehensive funding mechanism to cover all expenses for support organisations, thereby incentivising the establishment of such entities. However, the Agency for Innovative Development informed the research team that it plans to provide funding support for acceleration programmes through competitive tenders. Additionally, UzVC has expressed plans to support other actors, such as StartupGarage, C-Space, and HackConnect, which have the potential to evolve into VC funds with financial assistance.

Despite the government's recognition of the importance of a start-up ecosystem, as highlighted in various decrees, there is still no comprehensive entrepreneurship or start-up strategy and law, and support programmes remain dispersed across multiple decrees. In 2020, a draft law on start-ups was developed but has not been adopted due to bureaucratic challenges.[127] As delineated, the latest resolution, "On Measures for Further Development of Start-Up Projects and the Venture Funding Ecosystem", promulgated by the MDT, encapsulates fundamental provisions characteristic of comprehensive Start-up Laws. In parallel, a draft resolution formulated by the Agency for Innovative Development was shared with the research team, likewise encompassing critical components typically enshrined in such legislative frameworks. These elements include a structured start-up labelling mechanism, financial support for acceleration programmes through competitive tender processes, among other strategic measures. However, the

[126] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[127] Regulation.gov.uz (2020): Law of the Republic of Uzbekistan "On Startups".

resolution's formal enactment has been impeded by the diffuse allocation of start-up support responsibilities across multiple governmental entities, including the MDT, the Ministry of Economy and Finance, the MIIT, and the Agency for Innovative Development under the Ministry of Higher Education, Science and Innovation. Furthermore, disparities between the two resolutions in defining start-ups and delineating support mechanisms introduce the potential for systemic ambiguity and inefficiencies within the broader entrepreneurial ecosystem. While the MDT emphasises its prioritisation of digital entrepreneurship and the Agency for Innovative Development asserts its primary focus on scientific research-driven start-ups, this distinction is becoming increasingly ambiguous due to the growing integration of digital technologies across modern business models. This institutional fragmentation and conceptual misalignment underscore the imperative for enhanced inter-ministerial coordination and policy coherence. Establishing a harmonised regulatory and support framework is essential to fostering a structured, efficient, and sustainable start-up ecosystem that can effectively respond to the evolving demands of innovation-driven enterprises.

RECOMMENDATIONS

1. Enhance Coordination and Policy Framework:

- *Develop a comprehensive entrepreneurship and start-up strategy and law to consolidate support initiatives and address fragmented mandates across ministries.*

2. Expand Incentives for Venture Investments:

- *Introduce tax incentives such as capital gains tax exemptions, upfront income tax deductions for individual investors, and loss relief for venture capital investments.*

3. Focus on Regional Innovation Hubs:

- *Implement capacity-building initiatives for staff to improve service quality and incentivise private sector stakeholders and international organisations to support start-up development within the regions.*

5. Boost Alternative Financing Mechanisms:

- *Develop the legislative framework for alternative financing mechanisms (equity-based crowdfunding, convertible loans, and stock option schemes) and extend access to private actors, including start-ups and funds with less than 50% state ownership, to encourage broader experimentation with innovative financing instruments.*

6. Strengthen Legislative Framework:

- *Address existing gaps in the legal framework concerning GPs and Limited Partners.*

5.3 FINANCE

VC landscape has seen significant growth in Uzbekistan and is increasingly international

In Uzbekistan, the venture capital landscape has seen significant growth, though challenges remain. VC funding increased from USD 3 million in 2022 to USD 6.3 million in 2023, a 110 % growth rate. According to UzVC, the funding in domestic start-ups even stood at USD 7.1 million.[128] The number of deals in Uzbekistan also grew from 24 in 2022 to 34 in 2023, with investments mostly concentrated in early stages: 22% of deals were at the pre-seed stage, 51% at the seed stage, 13.5 % in the growth stage, and 13.5 % at pre-series A. The average deal size rose from USD 140,000 in 2022 to USD 204,000 in 2023. The sectoral focus was led by fintech, which attracted USD 2.75 million across 12 deals, followed by logtech with USD 1.775 million (4 deals), business management with USD 975,000 (9 deals), retailtech with USD 750,000 (4 deals), and edtech with USD 620,000 (5 deals).[129]

[128] Mastercard (2023): Fintech Market Uzbekistan.

[129] Rise Research et. all (2024): Venture Capital in Central Asia and the Caucasus 2023.

The investor landscape in Uzbekistan is increasingly international, with foreign investors accounting for 60% of total investments in 2023, while local investors contributed 40%. The government remains the largest domestic investor, although foreign venture capital's presence is growing. The country currently hosts over 11 venture capital funds, including AloqaVentures, which has invested USD 2.4 million across fintech, business management, mobility, edtech, and e-commerce sectors. Established in 2021 by Aloqabank with initial capital of UZS 25 billion (approx. USD 2 million), the fund now manages USD 8 million, offering ticket sizes between USD 50,000 and USD 250,000. [130] Its portfolio includes 30 start-ups, with the first exit planned for 2025. Equity stakes range from 1–15%, with most investments falling between 1–5%.

Corporate venture capital is slowly emerging in Uzbekistan, with Uzcard, a state-owned payments company, creating a USD 1 million venture fund in 2021 to support start-ups through its fintech accelerator. However, research revealed that the websites of both the fund and the accelerator were inaccessible. Stakeholders further confirmed that Uzcard's activities have significantly slowed, raising concerns about its operational status.

Government-led initiatives continue to play a significant role but are co-investing with private VC funds

Government-led initiatives continue to play a significant role, with UzVC investing USD 880,000 across fintech, business management, agritech, edtech, and insurtech.[131] To date, nine start-ups have received support from UzVC, each with an average ticket size of USD 100,000. UzVC has co-invested in several ventures alongside Aloqa Ventures, including Zypl.AI, Mohirdev, Depozit.UZ, and Cargon. The fund anticipates its first exit in 2025. While UzVC is set to evolve into a 'Fund of Funds' in the future, the new law also envisions the establishment of a dedicated venture fund at the IT Park, with an initial capital of USD 10 million.[132] The fund was officially launched in December 2024. While the average investment size will be USD 150,000, the fund plans to invest across stages, from idea development to Series A, with funding ranging from USD 10,000 to USD 1 million. The primary sector focus of the IT Park VC fund will be in AI and machine learning, with 50-60% of investments allocated to these areas. Other priority sectors include green technologies (greentech), educational technologies, fintech, and game development. Approximately 75-85% of the USD 10 million fund will be directed toward direct investments, with the remaining funds supporting the Local2Global programme, which aims to promote start-ups and businesses in international markets.[133]

Ecosystem stakeholders have noted that none of these funds are strategically designed to support women or address their specific resource needs. Additionally, concerns have been raised that, due to a limited pool of high-quality start-ups, most funds have concentrated their investments in the same ventures.

The new resolution issued in October 2024 also allows commercial banks and economic societies with a state share of more than 50% to establish venture funds, implement venture investments, and offer special leasing conditions to start-up. However, these provisions explicitly exclude private banks with a smaller state ownership share from participation.

Overall, Uzbekistan's VC ecosystem remains largely government driven. Experience from other countries suggests that direct government investment in venture capital funds often yields limited success. Instead, governments typically act as 'funders of funds', providing capital to private VC firms that are better equipped to assess start-up risks and opportuni-

130 UZDAILY (2021): Aloqabank established a venture fund Aloqaventures.

131 Rise Research et. all (2024): Venture Capital in Central Asia and the Caucasus 2023.

132 LexUZ (2024): On measures for further development of start-up projects and venture financing ecosystem.

133 UZ Daily (2024): Venture fund launched in Uzbekistan.

ties. As previously noted, the new resolution introduced in October 2024 seeks to transform the UzVC National Venture Fund into a 'Fund of Funds', marking a positive step forward. The legislation also includes provisions for matching investment funds of up to USD 100,000 for start-up projects that secure investments from foreign venture funds with assets under management exceeding USD 50 million.[134] While USD 50 million represents a medium-sized fund, this requirement could inadvertently restrict the entry of smaller funds into Uzbekistan, potentially limiting the diversity of investment opportunities.

An emerging angel network

Despite the expansion of venture capital activity, Uzbekistan is still in the early stages of developing a structured angel investment network. C-Space, a co-working space and start-up ecosystem developer, launched the C-Space Angel Club in 2024. The club currently includes 15 angel investors who have collectively funded three start-ups. The initiative is supported by UNDP through training and capacity-building programmes, in collaboration with MOST Ventures, a venture capital fund based in Kazakhstan. While this marks a positive step forward, other countries have successfully institutionalised angel networks by providing training, tax incentives, and subsidies to foster angel investment. The absence of such structural support in Uzbekistan significantly limits the availability of early-stage funding.[135]

Bank loans continue to be one of the financing options available to entrepreneurs. Under the new resolution introduced in October 2024, the IT Park is authorised to provide unsecured loans to start-ups at an attractive interest rate. This initiative aims to alleviate the financial burden on emerging businesses and foster innovation.[136]

Moreover, as highlighted previously, Uzbekistan has yet to implement several financing mechanisms that are widely used in other countries. Equity-based crowdfunding, convertible loans, and stock option schemes, which could provide alternative funding solutions for start-ups, currently lack the necessary legal and regulatory frameworks.

While Uzbekistan's venture capital sector is progressing, a more structured strategy is required to bolster angel investments, enact regulatory reforms for alternative financing, and provide government support for private venture capital initiatives.

RECOMMENDATIONS

1. Strengthen Angel Investment Networks:

- *Institutionalise angel investment networks by offering targeted training, tax incentives, and subsidies to foster early-stage funding opportunities. Support initiatives such as the C-Space Angel Club with additional resources to scale their activities.*

2. Diversify Venture Capital Funding Sources:

- *Encourage international venture funds with diverse asset sizes to invest in Uzbekistan by lowering the minimum asset management threshold for foreign funds eligible for matching investments.*

3. Enhance Focus on Women Entrepreneurs and Greentech:

- *Facilitate the creation of dedicated funds to meet the unique needs of women entrepreneurs and encourage investments in greentech. This includes supporting the establishment of gender-focused venture funds or incentivising the relocation of international funds to Uzbekistan, delivering targeted capacity-building programmes, and providing financial incentives for start-ups led by women or operating in environmentally sustainable sectors.*

[134] LexUZ (2024): On measures for further development of start-up projects and venture financing ecosystem.

[135] Zufarov, D., et. all (2023): Uzbekistan's Ecosystem for Technology Startups.

[136] LexUZ (2024): On measures for further development of start-up projects and venture financing ecosystem.

5.4 SUPPORT

To assess the maturity of Uzbekistan's digital start-up ecosystem, it is essential to analyse the organisations driving its development and their respective roles. Although the ecosystem is expanding with the establishment of numerous actors, the following highlights the most active and significant contributors.

IT Park

The IT Park is the most active player in Uzbekistan's entrepreneurship ecosystem. As of 2024, it has supported over 500 start-ups, with 260 still in operation.[137] The IT Park provides incubation and acceleration support and facilitates various programmes, often in collaboration with local ecosystem stakeholders. For instance, jointly with C-Space, the IT Park hosts start-up contests. In collaboration with AloqaBank and its venture arm, AloqaVentures, the IT Park launched the second wave of the AloqaTech Lab Technology Entrepreneurship Development Programme in December 2024, a corporate accelerator designed to introduce innovative services and products on AloqaBank's platform.

Additionally, in August 2024, the IT Park introduced the Local2Global Programme to help member companies expand into international markets. Funded by the IT Park's new venture capital fund, the programme offers a variety of benefits, including covering up to 50% of client travel expenses to Uzbekistan, export consulting and mentoring services, free access to Coursera courses, and financial support for participation in international exhibitions and seminars. In December 2024, the IT Park introduced the Digital Start-ups Programme, aligning with the provisions of the new resolution enacted in October 2024. This comprehensive initiative provides significant support to start-ups registered under the programme, including reimbursement of up to 50% of costs for incubation and acceleration programmes, capped at USD 20,000, and full reimbursement for intellectual property (IP) registration and patenting costs, as well as the unsecured loans previously mentioned, empowering start-ups to scale and innovate effectively.[138] [139]

Strategic partners and key ecosystem stakeholders for the IT Park are C-Space, AloqaVentures, Plug and Play, Startup Garage and U-Enter Entrepreneurship Innovation Centre.

C-Space

C-Space is an infrastructure-oriented business operating four co-working spaces and two offices. Beyond providing office and co-working facilities, C-Space actively contributes to the start-up ecosystem by offering community-building initiatives and support for corporate and government stakeholders. The organisation is planning to launch its own accelerator programme and has taken steps to establish an angel investor network, the C-Space Angel Club.

Plug and Play

Plug and Play commenced operations in Uzbekistan in October 2022 and is involved in three key activities:

1. Acceleration Programme: To date, Plug and Play has accelerated 40 start-ups across three batches, including one exclusively focused on women entrepreneurs.
2. Corporate Innovation: The programme connects start-ups with corporate entities to foster innovation.

[137] IT Park (2024): Presentation of the Digital Startups Program: Support for Startups.

[138] Daryo (2024): IT Park Uzbekistan launched Local2Global to expand member companies internationally.

[139] IT Park (2024): Presentation of the Digital Startups Program: Support for Startups.

3. Venture Capital: Plug and Play has invested in two Uzbek start-ups, Zypl.AI and PointAI, with investment amounts ranging from USD 50,000 to USD 150,000.

Plug and Play operates sector-agnostically. The first cohort emphasised fintech, enterprise tech, retail, and insurtech, while subsequent batches also included start-ups in crypto, AI, and healthtech.

UzVC

While UzVC is primarily known as a venture capital fund, it also plays a critical role in supporting start-ups. In 2022, UzVC launched the Start-up Growth Programme, a six-month initiative designed to help start-ups secure international funding. The programme brings in international mentors, assigning 2-3 mentors to each start-up. This approach has yielded significant results, with 8 out of 9 participating start-ups securing external funding from sources in Kazakhstan, Georgia, and the MENA region.

Startup Garage

Startup Garage, a recent entrant to the ecosystem, is a spin-off of Mohirdev, Uzbekistan's leading IT education and learning platform. Functioning as a venture studio, Startup Garage provides comprehensive support to start-ups at every stage of development, from ideation and team formation to securing initial funding through partnerships with various venture capital funds. The studio primarily focuses on fintech, edtech, AI, e-commerce, proptech, medtech, and govtech. Within its first months, Startup Garage onboarded 50+ start-ups providing consulting and facilitating initial investments. Its key partners include AloqaBank and AloqaVentures. Additionally, it aims to establish 13 branches across Uzbekistan by 2025.

Startup Garage is also in the process of establishing its own VC fund, targeting USD 2 million. The planned sector focus includes edtech and fintech, with AI as a cross-cutting theme. Anticipated investment ticket sizes range from USD 50,000 to USD 150,000. To date, the fund has secured USD 500,000 to USD 600,000 in commitments.

U-Enter Entrepreneurship Innovation Centre

The U-ENTER Entrepreneurship Innovation Centre, established in 2023, is the latest addition to Uzbekistan's start-up ecosystem. Supported by the Chamber of Commerce and Industry of Uzbekistan, TOBB ETU Tashkent University, and the Korea International Cooperation Agency (KOICA), the Centre aims to stimulate economic growth through the promotion of innovative entrepreneurship and the development of the start-up ecosystem. The Centre features a range of facilities, including office and co-working spaces, lecture halls, a media studio, and a makerspace equipped with advanced digital manufacturing tools. In addition, the Centre operates an IT Academy offering free courses in programming languages and technologies such as Java, Python, C++, UI/UX design, and Arduino robotics. The U-ENTER Centre also hosts a variety of programmes, primarily supported by development organisations like KOICA, UNDP, and GIZ. Notable initiatives include the U-Start Acceleration Programme, an 8-week programme that connects Uzbek start-ups with opportunities in Korea, and the Green Start Start-up Support Programme, among others.

StartupFactory

The previously mentioned actors maintain close collaboration with the MDT. In contrast, StartupFactory was historically more aligned with the former MID. With support from the Ministry, StartupFactory has previously implemented several acceleration programmes, focusing on sectors such as medtech and agritech, and was actively involved in the C.A.T Science Accelerator. However, the StartupFactory is no longer participating in the 2024 cohort of the C.A.T Science Accelerator. In recent years, the organisation's activities have declined, and it now operates primarily under a donor-funded business model, delivering programmes on behalf of larger development organisations.

Tech4Impact

Run by the same founders as the StartupFactory, Tech4Impact is a non-profit organisation established in 2019 to support development of innovations, information technologies, start-ups, human capital, green technologies, youth and women's entrepreneurship in Uzbekistan and the Central Asian region. Similarly to StartupFactory, Tech4Impact is mostly run on a donor-based funding business model. They run incubation programmes for women in the regions (e.g., the "Accelerate the creation of women's green technology start-ups in Uzbekistan" programme, "Technovation Girls Uzbekistan", etc.), do Science, Technology, Engineering and Mathematics (STEM) and IT-related projects for girls (e.g., the "STEM-programme for girls on launching nanosatellites") and IT and digital internship programmes. They are oriented towards impact, social and green entrepreneurship activities, mostly targeting women.

MID & Centre for Advanced Technologies

The MID, established in 2017, was tasked with fostering the development of the start-up ecosystem. Following a reorganisation in early 2022, MID was integrated into the newly named Ministry of Higher Education, Science and Innovation and rebranded as the Agency for Innovative Development. As noted, the Agency for Innovative Development continues to provide grants for research-focused start-ups. According to the Agency, more than 15 incubation and acceleration programmes have been conducted to date. Additionally, the Centre for Advanced Technologies operates under the Ministry of Higher Education, Science and Innovation. The Centre manages the C.A.T. Accelerator Programme, which commenced its fifth cohort in 2024, featuring 12 start-ups. This accelerator programme supports start-ups across several key sectors, including green technologies, diagnostics and biomedicine, advanced materials, alternative energy, food technologies, and IT+science. Specific emphasis in the IT domain is placed on AI and digital technologies aimed at improving health outcomes and educational skills. Ecosystem stakeholders noted that the Centre also operates a makerspace, providing entrepreneurs with facilities to develop and build prototypes.

Youth Technoparks and Innovation Centres

As highlighted, to date various Youth Technoparks have been established. These Technoparks are designed to support young entrepreneurs by providing access to workspace, prototyping and laboratory services, patenting assistance, consulting and mentorship, project development, as well as acceleration and incubation programmes.

For example, in 2021, the "Inno" Educational and Production Technology Park was launched on the student campus in Tashkent, spanning an area of 2 hectares at a cost of UZS 114 billion (approximately USD 8.9 million). This state-of-the-art facility is fully equipped with modern infrastructure and resources, catering to around 4,000 young individuals. According to available data, young innovators at the park have developed 54 prototypes, leading to the creation of 11 start-up enterprises and generating 84 new jobs.[140]

According to the Agency for Innovative Development, overall these parks and centres have engaged 2,500 young individuals. Additionally, 100 start-up projects have been launched.

However, start-up ecosystem actors expressed concerns about their effectiveness, particularly in regional areas, citing management by government representatives as a limiting factor. They emphasised that most regional start-up support is government-led and advocated for greater involvement of the private sector to enhance the success and sustainability of

[140] Zufarov, D., et. all (2023): Uzbekistan's Ecosystem for Technology Startups.

these initiatives. The Agency for Innovative Development has acknowledged that existing acceleration and incubation programmes for start-ups do not meet the required standards and that the number of acceleration programmes in youth technoparks remains insufficient. To address this challenge, the Agency plans to establish regional innovation hubs through collaboration with international organisations. Additionally, accelerator programmes will be selected through a competitive tender process. Furthermore, Plug and Play has stated that it is in discussions with the World Bank to support the development of regional start-up ecosystems.

University incubation

The university incubation ecosystem is widely regarded by stakeholders as nascent, with the understanding of entrepreneurial support within universities still in its formative stages. While IT Park highlights the existence of 46 incubations programmes at universities stakeholders confirmed that entrepreneurship promotion in universities remains mostly absent. Among the most active institutions in this domain is WIUT, particularly through its INNOWIUT start-up centre. Recently, WIUT launched the "Empowering Female Entrepreneurs Programme", a dedicated track to support women entrepreneurs. WIUT has established active collaborations with corporations such as Bloomberg and SAP. Notably, in partnership with SAP, the university created a laboratory supported by the SAP Next-Gen Lab to facilitate collaboration and train highly skilled personnel. Among the notable start-ups nurtured by INNOWIUT are TASS and PointAI.

As university-level entrepreneurship support is still in its infancy, so too is the concept of 'entrepreneurial universities'. Team University, the first institution to adopt this model, was recently established, offering comprehensive entrepreneurship education. However, it currently lacks its own incubator.

To address this gap, C-Space has proposed the establishment of an intra-university incubator at its premises. This initiative aims to involve multiple universities, including Tashkent State University of Economics, IT Park University, and Turin Polytechnic University. The concept is set to be implemented with support of UNDP.

Overall, ecosystem stakeholders emphasised the need for universities to evolve beyond their traditional role of producing workforce-ready graduates and embrace their potential as hubs for fostering entrepreneurship and innovation.

Corporate incubation

Similarly, corporate incubation in Uzbekistan is still in its early stages, with only a few entities recognising the value of collaboration with start-ups. Among the most active players is AloqaBank, which supports start-ups through its AloqaVentures initiative, offering both equity funding and venture-building services.

In 2022, UzCard took steps to engage in the ecosystem by launching the UZCARD Ventures Fund and a Fintech Accelerator. However, UzCard's involvement has since become inactive, with no notable activity over the past two years. Stakeholders have attributed this dormancy to dissatisfaction among UzCard's management with the quality of start-ups in the ecosystem, which led to its withdrawal from active participation.

While key ecosystem actors have signed Memorandums of Understanding (MoU) with corporates and conduct joint initiatives, the presence of fully corporate-led incubation programmes remains limited. This highlights a significant opportunity for further development in this area. However, the new resolution "On measures for further development of start-up projects and venture funding ecosystem" tries to address this gap by encouraging corporate involvement. It allows commercial banks and SOEs (with over 50% government ownership) to establish Start-up Studios when investing in start-ups. These entities can provide free access to vacant properties and equipment and transfer management rights to IT Park, its branches, or other ecosystem participants for professional oversight. They can also lease properties to registered start-ups at the lowest government-set rates, fostering a stronger public-private partnership model.

Building a Support Ecosystem: Addressing Existing Gaps

The start-up support ecosystem in Uzbekistan has seen significant growth in recent years, with the emergence of new actors. However, government entities continue to dominate the landscape, centralising support efforts. A notable step toward engaging private actors is, as highlighted, the introduction of the resolution "On Measures for Further Development of Start-Up Projects and the Venture Financing Ecosystem". This legislation introduces provisions to cover up to 50% of costs associated with hiring mentors and trainers for business entities running incubation and acceleration programmes, with a cap of USD 50,000. This marks a critical step in allowing private entities to receive government backing. The Agency for Innovative Development also noted plans for a forthcoming decree to fund accelerators and incubators directly.

Despite these developments, the ecosystem faces several challenges that need to be addressed for sustained growth. One of the most pressing issues is the lack of high-quality mentorship. As the start-up sector is still in its infancy, there is a dearth of experienced mentors capable of guiding entrepreneurs through the complexities of early-stage business development. Stakeholders emphasised the need for more international expertise and greater involvement from local ecosystem leaders who can inspire and mentor aspiring entrepreneurs. Another significant challenge highlighted by ecosystem stakeholders lies in the limited knowledge and capacity to support the internationalisation of start-ups.

Regional disparities further compound these issues. While the start-up ecosystem in Tashkent is rapidly evolving, support in other parts of the country remains insufficient. Technoparks, which are supposed to act as key support structures in the regions, have struggled to fulfil their mandates effectively. Stakeholders have stressed the need for increased government efforts to enable private actors in these regions to foster entrepreneurship and bridge the development gap.

The quality of start-ups in Uzbekistan also reflects broader systemic challenges. Stakeholders highlighted the importance of integrating entrepreneurship education more effectively into university curricula to better prepare future entrepreneurs. Universities need stronger incubation programmes to serve as foundational support for early-stage ventures. However, the disconnect between academic institutions and the entrepreneurial ecosystem remains a barrier.

Collaboration within Uzbekistan's start-up ecosystem reveals a strong network among actors affiliated with the MDT, including Plug and Play, C-Space, and Startup Garage. In contrast, partnerships with entities traditionally aligned with the Ministry of Higher Education, Science and Innovation are less consistent. This misalignment creates friction, as the Ministry of Higher Education, Science and Innovation is also engaged in supporting IT-based scientific start-ups. This gap also hampers efforts to foster commercialisation and the development of science-based start-ups. Furthermore, the absence of a national start-up association, such as those seen in other countries, further hampers collaboration and coordination across the ecosystem. Such an organisation could bridge gaps between ministries, sectors, and regions, creating a more cohesive and integrated framework for start-up development.

Adding to these challenges is the lack of adequate infrastructure, particularly laboratory facilities. While the U-Enter Innovation Centre has introduced FabLabs to address this gap, the IT Park – the largest support organisation for digital businesses – does not offer hardware prototyping and testing facilities that are crucial for digital start-ups developing physical components. This shortfall limits the ability of start-ups to innovate and refine their products effectively.

Another gap in identifying start-ups, tracking investments, and monitoring events within the ecosystem is being addressed through the establishment of the Start-up Base platform (https://dev.startupbase.uz/). This platform consolidates a comprehensive database of promising start-ups, their founders, as well as associated partners and investors, facilitating greater transparency and accessibility within the ecosystem. Similarly, the Agency for Innovative Development has launched another platform, https://startup.ilmiy.uz/, which serves as a centralised hub for start-ups in Uzbekistan. This platform provides entrepreneurs and innovators with access to essential resources and information, including details on competitions, participants, winners, and various start-up projects, with the overarching goal of fostering and strengthening the country's start-up ecosystem. These initiatives align with global best practices in start-up ecosystem development, where centralised platforms enhance visibility and connectivity within entrepreneurial networks. However, given that the responsibility for start-up ecosystem development is spread across multiple ministries, these parallel efforts risk redundancy. To maximise efficiency and avoid duplication, a single, independently managed platform consolidating all start-up-related information would provide a more streamlined and effective approach to ecosystem development.

RECOMMENDATIONS

1. Enhance Collaboration between Ecosystem Actors:

- *Foster stronger alignment and collaboration between actors affiliated with the Ministry of Digital Technologies and the Ministry of Higher Education, Science and Innovation to create a cohesive ecosystem supporting science-based and IT start-ups.*

2. Build a National Start-up Association:

- *Establish a national start-up association to unify ecosystem stakeholders, advocate for policy improvements, facilitate mentorship and networking, expand regional support, and foster international collaborations.*

3. Strengthen Mentorship and Expertise:

- *Leverage international partnerships to attract experienced mentors and establish a mentor certification programme to improve the quality of local support.*

4. Establish an Intra-University Incubator:

- *Facilitate the establishment of intra-university incubators, promoting collaboration between institutions to share resources and expertise, while offering capacity-building programmes for university staff on entrepreneurship and incubation.*

5. Establish Infrastructure for Innovation:

- *Expand access to fabrication labs and similar infrastructure to enable start-ups to prototype and test innovations. Ensure these facilities are available across regions to encourage entrepreneurship beyond urban hubs.*

6. Centralised Independent Start-up Platform:

- *Develop a centralised, single, independently managed platform consolidating all start-up-related information.*

5.5 START-UP SURVEY

To assess the state of digital entrepreneurship and the key concerns of entrepreneurs, a survey was conducted, yielding 20 responses. While the sample size is not fully representative, it offers valuable insights into the current landscape of digital entrepreneurship in Uzbekistan. It substantiates some of the findings and provides further recommendations for improving the start-up ecosystem in Uzbekistan.

The start-up ecosystem is characterised by pre-dominantly early-stage start-ups

The majority of businesses that participated in the survey belong to the ICT sector (5), followed by e-commerce (4), with three of those also identifying as part of the marketplace sector. Additionally, three energy start-ups took part, one of which also operates in the mobility sector. The fintech sector was represented by three start-ups, one of which also classified itself as an e-commerce/marketplace business. Two logistics start-ups participated, one of which indicated to be a digital logistics company. Similarly, two mobility start-ups responded, with one also identifying as part of the energy sector. Other sectors were represented by a single start-up each, including edtech, foodtech, and healthtech. Additionally, one start-up classified itself as a human resources business.

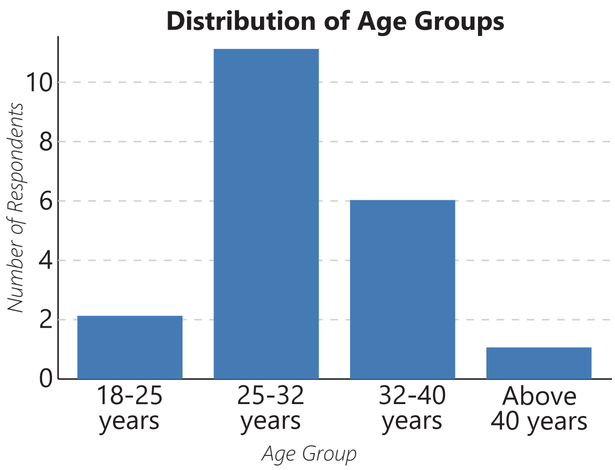

Figure 3: Distribution of age groups among start-up founders

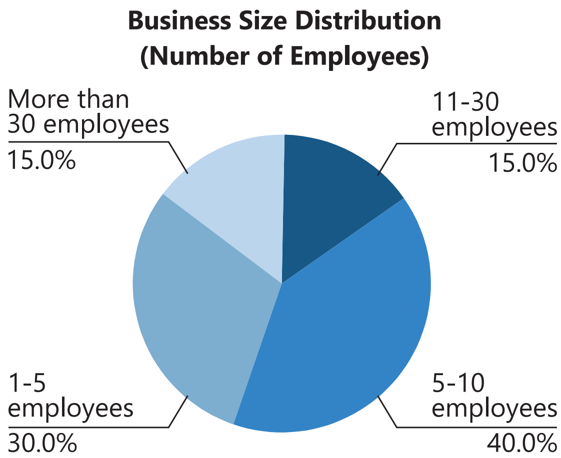

Figure 4: Distribution number of employees

The majority of start-up founders fall within the 25-32 age range, followed by those aged 32-40. Only one founder was over 40, indicating that the entrepreneurial landscape is predominantly driven by young founders. The majority of surveyed businesses (55%) have been operating for 1-3 years, reflecting a strong presence of early-stage start-ups. 25% of respondents reported being in operation for less than 1 year, while 15% have been active for 3-5 years. Only one business has been operating for more than 5 years.

The majority of surveyed start-ups (40%) have 5-10 employees, followed by 30% with 1-5 employees. Additionally, 15% of start-ups have either 11-30 employees or more than 30 employees.

Reflecting the characteristics of an early-stage ecosystem, the majority of surveyed start-ups are in the Pre-seed (20%) and Seed (55%) stages. Only 15% have reached the Early Growth phase, while 10% classify themselves as established businesses.

When asked about their primary customer engagement model, with the option to select multiple responses, 85% of start-ups indicated operating under a Business-to-Business (B2B) model, followed by 65% utilising a B2C model. Additionally, 15% reported engaging with the government (Business-to-Government (B2G), while 10% identified as using a Consumer-to-Consumer (C2C) model.

Access to capital remains the biggest challenge for start-ups

When asked about their greatest challenge, 70% of respondents (14 start-ups) identified access to capital as the most significant obstacle. This finding underscores that, despite recent improvements, securing funding remains a major barrier. Customer acquisition was identified as a challenge by 40% (8 start-ups). Scaling and expansion was reported by 35% (7 start-ups), suggesting that further support is needed for business growth. Both recruiting skilled talent and regulatory and legal barriers were mentioned by 30% (6 start-ups) each. Infrastructure and digital access, along with market competition, were the least reported challenges, each cited by 15% (3 start-ups). Interestingly, regulatory and legal barriers were the most frequently highlighted challenge among early-growth and established start-ups, cited by 60% of respondents in this category.

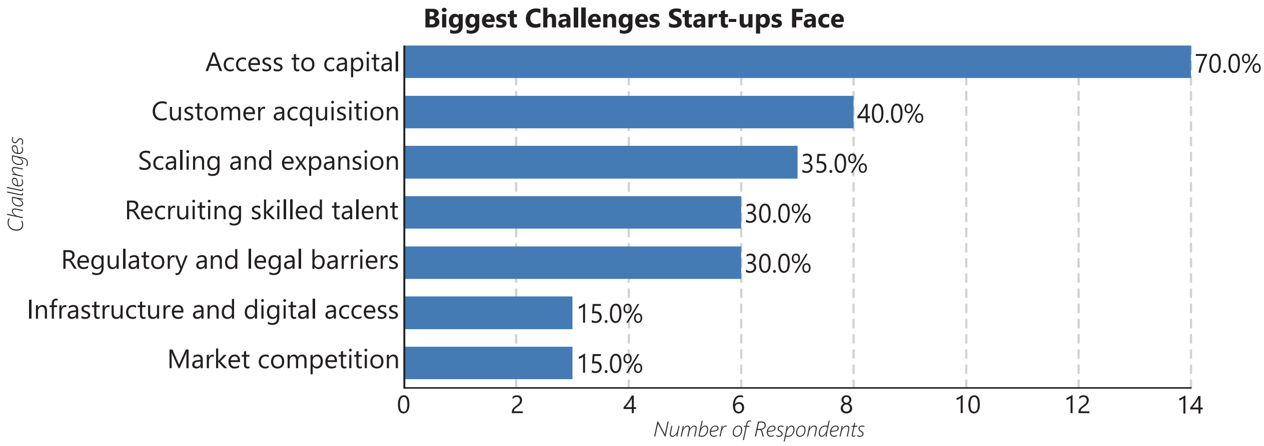

Figure 5: Challenges faced by start-ups

SaaS, mobile app development and AI among the most leveraged technologies

When asked which technologies they leverage, the most widely used technology among surveyed start-ups is SaaS (Software as a Service) Platforms, mentioned by 50% of all start-ups, suggesting that many businesses rely on cloud-based services for their operations. Mobile Applications Development technologies follow closely, with 40% (8 mentions). Interestingly, AI and Machine Learning (ML) tools are highly utilised as well, with 35% and 30% mentioning it respectively, highlighting the growing importance of AI-driven innovation. The recently released DeepSeek AI model, DeepSeek-R1, is expected to further accelerate AI development. As an open-source model, it grants developers the freedom to use, modify, and commercialise its capabilities. This openness is anticipated to drive innovation, lower development costs, and enhance accessibility within the AI community.

The technologies utilised by start-ups were analysed in relation to the most critical technical roles required for their growth. Software Developers/Engineers emerged as the most essential role, with 70% of start-ups identifying it as crucial. This aligns directly with the widespread adoption of SaaS platforms (50%), reinforcing start-ups' reliance on cloud-based software solutions. Similarly, 40% of start-ups leverage Mobile Application Development technologies, which corresponds with the 35% demand for Mobile Application Developers, highlighting the growing significance of mobile solutions in digital business models. A strong correlation is also evident between the demand for AI/ML Engineers (35%) and the prevalence of AI & Machine Learning technologies (35%). This suggests that start-ups are actively integrating AI-driven

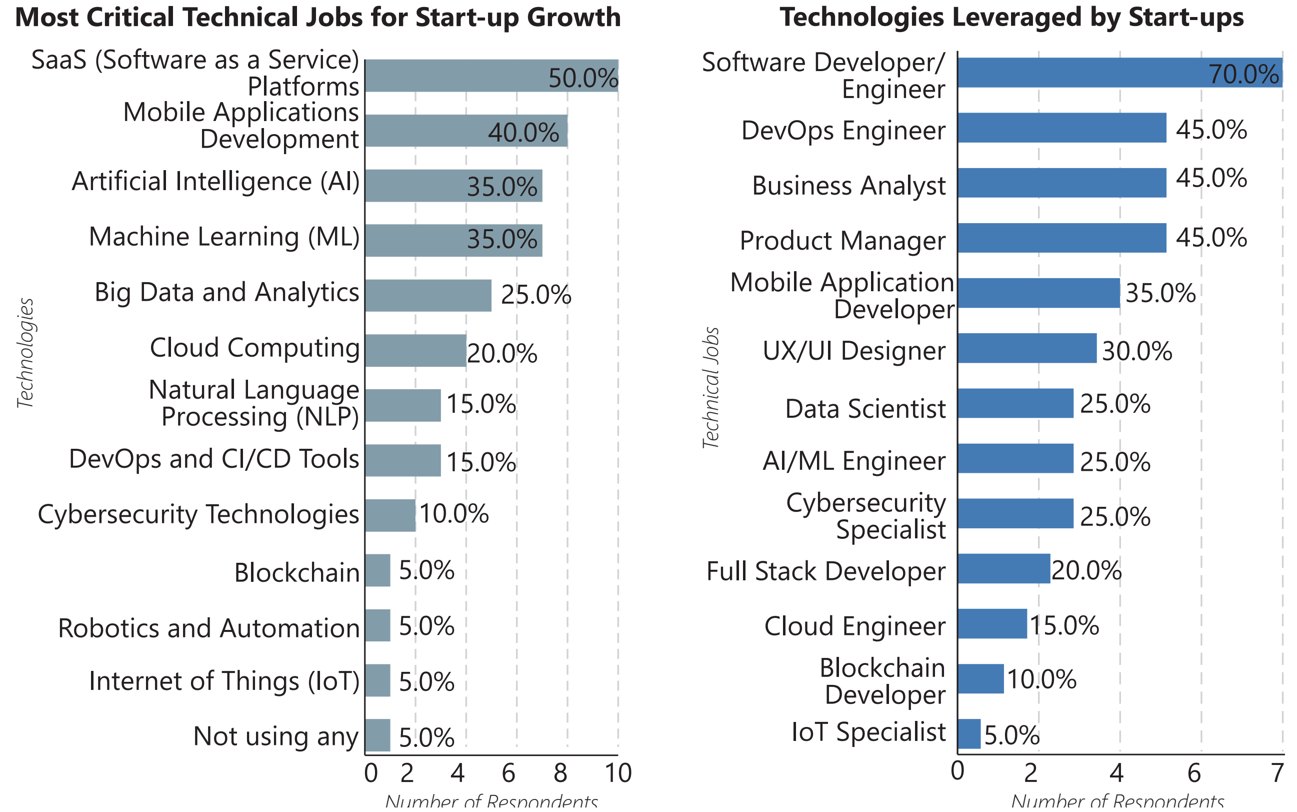

Figure 6: Technologies leveraged by start-ups and most critical technical jobs required for growth

solutions and consider AI/ML expertise essential for innovation and scalability. However, an interesting disparity arises when analysing DevOps Engineers, where 45% of start-ups consider them crucial, yet only 15% report using DevOps & CI/CD tools. This suggests that while start-ups acknowledge the importance of DevOps for automation, deployment, and infrastructure management, start-ups may still face challenges in fully implementing these tools. Potential reasons for this gap may include skill shortages, limited resources (especially in early-stage start-ups that may not yet require full-scale DevOps automation), and the prioritisation of other technologies such as AI and SaaS, which may take precedence over DevOps investment. Another key technical role for start-up growth is that of Business Analysts, with 45% of start-ups identifying them as essential. This reflects an increasing reliance on data-driven decision-making and business intelligence. However, despite this recognition, only 25% of start-ups report leveraging Big Data & Analytics technologies, suggesting a gap between acknowledging the value of data-driven roles and having the necessary infrastructure to support them. This discrepancy indicates that while start-ups see the potential of business intelligence, many may still be in the process of developing their data analytics capabilities.

In line with this, start-ups were also asked about the barriers to adopting new technologies within their businesses. Lack of skilled personnel emerged as the most significant challenge, cited by 50% of all start-ups, followed by high costs and limited access to resources, each reported by 35%. Notably, only 10% of respondents identified the complexity of new technologies as a barrier, suggesting that start-up founders have a strong awareness and understanding of emerging technologies.

Technical skills not top priority for start-ups but financial and business skills

Despite the importance of technology, technical skills were not identified as the top priority for start-ups. Instead, 70% of surveyed start-ups emphasised financial management and marketing and sales as the most critical skills, followed closely by leadership and management, cited by

65%. While technical skills and product development skills were still recognised by more than half of the respondents, the findings suggest that start-ups perceive greater gaps in financial and business competencies compared to technical expertise.

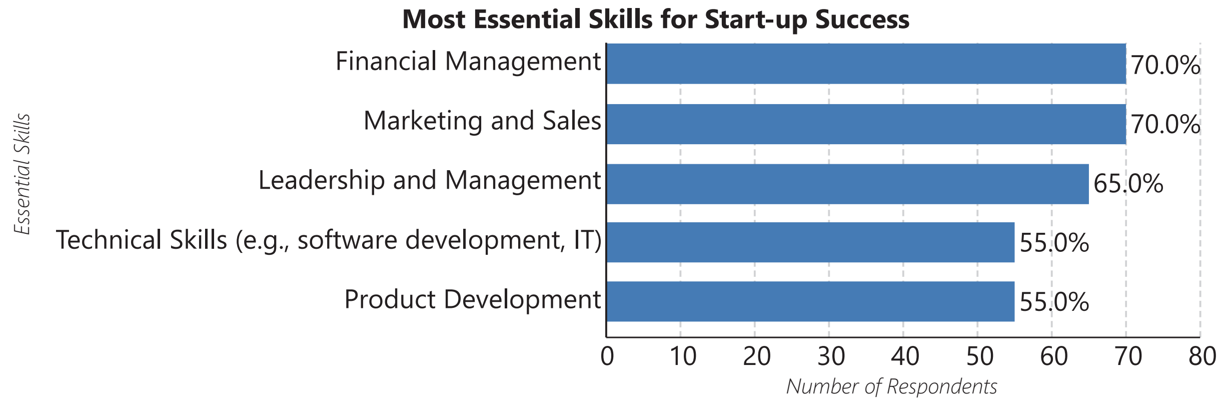

Figure 7: Essential skills for start-up success

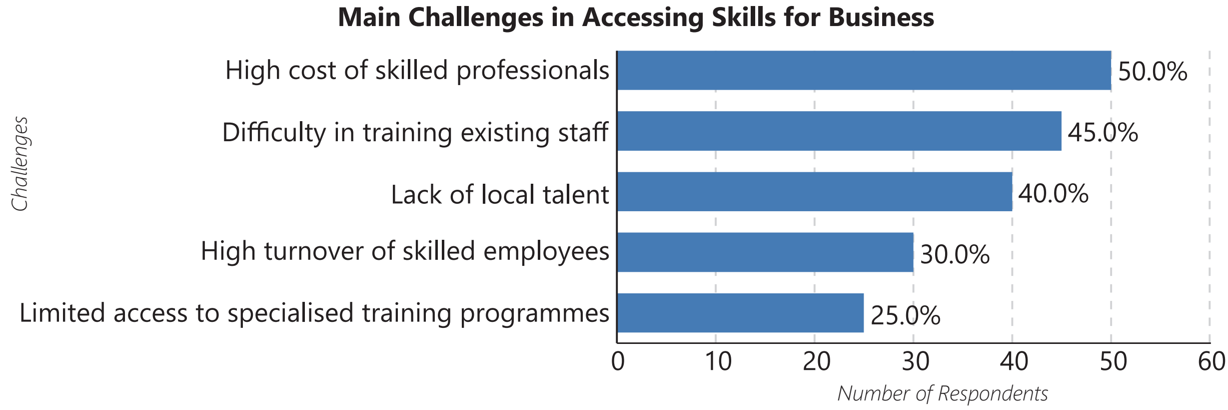

Figure 8: Main challenges in accessing relevant skills

When asked about the challenges start-ups face in accessing the skills required for their business, 50% of respondents identified the high cost of skilled professionals as a major barrier. Additionally, 45% of start-ups cited difficulty in training existing staff as a significant challenge. This indicates that even when start-ups successfully hire employees, they often lack the necessary resources, time, or access to high-quality training programs to upskill their workforce. The third most commonly reported challenge was the lack of local talent, mentioned by 40% of start-ups. This highlights that, despite ongoing updates to educational curricula, further alignment between academic training programmes and industry needs remains essential to ensure graduates are equipped with the skills required by the market.

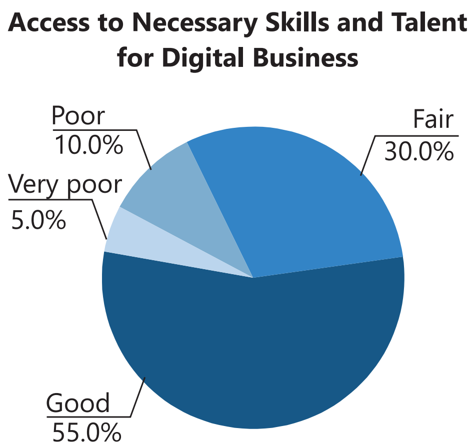

Figure 9: Rated access to necessary skills and talent

The majority of start-ups (55%) consider their access to necessary skills as good, indicating a moderate level of satisfaction with the availability of skilled talent. An additional 30% rate it as fair, suggesting that while they have some access, there are still notable challenges. However, the fact that no respondents rated their access as "very good" highlights a gap in meeting the highest standards of skill availability. Moreover, 15% of start-ups (10% poor, 5% very poor) struggle significantly with accessing the talent they need, which could hinder their growth and innovation potential.

Most start-ups are bootstrapped and rely on small funds

Start-ups were thoroughly assessed regarding their funding situation to understand their primary financial sources and challenges in securing investment. The findings indicate that bootstrapping is the most common funding method, with 50% of start-ups relying solely on their own financial resources. Private investors (40%) and family and friends (35%) also play a significant role, emphasising the importance of informal financing networks in early-stage ventures. Bank loans, on the other hand, are utilised by only 10% of start-ups, likely due to the difficulties in securing loans and the early-stage nature of these businesses. Crowdfunding remains the least used funding source, with only 5% of start-ups opting for this method, primarily due to uncertainties in the legal framework, particularly concerning equity crowdfunding.

The amount of funding raised indicated early development stages of start-ups, with 40% securing less than USD 10,000. Additionally, 15% of start-ups have raised between USD 10,000 and USD 20,000, while another 15% have managed to secure between USD 50,000 and USD 150,000. This distribution reflects that only a small proportion of start-ups have been able to secure moderate funding amounts or are not yet at this stage. The current funding needs further highlight this trend, as 35% of start-ups are actively seeking pre-seed funding, while 30% are looking for seed funding. This indicates that the majority of start-ups remain in the early stages of development and require initial capital to grow and scale. Access to finance remains a major challenge for half of the start-ups surveyed, underscoring significant gaps in financial support. This is further underpinned by the large number of start-ups that rely on bootstrapping, personal savings, or financial support from family and friends.

To better understand these barriers, start-ups were asked to identify the main challenges they face when securing funding. The most frequently cited issue, mentioned by 45% of respondents, was the inadequate local investment ecosystem. This suggests that many start-ups struggle to find accessible funding sources, investment networks (including business angels), and venture capital support, limiting their ability to secure necessary financial backing. Additionally, 40% of start-ups reported a lack of investor interest as a significant hurdle. Even when funding sources are available, many start-ups struggle to attract investors, likely due to market risk perceptions, low confidence in early-stage ventures, or inadequate growth projections for their business models. High interest rates were also highlighted as a challenge by 30% of respondents. The cost of borrowing remains a significant burden, discouraging start-ups from seeking bank loans as a viable financing option. Similarly, 30% of start-ups mentioned that high equity expectations from investors posed a challenge. Some investors demand significant ownership stakes in exchange for funding, making external investment less attractive for founders and raising concerns about the long-term sustainability of start-up ownership structures. This challenge may also stem from limited knowledge among investors regarding start-up valuation and investment strategies. In addition to these financial constraints, 25% of start-ups stated that they lacked knowledge about available funding sources and potential investors. This lack of awareness limits their ability to strategically approach financial support and secure investment opportunities. Another 25% of start-ups struggled with documentation and grant compliance requirements, which further complicates their ability to access funding. Meeting the necessary paperwork requirements for funding applications, such as financial statements and business plans,

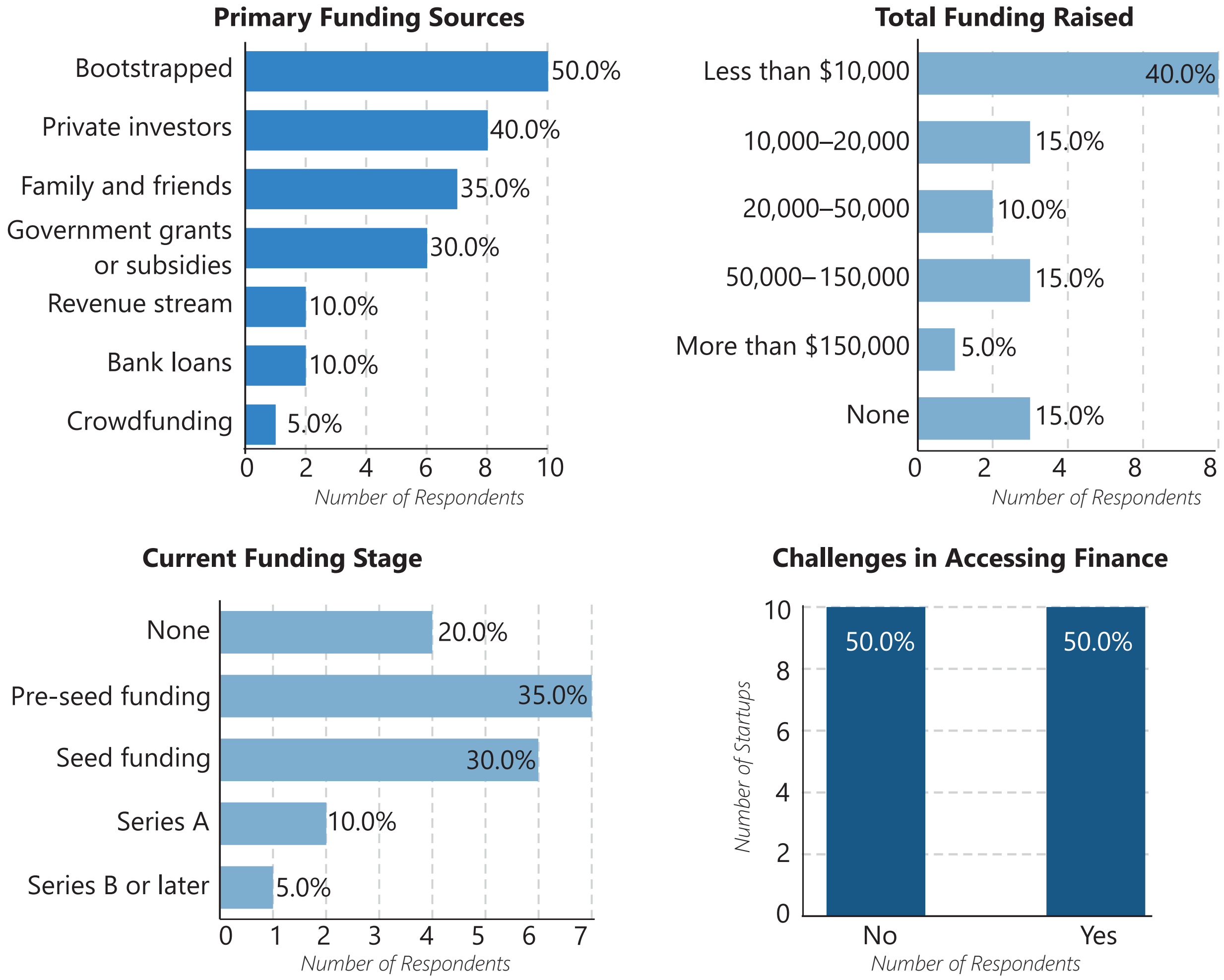

Figure 10: Funding sources, funding raised, current funding stage and challenges in accessing finance

remains a significant challenge for many early-stage businesses. The findings highlight critical gaps in start-up funding accessibility, particularly in terms of investor engagement, financial literacy and availability.

Start-ups do not access existing support structure

Start-ups were also surveyed on the support ecosystem available to them. The majority reported receiving no support, underscoring a potential gap in available resources or a lack of awareness about existing programmes. 35% (7 respondents) indicated that they had received funding from private investors, while 25% had accessed government grants or funding. However, 75% of all respondents called for improvements in access to funding, reinforcing earlier findings that financial accessibility remains one of the primary challenges for businesses. Additionally, 25% of start-ups reported receiving support from business incubators or accelerators, indicating that some businesses are benefiting from structured programmes. Despite this, 55% expressed a need for more acceleration and incubation programmes, suggesting that current offerings may not be sufficient to meet demand. Specialised support remains limited. Only 10% of respondents reported receiving assistance in technology development, mentorship, or infrastructure support (such as access to labs), while just one respondent highlighted having received business advisory support. These findings align with insights gathered from interviews with start-ups, where entrepreneurs emphasised a lack of high-quality mentoring and a shortage of well-equipped lab facilities. Underpinning this 45% of surveyed start-ups expressed a desire for more networking opportunities (including mentoring), highlighting the need for better collaboration and engagement within the ecosystem. A particularly pronounced gap exists in technology development support – while only 10% had received such support, 40% identified it as a priority for improvement. Similarly, business advisory services appear to be lacking, with start-ups expressing the need for structured guidance on regulatory and legal matters. This is reinforced by feedback from survey respondents, including one start-up that suggested: *"It would be best if there were legal advisory hubs or consulates where young entrepreneurs could seek guidance on the legal aspects of their business and prepare for regulatory hurdles before encountering them."*

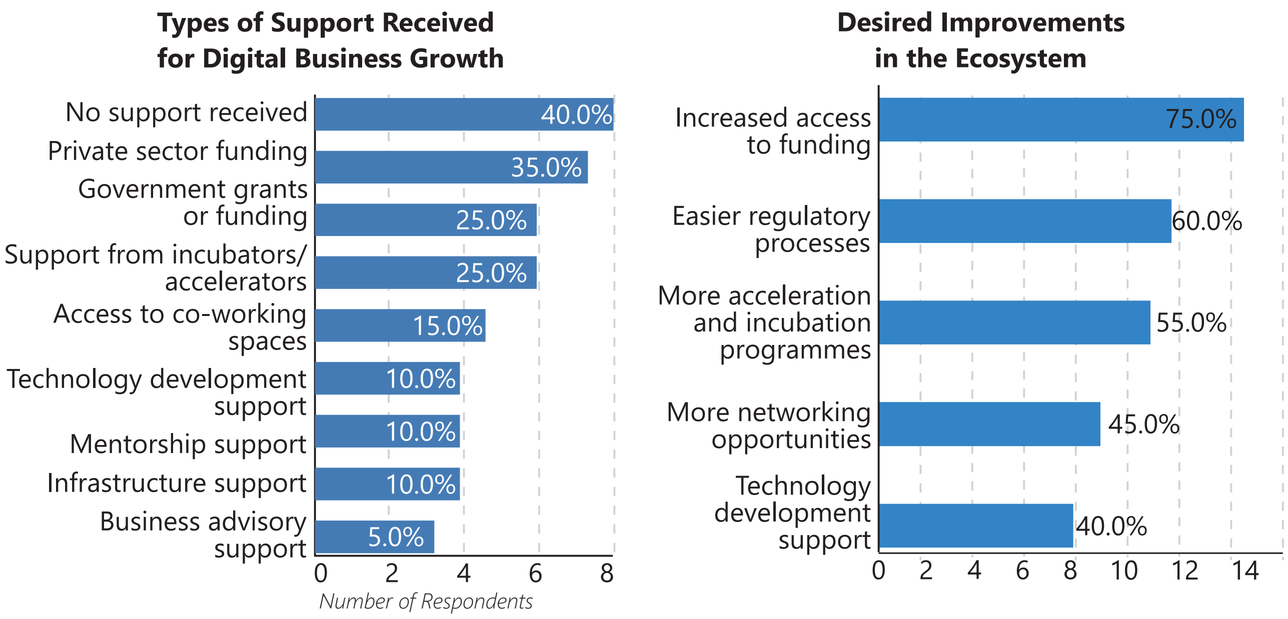

Figure 11: Types of support received and desired ecosystem improvements

Simplifying business regulation and increasing tax incentives for start-ups

A significant 60% of all start-ups express a strong preference for more streamlined regulatory processes. When asked about desired regulatory changes for their businesses, 75% of respondents identified improved access to finance as the top priority, followed by 50% advocating for simplified business regulations. In this line, many start-ups cite complex tax procedures as a major challenge. One start-up, while acknowledging the tax advantages of the IT park, noted that the 12% employee salary tax discourages them from officially hiring staff. Another start-up highlighted difficulties in integrating online payments due to unclear tax regulations, stating that they are uncertain about the applicable charges and the responsible authorities. Despite these concerns, tax benefits were recognised by 50% of respondents as the most valuable government-provided advantage for start-ups. Additionally, a start-up proposed the creation of regulatory sandboxes where businesses could test their solutions under simplified rules. Furthermore, 45% of respondents indicated that regulatory changes facilitating access to international markets would be beneficial. With regard to this, one start-up pointed out the limitations in accessing global payment systems such as Stripe and PayPal. Another start-up suggested increasing the number of "Local2Global" events, as such initiatives provide valuable opportunities for start-ups to expand internationally and attract foreign investment. Moreover, 40% of start-ups emphasised the need for regulatory changes concerning access to open data and resources. One start-up specifically recommended eliminating import taxes on servers, noting that high import duties contribute to the elevated costs of servers in Uzbekistan. Removing these taxes could make data centres more affordable and enhance access to data. Additionally, a start-up expressed concern over the mandatory local storage of personal data, which makes cloud computing unnecessarily expensive. Businesses should be granted the flexibility to choose their preferred data storage locations.

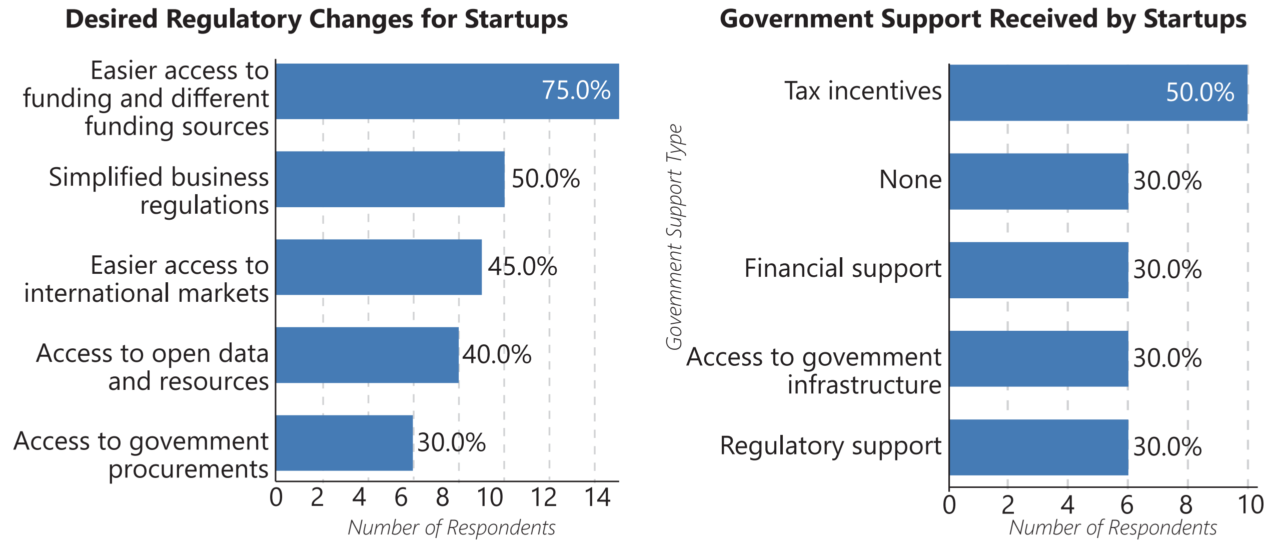

Figure 12: Desired regulatory changes and government support received by start-ups

More support needed for internationalisation

Nearly half (45%) of start-ups expressed a desire for regulatory changes to improve access to international markets. This comes against the backdrop of the increasing internationalisation of Uzbek start-ups. While 30% operate exclusively in the local market, 45% (nine start-ups) are active both locally and regionally, with three of them also engaged in global markets. One of these nine start-ups operates locally and globally but not regionally. Additionally, 10% (two start-ups) conduct business both regionally and globally, while another 10% operate solely in global markets. When asked about the challenges they face in expanding to international markets, 19 start-ups responded, while one indicated that it had not yet begun expansion efforts. The most commonly cited challenge, identified by 73.7% of respondents, was finding customers and business partners. This underscores the need for improved networking opportunities, international business matchmaking services, and enhanced support for market entry strategies. Additionally, 63.2% of start-ups reported difficulties

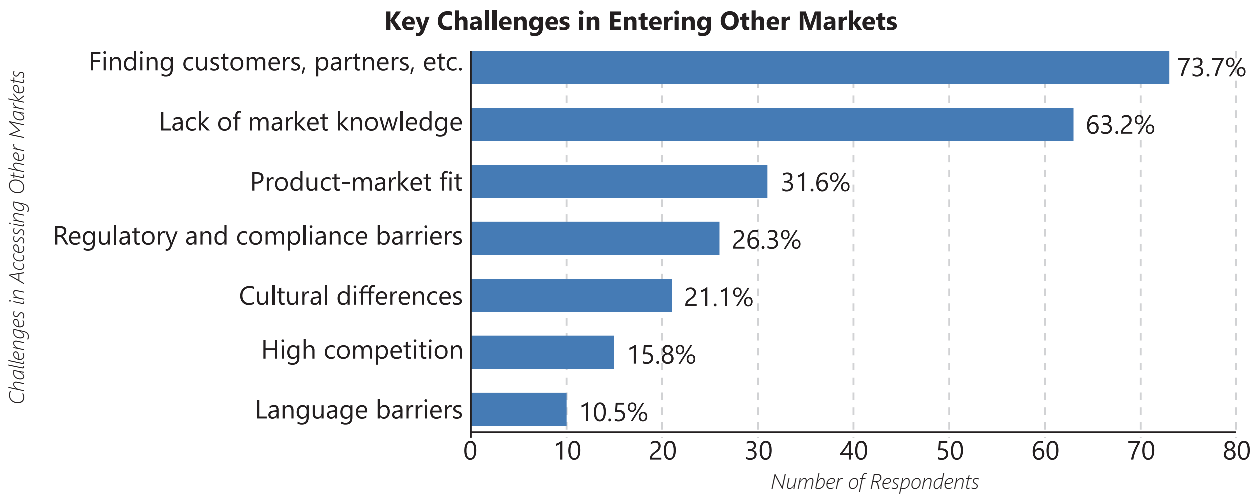

Figure 13: Key challenges in entering other markets

in understanding foreign markets, including consumer behaviour, legal frameworks, and competitive dynamics. This suggests a demand for more robust market research tools, training programmes, and advisory services. Furthermore, 31.6% of start-ups encountered challenges in adapting their products or services to meet the expectations and demands of foreign markets. In contrast, only a small percentage of respondents considered cultural differences, high competition, or language barriers to be significant obstacles to international expansion.

Optimism about the Future of Digital Entrepreneurship in Uzbekistan

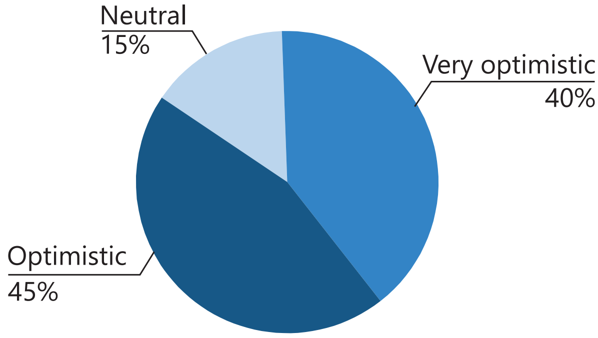

Figure 14: Optimism about the future of digital entrepreneurship in Uzbekistan

International and national expansion is a key growth objective for 75%, alongside revenue growth over the next one to three years. This reflects a collective ambition to scale operations beyond their current markets while ensuring profitability. Closely following these priorities is the development of new products or services, cited by 60% of start-ups. This suggests that many start-ups recognise the importance of innovation and differentiation in competitive markets. Another 55% of start-ups see securing additional financial resources as a priority in the next 1-3 years. This aligns with previous findings that access to finance remains a significant barrier to growth for many digital businesses. Additionally, 45% of start-ups identified workforce expansion as a goal, indicating that while hiring more employees is important, it is not as immediate a priority as revenue growth, product innovation, and market expansion.

Finally, start-ups were asked about their outlook on the future of digital entrepreneurship in Uzbekistan. An overwhelming 85% expressed optimism or strong optimism about the digital entrepreneurship landscape, signalling a positive outlook despite existing challenges.

RECOMMENDATIONS

1. **Improve Financial Literacy and Fundraising Readiness**
   - *Establish online resource hubs offering financial planning tools, legal guidance on fundraising, etc. This could be integrated in the newly established Startup Base platform.*
2. **Expand Start-up Incubation and Acceleration Programmes**
   - *Enhance the quality and scope of incubator and accelerator programmes by improving services and training initiatives that address skill gaps in financial management, business competencies, such as marketing and sales, technology development and internationalisation.*
   - *Develop partnerships with international accelerators and incubators to facilitate cross-border exchange and increase internationalisation of Uzbek start-ups.*
   - *Increase awareness among start-ups regarding available support programmes by implementing targeted outreach strategies, ensuring broader access to existing resources and opportunities.*
3. **Improve regulatory environment and incentives**
   - *Expand tax benefits to all certified start-ups by developing a structured certification or labelling process with clearly defined eligibility criteria.*
   - *Establish regulatory sandboxes to enable start-ups to experiment with innovative business models under flexible compliance conditions.*
   - *Offer financial incentives and support mechanisms to help start-ups access external business and technology services, fostering innovation and growth.*

6. DEEP DIVE: ARTIFICIAL INTELLIGENCE LANDSCAPE

6.1 GENERAL

Rise of AI and AI regulations globally

The application of AI technologies is projected to contribute between USD 13 trillion[141] to USD 16 trillion[142] to the global economy by 2030, accounting for roughly 20% of the total global GDP. In Uzbekistan it is estimated that AI will contribute approximately USD 10 billion to Uzbekistan's GDP and create over 430,000 new jobs in sectors such as industry, construction, and agriculture.[143]

In South and Central Asia, 78% of governments still do not have national AI strategies in place.[144] However, Uzbekistan is collaborating with other Turkic countries on the development of a joint large language model (LLM). Although Uzbekistan launched its AI strategy as recently as October 2024, neighbouring Tajikistan and Kazakhstan have already established national AI strategies.

Globally, AI-related regulatory initiatives are expected to increase, with countries adopting two distinct approaches: 1) a "risk-based approach" that imposes legal bans and penalties for the most dangerous AI systems, as seen in the EU's AI Act, and 2) a less stringent approach, prioritising non-binding guidelines and recommendations while avoiding strict regulations. This divergence in regulatory strategies could result in fragmented AI governance across jurisdictions.[145] Representatives from the MDT confirmed that Uzbekistan has opted for a balanced human-centred approach, situated between these two approaches.

Steady progress with set-backs due to a lacking AI vision until 2024

Uzbekistan has demonstrated steady progress in its AI readiness rankings, rising from 95th place in 2020 to 79th in 2022. However, by 2023, the country experienced a significant decline, dropping to 87th position. The adoption of the new AI Strategy has helped reverse this trend, improving Uzbekistan's ranking to 70th in 2024. While significant improvements are evident in the Government Pillar, which evaluates strategic vision, governance and ethics, digital capacity, and AI adaptability, progress in the Technology Sector Pillar – which assesses innovation capacity, human capital, and sector maturity – has been relatively limited. Conversely, the Data & Infrastructure Pillar, which measures data representativeness, data availability, and infrastructure, has experienced a decline in its score. This highlights existing gaps in this area, aligning with the findings of this study (refer to chapter 6.3 Infrastructure & Data Access).

In comparison to global trends, the South and Central Asia region registers the second-lowest average in the AI Readiness Index 2024, with Uzbekistan ranking third following India and Türkiye. This further underscores the need for more robust efforts in AI development within Uzbekistan and its neighbouring countries.[146]

141 McKinsey & Company (2023): AI: The next frontier of performance in industrial processing plants.

142 PWC (2017): Sizing the prize: What's the real value of AI for your business and how can you capitalise?

143 Daryo (2024): Uzbekistan's GDP to see $10 bn boost from AI by 2030, says Sberbank's First Deputy Chairman.

144 Oxford Insights (2023): Government AI Readiness Index 2023.

145 Securelist (2023): Story of the year: the impact of AI on cybersecurity.

146 Oxford Insights (2023): Government AI Readiness Index 2024.

Table 1: AI Readiness Index (Source: Oxford Insight)

	2020	2021	2022	2023	2024
Rank	95 / 172	93 / 160	79 / 181	87 /193	70 / 188
Total Score	NA (Different Scoring System)	40.13	44.51	43.26	53.45
Government Pillar Score	NA	37.95	49.90	42.53	64.71
Technology Sector Pillar Score	NA	31.32	24.45	31.97	33.50
Data & Infrastructure Pillar Score	NA	51.13	59.17	55.28	53.45

6.2 GOVERNMENT

AI framework remains in development

Although the government has acknowledged the potential of AI, the legislative and regulatory framework remains in development.

On February 17, 2021, the President of Uzbekistan issued Decree No. PP-4996, titled "On Measures to Create Conditions for the Accelerated Implementation of Artificial Intelligence Technologies".[147] This decree laid the legal foundation for the development of AI technologies in the country, outlining key directions for advancing AI adoption. As part of this decree, a programme of measures for the study and implementation of AI technologies for the period of 2021–2022 was developed, which includes several important initiatives including the development of an AI Strategy, the application of AI in public services, building a domestic AI ecosystem, among others.

Additionally, the decree approved a list of nine pilot projects for the implementation of AI technologies in 2021–2022. These projects cover key sectors such as agriculture, banking and finance, transport, healthcare, pharmaceuticals, energy, taxation, and the development of e-government.[148]

With the decree the Digital Technologies and Artificial Intelligence Research Institute under the MDT was established, tasked to engage in fundamental and applied scientific research in AI, collaborate and jointly implement projects with leading foreign innovative and scientific institutions, and address the introduction of AI technologies in economic sectors, social spheres, and public administration, as well as the formation of a scientific ecosystem for the development of digital technologies.[149]

Another important milestone came on August 26, 2021, when a decree (PQ-5234 "On Measures to Introduce a Special Regime for the Use of Artificial Intelligence Technologies") was issued to establish a "special regime" (sandbox) for the application of AI technologies. This decree aimed to create an optimal ecosystem for the development of innovative AI-based business models, products, and services, facilitating their implementation and

[147] LexUZ (2021): On Measures to Create Conditions for Rapid Introduction of Artificial Intelligence Technologies.

[148] LexUZ (2021): On Measures to Create Conditions for Rapid Introduction of Artificial Intelligence Technologies.

[149] UNDP & Ministry for Information Technology and Communications (2022): Перспективные направления применения технологий искусственного интеллекта в Узбекистане (Promising Areas of Application of Artificial Intelligence Technologies in Uzbekistan)

practical application.[150] However, it has been observed that the sandbox regime has not achieved the desired outcomes, necessitating the development of a more effective and functional mechanism.

While these decrees have laid a solid foundation for the development of an AI ecosystem, areas that required further attention remained. The progress of many pilot projects outlined in the decrees remains uncertain, even though some initiatives have been successfully completed. For example, AloqaBank has launched a Cisco-based contact centre using voice biometrics technology.[151] Additionally, MyID, an electronic identification system, has been rolled out across sectors such as banking, government services, insurance, and mobile communications. While MyID incorporates some AI elements, its primary focus seems to be on biometric and digital identity management rather than broader AI applications. Certain AI-based applications like speech recognition and big data analysis for biometric identification still seem to be under development. However, in December 2024, it was reported that the OneID system, which functions as a unified identification platform enabling users to access multiple websites and portals of state and economic administration bodies, local government entities, and commercial organisations, had been enhanced with FaceID integration. This advancement eliminates the need for physical documentation.[152] During interviews with the MDT, it was emphasised that the FaceID system incorporates AI elements. Additionally, the ministry expressed its intention to expand the integration of AI technologies into other public services such as digital signatures and other related functionalities.

The decrees also envision the organisation of a joint council for AI development in economic sectors, the social sphere, and public administration. It is not clear what kind of council it refers to. In 2022, the Artificial Intelligence Council was established under the MID to propose a national AI strategy. The Council was intended to form working groups comprising researchers and companies to conduct practical AI experiments but seems inactive since its first meeting in 2022.[153]

The new AI Strategy closes gaps not addressed in previous decrees

To address several gaps in previous decrees, Uzbekistan officially launched its AI Strategy on October 14, 2024.[154] While the country initially aimed to finalise its "AI Development Strategy" by September 2021, the initiative was delayed and only materialised after the president, in August 2024, reaffirmed the urgent need for its development.[155]

The AI Strategy sets forth ambitious goals to integrate AI technologies across Uzbekistan's key economic and social sectors. Its primary objectives include fostering innovation, developing a skilled workforce, and positioning Uzbekistan among the top 50 countries on the Government AI Readiness Index by 2030. Additionally, the strategy targets generating USD 1.5 billion in AI-driven software and service revenues and increasing the share of AI-enabled services on the Unified Interactive Public Services Portal to 10% by the same year. To achieve these goals, the government emphasises the creation of technical infrastructure,

[150] LexUZ (2021): On measures to introduce a special regime for the use of artificial intelligence technologies.

[151] Aloqabank (2024): Presentation 2024.

[152] Toshkent24.com (2024): Government services in Uzbekistan are now accessible via Face ID, eliminating the need for physical documents.

[153] Ministry of Innovative Development of the Republic of Uzbekistan (2022): The first meeting of the Advisory Council on Artificial Intelligence under the Ministry of Innovative Development has started its work.

[154] LexUZ (2024): On the Approval of the Strategy for the Development of Artificial Intelligence Technologies until 2030.

[155] Interfax (2024): Uzbekistan set to draft AI regulations.

the development of a normative-legal framework, and the enhancement of knowledge and skills.

A significant component of the strategy involves building a comprehensive normative-legal framework to support AI development. This includes drafting and refining national legislation, fostering a research-friendly environment, and implementing ethical and security standards. By December 2024, the government had begun developing the "Ethical Principles for the Development and Application of AI Technologies", addressing a gap that had previously been identified but not yet addressed in earlier decrees.

The strategy also sets goals to enhance AI integration across key social and economic sectors, including healthcare, banking and finance, tax and customs, agriculture and energy. Notable initiatives include the development of AI models for diagnosing diseases, optimising energy distribution, forecasting agricultural yields, forecasting market trends in the banking sector among others. Initially, 20 projects have been identified, focusing on the integration of AI-driven solutions. These include upgrading the existing FaceID system with advanced AI features for improved accuracy and security, implementing AI-powered palm recognition technology for seamless payment processing, and deploying AI-based monitoring systems in parks, theatres, and other public spaces to enhance safety.

The strategy places significant emphasis on developing the technical infrastructure required for training, testing, and advancing artificial intelligence models, as well as establishing open data and 'big data' repositories. According to the MDT, 60% of the total budget of USD 50 million is allocated for infrastructure development. To advance this development, the Centre for Innovative Economic Research and the Digital Economy Research Centre (DERC), both previously focused on research, will merge to form the Centre for the Development of Artificial Intelligence and the Digital Economy. The newly consolidated entity will assume primary responsibility for establishing the necessary AI infrastructure while also overseeing the implementation of 200 sector-specific projects. The institution will connect information systems and databases while providing expertise on information systems and software development.

Capacity building is a cornerstone of the strategy, with efforts directed toward developing a skilled workforce capable of driving AI adoption. This includes expanding educational programmes, establishing AI-focused laboratories, and providing opportunities for international training and collaboration. By integrating AI into academic curricula and promoting youth engagement, Uzbekistan aims to cultivate a future-ready talent pool.

The strategy is accompanied by an Action Plan for 2024–2026, reflecting a structured approach to implementation. It incorporates insights from Oxford Insights, Meta, and GenAI, marking the third iteration of Uzbekistan's AI Strategy.

A comprehensive analysis of the strengths and weaknesses of Uzbekistan's AI Strategy, along with detailed recommendations based on comparisons with other global AI strategies, is presented in Chapter 7. Comparative Policy Analysis & Recommendations. Uzbekistan's AI Strategy represents a commendable step toward building a robust AI ecosystem. However, its successful implementation will be crucial. Addressing the skills gap within the public sector is particularly important in this context. Representatives from the MDT have noted that Uzbekistan's primary focus is on AI adoption rather than innovation. Nonetheless, the current shortage of AI expertise among policymakers poses a significant obstacle to advancing public sector adoption – a challenge that the new AI Strategy aims to overcome.

RECOMMENDATIONS

1. Accelerate AI Strategy Implementation:

- *Ensure timely and effective implementation of the new AI Strategy. Considering the delay in its adoption, the government should closely monitor the implementation process and take prompt action as necessary.*

2. Foster Private-Sector AI Adoption:

- *While the strategy focuses on state-run sectors, more attention is needed on facilitating AI adoption in the private sector. The government should reconsider its stance that private-sector adoption will occur naturally, and provide targeted incentives and support for AI innovation in private companies.*

3. Enhance Investment and International Partnerships:

- *Attract significant investments in AI R&D and infrastructure. Strengthening international cooperation through partnerships with global AI leaders will help improve Uzbekistan's position in global AI rankings and foster knowledge exchange.*

4. Increase Budget and Resources:

- *The current budget of USD 50 million for the implementation of the strategy is relatively modest. Increasing financial allocations for AI R&D and infrastructure would allow Uzbekistan to compete with other countries that are investing significantly more in AI.*

5. Close the Skills Gap in Public Sector:

- *Significant efforts are needed to build AI expertise within the public sector. Policymakers should be trained in AI concepts and their applications to improve public sector adoption and effective AI governance.*

6. Develop a Functioning Sandbox Regime:

- *Develop an AI sandbox regime to provide a secure and controlled environment for testing AI applications, ensuring compliance with regulatory frameworks while accelerating AI deployment and innovation (e.g. Regulatory Sandbox Act of Germany - https://www.bmwk.de/Redaktion/EN/Dossier/regulatory-sandboxes.html).*

6.3 INFRASTRUCTURE & DATA ACCESS

AI infrastructure remains underdeveloped with no supercomputing facilities

AI infrastructure in Uzbekistan remains underdeveloped, yet it is a critical area consisting of big data, telecommunications for data transmission and storage, access to and for organisations, and computing power necessary for creating AI systems. The readiness of these components varies significantly in Uzbekistan.

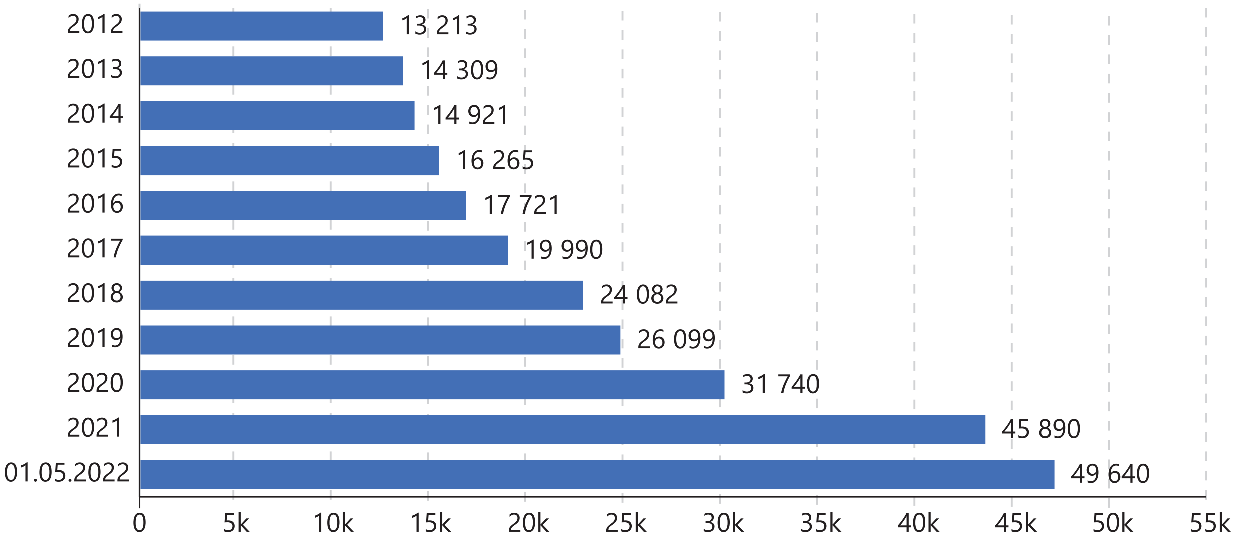

Figure 16: Number of mobile base stations increase (Source: MDT)

Between 2013 and 2022, the extension of fibre-optic communication lines increased from 12,700 kilometres to 118,000 kilometres, significantly furthered by UzbekTelecom's addition of 60,000 kilometres in 2023 alone, as part of the 'Digital Uzbekistan 2030' strategy. This strategy aimed for 120,000 kilometres by 2025 and 250,000 kilometres by 2030. Thus, overachieved its goals before 2025. However, detailed connectivity data for different regions remains undisclosed.[156]

The number of mobile base stations also surged from 13,213 to 49,640 between 2012 and 2022, indicating a broadening telecommunications network.[157]

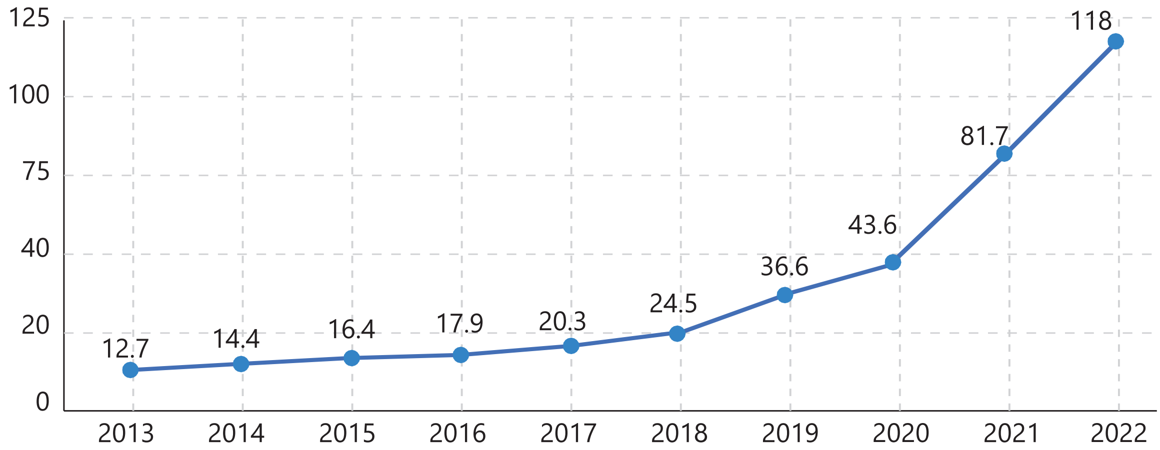

Figure 15: Length of fibre-optic communication lines increase (Source: MDT)

Data infrastructure is being expanded

Uzbekistan has advanced its data centre infrastructure in recent years. In 2022, two major data centres were constructed, and the existing data centre was expanded. As part of the project "Creation of a Data Processing and Storage Centre of JSC UzbekTelecom", a new facility was established, comprising 70 cabinets, 149 blade servers, and a data storage system with a capacity of 5 petabytes. Additionally, the existing data centre of JSC Uzbektelecom was expanded with 40 more blade servers and an additional 5 petabytes of storage capacity.

In the third quarter of 2022, construction was completed on a centralised data processing and storage centre for the Electronic Government system in the Tashkent region, built to the TIER 3 standard set by the international organisation Uptime Institute. This facility includes 300 cabinets, 580 servers, and a 20-petabyte data storage system.[158]

The "Digital Uzbekistan – 2030" strategy envisions the launch of three large data centres in Tashkent, Bukhara, and Fergana, aimed at strengthening the country's digital infrastructure. In 2023, construction began for the East Telecom Data Centre in the Yunusabad district of Tashkent – a 4-storey building that will accommodate 300 racks. It plans the establishment of a second data centre near Tashkent in the near future.[159] The Centres in Bukhara and Fergana have not commenced construction.

While these centres reflect an improvement in Uzbekistan's data processing capabilities, the country currently lacks the supercomputing infrastructure necessary for advanced

[156] MDT (2022): The length of fibre-optic communication lines.

[157] MDT (2022): Number of mobile base stations.

[158] Davlat (2022): Telecommunication infrastructure – at a new stage of development.

[159] East Telecom (2024): Data Center (DC) Joint Project of East Telecom and Korea Telecom.

AI applications. Previous challenges stemmed from the absence of a unified approach to the specification, procurement, and management of supercomputers. This lack of coordination led to fragmented efforts, with individual organisations independently attempting to establish data centres with supercomputing capabilities but struggling to implement AI systems effectively.[160] The newly introduced AI strategy aims to address this gap by establishing the Centre for the Development of Artificial Intelligence and the Digital Economy, which will be tasked with driving the development of AI infrastructure.

However, overall, there is a lack of supercomputing infrastructure in the region with Kazakhstan leading the development of supercomputing infrastructure. Kazakhstan's Nazarbayev University has made notable strides in this field, having installed two NVIDIA DGX systems in 2020 to accelerate deep learning research.[161] In 2022, the university upgraded its computational infrastructure with the installation of NVIDIA DGX A100 systems, among the most advanced available. However, while the capacity is sufficient for testing, research and development, it is insufficient for the use of bigger AI development.[162]

Recognising the urgent need to develop supercomputing capabilities and bridge the gap with Kazakhstan, Uzbekistan announced in May 2024 that the Saudi Arabian company DataVolt would establish "green" supercomputing data centres in the country.[163] Plans include the creation of a 10MW data centre in the IT Park, with future projects involving two regional data centres with capacities of 240MW and 250MW, respectively. The data centre will feature a modular infrastructure design, providing scalable solutions capable of handling various workloads, ranging from hundreds to several thousand teraflops.[164] MDT representatives indicated plans to procure NVIDIA A200 and A500 graphic processing units (GPUs) for the new data centres, emphasising that this capacity would suffice as 80% of the projects outlined in the AI strategy rely on open-source models that primarily require fine-tuning rather than extensive computational power. In addition, DataVolt has committed UZS 27–28 billion (approx. USD 2.25 million to 2.33 million) to construct solar panels that will supply green energy to these data centres. Furthermore, a MoU was signed in May 2024 with the United Arab Emirates to promote investment cooperation in digital infrastructure, with a particular focus on data centres and artificial intelligence projects in Uzbekistan.[165]

Representatives of the MDT also outlined plans to establish laboratories equipped with supercomputing facilities in universities and research centres in the coming years.

Access, usage and storage of data remains constrained

As highlighted above, access to data is crucial for AI development. Although several AI decrees emphasise enhancing data access for AI developers, practical access remains constrained. The open data portal, data.egov.uz has been launched to provide public government information to organisations, citizens, and businesses. Initially, this platform contained 24 datasets from four organisations. As of November 2024, the platform hosts 9,668 datasets from 158 organisations, with a total of 489,281 downloads. While the platform includes datasets relevant to artificial intelligence, only a limited number are

[160] UNDP & Ministry for Information Technology and Communications (2022): Перспективные направления применения технологий искусственного интеллекта в Узбекистане (Promising Areas of Application of Artificial Intelligence Technologies in Uzbekistan)

[161] Nazarbayev University (2020): Kazakhstan's first computer station for data analysis launched at NU.

[162] ISSAI (2022): ISSAI increases its computational power.

[163] Aletihad (2024): UAE, Uzbekistan sign investment memorandum to boost digital infrastructure.

[164] Swinhoe, D. (2024): DataVolt breaks ground on data center in Tashkent, Uzbekistan.

[165] Aletihad (2024): UAE, Uzbekistan sign investment memorandum to boost digital infrastructure.

directly applicable to AI, and not all of the data is fully accessible. Additionally, many datasets are incomplete, creating barriers to their effective use. The absence of adequate tools for data analysis further limits the usability and reusability of the available open data.[166] Furthermore, USAID reports that while progress has been made, there remain challenges in fully adopting open data practices by the government. The study emphasises the need for greater consolidation, simplification, and harmonisation of existing legal and regulatory frameworks to facilitate broader access to and utilisation of open data by citizens, businesses, and organisations. USAID also underscores the importance of collaborative engagement with stakeholders to identify key priority areas for open data initiatives, ensuring they align with national development goals and public interest.[167] To enhance data usability, the MDT is planning to develop data lakes to collect vast amounts of raw data. While 100 priority AI models have been identified for implementation, the exact list is still pending final approval.

However, several interviewees highlighted that, in addition to challenges related to data access, data storage requirements pose significant constraints. Existing data protection regulations, which mandate that certain data be stored within Uzbekistan, add to these complexities. Interviewees highlighted the need for companies to be allowed to store data in the cloud, as the current regulations require personal data to be stored on local servers, making cloud computing unnecessarily expensive.

Furthermore, the lack of appropriate cybersecurity laws and infrastructure also impedes the development of a functioning AI ecosystem. AI systems rely heavily on large volumes of data to function effectively. Cyberattacks targeting data systems can compromise the integrity, availability, and confidentiality of this data, leading to faulty or biased AI outputs, and putting sensitive information at risk. Developing a secure AI ecosystem in a country prone to cyberattacks requires significant investment in cybersecurity infrastructure. Companies and institutions must implement robust defences, which increases operational costs and diverts resources that could have been used for AI innovation and development. Additionally, the global reputation of a country's digital infrastructure is critical for attracting international partnerships and investments in AI. A high rate of cyberattacks can damage this reputation, making investors and partners wary of collaborating or sharing sensitive AI-related technologies and data.

In conclusion, while Uzbekistan has made notable progress in enhancing its digital and AI infrastructure, several challenges persist in fostering the sustainable growth of its AI ecosystem. The country's advancements in telecommunications, data centres, and fibre-optic networks are commendable; however, critical gaps remain in supercomputing capabilities, data accessibility, and energy supply, which must be addressed to ensure long-term scalability.

Additionally, regulatory constraints – including data localisation requirements, fragmented datasets, and the absence of a comprehensive cybersecurity framework – present further obstacles to the effective deployment and integration of AI technologies.

[166] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[167] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

RECOMMENDATIONS

1. **Strengthen Supercomputing Infrastructure:**
   - *Accelerate the development of the Centre for the Development of Artificial Intelligence and the Digital Economy to address the lack of high-performance computing resources for AI.*
   - *Encourage foreign and domestic investment in supercomputing infrastructure to ensure AI research and development capabilities by developing specialised investment benefits*
2. **Enhance Data Accessibility and Open Data Initiatives:**
   - *Improve data transparency and availability by expanding and improving datasets on data.egov.uz, ensuring completeness, usability, and accessibility.*
   - *Create engagement forums for stakeholders, including start-ups, researchers, and businesses, to identify priority datasets and enhance the quality and relevance of open data.*
   - *Develop a National Data Strategy that establishes legal frameworks, data standards, infrastructure, and governance mechanisms to integrate datasets from government agencies, private sector entities, and research institutions into a unified, accessible platform.*
3. **Allow Cloud Data Storage Outside of Uzbekistan**
   - *Reform data protection laws to permit data storage for companies outside of Uzbekistan, reducing local storage costs and enabling more efficient AI development.*

6.4 EDUCATION & RESEARCH

Uzbekistan faces challenges in advancing AI education and research. A survey in the financial sector identified the shortage of skilled professionals with expertise in AI technologies as the primary barrier to AI adoption in banking – a challenge mirrored across other sectors striving to implement AI solutions.[168] Government representatives have also acknowledged that the lack of expertise in both the public and private sectors is a critical obstacle to developing a robust AI ecosystem.

Education and research are central to the various AI decrees and the new AI Strategy, which include initiatives such as developing specialised training programmes, offering open AI classes for school students, increasing AI doctoral quotas, hosting AI hackathons, enhancing AI lab infrastructure, and expanding the number of training centres focused on artificial intelligence, robotics, and related fields.

AI education is gaining traction

The number of universities teaching AI has grown significantly in recent years. Initially, only four higher education institutions in Uzbekistan trained AI specialists, while the country required an estimated 600 experts in big data and LLMs.[169] According to the MDT, this number has now increased to 12 public and four private higher education institutions offering AI modules and dedicated bachelor's and master's programmes in the field. Starting from the 2023/2024 academic year, a total of 572 students – comprising 510 undergraduate and 62 master's students – were enrolled in 12 public higher education institutions to pursue studies in the field of "Artificial Intelligence".

[168] Abdurashidova, M. S., Eid Balbaa, M. (2023): Artificial Intelligence in the Banking Sector in Uzbekistan: Exploring the Impacts and Opportunities.

[169] Interfax (2024): Uzbekistan set to draft AI regulations.

Table 2: Public Higher Education Institutions (Source: MDT)

No.	Institution Name	Faculty Name	Department Name	Quota	Bachelor's	Master's
1	National University of Uzbekistan named after Mirzo Ulugbek	Applied Mathematics and Intelligent Technologies	Artificial Intelligence	62	50	12
2	Tashkent State Technical University named after Islam Karimov	Artificial Intelligence	Artificial Intelligence	58	50	8
3	Tashkent State University of Economics	Digital Economy	Artificial Intelligence	70	50	20
4	Tashkent Financial Institute	Artificial Intelligence	Artificial Intelligence	50	50	-
5	Andijan Institute of Mechanical Engineering	Faculty of Intelligent Management and Computer Systems	Artificial Intelligence	25	25	-
6	Samarkand State University named after Sharof Rashidov	Intelligent Systems and Computer Technologies	Artificial Intelligence and Information Systems	31	25	6
7	Fergana Polytechnic Institute	Artificial Intelligence	Artificial Intelligence	50	50	-
8	National Research University «Tashkent Institute of Irrigation and Agricultural Mechanization Engineers»	Ecology and Law	Digital Technologies and Artificial Intelligence	50	50	-
9	Tashkent University of Information Technologies named after Muhammad al-Khwarizmi (TUIT)	Computer Engineering	Artificial Intelligence	83	75	8
10	TUIT Nukus Branch	Computer Engineering	Artificial Intelligence	25	25	-
11	TUIT Samarkand Branch	Computer Engineering	Artificial Intelligence	33	25	8
12	TUIT Fergana Branch	Computer Engineering	Artificial Intelligence	35	25	-

Table 3: Private Higher Education Institutions (Source: MDT)

No.	Institution Name	Program Name
1	Acharya University	Artificial Intelligence and Machine Learning
2	Central Asian University	Computer Science / Machine Learning
3	International Digital University	Informatics / Computer Science
4	IT Park University	Foundations of Artificial Intelligence and Machine Learning

Several higher education institutions in Uzbekistan have established dedicated faculties, departments and programmes focused on AI. For instance, under an order issued on August 18, 2021, the Tashkent University of Information Technologies launched the Department of Artificial Intelligence within its Faculty of Computer Engineering. TUIT now offers both bachelor's and master's degrees in AI, and AI modules are integrated into bachelor's programmes such as Mechatronics and Robotics and master's programmes including the Internet of Things, Computer Systems in Medicine, and Intelligent Information and Communication Systems.[170]

[170] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

Similarly, the National University of Uzbekistan, named after Mirzo Ulugbek, established an AI department in June 2022 within its Faculty of Applied Mathematics and Intelligent Technologies. This department offers both bachelor's and master's degrees in AI, while AI-related modules have also been integrated into various disciplines, including Mathematics, Software of Information Systems, Information Security, Computer Science, and Information Technologies.

The State Technical University, named after Islam Karimov, also features an AI faculty, integrating AI education into various programmes. For example, the bachelor's programme in Information Systems and Technologies offers AI as an elective, while the master's programme in Intelligent Engineering Systems includes specialised AI modules.

In regional areas, the Fergana Polytechnic Institute has established an AI faculty, and several other regional universities have introduced dedicated AI departments.

Recently, the IT Park launched its own digital university, offering bachelor's and master's programmes in Software Engineering with a focus on AI and specialisations in Solution Architecture, Cloud and DevOps, and Data Processing and AI.[171] Other private universities have also embraced AI education. Acharya University, Central Asian University, and the International Digital University all provide AI-related courses. Inha University has also expressed its commitment to developing AI expertise in its students, [172] offering AI courses within its Bachelor of Computer Science and Software Engineering programme. Additionally, its Bachelor of Information and Communication Engineering includes AI courses, and the MBA programme with a specialisation in Digital Transformation covers courses on AI applications for digital transformation.

In addition to academic institutions, numerous training centres across the country provide AI courses. These programmes, which range in duration from 2 to 12 months, are priced between UZS 3 million (approximately USD 230) and UZS 29.87 million (approximately USD 2,300).

Table 4: Training Centres offering AI courses in Uzbekistan (Source: MDT)

No.	Training Center	Course/Programme Name	City	Mode	Duration	Price (in million UZS)
1	AKITA IT Academy (Astrum Korea)	Educational Program on Artificial Intelligence (AI Data Science)	Tashkent	Offline	12 months	22.5
2	Uacademy	AI (Python, Pandas, Math, Regression, Classification, Clustering, Data Processing, SQL, Docker, OpenAI)	Tashkent	Offline	2 months	4.3
3	Bobir Akilkhanov Tech Academy	AI - Module 1: Programming Basics (Ubuntu OS setup, C language, GitHub)	Tashkent	Offline	3 months	9.137
4	ML Community	Machine Learning Engineer (ML Algorithms, NLP, Computer Vision)	Tashkent	Offline	5 months	9.675
5	Dasturchilar Clubi	Python (AI-focused)	Samarkand	Offline	12 months	12.9
6	United IT Clubs	AI/Machine Learning	Namangan	Offline	8 months	6.88
7	Mohirdev	Online Platform: Data Science and AI	Tashkent	Online	6 months	3.0
8	Geekbrains.uz	AI from Scratch	Tashkent	Online	12 months	29.87
9	7di.uz	Advanced AI Developer Program (ML, NLP, Computer Vision, Ethics)	Tashkent	Online	12 months	15.0

171 ITPU (2024): IT Park University.

172 Inha University (2024): IUT Students to Develop in the Field of Artificial Intelligence.

AI also holds significant potential to address challenges within Uzbekistan's education system and to further automate university processes. However, a critical barrier is the shortage of high-quality educational materials in local languages, including Uzbek, Tajik, and Karakalpak.[173]

While AI integration in public universities remains limited, some private universities are pioneering its adoption. For instance, WIUT has integrated AI into its learning and document management systems. The university also employs an AI-powered chatbot, developed through an Application Programming Interface (API) based on ChatGPT, to streamline communication. Future plans for 2025 include the development of AI-based solutions for initial marks assessment. Although WIUT has not yet incorporated AI into its curriculum, it has fostered innovative AI start-ups, such as Sparkle AI. This start-up efficiently monitors and responds to user queries across WIUT's platforms like Instagram and Facebook.

Inha University has also taken notable steps by developing an AI-based Face ID recognition system. Despite these promising advancements, broader AI adoption across the university sector is essential. During interviews, university representatives emphasised the need for a cultural shift among staff to fully embrace AI's potential and integrate it into their operations and academic programmes.

Uzbekistan's AI Research: Progress Behind Global Leaders

In terms of research, the country ranked 70th out of 134 countries in 2023 for AI-related scientific publications, placing it in the middle tier.[174] Data on research outcomes for Uzbekistan are scarce. However, according to the OECD.AI, most publications relating to AI are produced by TUIT and the National University of Uzbekistan as well as the Tashkent Institute of Irrigation and Agricultural Mechanisation Engineers.[175]

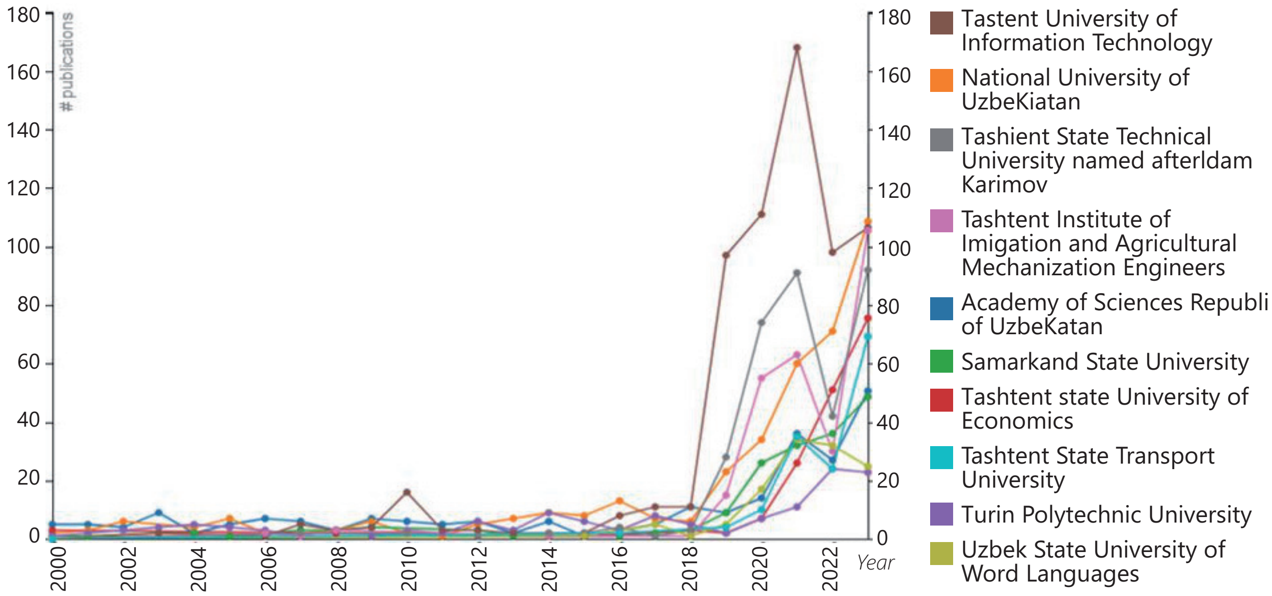

Figure 17: Number of AI publications per year per institute (Source: OECD.AI)

[173] USAID (2022): Uzbekistan Digital Ecosystem Country Assessment (DECA).

[174] Portulans Institute (2023): Network Readiness Index.

[175] OECD.AI (2024): AI in Uzbekistan.

With regard to doctoral programmes and research positions with focus on digital technologies and artificial there is a noticeable increase in both DCs and PhD programmes* since 2020.[176] This highlights Uzbekistan's emphasis on advancing its academic research capabilities in AI.

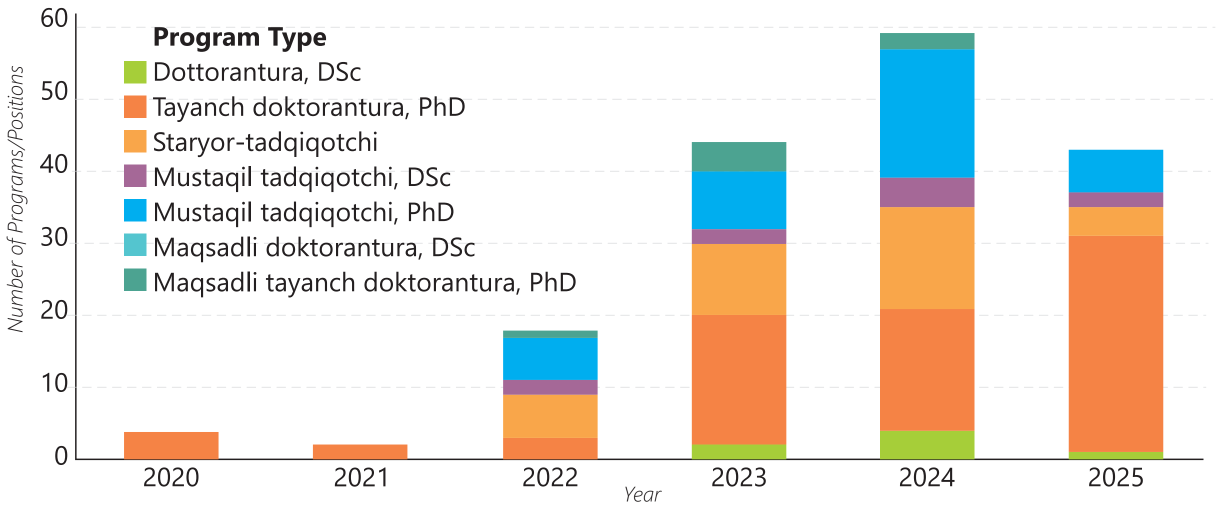

Figure 18: Growth of doctoral programmes and research roles over time (Source: Agency for Innovative Development)

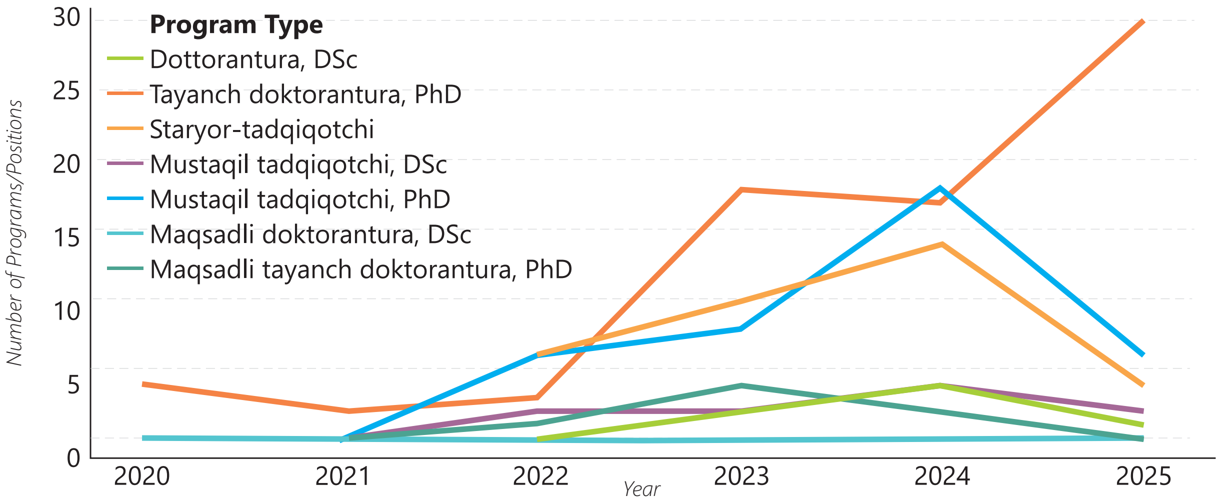

Figure 19: Timeline of programmes/positions growth (2020-2025) (Source: Agency for Innovative Development)

The Research Institute for the Development of Digital Technologies and Artificial Intelligence consistently demonstrates leadership, showing a steady increase in Tayanch doktorantura (PhD) enrolments and diversification of roles, including independent researchers and targeted doctoral programmes. The Research Institute for Digital Technologies and Artificial Intelligence Development, under the MDT, was established to conduct fundamental and applied AI research. This institute is the leading organisation in the field. According to

[176] Agency for Innovative Development (2025): Unified electronic system of coordination of postgraduate education.

* The academic positions in Uzbekistan's doctoral framework cover a range of roles and programmes tailored to different levels of expertise and goals. Doktorantura, DSc represents a traditional, advanced doctoral programme aimed at achieving a Doctor of Science degree, while Tayanch doktorantura, PhD serves as a foundational doctoral programme leading to a PhD. For those at the entry level, the Stajyor-tadqiqotchi role provides a preparatory research position. Independent researchers can pursue Mustaqil tadqiqotchi roles, focusing on either a DSc or PhD. Additionally, Maqsadli doktorantura programmes cater to targeted research goals, offering structured pathways for both DSc and PhD candidates.

the website, the centre hosts 50 doctoral candidates and 10 doctoral researchers. Since 2020, data from the Ministry of Higher Education, Science and Innovation indicates that 34 PhD positions (Tayanch doktorantura, PhD), two DSc positions (Doktorantura, DSc), three independent DSc researcher positions (Mustaqil tadqiqotchi, DSc), 13 independent PhD researcher positions (Mustaqil tadqiqotchi, PhD), and three targeted PhD research positions (Maqsadli tayanch doktorantura, PhD) have been filled by the institute.

The institute currently manages six ongoing projects according to the website. However, representatives emphasised that their current active involvement in research is within the agriculture and healthcare sectors. For instance, they are utilising machine learning and neural networks to create a proprietary AI model capable of detecting, classifying, and forecasting diseases. They noted that the model is currently in the training phase, with its accuracy to be assessed upon completion. If the model achieves a 90% accuracy threshold, it will be integrated into the interface and the solution will be launched. Specific details regarding other projects were not disclosed.

The TUIT also stands out, showing a consistent output in research programmes and a high number of independent researchers. Institutions such as Kokand University, Namangan State University, and Samarkand State University appear in 2024-2025, though their contributions are currently minimal. This underscores the need for greater efforts to decentralise research opportunities and enhance academic engagement in AI across the country, ensuring a more equitable distribution of expertise and innovation beyond major urban centres.

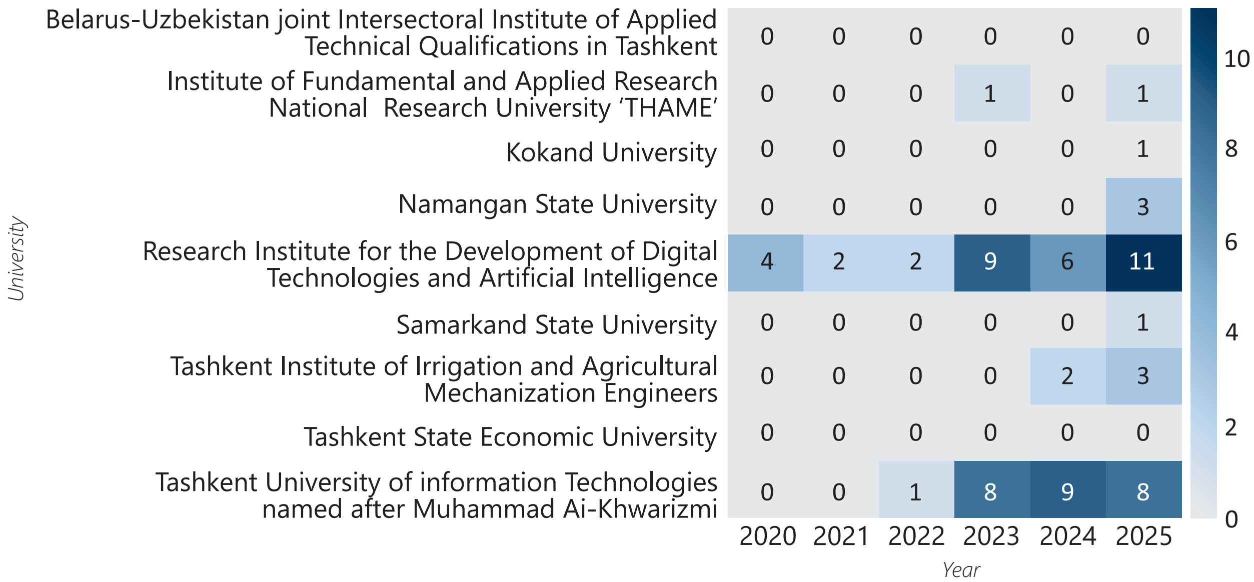

Figure 20: Heatmap of 'Tayanch Doktorantura, PhD' programmes by university (Source: Agency for Innovative Development)

Uzbekistan has made significant strides in expanding AI education and research initiatives, with a growing number of universities offering AI programmes and an increase in doctoral opportunities. However, the skills gap remains a key challenge to AI adoption across sectors, particularly in regional areas. The country lags behind global leaders in AI publications and research infrastructure. To strengthen its AI ecosystem, Uzbekistan must increase industry-academia collaboration, enhance research funding and infrastructure and expand AI education to drive innovation and competitiveness.

RECOMMENDATIONS

1. **Expand AI Education in Universities:**
    - *Increase the number of AI-focused bachelor's and master's programmes across universities, particularly in regional institutions to decentralise AI expertise.*
2. **Increase Doctoral and Research Opportunities in AI:**
    - *Expand PhD and postdoctoral positions in AI research to strengthen Uzbekistan's academic and scientific capabilities.*
    - *Introduce funding schemes and scholarships for doctoral research in AI, ensuring financial support for students pursuing AI-related studies.*
    - *Establish joint AI research programmes between Uzbek universities and leading global AI institutions.*
3. **Improve Access to High-Quality AI Educational Materials in Local Languages:**
    - *Encourage AI-driven translation and localisation tools to support the development of AI-related learning resources.*
4. **Enhance AI Lab and Research Infrastructure:**
    - *Increase investment in university AI labs and innovation hubs, ensuring they are equipped with high-performance computing resources and cloud-based AI platforms.*
    - *Provide grants and subsidies for universities to upgrade AI laboratory equipment and research facilities.*
5. **Strengthen AI R&D Capabilities:**
    - *Facilitate AI research collaboration between universities, research institutes, and industry stakeholders to foster knowledge exchange and the commercialisation of AI innovations. Establishing the Research Institute for the Development of Digital Technologies and Artificial Intelligence as a multi-partner platform for sector-specific collaboration and research could drive innovation in priority industries.*
6. **Promote Industry-Academia Collaboration for Talent Development:**
    - *Create joint AI training programmes between universities and major technology firms to provide hands-on experience for students.*

6.5 BUSINESS

To assess AI adoption levels among businesses, a survey was conducted, receiving 19 responses. While the sample is not fully representative, it offers insights into AI adoption trends in Uzbekistan's business sector.

Majority of survey businesses are in the ICT sector

Among the respondents, 84.2% operate in the IT sector, with 42.1% specifying their industry focus. The majority of IT businesses surveyed are active in Finance & Banking, followed by Education, E-commerce, and Agriculture. Additionally, 15.8% of respondents reported operating in other sectors, including Transport & Logistics, Marketing, and Energy/Process Automation.

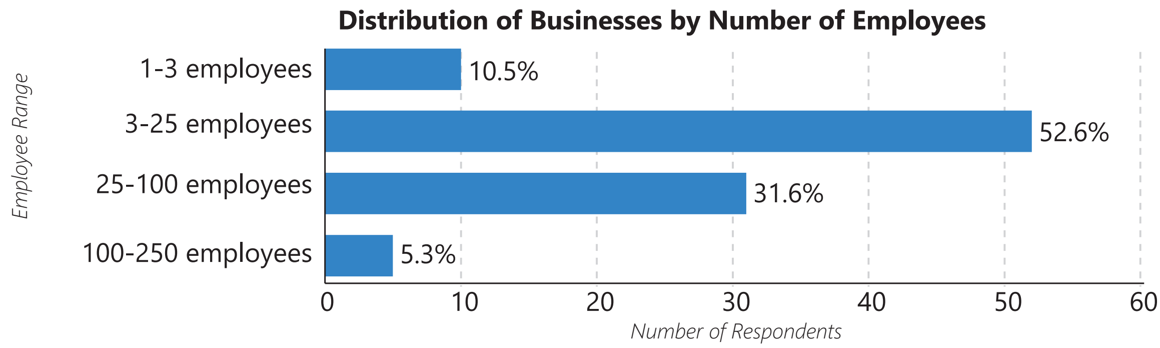

Figure 21: Distribution of businesses by number of employees

The majority of surveyed businesses fall within the 3-25 employee range, followed by those with 25-100 employees. A smaller proportion consists of micro-businesses (1-3 employees), while only one business operates with 100-250 employees. The most common revenue range is UZS 2 billion (approx. USD 160,000) to UZS 10 billion (approx. USD 800,000), reported by 42.1% of businesses. Additionally, 26.3% of businesses generate revenue between UZS 500 million (approx. USD 40,000) and UZS 2 billion (approx. USD 160,000), reflecting a strong presence of mid-revenue companies. Meanwhile, 21.1% of businesses report earnings below UZS 500 million (approx. USD 40,000), and 10.5% exceed UZS 10 billion (approx. USD 800,000).

A majority indicates high familiarity levels with AI

When asked about their familiarity with AI technologies, 45% of respondents described themselves as "Very familiar", while 25% reported being "Somewhat familiar", indicating a moderate understanding. One respondent positioned themselves between "Very familiar" and "Somewhat familiar". Additionally, 20% identified as "Not very familiar", reflecting limited AI knowledge. One respondent selected a combination of "Somewhat familiar" and "Not very familiar", suggesting mixed familiarity levels. Overall, the responses indicate that most participants have at least a moderate understanding of AI, with nearly half considering themselves "Very familiar", demonstrating growing awareness of AI in businesses across Uzbekistan.

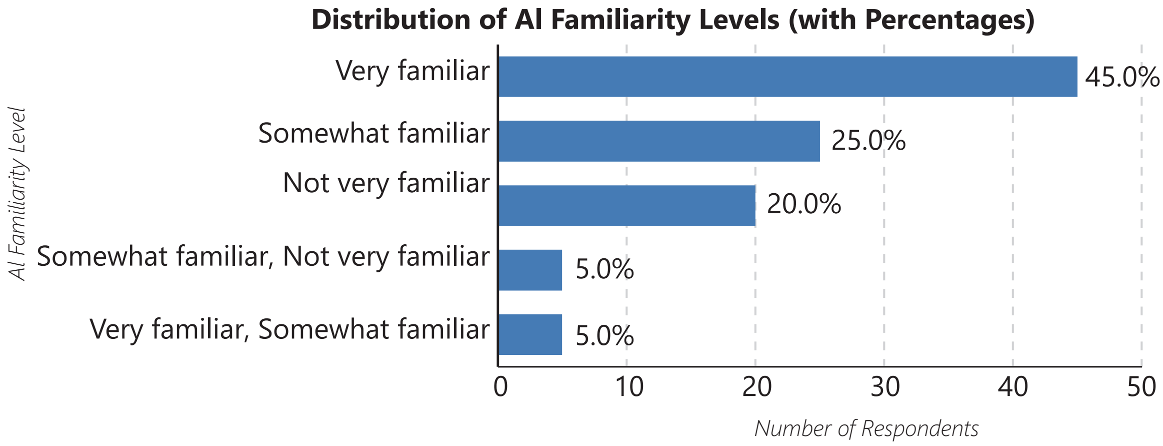

Figure 22: Distribution of AI familiarity levels

When asked about the importance of AI in the future of their industry, 73.7% of respondents rated it as "Very important," reflecting a strong consensus on its significance. Meanwhile, 26.3% considered it "Somewhat important," indicating a moderate but still notable level of relevance. Notably, none of the businesses regarded AI as insignificant to their industry.

Content creation and creative generation the best-known application area of AI

When asked about areas where they have heard AI being used, 84.2% of surveyed businesses cited content creation and creative generation, making it the most recognised application. This was followed by sales and marketing (73.7%), product development and innovation (68.4%), customer engagement (63.2%), and operations and process efficiency (63.2%). In contrast, the least recognised AI applications were compliance and supply chain management, with only 15.8% of businesses acknowledging awareness in these areas. When asked which key challenges in their business could be addressed by AI, 63.2% of respondents identified sales and marketing as the primary area, followed by customer engagement (57.9%), product development (52.6%), and data management, storage, and analysis (52.6%). While 84.2% of businesses were aware of AI applications in content creation and creative generation, only 36.8% reported facing challenges in this area, suggesting a need to increase awareness of

AI's potential in other business functions. The least cited challenges that AI could address were in human resources, compliance, and supply chain management, each highlighted by only 21.1% of respondents.

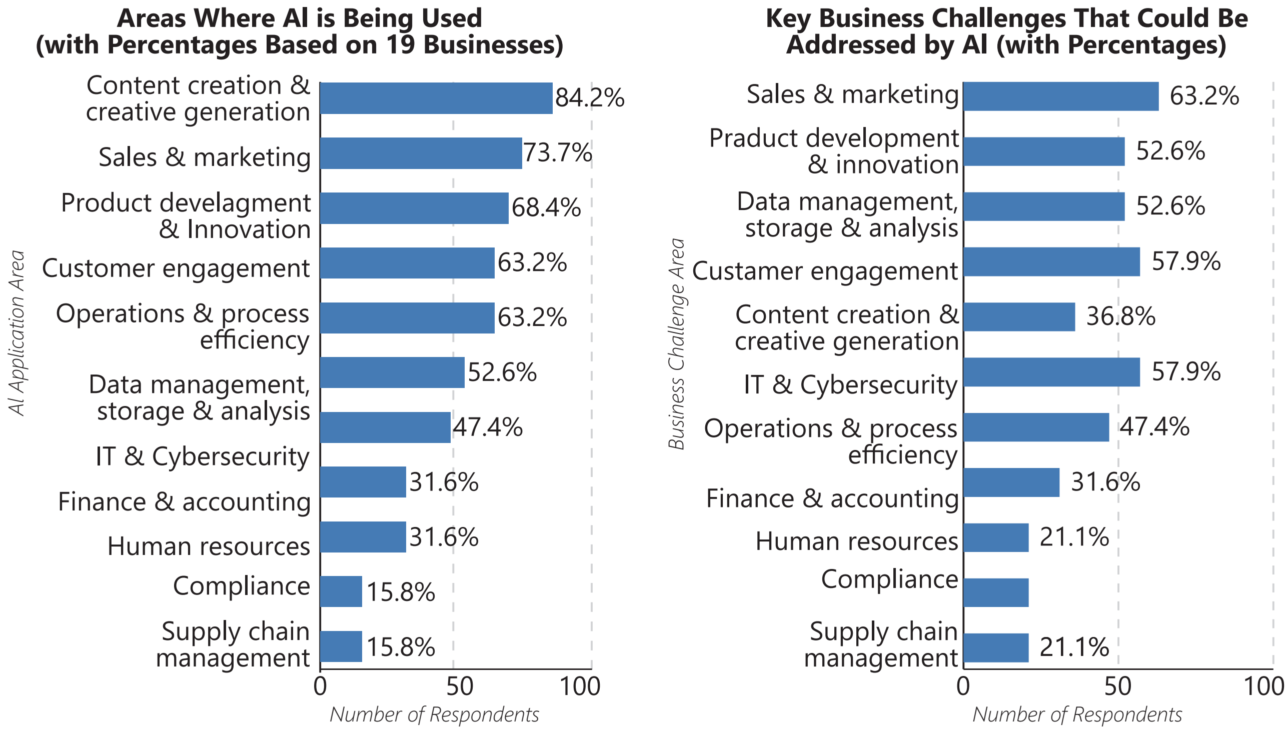

Figure 23: Areas where AI is being used and key business challenges that could be addressed by AI

When asked about AI adoption, 57.9% of businesses reported having integrated AI into their operations, while 42.1% have not yet adopted AI, indicating opportunities for further expansion. Among AI software platforms, 42.1% of businesses use ChatGPT, making it the most commonly mentioned tool. Other AI solutions, including Claude, Gamma App, and MidJourney, were cited, reflecting AI's widespread use in content creation and creative generation. Beyond content applications, businesses are leveraging AI for programming and algorithmic tasks. One company specifically noted using ChatGPT for algorithmic solutions in programming, while another reported employing LLMs like LLaMA to train open-source models tailored to its needs. The same business also utilises GitHub Copilot for AI-assisted coding, and another company highlighted using open-source LLMs for code generation, solution development, and solution comparison. Additionally, one business has developed a proprietary AI solution for Uzbek language transcription, demonstrating AI's potential for custom language processing applications. While these examples showcase diverse AI applications, the majority of businesses primarily focus on content generation, suggesting untapped opportunities for AI integration in more advanced functions.

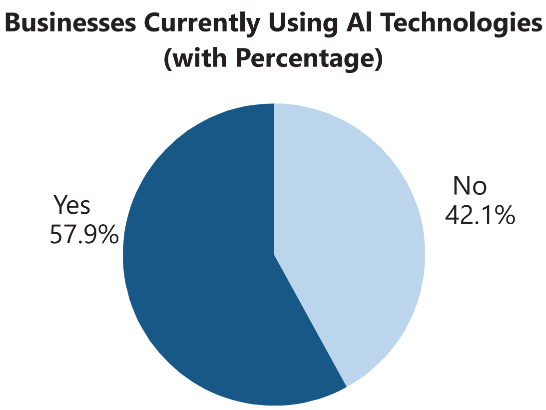

Figure 24: AI usage by businesses

Among the 19 businesses surveyed, only 10 responded to the question regarding the duration of their AI usage, indicating that 47.4% either have not yet adopted AI or were uncertain about their AI usage timeline. Among those who provided responses, 2 businesses adopted AI within the last 6 months, 3 businesses have been using AI for 6 months to 1 year, another 3 businesses have integrated AI for 1-2 years, and 2 businesses have been using AI for more than 2 years. This distribution suggests that AI adoption is relatively recent, with the majority of businesses having implemented AI within the last two years.

Skilled personnel is the biggest barrier to AI adoption

When asked about the biggest challenges in AI adoption, 57.9% of businesses cited a lack of skilled personnel, underscoring the need for AI expertise and specialised workforce training. 47.4% identified data quality and availability as a major concern, emphasising the importance of reliable and accessible data for effective AI implementation. 36.8% highlighted cost constraints and integration difficulties with existing systems, pointing to significant technical hurdles in AI adoption. In contrast, only 21.1% were concerned about return on investment (ROI), suggesting that the majority recognise AI's long-term benefits. Additionally, only 10.5% of respondents viewed regulatory barriers, resistance to change, and customer trust issues as major obstacles. Notably, 15.8% of businesses reported no challenges, indicating that AI integration has been smooth for some organisations. These findings suggest that while AI adoption is expanding, businesses continue to face barriers related to talent acquisition, data readiness, technical integration, and financial feasibility. Addressing these challenges through AI education, workforce development, and financial incentives will be key to accelerating AI adoption.

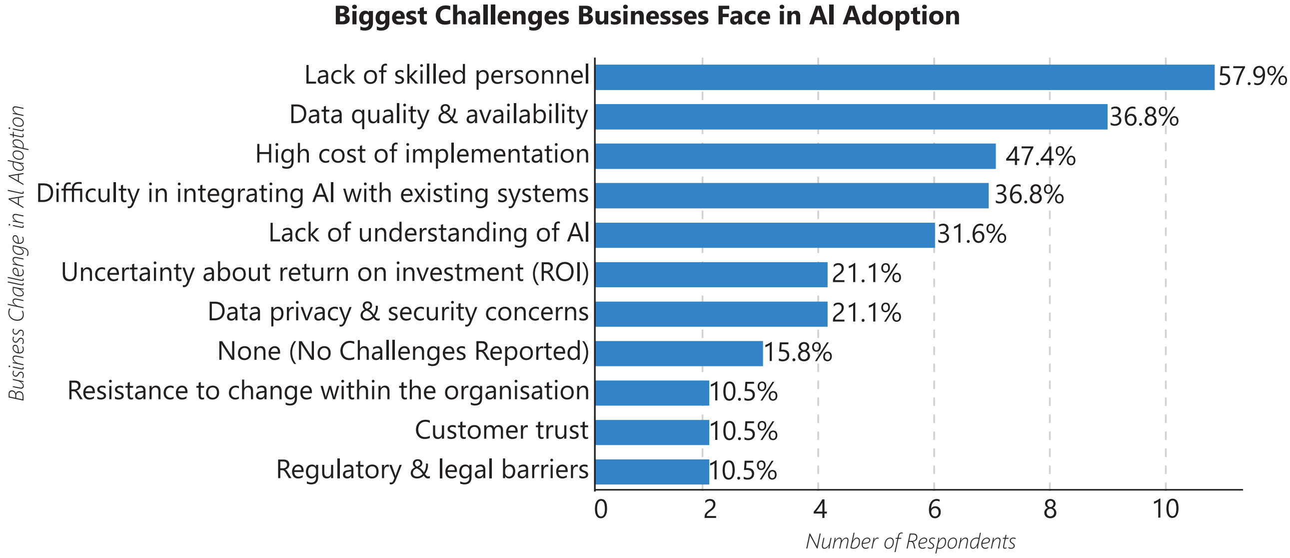

Figure 25: Challenges businesses face in AI adoption

When asked whether they had sought assistance from AI consultants or service providers, only 26.3% of businesses indicated they had looked for external support, while the majority (73.7%) did not seek any external assistance. 14 businesses provided insights into the barriers preventing them from doing so. Among these, 42.9% cited cost and unclear benefits as the primary obstacles. Additionally, 35.7% highlighted the lack of available AI service providers, suggesting that many businesses struggle to find suitable expertise. One business reported facing no barriers, while another stated they had not needed to seek help

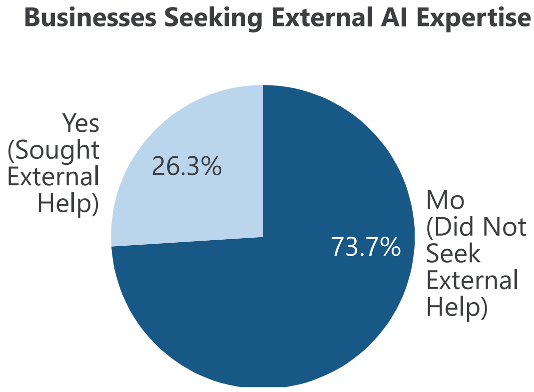

Figure 26: Businesses seeking external AI expertise

yet, implying they may consider it in the future. However, 79.9% of respondents indicated plans to adopt or expand their use of AI within the next 12 months. Only 21.1% (three businesses) were uncertain about their AI adoption plans. Notably, two of these businesses had not yet implemented any AI technology in their operations.

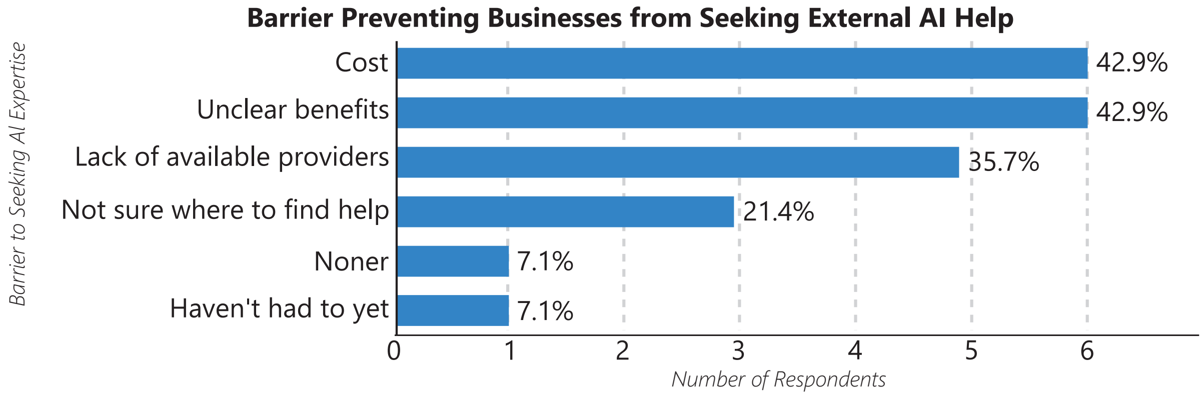

Figure 27: Barrier preventing businesses from seeking external help

Most businesses plan to strengthen sales & marketing through AI adoption

Two businesses that do not plan to expand AI in the next 12 months did not respond to the question regarding their intended areas of AI implementation. Sales & marketing (70.6%) emerged as the top priority for AI adoption, followed by customer engagement (58.8%), reflecting AI's increasing role in enhancing customer interactions and service efficiency. Finance & accounting, human resources, compliance, and supply chain management remain the least prioritised areas, aligning with previous findings. However, some responses should be interpreted with caution, as certain businesses indicated plans to implement AI across multiple areas, which may deviate from realistic adoption expectations. Additionally, two businesses that expressed intentions to implement AI did not specify a budget, raising questions about their readiness for adoption.

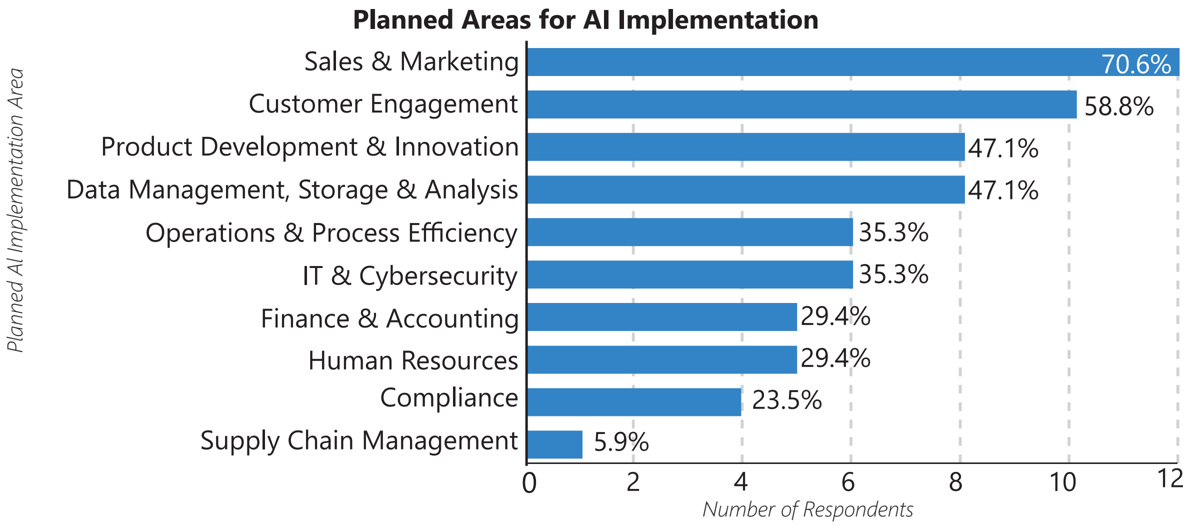

Figure 28: Planned areas for AI implementation

Despite the majority of businesses expressing intentions to adopt AI, a significant portion allocate little to no funds for implementation. 21.1% have no budget for AI adoption, while 52.6% plan to invest only up to UZS 125 million (approx. USD 10,000). Among those in this investment category, three businesses intend to deploy AI across more than seven application areas, raising concerns about the feasibility and seriousness of their investment plans. One business, which plans to invest over UZS 1.25 billion (approx. USD 100,000), has not previously used AI but has outlined concrete plans for AI-driven harvest forecasting. Among the four businesses intending to invest between UZS 125 million and UZS 1.25 billion (USD 10,000 – 100,000), three have already integrated AI into their operations. Of these, two businesses reported that 10-25% of their processes are AI-automated, while one business indicated that more than 75% of its processes rely on AI. The remaining business in this category stated that it is still in the development stage of AI adoption.

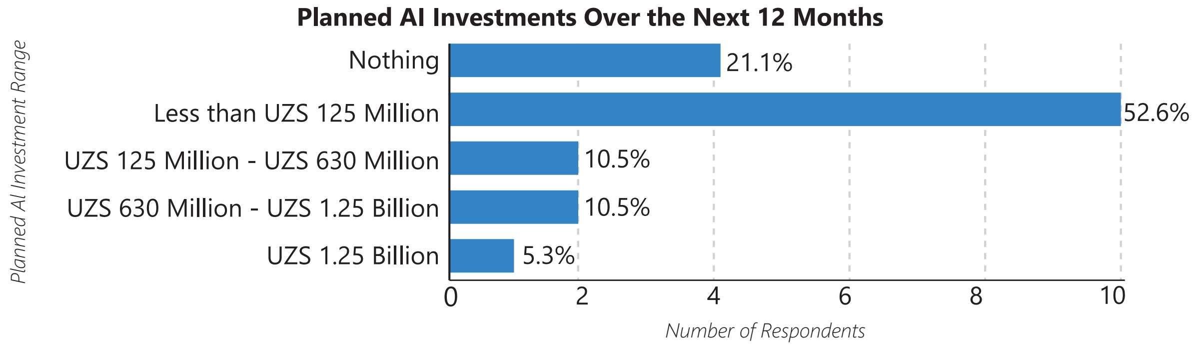

Figure 29: Planned AI investments over the next 12 months

However, among the 19 surveyed businesses, 47.4% believe that AI will be a significant driver of growth and innovation, reflecting strong expectations for its transformative potential. Additionally, 42.1% anticipate that AI will moderately enhance efficiency but do not expect it to fundamentally reshape their industry. One business remains uncertain about whether AI will lead to moderate efficiency improvements or have minimal impact, while another explicitly stated that AI will have minimal influence on its industry. Notably, none of the businesses believe AI will create more challenges than benefits.

Improved data management key for tackling data quality challenges

Businesses were also surveyed on the primary challenges they face in preparing data for AI solutions. Data quality issues (52.6%) – such as incomplete or inaccurate data – were the most frequently cited challenge, emphasising the need for improved data management. Additionally, 47.4% of businesses pointed to a lack of internal expertise, highlighting the shortage of skilled personnel for AI data handling. 42.1% cited high costs associated with data preparation, indicating that financial investment in structuring and processing data remains a barrier. Regulatory or compliance barriers were the least frequently mentioned challenge.

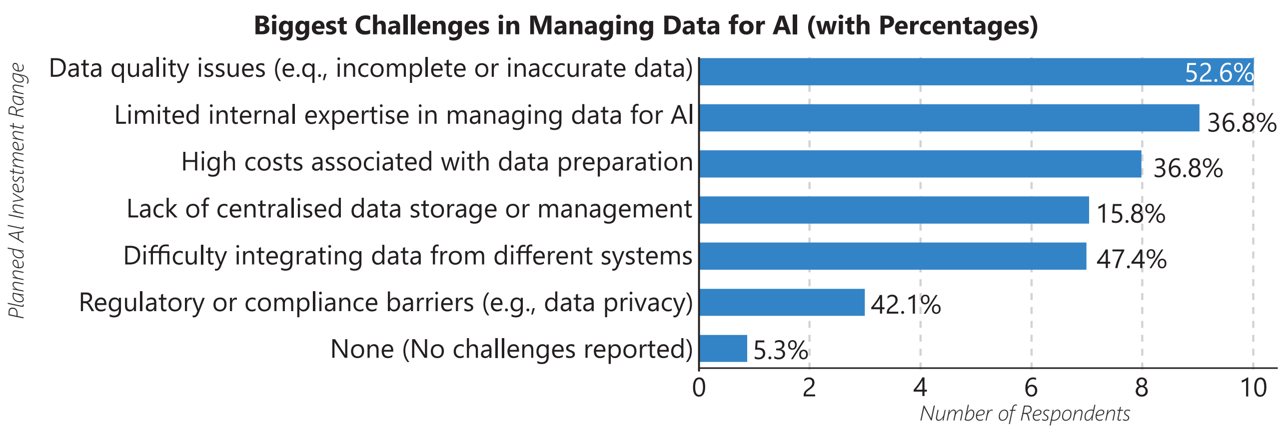

Figure 30: Challenges in managing data for AI

Data Privacy & Security is the most critical ethical concern

Businesses were also surveyed on the importance of ethical concerns in their AI projects. Data privacy and security (4.32) emerged as the top ethical priority, highlighting the critical need for protecting sensitive information. Accountability for AI decisions (4.16) ranked second, reflecting concerns over responsibility for AI-generated outcomes. Impact on the workforce (3.63) received the lowest average rating, suggesting that while businesses recognise AI's effect on employment, they do not perceive it as an immediate ethical challenge.

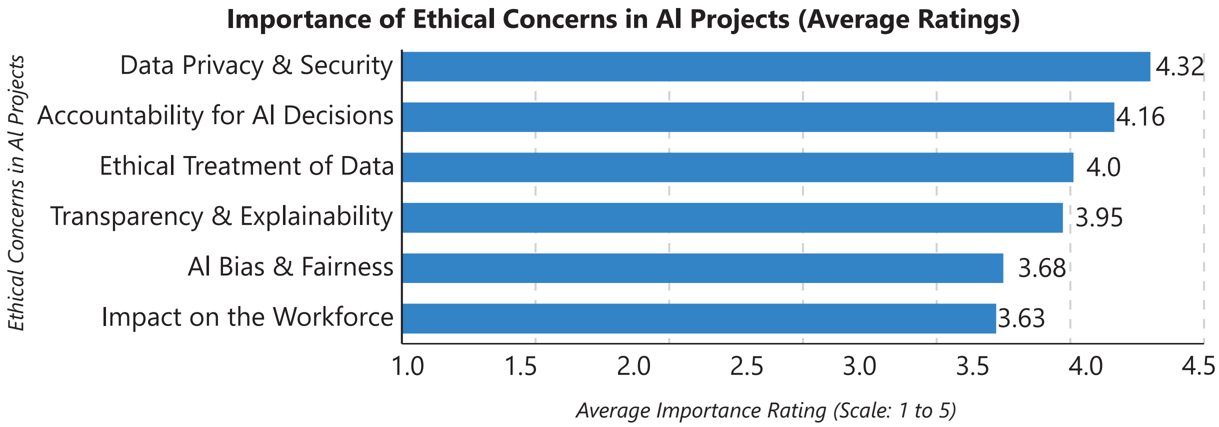

Figure 31: Importance of ethical concerns

Most businesses believe more regulations are needed to govern AI

When asked about their perception of AI regulation, 42.1% of businesses stated that more AI regulations are needed, highlighting a demand for clearer policies and regulatory frameworks. An equal percentage of respondents were unsure, suggesting a lack of clarity or awareness regarding existing AI regulations.

Businesses were also asked about the support or resources needed to adopt AI more effectively. The majority (84.2%) identified financial assistance as the most critical enabler for AI adoption. Access to skilled AI professionals (73.7%) ranked second, emphasising the need for AI expertise in the workforce. AI consultation services (68.4%) were also highlighted, reflecting a demand for specialised guidance in AI integration. While affordable and accessible infrastructure and hardware (36.8%) was the least cited factor, it remains a challenge for some businesses. These findings indicate that businesses require a combination of financial support, skilled professionals, and AI expertise to successfully implement AI solutions. Government policies that facilitate funding, training programmes, and expert guidance could play a crucial role in accelerating AI adoption and fostering innovation.

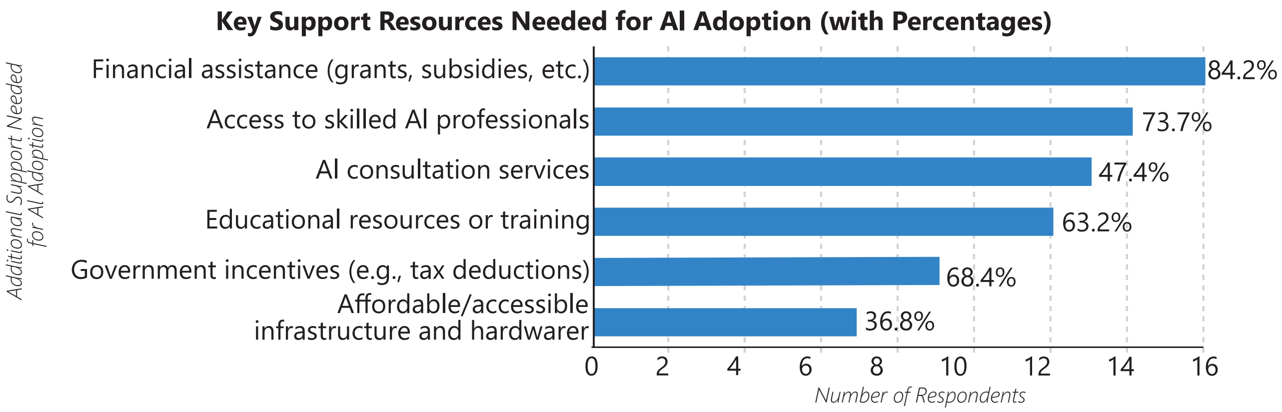

Figure 32: Key support resources needed for AI adoption

RECOMMENDATIONS

1. **Develop AI Talent and Upskill the Workforce:**
   - *Provide tax incentives for companies investing in AI training programmes for their employees.*
   - *Develop training programmes in collaboration with the Research Institute for the Development of Digital Technologies and Artificial Intelligence to enhance employee awareness and expertise in AI, ensuring businesses understand its strategic importance and practical applications.*
2. **Create Incentives for R&D and partnership:**
   - *Strengthen partnerships between universities, private companies, and international tech firms to jointly implement AI projects in businesses. Incentivise private sector investments in AI projects through tax benefits (training cost deductible from profits), vouchers and co-financing schemes.*
3. **Improve AI Data Accessibility:**
   - *Develop (sector-specific) open data platforms allowing businesses to provide and access high-quality datasets.*
   - *Incentivise companies to contribute anonymised datasets for AI research and training purposes.*
4. **Increase Access and Quality of Consultancy Services:**
   - *Establish a network of certified AI consultancies to provide expert guidance and support for businesses implementing AI projects.*
5. **Increase Awareness:**
   - *Showcase AI success stories from Uzbek companies to raise awareness and drive adoption.*

7. COMPARATIVE POLICY ANALYSIS & RECOMMENDATIONS

To assess how Uzbekistan compares to other countries in the policy arena regarding entrepreneurship and AI promotion, a comprehensive benchmarking framework was developed. This framework facilitated a thorough analysis of selected policies, enabling a direct comparison between Uzbekistan and its global counterparts. The findings from this analysis led to strategic recommendations aligned with the benchmarking framework, aiming to enhance Uzbekistan's policy effectiveness in fostering the entrepreneurship and AI ecosystem.

7.1 BENCHMARKING FRAMEWORK

7.1.1 ENTREPRENEURSHIP POLICY & STRATEGIES BENCHMARKING

The following benchmarking framework has been developed to compare the entrepreneurship strategies selected within the framework of this research:

1. Strategic Goals and Vision

The long-term goals for entrepreneurship (e.g., fostering innovation-driven enterprises, increasing global competitiveness) and the strategic objectives of the policy (e.g., improving talent, increasing access to finance). This section includes specific focus areas (e.g., technology-driven entrepreneurship, women-led enterprises) and the allocated budget or resources for implementation.

2. Sector Priorities

The targeted sectors for entrepreneurial development (e.g., healthcare, agriculture, green energy) and the rationale for their selection. This section also examines sector-specific goals and the policy's approach to encouraging innovation and growth in these areas.

3. Legal and Regulatory Environment

The provisions related to the ease of business formation, available business structures, definition of start-ups, the registration processes and the certification processes as well as accreditation process of start-ups.

4. Specific Provisions for Start-ups

Unique provisions such as innovative public procurement policies, employee shares, sandbox regulations and special measures for fostering innovative and scalable entrepreneurship.

5. Financial Support and Incentives

The provisions to strengthen access to finance for start-ups, including tax benefits such as reduced corporate tax rates, deferrals and special tax regimes for start-ups and investors, alternative funding instruments, grants, subsidised loans and equity financing support.

6. Support Infrastructure

The provisions supporting access to infrastructure, such as innovation hubs, tech parks and other support structures. This includes the role of specialised agencies in providing resources and support to start-ups.

7. Research, Education, Training and Skill Development

The provisions fostering entrepreneurial education integration, skill development programmes, research and development support, and public-private collaborations with universities.

8. Networking & Internationalisation

The provisions supporting exports, international agreements, market access programmes, and initiatives facilitating start-ups' expansion abroad. This includes measures for fostering cross-border collaborations.

9. Support for International Talent and Investments

The provisions to attract international talent and investment, such as streamlined immigration policies, digital nomad visas, incentives for foreign investors, and simplified tax identification processes. This includes measures to retain international talent and foster a multicultural entrepreneurial environment.

10. Governance and Regulation

The provisions relating to the governance structures in place for overseeing the start-up ecosystem, including the roles of governmental bodies, regulatory frameworks and coordination mechanisms between state and regional authorities.

11. Monitoring, Evaluation, and Adaptability

The provisions for performance metrics and indicators to measure the success of start-up policies and their impact on economic growth, innovation, and social well-being. This includes mechanisms for feedback, regular monitoring, evaluation reports, and policy adaptability to ensure continuous improvement based on empirical data and stakeholder input. **12 General**

A brief summary of the strengths and weaknesses of the strategies, along with additional relevant information.

7.1.2AI STRATEGIES & POLICIES BENCHMARKING FRAMEWORK

The following benchmarking framework has been developed to compare the AI strategies selected within the framework of this research:

1. Strategic Goals and Vision

The long-term goals for AI (e.g., becoming a leader in AI, fostering innovation) and the strategic objectives & focus areas of the AI policy (e.g., building destination for AI, attract and train talent, etc.).

2. Sector Priorities

The targeted sectors for AI development and implementation and the rational for selection. This section outlines specific sectoral goals as well as potential projects for AI integration and its potential to drive innovation, efficiency, and sustainable growth across industries.

3. Ethical and Responsible AI

The provisions and mechanisms relating to AI ethics principles, fairness, transparency, non-discrimination, accountability, and human rights protection as well as mechanisms to prevent or mitigate algorithmic bias and ensure inclusivity and diversity.

4. Regulation and Governance

The provisions and mechanisms to govern the use, development, testing, deployment and monitoring of AI technologies. Additionally, measures to promote oversight and assessment mechanisms to complement policy frameworks and experimentation.

5. Research, Development and Innovation

The provisions and mechanisms to foster investment in AI Research, establish public private partnerships or other initiatives driving research and innovation into AI.

6. Business and Entrepreneurship

The provisions and mechanisms designed to foster the adoption of AI in businesses, and entrepreneurship. Additionally, provisions such as financial incentives to support businesses adopting AI solutions and funding programmes to encourage AI-driven start-ups.

7. Data Infrastructure and Governance

The provisions and mechanisms on access to data, data sharing and open data initiatives to provide the necessary data infrastructure for AI development as well as data quality and standards for the quality, labelling, and accuracy of data used to train AI systems. Additionally, provisions on clarifications on data ownership, especially for sensitive or national data as well as the take of the policy on data protection and privacy.

8. Infrastructure

The provisions relating to development of AI infrastructure such as high-performance computing to handle large-scale data processing or cloud infrastructure.

9. Education and Human Capital Development

The provisions and initiatives to integrate AI education into the curriculum at all levels (K-12, higher education) to build a future AI-capable human capital as well as programmes to train and retrain workers, particularly also those displaced by AI.

10. AI in Public Services

The provision relating to the use of AI to improve government operations, decision-making, and service delivery as well as the role of AI in other public initiatives, e.g. development of smart cities, managing urban infrastructure, and optimising resources.

11. International Cooperation and Global Standards

The provisions relating to the alignment with International AI Principles such as those from the OECD, United Nations Educational, Scientific and Cultural Organisation (UNESCO), or the EU. Additionally, the provisions relating to cross-border AI collaboration and the participation in international AI initiatives and research collaborations to share knowledge and resources as well as relating to AI Diplomacy by engaging in dialogue with other nations on the governance, ethics, and regulation of AI technologies.

12. Monitoring, Evaluation, and Adaptability

The Performance Metrics and indicators to measure the success of AI policies and their impact on economic growth, innovation, and social well-being as well as the provision relating to feedback mechanisms and the review and update of AI policies.

13. General

A brief summary of the strengths and weaknesses of the strategies, along with additional relevant information.

7.2 GLOBAL BEST PRACTICES

7.2.1 ENTREPRENEURSHIP STRATEGIES & POLICY BEST PRACTICES

Strategies that have be reviewed as benchmark are the following:

- **Spain:** Spain's Entrepreneurial Nation (Entrepreneurship Strategy)[177] and Spain Start-up Law[178]
- **Nigeria:** Nigeria Start-up Act[179]
- **Uzbekistan:** The country does not have a national Start-up Strategy or Law. Over the years several decrees and decisions have been issued that have been analysed for the benchmark. These include but not limited:
  - 2018 No. PF-5583 "On Additional Measures to Improve the Financing Mechanisms for Projects in the Field of Entrepreneurship and Innovation"[180]
  - 2018 No. PP-3682 "On Measures to Further Improve the System of Practical Implementation of Innovative Ideas, Technologies and Projects"[181]
  - 2018 No. PP-3697 "On Additional Measures to Create Conditions for the Development of Active Entrepreneurship and Innovative Activity"[182]
  - 2019 Decision No. 414 "On Approving the Regulations for Investment and Management Companies"[183]
  - 2020 Decision No. 684 "On Organising the Activities of the UZVC National Venture Fund"[184]
  - 2024 Resolution No. 87 "On Additional Measures to Promote the Export of Services in the Field of Digitalisation in the Country"[185]
  - 2024 Resolution No. 128 "On Measures to Implement the Innovative Development Strategy of the Republic of Uzbekistan"[186]
  - 2024 No. PP-357 "On Measures for Further Development of Start-Up Projects and the Venture Funding Ecosystem"[187]

The strategies analysed were selected from an advanced economy (Spain) and a comparable lower-middle-income economy (Nigeria). These strategies were thoroughly examined within the framework to formulate potential recommendations for developing a Start-up Law for Uzbekistan. No regional Start-up Law/Act was identified; however, notably,

[177] Gobierno de Espana (2021): Spain Entrepreneurial Nation.

[178] Boletín Oficial Del Estado (2022): Jefatura Del Estado.

[179] Federal Republic of Nigeria Official Gazette (2022): Nigeria Startup Act.

[180] LexUZ (2018): On additional measures to improve the financing mechanism for projects in the field of entrepreneurship and innovation.

[181] LexUZ (2018): On measures to further improve the system of practical implementation of innovative ideas, technologies and projects.

[182] LexUZ (2018): On additional measures to create conditions for the development of active entrepreneurship and innovative activities.

[183] LexUZ (2019): On approving the regulations for investment and management companies.

[184] LexUZ (2020): On organising the activities of the UZVC National Venture Fund.

[185] LexUZ (2024): On additional measures to promote the export of services in the field of digitalisation in the country.

[186] LexUZ (2024): On measures to implement the innovative Development Strategy of the Republic of Uzbekistan.

[187] LexUZ (2024): On measures for further development of start-up projects and the venture funding ecosystem.

Tajikistan introduced a dedicated Social Entrepreneurship Law in January 2025, reflecting its commitment to supporting social businesses.

7.2.2 AI STRATEGIES & POLICIES BENCHMARKING BEST PRACTICES

Strategies that have be reviewed as benchmark are the following:

- **Germany:** Nationale Strategie für Künstliche Intelligenz[188]
- **Egypt:** Egypt National Artificial Intelligence Strategy[189]
- **Turkey:** National Artificial Intelligence Strategy 2021-2025[190]
- **Uzbekistan:** Strategy for the Development of Artificial Intelligence Technologies until 2030[191]

The strategies analysed were selected from an advanced economy (Germany), a comparable lower-middle-income economy (Egypt), and a regional peer (Turkey). These strategies were thoroughly examined within the framework to formulate potential recommendations for updating Uzbekistan's AI strategy.

7.3 RECOMMENDATIONS

7.3.1 ENTREPRENEURSHIP STRATEGY OF UZBEKISTAN

1. Strategic Goals and Vision

Spain, Nigeria, and Uzbekistan have each adopted distinct approaches to fostering entrepreneurship, shaped by their respective economic conditions, policy priorities, and development objectives. Spain has implemented a comprehensive and structured framework through the Entrepreneurial Nation Strategy (2021) and the Spanish Start-up Law (2022). These initiatives establish a long-term vision cantered on investment, talent attraction, ecosystem scaling, and regulatory flexibility while also addressing inclusivity through gender, regional, and socioeconomic considerations. Nigeria has taken a structured approach by prioritising regulatory clarity, investment attraction, and digital innovation to support its entrepreneurial landscape. Uzbekistan, in contrast, does not yet have a dedicated Entrepreneurship Strategy or Start-up Law. Instead, the regulatory environment is governed by a collection of policies, decrees, and resolutions, resulting in a fragmented framework where responsibilities are spread across multiple ministries. Establishing a unified National Entrepreneurship Strategy and Law would enable the consolidation of existing initiatives into a coherent, cross-sectoral policy. This strategy/law should not only focus on digital entrepreneurship but also expand support to other high-potential industries, acknowledging that the distinction between digital and non-digital sectors is increasingly blurred, especially in emerging economies where most start-ups inherently integrate digital components. A holistic strategy should also address several critical gaps in Uzbekistan's entrepreneurial ecosystem. Key missing elements include the introduction of a clear start-up labelling and certification process to provide transparency and recognition, improved access to alternative funding instruments,

[188] Die Bundesregierung (2020): Nationale Strategie für Künstliche Intelligenz.

[189] The National Council for Artificial Intelligence (2022): Egypt National Artificial Intelligence Strategy

[190] Republic of Türkiye Ministry of Industry and Technology & Digital Transformation Office (2021): National Artificial Intelligence Strategy 2021-2025.

[191] LexUZ (2024): On the approval of the strategy for the development of Artificial Intelligence technologies until 2030.

and the introduction of tax benefits and incentives tailored for both local and international investors, particularly for angel investors who play a crucial role in early-stage funding. Additionally, a greater emphasis should be placed on talent development and university-based incubation support to strengthen the link between academia and entrepreneurship. Furthermore, incentivising international private support organisations (incubators and accelerators) to establish operations in Uzbekistan could bring valuable expertise and global best practices to the local ecosystem. By integrating these elements into a comprehensive strategy/law, Uzbekistan could create a more dynamic, competitive, and investor-friendly start-up ecosystem, fostering sustainable innovation and economic growth.

2. Sector Priorities

Spain has adopted a broad, sector-diverse strategy through its Entrepreneurial Nation Strategy, prioritising industries such as tourism, health, construction, energy, banking, digitalisation, agribusiness, and biotechnology. While the Spanish Start-up Law is sector-neutral, it focuses on technology-driven start-ups with strong growth potential and extends support for industries with longer development cycles, such as biotechnology and energy. Nigeria, in contrast, has taken a concentrated approach, prioritising digital technology as the key driver of economic growth, job creation, and global competitiveness. Uzbekistan does not yet have a clearly defined sectoral focus. While the MDT supports digital entrepreneurs, previous strategies of other ministries have emphasised sectors such as renewable energy, robotics, biotechnology, food safety, smart agriculture, and healthcare. However, these efforts remain fragmented, without a unified framework that aligns start-up development with national economic goals. If Uzbekistan were to develop a comprehensive strategy and Start-up Law, it could benefit from combining Spain's broad sectoral approach aligned with national priorities with Nigeria's targeted focus on digital transformation, prioritising high-growth digital industries such as fintech while fostering emerging sectors like e-commerce. Additionally, aligning the strategy/law with recently identified national priorities such as the advancement of artificial intelligence, would ensure a forward-looking and innovation-driven start-up ecosystem. In this context, the strategy could address key gaps, particularly the challenges surrounding data availability, which remains a critical factor in AI development. A targeted approach could support start-ups that specialise in data collection, management, and processing, thereby strengthening the foundation for AI-driven innovation and technological progress.

3. Legal and Regulatory Environment

Uzbekistan has made significant progress in defining the legal status of start-ups and supporting the venture funding ecosystem. However, compared to Spain and Nigeria, its regulatory framework remains less structured and lacks key mechanisms for certification and compliance. Spain has implemented a certification process, ensuring that only innovative and scalable businesses receive start-up benefits. Similarly, Nigeria's Start-up Act has introduced a labelling system that categorises start-ups based on specific criteria, such as company age, digital innovation, and local ownership. This labelling grants start-ups access to benefits for a specified period, enabling early-stage businesses to secure financial and operational support. Furthermore, Nigeria has established a mandatory compliance framework, requiring start-ups to submit annual reports on their financial and operational performance. This ensures accountability while allowing businesses to retain their incentives. While Uzbekistan has introduced a legal definition for digital start-ups, it still lacks a clear certification system or labelling process to distinguish eligible businesses and provide structured incentives. To strengthen its start-up ecosystem, Uzbekistan should develop a comprehensive Start-up Strategy and Law that includes a formal labelling system managed by an independent certification body. This body would evaluate start-ups based on their innovation, scalability, and compliance with legal requirements, ensuring that only qualifying businesses benefit from government incentives. Additionally, it is crucial to clearly define how long start-ups can receive incentives such as tax benefits and grants, while also specifying the conditions under which they lose start-up status. To ensure transparency and track the success of start-ups, Uzbekistan should establish a robust progress monitoring system, similar to Nigeria's requirement for annual reporting on human resources, assets, turnover, incentives received, and business advancements of start-ups.

4. Specific Provisions for Start-ups

Uzbekistan has made significant progress in supporting start-ups through the **Digital Start-up Programme**, introducing financial incentives such as **reimbursement for international acceleration programmes** and **funding for training courses**. However, compared to Spain and Nigeria, it lacks **structured mechanisms for public procurement** and **sandbox regulations** that allow start-ups to test emerging technologies in a secure environment. Spain's **Start-up Law** mandates **public procurement opportunities** for start-ups, ensuring their inclusion in government contracts. Nigeria's **Start-up Act** streamlines **IP registration for labelled start-ups**, simplifies **licensing procedures for fintech companies**, and facilitates **government contract access through a centralised Start-up Portal**. To strengthen Uzbekistan's start-up ecosystem, several key provisions could be introduced. **Public procurement opportunities could** be extended beyond **commercial banks and SOEs** for IT system implementation and support. Additionally, the requirement that **SOEs must hold at least 5% equity in a start-up to procure its services should be abolished**, as it restricts broader participation. Furthermore, **sector-specific regulatory sandboxes** should be developed, allowing start-ups to **test emerging technologies in a controlled environment** before full-scale deployment. While **Spain's legal framework for equity-based compensation plans** is a feature of more mature markets, Uzbekistan could take a step towards this by incorporating **phantom shares as an incentive mechanism** in a future **Start-up Law**. Recognising phantom shares as a **legitimate compensation structure** would allow start-ups to offer them **without altering existing shareholding structures**. To further encourage adoption, the government could introduce **tax deductions for companies implementing employee incentive programmes**, such as phantom shares. Additionally, **favourable tax breaks** could be provided for **phantom share payouts**, similar to stock option incentives in other countries. This would **encourage start-ups to use phantom shares instead of direct cash bonuses**, aligning employee incentives with long-term business growth and helping retain top talent in the start-up ecosystem.

5. Financial Support and Incentives

Uzbekistan has introduced several financial support mechanisms for start-ups, including investment matching, special loans, and a special legal regime for alternative funding instruments. However, compared to Spain and Nigeria, its framework lacks dedicated tax incentives for start-ups and structured co-investment mechanisms that could attract more private capital from local investors. Both Spain and Nigeria offer various tax benefits that could serve as a model for Uzbekistan. Particularly relevant is a temporary tax exemption for labelled start-ups, as well as the option to defer tax payments for a period after achieving a positive taxable base. This approach reduces upfront tax burdens and improves cash flow management, allowing start-ups to reinvest in growth. Additionally, both Spain and Nigeria recognise crowdfunding as a legitimate financing mechanism, an approach that Uzbekistan should formally implement to expand access to alternative funding sources. Furthermore, Uzbekistan could establish a comprehensive tax incentive system for local investors, similar to Nigeria's model, which offers investment tax credits equivalent to a percentage of the total investment in a labelled start-up. Uzbekistan could also replicate Nigeria's capital gains tax exemption, where no tax is imposed on profits from the disposal of assets held in labelled start-ups for a period. In addition, Uzbekistan could introduce investment loss reliefs taxes that allow investors to offset losses from failed investments against their taxable income. To further encourage investments, Uzbekistan's matching fund, which is currently limited to foreign venture funds managing assets over USD 50 million, should be expanded to include local funds and investors without requiring a minimum asset threshold, however with special incentives for investments in women entrepreneurs or priority sectors. This would broaden access to investment capital, support local investors, and accelerate the development of the start-up ecosystem.

6. Support Infrastructure

Uzbekistan, Spain, and Nigeria have all actively supported the development of start-up support infrastructure. A distinctive feature of Nigeria's Start-up Act is the Start-up Investment Seed Fund, which provides direct financial support to technology laboratories, accelerators, and incubators. In contrast, Uzbekistan covers up to 50% of costs for entities operating incubation and acceleration programmes, specifically for hiring mentors and trainers, with a maximum cap of USD 50,000 per programme. However, there is no dedicated fund to support the operational costs of these entities. A Start-up Law in Uzbekistan could introduce such provisions or promote a public-private partnership model, particularly for accelerators and incubators in regional areas, fostering local entrepreneurship and private sector participation. Support for the establishment of FabLabs and other relevant innovation laboratories should be prioritised and integrated into the framework. Additionally, Nigeria's Start-up Act envisions a national policy for accelerators and incubators, aimed at facilitating their establishment and improving their quality. Uzbekistan could benefit from a similar framework, including the development of an excellence label for incubators and accelerators, as seen in other economies, to ensure high-quality support structures. Spain's entrepreneurship strategy also includes the creation of a National Network of Entrepreneurship Centres, which could serve as a blueprint for Uzbekistan. Such a network could be integrated into a Start-up Law, fostering collaboration between support organisations to strengthen cooperation and knowledge-sharing. Spain also seeks to encourage open innovation, with public administrations playing a dual role by identifying opportunities in strategic sectors and facilitating collaboration between companies and start-ups. A similar provision in Uzbekistan's Start-up Law could help align public and private innovation efforts, driving greater synergy between the government, established industries, and start-ups. One of the most unique aspects of Spain's Start-up Law is the mandate to establish the Spanish Agency for Artificial Intelligence Oversight, responsible for AI system oversight, advisory services, awareness-building, and training, particularly regarding the responsible use of algorithms. By integrating AI oversight into the Start-up Law, Spain provides regulatory clarity for AI-driven start-ups, ensuring AI innovation aligns with ethical and legal standards. The agency is also tasked with driving AI development in both the public and private sectors, including start-ups. Since Uzbekistan currently lacks a dedicated AI observatory or oversight body, a similar provision in a Start-up Law could ensure regulatory clarity and facilitate the interaction between AI innovations and start-ups, promoting responsible and sustainable AI development in the country.

7. Research, Education, Training and Skill Development

Research, education, training, and skill development have been addressed with varying levels of depth across Spain, Nigeria and Uzbekistan. Spain emphasises the role of Knowledge Transfer Offices to facilitate collaboration between businesses, research centres, incubators, accelerators, and venture builders. Establishing similar structures in Uzbekistan's legal framework could enhance the transfer of research into practical applications, strengthening the link between academia and entrepreneurship. Spain also promotes academic entrepreneurship by allowing teachers and researchers to take paid leave while establishing start-ups, ensuring financial stability during the transition. A similar provision in Uzbekistan's Start-up Law could encourage more researchers and educators to engage in entrepreneurship. Nigeria's national database of research and innovation promotes knowledge sharing and commercialisation, fostering stronger collaboration between researchers and entrepreneurs. Implementing a similar database in Uzbekistan could facilitate connections between potential founders and research institutions, encouraging innovation-driven start-ups. A Start-up Law for Uzbekistan could also introduce compulsory entrepreneurship courses in universities and vocational training programmes across various disciplines, similar to Spain, with a particular emphasis on regional universities to ensure equal access to entrepreneurial education. Additionally, Uzbekistan's self-employment support programme for digital technologies, currently scheduled for 2028, could be accelerated through the Start-up Law. Providing freelancers and self-employed individuals with free access to infrastructure, training, and advisory services would help develop entrepreneurial talent and potentially facilitate their transition into fully operational start-ups.

8. Networking & Internationalisation

Neither Nigeria nor Spain has a fully comprehensive framework dedicated to start-up internationalisation. However, Nigeria's Start-up Act includes export incentives and financial assistance programmes to help start-ups expand into international markets. In Uzbekistan, existing incentives for IT Park residents could be extended to labelled start-ups, particularly by supporting participation in international trade fairs and conferences, which are crucial for building global networks and market access. While the new resolution facilitates Uzbek start-ups' participation in leading international acceleration programmes, it imposes strict eligibility criteria, requiring programmes to have operated for at least five years and attracted a minimum investment of USD 100 million. This restricts access to only high-profile programmes, which may not be easily accessible to Uzbek start-ups. Reducing or eliminating these requirements would broaden opportunities for more start-ups to benefit from global acceleration initiatives. A Start-up Law could also identify key priority markets for Uzbek start-ups and establish bilateral cooperation agreements through joint programming with partner countries. Since limited market knowledge has been identified as a key barrier to international expansion, a dedicated platform providing up-to-date market insights, regulatory guidance, and trade opportunities could significantly enhance the global readiness of Uzbek start-ups. Additionally, initiatives such as the Local2Global programme, which supports start-ups in entering international markets, should be expanded and offered more frequently to maximise their impact.

9. Support for International Talent and Investments

Uzbekistan, Spain, and Nigeria have implemented various measures to attract international talent and investment, with Spain's provisions being the most comprehensive. Spain's Entrepreneurship Strategy focuses on enhancing global visibility through a national entrepreneurial brand and the development of an English-language web portal to provide accessible information for foreign entrepreneurs and investors. Uzbekistan could introduce a similar initiative by developing a unique branding narrative and enhancing the Startup Base platform to cater to international investors and start-ups. This platform could include English-language resources offering investment guides, regulatory information, and market insights to attract global stakeholders. While both Spain and Uzbekistan offer work visas for foreign professionals, particularly in IT, Spain has also introduced a digital nomad visa to attract entrepreneurs and freelancers. Uzbekistan could increase its appeal by implementing a similar visa, as seen in countries like Turkey, to attract remote workers and digital entrepreneurs. Investment incentives could also be extended to international investors, drawing from Spain's personal income tax deductions for start-up Investments, where investors can deduct a percentage of their investments in new or recent start-ups from their taxable personal income. Alternatively, Uzbekistan could adopt Nigeria's model, which offers investment tax credits equivalent to a percentage of the total investment in a labelled start-up. Additionally, Uzbekistan could replicate Nigeria's capital gains tax exemption, ensuring that no tax is imposed on profits from the disposal of assets held in labelled start-ups for a defined period. Although IT Park incentives in Uzbekistan already offer reduced income tax rates and lower taxation on dividends and interest for (foreign) employees, these benefits could be further extended to foreign professionals working in Uzbek start-ups. Reducing personal income tax for foreign employees could help attract high-quality talent while also easing the financial burden on start-ups. Additionally, a tax scheme extending benefits to the dependents of foreign professionals, including children under 25, spouses, or co-parents like in Spain could be introduced.

10. Governance and Regulation

Uzbekistan currently lacks a structured governance system to holistically oversee the start-up ecosystem. A comprehensive start-up regulation should consolidate start-up policies under a single long-term national strategy with clearly defined objectives, regulatory frameworks, and a governance structure. Spain and Nigeria have implemented coordinated governance models through multiple institutions, ensuring transparency, inclusivity, and inter-ministerial collaboration. Both countries have designated bodies responsible for overseeing strategy implementation and policy coordination. A similar governing entity should be established in Uzbekistan's Start-up Law to enhance efficiency and coherence. In Nigeria, a Secretariat manages the start-up labelling process and the Start-up Portal, centralising regulatory procedures and facilitating access to resources. A similar independent body could be established in Uzbekistan, responsible for start-up labelling. Despite public actors it should also include experts from the private sectors to ensure balanced decision-making and industry relevance. Additionally, Spain's National Start-up Forum and Nigeria's Start-up Consultative Forum serve as platforms for stakeholder engagement and continuous evaluation of start-up policies. Uzbekistan's Start-up Law should introduce a similar advisory body comprising start-up founders, investors, corporate leaders, and policymakers. This body would facilitate collaboration, policy improvement, and regular dialogue between the public and private sectors, ensuring that regulatory frameworks remain adaptable to the evolving needs of the start-up ecosystem.

11. Monitoring, Evaluation, and Adaptability

Nigeria Start-up Act assigns the National Council for Digital Innovation and Entrepreneurship the responsibility of regular monitoring and evaluation of policies and programmes implemented under the Act. Similarly, in Spain, the National Start-up Forum is responsible for monitoring and evaluation, while the Government Delegate Commission for Economic Affairs (CDGAE) oversees the implementation of the Start-up Law. In consultation with the National Start-up Forum, the CDGAE approves compliance indicators for the law's objectives, ensuring policy independence and accountability. A similar approach could be implemented in Uzbekistan to enhance transparency, governance and oversight. Currently, the latest resolution seeks to establish a monitoring department within the Ministry of Economy and Finance, responsible for systematic evaluation and progress tracking. To further strengthen transparency and adaptability, Uzbekistan could introduce annual reports on start-up ecosystem performance, similar to Spain's mandatory annual parliamentary report, which details progress and proposes necessary improvements.

7.3.2 AI STRATEGY OF UZBEKISTAN

1. Strategic Goals and Vision

Germany's strategy is distinguished by its emphasis on ethical AI development, societal benefits, and alignment with European values. It prioritises sustainability, environmental protection, and industrial competitiveness. Similarly, Egypt's strategy integrates AI with the SDGs, demonstrating a clear link between AI and broader societal impact. Unlike other AI strategies, Uzbekistan's plan does not align with specific SDGs, missing an opportunity to demonstrate AI's potential for societal impact beyond economic sectors. While MDT representatives assert that sustainability is an overarching goal, it has not been explicitly addressed within the strategy's provisions. Similarly, Germany, Egypt, and Türkiye incorporate a strong human-centric approach into their strategies, with significant measures to protect society from potential risks associated with AI. This includes the development of robust ethical frameworks, standards, and mechanisms to mitigate societal impacts. In contrast, while Uzbekistan's strategy is technically and developmentally comprehensive, it places less emphasis on human-centric principles. Although MDT representatives have highlighted their commitment to such an approach, the strategy does not explicitly address societal impacts, public welfare, or inclusivity, presenting opportunities for further alignment with global best practices. All four strategies articulate clear objectives for their global positioning. Türkiye aims to rank among the top 20 countries in AI readiness, while Uzbekistan aspires to secure a top-50 position in the Government AI Readiness Index. Egypt emphasises regional leadership within Africa and the Arab world, and Germany seeks to establish itself as a global leader in AI innovation, branding "AI made in Germany" as a globally recognised quality standard. The four AI strategies – Germany, Egypt, Türkiye, and Uzbekistan – each outline distinct pillars and priority areas that reflect their national contexts, strengths, and goals. While the four strategies share common themes, such as a focus on governance, education, and data infrastructure, there is significant divergence in the depth and specificity of measures proposed to achieve these priorities. Uzbekistan's strategy, in particular, would benefit from deeper analysis in these areas to enable more informed recommendations. This is especially critical given the country's limited data and information on its AI ecosystem. Developing robust data standards would strengthen Uzbekistan's ability to formulate well-informed, evidence-based AI policies and accelerate progress in aligning with international benchmarks.

2. Sector Priorities

Germany and Egypt both establish sector-specific priorities, such as healthcare, agriculture, and mobility, aligning them with national objectives like climate protection and environmental sustainability. In contrast, Türkiye adopts a broader approach, focusing on application areas like manufacturing and digital government without defining specific priority sectors. Uzbekistan, however, targets sectors with significant state dominance, including finance and banking, healthcare, and agriculture. To strengthen its strategy, Uzbekistan could consider prioritising sectors where AI has the potential to generate the most significant impact and foster high growth, such as education and e-commerce. This approach would also provide greater opportunities for the private sector to leverage advancements in the AI landscape and contribute to the country's development.

3. Ethical and Responsible AI

The four AI strategies – Germany, Egypt, Türkiye, and Uzbekistan – approach ethical and responsible AI with varying levels of depth and specificity. Germany and Türkiye stand out with their comprehensive, human-centric frameworks, which align with European values such as fairness, transparency, and accountability. A key feature of Germany's strategy is the AI Observatory, which monitors the societal impacts of AI and ensures alignment with ethical principles. Türkiye also plans to evaluate the socioeconomic impacts of AI, including updates to the Official Statistics Programme to incorporate AI-related metrics and the preparation of sector-specific impact analysis reports. Egypt's strategy adopts a similarly human-centric perspective, prioritising citizen well-being and aligning AI development with global standards for fairness and accountability. A dedicated ethical AI track within the National Council for AI (NCAI) is proposed to guide the government on legal and ethical issues. All four strategies emphasise the development of standards and guidelines aligned with international best practices. Germany takes a leading role by proposing a standardisation roadmap that integrates ethical principles into AI development. Germany also emphasises sustainability through initiatives like the "Sustainable AI" brand, ensuring AI systems are socially and environmentally responsible. Unique to Egypt's and Türkiye's strategies is their integration of ethics into educational resources. Egypt plans to embed ethical principles into university curricula to prepare future professionals for addressing AI-related challenges, while Türkiye aims to develop online tools and materials on data privacy and ethical AI to benefit its broader AI ecosystem. In comparison, Uzbekistan's approach to ethical AI is broad and lacks the detailed governance structures and implementation mechanisms found in the other strategies. The strategy broadly mentions the development of ethical guidelines and the enhancement of data integrity and security frameworks. However, it does not specify detailed governance structures, monitoring mechanisms, or capacity-building initiatives to address ethical concerns effectively. Furthermore, it does not include provisions for increasing societal awareness of the impacts of AI, which are critical for fostering trust and acceptance. A more detailed framework, including establishing a national body to oversee ethical AI governance, similar to Germany's AI Observatory or Egypt's NCAI, would be a critical step. While Uzbekistan's strategy outlines plans to leverage international expertise for developing and harmonising AI standards, actively participating in global discussions on AI ethics would further enhance its alignment with best practices. Finally, incorporating societal impact assessments and transparent monitoring mechanisms would ensure that AI technologies are responsibly integrated into Uzbekistan's development plans, aligning innovation with societal benefit.

4. Regulation and Governance

Germany's governance model incorporates AI into existing legal frameworks while addressing emerging risks. The country follows a departmental principle, where each minister independently oversees AI development within their respective ministry, aligned with overarching government guidelines. In Egypt, the NCAI ensures robust governance, overseeing the implementation of AI initiatives and maintaining alignment with national priorities. Türkiye adopts an inclusive governance model with multi-stakeholder participation, supported by a multi-layered governance structure comprising advisory groups and coordination committees. Uzbekistan, meanwhile, is establishing the Centre for the Development of Artificial Intelligence and the Digital Economy under the MDT, which will focus on advancing the country's AI infrastructure. However, the strategy lacks a dedicated governance mechanism to guide implementation, coordinate efforts across sectors, and integrate perspectives from the private sector and broader society. To strengthen its governance approach, Uzbekistan would benefit from establishing a dedicated AI governance body. Such an entity could oversee the implementation of the national AI strategy, ensure cross-sectoral coordination, and provide regulatory clarity while incorporating input from all relevant stakeholders, including the private sector and civil society.

5. Research, Development and Innovation

Germany and Türkiye prioritise research and innovation through dedicated funding, national research networks, and AI competence centres. Germany aims to create a cohesive network of competence centres focused on foundational and applied AI research, supported by international collaborations such as the German-French research and innovation network, which leverages existing infrastructure and expertise. Türkiye adopts a multi-layered approach with TÜBİTAK, the Scientific and Technological Research Council of Türkiye, at its core, connecting academia, industry, and the public sector to advance the AI ecosystem. It also plans to establish clusters and centres of excellence dedicated to advanced AI research and development. Egypt emphasises the establishment of an AI Centre of Excellence to create and implement AI-driven solutions addressing societal challenges, while Uzbekistan focuses on setting up laboratories in higher education and research institutions. Uzbekistan's strategy, while recognising the importance of research and international collaboration, lacks holistic mechanisms to connect stakeholders – industry, academia, and society – and link research efforts to commercial applications. Unlike Germany's emphasis on public-private partnerships for commercialisation and transfer of research into the business sector, Uzbekistan does not provide sufficient focus on leveraging such partnerships. The role of the Digital Technologies and Artificial Research Institute, Uzbekistan's designated research body, is not clearly defined in the strategy. Strengthening its role as a multi-stakeholder platform for sector-specific collaboration and research could enhance innovation in priority sectors. Moreover, Uzbekistan's strategy does not outline specific funding mechanisms, as seen in Germany and Türkiye, which are critical for fostering AI innovation. By enhancing funding models and introducing incentives for private sector involvement, Uzbekistan could bridge the gap between research and application, ensuring sustainable growth in its AI ecosystem. Germany, Egypt, and Uzbekistan all emphasise increasing AI faculties to build capacity in universities, a positive step for strengthening local expertise. Additionally, Türkiye and Germany propose sandboxes to test AI innovations in controlled environments, fostering experimentation while managing risks. Uzbekistan could adopt a similar approach to support experimental AI applications, creating a more favourable environment for innovation and accelerating the development of its AI ecosystem.

6. Business and Entrepreneurship

Türkiye, Egypt, and Germany place significant emphasis on fostering entrepreneurship and supporting start-ups through initiatives such as venture capital funding, incubation programmes, and collaborations with global technology leaders. Germany specifically focuses on integrating AI into industry by providing SME-focused training and funding initiatives, as well as strengthening intermediary organisations, such as Chambers of Commerce, to act as key enablers of AI adoption in businesses. The German strategy further promotes "lighthouse projects" for their innovative potential and organises roadshows to inspire SMEs and start-ups while encouraging exchange and collaboration among companies. Similarly, Egypt's strategy emphasises creating an ecosystem that incorporates AI into business operations by offering both financial and structural support, ensuring successful AI implementation. It also provides opportunities for local AI businesses to participate in government projects, fostering public-private collaboration. In contrast, Uzbekistan's strategy lacks specific provisions for the adoption of AI in businesses or the promotion of entrepreneurship. The strategy heavily emphasises state-run sectors while offering limited support for private-sector AI adoption.

This is significant given the low levels of technology adoption in Uzbekistan's private sector. MDT representatives believe the private sector will naturally adopt AI without government intervention, but this assumption may require reassessment in future iterations. To address these gaps, Uzbekistan could introduce targeted incentives for AI start-ups aligned with start-up policies, provide opportunities for AI businesses to participate in government projects, and create platforms for showcasing local AI solutions to encourage wider adoption. These measures would help foster a more dynamic and inclusive AI ecosystem.

7. Data Infrastructure and Governance

All strategies acknowledge data infrastructure and governance as foundational pillars for AI development. Germany's AI strategy excels in its focus on creating secure and sovereign data platforms, exemplified by the federated European ecosystem Gaia-X. Similarly, Türkiye's Open-Source Platform, designed to expand across all sectors, underscores its commitment to fostering collaboration and innovation. Uzbekistan's strategy emphasises the creation of open data platforms and "big data" repositories, highlighting their role in supporting AI initiatives. Germany, Türkiye, and Egypt emphasise open data sharing as a catalyst for innovation. Germany's approach includes supporting synthetic datasets and privacy-compliant methods for smaller datasets to ensure equitable access for SMEs and start-ups. Both Germany and Türkiye excel in fostering collaboration between public institutions, private organisations, and research institutions for data availability. Germany prioritises public-private partnerships to enhance data availability and supports the development of the National Research Data Infrastructure, which systematically captures and shares decentralised research data. Türkiye integrates similar collaboration mechanisms through its Sectoral Co-Creation Laboratories, linked to the Türkiye Open-Source Platform. In contrast, Uzbekistan, while recognising the importance of open data, lacks significant mechanisms to incentivise private-sector participation or establish structured mechanisms to connect research institutions, government agencies, and private enterprises to enhance data availability. Current efforts remain largely focused on government-held data, with limited provisions for engaging SMEs and start-ups. All strategies highlight the importance of Open Government Data Portals and making public data available. Türkiye emphasises standardising data definitions across public sector platforms, while Germany focuses on developing data formats and interfaces to streamline data sharing. Uzbekistan also emphasises the development of data quality standards to ensure the accuracy, labelling, and reliability of datasets, aligning with international norms. Strong legal frameworks underpin Germany's and Türkiye's strategies, with Germany ensuring GDPR compliance and Türkiye aligning with international data protection standards. Uzbekistan, while acknowledging the need for updates to its legal frameworks for data collection, storage, and processing, has yet to detail specific measures to ensure alignment with global standards. Overall, to strengthen its data infrastructure and governance, Uzbekistan should prioritise creating mechanisms to incentivise private-sector engagement and fostering collaborative ecosystems.

8. Infrastructure

Germany and Türkiye place significant emphasis on developing high-performance computing resources and scalable infrastructure to support AI research and applications. Both strategies prioritise the importance of shared infrastructure. Türkiye's AI strategy focuses on providing shared access to high-performance computing resources for researchers and projects, proposing the creation of an inventory of high-performance computing infrastructures across public institutions, universities, and research centres. It also supports the establishment of joint technical infrastructures through collaborations with the private sector, academia, and NGOs, fostering an integrated and resource-efficient approach Similarly, Germany's AI strategy highlights that many advancements in AI infrastructure depend on cross-border cooperation and joint financing for the shared use of infrastructure. Uzbekistan's strategy includes plans to expand data centres and cloud infrastructure, which are critical for advancing AI capabilities. However, these efforts could be strengthened through public-private partnerships to accelerate infrastructure development and by fostering regional cooperation, such as with Kazakhstan, for shared use of high-performance computing resources. Additionally, Uzbekistan's allocated budget of USD 50 million for the implementation of the strategy appears modest for the scale of infrastructure development required, suggesting the need for increased investment and innovative financing mechanisms to ensure the strategy's success.

9. Education and Workforce Development

The AI strategies of Germany, Egypt, Türkiye, and Uzbekistan adopt varied approaches to education and human capital development, reflecting their unique priorities. All four strategies emphasise integrating AI into school curricula and expanding higher education and vocational training opportunities. Germany's strategy, for example, places particular emphasis on STEM education, aiming to encourage participation from underrepresented groups, such as women. It also prioritises attracting international students to AI-related fields, an approach that Uzbekistan could adopt as it seeks to position itself as a hub for foreign talent. Germany, Egypt, and Uzbekistan highlight practical learning opportunities like bootcamps, hackathons, and internships, with Uzbekistan envisioning scholarships to place talented students in leading international companies to enhance AI skills. However, Germany, Türkiye, and Egypt go further by incorporating lifelong learning programmes to skill and reskill workers, particularly those at risk of job displacement due to AI advancements. Türkiye's strategy includes special programmes to equip such individuals with new skills and offers incentives like tax reductions and grants for employers investing in workforce training. To manage the labour market transformation, social dialogue mechanisms will be established between employer and worker organisations, fostering discussions on the evolving workforce and the impact of AI on professions. Uzbekistan's strategy, by contrast, lacks comprehensive provisions for upskilling workers. Introducing incentives for employers to invest in training and creating specialised AI certification programmes could better position Uzbekistan in the global AI economy. Both Egypt and Uzbekistan emphasise educating government officials on AI. Egypt's proposal for "AI for Leaders" sessions across all government entities is a forward-looking initiative that Uzbekistan could replicate to ensure its policymakers are equipped with the knowledge to navigate the AI era effectively.

10. AI in Public Services

All four AI strategies highlight the transformative potential of AI in public services. Germany's strategy emphasises the enhancement of government operations and citizen services through transparency and accessibility, driven by open data initiatives under the "Open by Default" principle. While Uzbekistan has introduced an open data platform, resistance to open data among government employees remains a challenge. Incorporating provisions to foster an open data mindset and build awareness among public sector employees could enhance the platform's impact. Both Egypt and Uzbekistan recognise the critical role of AI in supporting government operations, focusing on areas such as crisis preparedness, decision-making optimisation, automation of routine tasks, and improving planning and forecasting in public administration. Uzbekistan's strategy identifies the public sector as a priority, proposing concrete initiatives like AI-driven chatbots to automate service delivery on government portals. Türkiye's strategy takes a more comprehensive approach, detailing steps to increase AI adoption in the public sector. These include creating an inventory of AI experts within government to facilitate knowledge sharing, developing a standardised AI maturity model to assess and monitor institutional progress in adopting AI technologies, and preparing guides to manage AI projects effectively. Additionally, Türkiye emphasises innovation through a repository of AI challenges and use cases, as well as prize-based competitions to encourage creative solutions for public administration. For Uzbekistan, despite planned initiatives to upskill public employees, the strategy could benefit from incorporating elements similar to Türkiye's approach. This includes competitions to foster innovative AI solutions for public services, the establishment of a repository of AI use cases to guide implementation, and detailed guides to support the management and integration of AI projects. These measures would address existing gaps in knowledge and capacity within the public sector, accelerating the adoption of AI technologies and enhancing the quality of public services.

11. International Cooperation and Global Standards

International cooperation is a key pillar across all four AI strategies. Germany and Türkiye actively engage in global AI initiatives and standard-setting activities, with Germany placing particular emphasis on European collaborations. Both strategies demonstrate strong participation in OECD and G20 initiatives, with Germany specifically highlighting its various international commitments. Germany's strategy underscores the importance of cooperation through initiatives such as the German-French AI Research and Innovation Network and cross-border partnerships in research and data sharing. Notably, Germany also extends support to emerging economies by fostering technical expertise and encouraging the economic application of AI technologies, reflecting its comprehensive commitment to global AI collaboration. Egypt's strategy prioritises regional leadership within Africa and the Arab world. It seeks to align with global AI principles while promoting responsible AI development. A key feature of Egypt's approach is its focus on fostering donor cooperation for expertise exchange and strengthening bilateral relationships to advance AI innovation. Uzbekistan could draw inspiration from Egypt's focus on donor cooperation and bilateral partnerships to secure expertise and resources. Uzbekistan's AI strategy acknowledges the importance of international cooperation and focuses on building relationships with global scientific and technological organisations. Plans to host forums and seminars to exchange knowledge and adopt global best practices are promising steps. The strategy also supports local companies in showcasing their solutions on international platforms. However, Uzbekistan's approach is less structured compared to the other strategies and lacks specific mechanisms for engaging in large-scale multilateral collaborations or global standard-setting activities. Addressing these gaps in an updated strategy would be critical to strengthening its global AI presence. Leveraging its regional position, Uzbekistan should aim to build stronger partnerships with neighbouring countries, focusing on joint infrastructure development. These initiatives would not only enhance regional collaboration but also position Uzbekistan as a key regional player.

12. Monitoring, Evaluation and Adaptability

The AI strategies of Germany, Egypt, Türkiye, and Uzbekistan demonstrate varied approaches to monitoring, evaluation, and adaptability. Germany's strategy employs mechanisms such as the "Platform Learning Systems" for science-based policy advice and societal consultation, complemented by external evaluations, including OECD reviews, to ensure adaptability and alignment with global standards. Türkiye adopts a more structured, multi-tiered governance model, integrating inputs from industry, academia, and civil society into its monitoring framework. Egypt's strategy is similarly structured, employing a phased implementation monitored by the NCAI and a robust KPI framework to measure progress and adjust priorities. Uzbekistan, while developing a KPI framework to track progress in the AI landscape, lacks a comprehensive governance structure for monitoring and evaluation that incorporates diverse stakeholders from across society. Adopting elements from Türkiye's and Egypt's models, such as a multi-stakeholder advisory group, could strengthen Uzbekistan's approach. Additionally, integrating external reviews, as seen in Germany, would provide valuable benchmarks for aligning with international standards. Establishing a more dynamic framework with regular evaluations and adjustments would enhance Uzbekistan's ability to respond to rapid advancements in AI and maintain the long-term relevance and effectiveness of its strategy.

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