ITU Publications

International Telecommunication Union
Development Sector

Digital innovation profile: Georgia

Digital innovation ecosystem: Strategies and recommendations for accelerating digital transformation

Digital innovation profile: Georgia

Digital innovation ecosystem: Strategies and recommendations for accelerating digital transformation

Acknowledgements

The digital innovation profile for Georgia has been produced by the International Telecommunication Union (ITU) Office for Europe in the Telecommunication Development Bureau (BDT) under the ITU-D priority digital transformation, in close collaboration with the Ministry of Economy and Sustainable Development of Georgia.

ITU is grateful to the ministry as well as the Georgia Innovation and Technology Agency, the International Research Centre on Artificial Intelligence under the auspices of UNESCO, local stakeholders of the digital ecosystem, and ITU ecosystem experts who have all contributed to the development of this profile.

Disclaimer

Information in this profile that expresses opinions or claims has been informed by national stakeholder consultations and qualified through surveys, interviews, and workshops, which were further validated in the process of developing this profile.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of ITU concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or certain manufacturer products does not imply that they are endorsed or recommended by ITU in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by ITU to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. The opinions, findings and conclusions expressed in this publication do not necessarily reflect the views of ITU or its membership.

ISBN

978-92-61-37781-6 (Electronic version)
978-92-61-37791-5 (EPUB version)
978-92-61-37801-1 (MOBI version)

Please consider the environment before printing this report.

Foreword

Innovation and entrepreneurship are essential for the development of an economy as they foster resilience and adaptability. By encouraging a culture of innovation and supporting entrepreneurial ventures, economies can diversify their industries, create a favourable business environment, and drive long-term economic growth. Georgia recognizes the pivotal role these concepts play in creating a cutting-edge technology-driven economy, and has made considerable efforts with various ICT investments towards building an artificial intelligence-driven digital economy to foster innovation and global competitiveness.

This digital innovation profile, developed in collaboration with the Ministry of Economy and Sustainable Development and the Georgia Innovation and Technology Agency, aims to accurately assess the country's digital ecosystem capacity and maturity to help Georgia and its stakeholders navigate the digital innovation landscape. The objective is to help Georgia to continue building new capabilities for a competitive, sustainable, and ICT-enabled economy that accelerates the development of the digital economy toward achieving Georgia's vision.

The creation of this profile entailed an exhaustive process, involving comprehensive research, one-on-one interviews with experts, and collaborative workshops with stakeholders from the public sector, private sector, finance, academia, entrepreneurs, and support networks. I extend my heartfelt appreciation to all the national stakeholders who actively participated in this endeavour. Their contributions and insights have been instrumental in shaping the profile and ensuring its relevance and applicability.

This digital innovation profile will serve as a valuable resource for policymakers, innovators, the private sector, and other stakeholders in Georgia. It offers critical insights into Georgia's digital innovation landscape, identifies areas for improvement, and presents strategic recommendations for collective decision-making processes towards accelerating the country's AI-driven competitive advantage. I am confident that this profile will guide Georgia's efforts and investments, driving growth and development in areas crucial to the nation's future.

I look forward to seeing the positive impact of this digital innovation profile on Georgia's digital transformation journey. ITU is ready to continue to support Georgia in the next phase of this relationship to see the results of these recommendations.

Dr. Cosmas Luckyson Zavazava
Director, Telecommunication Development Bureau
International Telecommunication Union

Table of contents

Foreword iii

1 Introduction 1

2 Background and context 2

3 Current landscape 4

3.1 Vision and strategy 5

3.2 Infrastructure and programmes 6

3.3 Policies and regulations 7

3.4 Talent and champions 8

3.5 Networks and markets 9

3.6 Capital and resources 10

3.7 Culture and communities 10

4 Ecosystem challenges and opportunities 12

4.1 Innovation ecosystem 12

4.2 Entrepreneurial ecosystem 13

4.3 Technology entrepreneur 14

4.4 Macro challenges and opportunities 15

5 Stakeholders 16

6 Ecosystem maturity map 17

6.1 Entrepreneurs 18

6.2 Finance 19

6.3 Entrepreneurial support networks 19

6.4 Private sector 19

6.5 Public sector 20

6.6 Academia 20

7 Relevant practices 21
8 Perspectives on national priorities 23
9 Key performance indicators 25
10 Next steps 28
Appendices 29
Appendix 1: Detailed recommendations 29
Appendix 2: Methodology 39
Appendix 3: Key words and definitions 40
Appendix 4: Acronyms and abbreviations 41

List of tables and figures

Tables

Table 1: Key indicators 2
Table 2: Key stakeholders in the ecosystem 16
Table 3: Stakeholders and their roles in the ecosystem 18
Table 4: Digital transformation strategies towards the national vision 23
Table 5: Strategies for digital transformation 25
Table 6: Detailed strategies and actions 29
Table 7: Key words and definitions 40
Table 8: Nomenclature of abbreviations 41

Figures

Figure 1: Ecosystem assessment canvas 4
Figure 2: Ecosystem assessment canvas and its related issues 4
Figure 3: Engines of growth 12

1 Introduction

Digital innovation profiles are an important element in the ITU series of snapshots of information and communication technology (ICT)-centric innovation ecosystems. Each profile assesses and summarizes the opportunities and challenges in a country's ICT ecosystem. The at-a-glance format of the report enables international comparisons and provides an overview of the digital innovation ecosystem capacity to accelerate digital transformation as well as its capability to integrate digital innovation into its national agenda. The digital innovation profile is an accurate diagnosis of digital innovation ecosystem health that will help to develop strategies, inform national policies, and accelerate digital transformation.

Digital innovation profiles offer a rapid and straightforward means of analysing and optimizing an ICT ecosystem. This analysis will help to navigate through the fast-moving ICT/telecommunication landscape to enhance the competitiveness of the ICT sector and unlock the potential for a sustainable digital transformation to support the country's transition into a knowledge economy. Further collaboration with ITU can target specific engagements, including the implementation of appropriate, co-developed, bankable projects of high value in the national context.

All digital innovation profiles are developed by experts specially trained to apply the ITU digital innovation framework. This framework features highly structured workshops and facilitated assessments, designed to build national capacity, enhance on-the-ground skills and powerfully accelerate digital transformation. The framework process equips ITU Member States with the tools to assess and monitor their ICT innovation ecosystems and produce evidence-based assessments and concrete recommendations to change the ecosystem dynamics and propel them towards digital transformation.

The analysis and the positions expressed in this report reflect the opinions and research of the national expert, working within the ITU digital innovation framework process, and with guidance from the ITUD digital innovation ecosystems cluster.

2 Background and context

Table 1: Key indicators

Key Indicators	
Population [2021]: 3 728 600	ITU Digital Development Dashboard [As of 2021]: • Population coverage by at least 4G mobile network: 100 per cent • Households with a computer at home: 62 per cent • Fixed broadband subscriptions per 100 inhabitants: 25 • Fixed broadband basket as a % of GNI: 0.7 per cent • Individuals using the Internet: 73 per cent • Individuals with advanced skills: 1 per cent
Population density [2021]: 65.2 km^2	Global innovation index [2020]: Rank 63/131
GNI per capita [2020]: USD 4 071	Global entrepreneurship index [2018]: 74/137
Region: Europe	Global competitiveness index [2019]: Rank 74/141
	Ease of doing business [2020]: 7/190

With a population of 3.7 million, Georgia is a small, lower-middle-income country located in the South Caucasus, at the intersection of Eastern Europe and Western Asia. In 2020, agriculture contributed around 7.37 per cent to the gross domestic product (GDP) of Georgia, 21.63 per cent came from the industries, and 58.57 per cent from the services sector (Statistica, 2021). Economic growth had been robust until 2019, averaging 5 per cent per annum, and poverty declined rapidly to 19.5 per cent, almost half its 2007 rate, driven by sound macroeconomic policies and improved governance (World Bank, 2020). Deep reforms in economic management and governance have earned Georgia a reputation as a "star reformer," with a rank of 7th out of 190 countries for ease of doing business. Today, the Georgia National Innovation Ecosystem (GENIE) Project (USD 23.5 million) is helping the country develop innovative start-ups, deepen financial and capital markets, improve corporate governance and strengthen investment promotions.

A long-term challenge to economic growth is the low rate of population growth and high emigration, which is shrinking the labour force (Geostat, 2021). The small labour market lacks appropriate technical skills. Despite significant achievements of Georgia's education system in recent years, it continues to face many challenges. The high rate of unemployment (30-40%) in the 15 to 24 years of age group indicates a lack of employment opportunities in general and shows that Georgia lacks a suitably qualified talent pool (UNDP, 2021). In 2018, the OECD Student Assessment placed Georgia 70th out of 79 countries. In the same year, public spending on education and training was 3.52 per cent of GDP, while the European Union average for 2017 was 4.72 per cent (World Bank, 2018). In March 2019, the government announced plans to set aside about 6 per cent of GDP to invest in the education system by 2022 (Agenda.GE, 2019). There is an educational framework for ICT studies; however, Georgia lacks an integrated education information management system and robust data analytics to inform and support education policy decisions.

The World Intellectual Property Organization (WIPO) ranks Georgia 63rd out of 131 countries in its Global Innovation Index (2020). Since 2010, Georgia has strengthened its support for ICTs through public-private partnerships and digital-related initiatives such as zone tax exemption, foreign investment, and projects to improve the labour force (ITU, 2020). In 2017, the ICT

development value was 5.79, and the ICT sector accounted for 3.8 per cent of the total GDP (Geostat, 2018).

The telecommunication market is in general very open to competition. There are more than 270 licensed and operational service providers and network operators (ITU, 2020). The Georgia National Communications Commission (COMCOM) was established in 2000 with the aim to establish a transparent regulatory environment and promote competition in electronic communications and broadcasting. With a competitive sector primarily driven by private investments, the telecommunication sector remains among the fastest growing and, in 2017, represented between 5 and 7 per cent of the country's GDP (ITU, 2020).

ITU data shows that the number of fixed-broadband subscriptions per 100 inhabitants in 2019 was 23.56 and that 75.8 per cent of households had Internet access at home. Wireline broadband networks (using optical fibre or cable networks) are limited in their reach outside urban areas. The country's National Broadband Network Development Strategy for 2020-2025 (NBDS) targets for 2025 are: (i) 4G cover 99 per cent of Georgia; pilots for 5G services are in operation in three municipalities; (ii) All institutional entities have access to 1 Gbit/s connectivity; (iii) All households have access to networks for high-speed (100 Mbit/s+) broadband, aligned with plans for 5G development in the country. The strategy aims to create a robust infrastructure and establish Georgia as a digital and information hub between Europe and Asia while also upgrading knowledge and skills, leading to employment growth (EU4Digital, 2020).

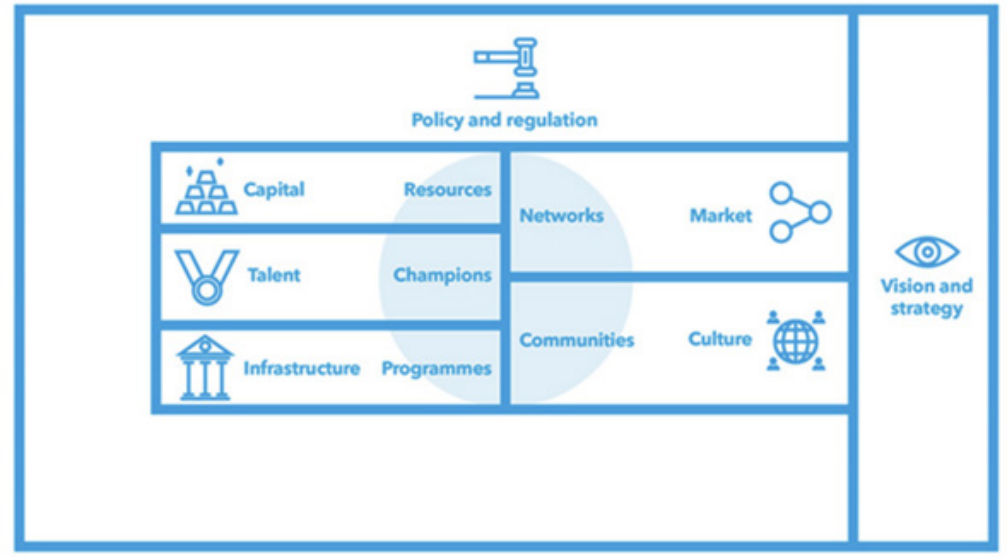
The introduction of artificial intelligence (AI) systems in the public sector in Georgia is at an early stage of development. The most prevalent AI technologies in the civil service are chatbots, used by several government agencies to consult citizens. The Ministry of Internal Affairs uses AI in image processing (radar and video technologies for road traffic), and law enforcement agencies use automated facial recognition technology. The Prosecutor's Office uses some AI-based applications to support crime investigations (PMC, 2021). Further, there are many successful examples of AI solutions in the private sector, especially in insurance and banking, including a neobank that exists only as a mobile app, without branches or a physical presence. In 2020, Georgia reached an index of 43.39/100 and was ranked 72nd out of 172 countries, according to the AI Readiness Index.

The Georgian private sector is dominated by services that provide 44.5 per cent of the country's jobs. This sector is boosted by the hotel, restaurant, transport and telecommunication industries. While agriculture employs 41.3 per cent of the working population, it only accounts for 6.22 per cent of GDP. The SME Development Strategy 2016-2020 has led to improvements in legislation, institutional and regulatory frameworks and the operational environment. This has subsequently widened access to finance, increased entrepreneurial skills, broadened internationalization and supported innovation activities in the ecosystem. However, SMEs still face challenges in terms of funding for innovation and attracting and retaining digital talent.

3 Current landscape

Understanding the ecosystem assessment canvas

Figure 1: Ecosystem assessment canvas



The ecosystem assessment canvas offers an overview of the seven components that make up the innovation ecosystem. It helps assess both the challenges and opportunities for the components essential to building a vibrant and innovative digital ecosystem.

Figure 2: Ecosystem assessment canvas and its related issues

Building on the ecosystem assessment canvas, the image above presents the main issues of an enabling environment that, if achieved, can accelerate digital transformation in the economy.

The following section provides insights on the current landscape of the ecosystem across seven components, based on interviews and group discussions in co-creation workshops with local stakeholders and validated by secondary research and literature reviews.

3.1 Vision and strategy

- There is a strong innovation strategy but information on this is not reaching ecosystem stakeholders.
- There is consensus among stakeholders on common issues but stakeholders lack an understanding of the big picture.
- The public sector engagement with stakeholders is good but it needs to be more multilateral and multidirectional.
- Local stakeholders understand their individual roles but not their role in supporting the ecosystem.

The Government of Georgia created the Georgia Innovation and Technology Agency (GITA) under the Ministry of Economy and Sustainable Development of Georgia (MoESD) to speed up and support innovation. The MoESD is committed to making broadband Internet and ICT technologies accessible for the larger population – especially entrepreneurs and SMEs – and promotes the development of the innovation-driven digital economy. In its area of responsibility, the MoESD elaborates legislation and coordinates telecommunication and postal sectors innovation processes.

Since the creation of GITA in 2014, there have been significant efforts to develop the digital ecosystem in Georgia. ICT-centric innovation development was one of the priorities of the Georgia 2020 social-economic development strategy. It fostered private sector competitiveness by improving access to finance, supporting commercialization, developing the necessary infrastructure for innovation, and establishing an efficient communication network. To a large extent, it has also laid the foundations for a vibrant ICT innovation ecosystem. Since 2020, the Government of Georgia has made several unsuccessful attempts to adopt a new national innovation strategy due to leadership changes within responsible institutions or due to changes in policy priorities. As a result, actors within the ecosystem lack a clear national innovation strategy. This shows the need for a sustainable digital transformation vision to engage all relevant stakeholders.

Although there is no clear strategy, stakeholders agree that a number of issues exist. In Georgia, the public sector plays an essential role in supporting the ecosystem and it is well connected to other stakeholders. The implementation agency, GITA, is very active in the ecosystem and stakeholders are aware of its programmes and initiatives. However, for the ecosystem to develop, stakeholders feel that GITA should no longer be the main player. Instead, they feel it is time for the private sector to take the lead. Overall, the big picture is not clear, leading to some stakeholders misunderstanding their roles in the ecosystem. Consequently, several actors did not feel part of the ecosystem at all and focused solely on their individual missions and servicing international markets. However, some start-ups aimed to be role models to inspire young entrepreneurs and support the ecosystem, encouraged by academic institutions and the public sector.

The government plans to create a cutting-edge, technology-driven economy that will foster innovation and progress in the region, as well as encourage investments into the country. Georgia has the potential to leapfrog digital development if existing ICT policies and programmes are comprehensive enough to address opportunities in the economy.

The government recognizes artificial intelligence (AI) as an engine of productivity that can boost the country's economic growth, and thus aims to position itself as a digital hub with AI. However, the development of the AI ecosystem requires some prerequisites, such as a well-developed

ICT sector and good STEM education. Additionally, AI needs to be a part of the overall digital ecosystem strategy for Georgia to reach its goal.

3.2 Infrastructure and programmes

- There is good access to hard infrastructure in urban areas with affordable Internet but there remains an urban-rural divide.
- There is a concentration of soft infrastructure in Tbilisi but the creation of technology parks has helped in the dissemination of innovation to rural areas.
- There is some latency due to the physical location of cloud service data centres but firms have access to hardware and software resources.
- Georgia's potential to be competitive as a regional data conductor is undermined by its current level of maturity.

The government is investing heavily in providing access to both hard and soft infrastructure, although there remains a significant urban-rural divide. Tbilisi is the hub of economic activities and connectivity in the country. All stakeholders located in the capital benefit from affordable, high-speed Internet access. The COMCOM data shows that Tbilisi and Adjara have the highest Internet penetration, while Abkhazia has the lowest. In April 2020, COMCOM informed the local press that it had already carried out large-scale work to install 5G Internet infrastructure, and will announce a tender for operators. Optical fibre is the most used technology in Georgia, followed by Wi-Fi in rural areas where fibre connections are not available due to economic return on investment. Georgia benefits from a fully deregulated electricity sector, which provides a stable, uninterrupted energy supply for telecommunication networks. However, in some remote rural areas, stakeholders have reported issues with basic infrastructure, including road networks and limited access to running water.

Login Georgia has been developed by the government, in cooperation with the World Bank, under the 2020-2025 strategy for developing broadband Internet networks. The World Bank is providing EUR 35.7 million (USD 40 million) financial support for the project, which aims to connect people, enterprises and institutions across rural Georgia to high-quality, affordable broadband Internet to promote the use of digital services. The initiative will enable 500 000 citizens in almost 1 000 settlements, including in mountainous areas, to enjoy quality Internet and services such as ehealthcare, e-education and e-governance.

GITA has established five technology parks and innovation centres that focus on the development of technologies and the innovation ecosystem. These offer physical space with fabrication laboratories equipped with the latest technology, free open co-working space, training facilities, and business incubators. According to some stakeholders, these have had a positive impact but are only sufficient for basic prototyping rather than advanced ICT research and development. Apart from the technology parks, universities provide laboratories for innovation, however, these lack up-to-date equipment and are not open access. Mentoring, training and other soft infrastructure are adequate in the ecosystem. GITA has established an ICT training programme that aims to train 3 000 IT specialists in 2023. Although a positive step for the ecosystem, some stakeholders believe this is ambitious due to the lack of demand for ICT and AI training, reflecting the need to raise awareness about career opportunities and the benefits of digitalization to increase uptake of such programmes.

Currently, there is no cloud infrastructure in Georgia. Therefore, some companies use cloud services from global technology giants such as Amazon, Apple, Google, and Microsoft but

not without experiencing network lags. Cloud computing technologies can accelerate AI development and give AI developers quick access to infrastructure environments (computing power, etc.), as well as access to data management and AI services. Cloud computing with AI can reduce costs and offer more flexibility, especially for small businesses, which do not need to set up the complete infrastructure. If local cloud infrastructure is made available, firms would be able to rent cloud platforms for a monthly fee and scale their services later if required.

However, cloud computing raises concerns about data security (including data loss, data breaches, privacy protection, and legal compliance regarding the data), unauthorized use of cloud services, accessibility of cloud services, and vendor lock-in and digital sovereignty regulations, with many countries requiring customer data to be stored domestically rather than abroad. Some of these concerns – especially those regarding privacy, security and legal compliance – could be addressed by locating the cloud infrastructure inside the country, which would also reduce network lag and increase cloud availability and service responsiveness.

Currently, stakeholder perceive a lack of regional and national ecosystem competitiveness. However, Georgia has a competitive advantage with existing telecommunication infrastructure, including the submarine Black Sea Fibre-Optic Cable System, which was established to develop the corridor between Europe and the Middle East via Armenia, and between Europe and East Asia via Azerbaijan. This gives Georgia the potential to position itself as a safe and trusted data conductor and digital hub.

3.3 Policies and regulations

- Georgia can boast of a favourable business environment but regulatory reform is yet to be fully implemented.
- Tax incentives create opportunities for foreign companies but hinder the growth of local firms.
- There are strong intellectual property (IP) laws, but a culture of copyright infringement and counterfeiting is still prevalent.
- Strong ICT and SME policies are in place but are yet to be developed in the field of AI.

Substantial efforts by the government have resulted in Georgia's success in the ease of doing business rankings. The country scored highly for ease of starting a business, registering property, protecting minority investors, enforcing contracts and getting credit. Stakeholders have acknowledged significant improvements in regulations, and other supportive policies and regulations will further help and support entrepreneurs and innovators. However, to build a genuinely vibrant ICT-centric innovation ecosystem, all stakeholders need to understand their responsibilities and have the capacity to act on them.

Tax incentives have enabled Georgia to attract a United States of America technology company that will create 400 local jobs. Although viewed by some actors as positive for the ecosystem, start-ups and SMEs noted the discrepancy between tax regimes applied to foreign and local companies. This results in foreign IT companies paying less tax, enabling them to offer better salaries and recruit the already scarce talent from local companies. The private sector views this as potentially harmful to the ecosystem.

The players in the ecosystem recognize that there exists a culture of piracy and copying of intellectual property. It is particularly challenging for start-ups looking for venture capital, as United States investors require international intellectual property (IP) protection. However,

start-ups are reluctant to file patents in Georgia as this exposes their ideas and offers no IP protection outside of the country. Although the Government of Georgia has tried to strengthen the legislative and institutional framework relevant to IP protection, awareness and implementation remain an issue. At present, individuals rather than businesses file most patents, which shows a need to develop a collaborative research culture with companies and universities.

In addition, there is no single government institution responsible for setting AI policy in Georgia. It is crucial to set AI policy goals, especially for business development, government services improvement, and economic growth. There is also no specific legal regulation on AI. The most important legal act related to AI is the law on Personal Data Protection. The State Inspectorate is responsible for monitoring and ensuring compliance in this area. It recently recommended the Ministry of Internal Affairs to change practices regarding information registry, data retention dates, and deletion upon expiration dates.

3.4 Talent and champions

- The ecosystem has the capacity to develop technical capabilities but the volume of talent remains small.
- There is a high number of university students but very few of them are engaged in innovation and entrepreneurship studies.
- The government is making efforts to reduce the brain drain but efforts are yet to show results.
- The Bank of Georgia and TBC Bank have been identified as champions by the private sector for supporting innovation but more champions are needed.

One of the biggest challenges identified by ecosystem stakeholders concerns the lack of technical skills, especially among developers and digital analysts. SMEs and start-ups struggle to find suitable technical talent, and larger organizations have had to invest in internal training programmes to develop graduates. In a less mature ecosystem, such as Georgia, much of the best talent is migrating to other parts of Europe and the United States. In addition, the growth of remote working is contributing to the brain drain. To attempt to reduce this, the government has launched a "Work from Georgia" initiative to attract intellectual nomads to the country. However, this is yet to demonstrate real benefits for the local ecosystem.

There is a small number of stand-out university programmes, but the volume of ICT graduates is not yet close to market needs. Apart from universities, private organizations offer subsidized courses in web and mobile applications, but this is still not enough. There is a notable excess of over-qualified candidates (European Training Foundation, 2019) and there appears to be no coordination between qualifications required of the workforce and qualifications provided by the education system. A clear skills gap exists in terms of competent business professionals and skilled engineers. Although there have been efforts to introduce entrepreneurship programmes in universities, the education system is yet to generate enough human capital for the innovation ecosystem.

According to ecosystem stakeholders, the education system is the main contributing factor to the labour market shortage in the country. A large share of students continues to leave school without mastering basic competencies for work readiness (OECD, 2020). Investment in STEM education at all levels is essential to encourage interest in entrepreneurship and technology to develop the ecosystem in the long term. This is also true for the AI ecosystem, which needs people with AI research, development and implementation skills. A humanitarian aid programme

in rural Georgia has helped introduce children to STEM by running science camps and providing starter robot kits to strengthen their basic understanding of coding and machine learning. Many STEM education opportunities for young people exist in informal education settings rather than in schools. Grass root projects should be supported and encouraged to help raise the aspirations of Georgian youth and increase uptake in STEM subjects in higher education.

Most stakeholders perceived the Bank of Georgia and TBC Bank to be the champions providing support for innovation, social responsibility and e-commerce. Some start-ups also expressed a desire and willingness to act as role models. However, Georgia needs more diverse advocates representing each group of actors to rally everyone around a common cause and drive initiatives.

3.5 Networks and markets

- Formal networks focused on supporting large firms are yet to showcase effective support for start-ups and SMEs.
- The country has a small domestic market with limited demand for digital consumption and is unable to support innovators to scale up.
- While procurement has undergone digital transformation, it remains limited to ICT and AI development opportunities.
- Trade flows are encouraged and supported but remain focused on traditional rather than digital products.

Business associations and formal networks are active in the innovation ecosystem. However, some stakeholders perceived these as mainly supporting large companies, with an underrepresented ICT sector. This is especially true for the small AI ecosystem – AI stakeholders are not very well connected. Recent efforts to establish a Tech Start-up Association, ICT Association, and an AI Association have been slow to gain traction. As a result, companies are unable to build local synergies and benefit from knowledge sharing and collaboration. In addition, no explicit mapping of the ICT ecosystem exists, limiting cooperation between stakeholders. Strong networks are a crucial ingredient for building innovation capacity, and ecosystem stakeholders should focus on developing these.

Demand for digital consumption exists within Georgia, and citizens benefit from innovations in peer-to-peer lending and personal financial management products. However, the main challenge is the size of the market as innovators are unable to develop and expand. To be successful, entrepreneurs need to focus their products and services on global markets. GITA is addressing this challenge by providing support to scale up abroad.

The public procurement system has undergone significant public financial management reforms and is now more transparent, secure and convenient. Cooperation between the private sector and the government has resulted in substantial savings for the State and citizens. Although there has been some progress, the ecosystem believes public procurement offers limited ICT and AI development opportunities. Most government departments develop their own IT systems, so public procurement remains very difficult to access for start-ups.

Most stakeholders agreed that the Deep and Comprehensive Free Trade Agreement (DCFTA) with the European Union (EU) and the more recent free trade agreement with China are positive steps for the ecosystem. Enterprise Georgia organizes trade missions and international exhibitions to connect producers to foreign buyers, and while trade flows are possible, they focus on traditional rather than digital products.

3.6 Capital and resources

- The government remains the main provider of capital for innovation but is more focused on seed investment.
- While efforts have been made to attract foreign investment, VCs and angel investors are still needed to support the ecosystem.
- There is insufficient local funding for academic research to expand the digital ecosystem.
- There have been attempts to stimulate technology transfer but with modest results.

Georgia's digital competitiveness remains hampered by an immature capital market and a lack of private investment. The banking sector is one of the most digitally advanced in the country but remains risk-averse to lending. Due to high-interest rates and personal guarantees, bank loans are unsuitable for financing start-ups. Alternative financing sources, such as angel investors, seed and venture capital, leasing and factoring, are largely unavailable from private sources in Georgia, and the nascent capital market infrastructure prevents easy exit from investments. There is a lack of government funding for research projects, and several stakeholders stressed that local funding is not sufficient for AI research. Access to financial resources is critical to innovators and growing the ecosystem. Foreign direct investments (FDI) in Georgia have fallen since 2017 (Geostat, 2021). The country has the potential to be an attractive investment destination, so more needs to be done to unlock this potential.

In 2016-2017, GITA developed three schemes to provide capital for innovation: the Micro Grants, the Start-up Georgia and the Matching Grants programmes. From 149 applications received within the framework of the high-tech component of Startup Georgia, 20 start-ups were selected and financed with GEL 100 000 (USD 30 000). These were evaluated by leading international experts from Silicon Valley and submitted to global investors in Silicon Valley. GITA complements its financial support with training, coaching, mentoring and consulting services for all programme beneficiaries. Many stakeholders felt GITA had helped kickstart the ecosystem, but there is a need to develop venture capital and nurture alternative funding sources such as crowdfunding.

Research and development expenditure in Georgia was only 0.290 per cent of GDP in 2017 (UNESCO, 2017). Many stakeholders agreed that there is insufficient funding for the academic research needed to develop the ecosystem and that there is a shortage of applied research projects. In addition, researchers often lack the soft skills required to write compelling funding applications, which is compounded by significant competition for European funding.

Meanwhile, there have been some efforts in technology transfer. In 2019, GITA established a Technology Transfer Pilot programme to support the commercialization of Georgian scientific research that respond to market needs. To date, outputs have been fairly modest with eight receiving support out of 74 applications. Some ecosystem players believe that, at present, companies in Georgia are not developing new technology using existing knowledge. The challenge is that most research is still theoretical rather than applied, so there is a need for universities to collaborate with foreign firms to develop these applications.

3.7 Culture and communities

- Regular events take place across the ecosystem to help develop entrepreneurial culture but they do not foster enough collaboration.
- Young people are showing a growing interest in entrepreneurship but the motivation is not always linked to innovation.

- Risk-taking is uncommon, start-ups do not appreciate the value of failure.
- Women are active in the digital ecosystem but people living in rural and poor communities are not yet equally represented.

Regular events organized by the public and private sector – with an aim to foster innovation – take place across the ecosystem. Stakeholders were aware of popular knowledge sharing gatherings such as the Impact Hub, Start-up Bureau and Start-up Grind. Although the small start-up community appears open and inclusive, not all stakeholder groups are actively engaged, especially in AI, potentially limiting ecosystem growth.

According to ecosystem stakeholders, there has been a surge of interest in entrepreneurship from young people in Georgia. Unfortunately, young entrepreneurs, who often lack the resources and business and technical skills to start competitive enterprises, focus on traditional sectors within their comfort zone, such as retail and tourism. Due to high unemployment, setting up a business is sometimes more for survival and income than a genuine interest in becoming the next unicorn. However, this mindset is changing, and the education system could help drive this change. Georgia could tap into the pool of young people educated abroad who have the ambition to create their own ventures.

Risk-taking and failure are not yet embraced in Georgia as an opportunity for learning. Due to the lack of capital and resources, ecosystem stakeholders feel that failure is poorly viewed, and there exists a tendency to blame others when things go wrong. In Georgia, SMEs and larger companies tend to be more risk-averse than start-ups. There is a need to develop innovative and entrepreneurial thinking and behaviour by sharing fundamental values and developing a willingness to iterate and learn. This behaviour will help Georgia create a more vibrant ecosystem.

In terms of representation, women are active but remain under-represented in the ecosystem. GITA data show that between 2018 and 2020, among the 95 winners of the Matching Grants Program, 33 were female founders or co-founders. The ecosystem is trying to address this issue. Enterprise Georgia prioritises women in its programmes, and the Bank of Georgia received a long-term local currency loan of GEL 100 million (USD 35 million) from the World Bank to help boost access to finance for small businesses and women entrepreneurs. Start-up Georgia and Project Growth is a joint initiative to help residents in villages to start companies. However, rural and poor communities are still unrepresented due to a lack of technical and business skills, information, infrastructure, and capital.

4 Ecosystem challenges and opportunities

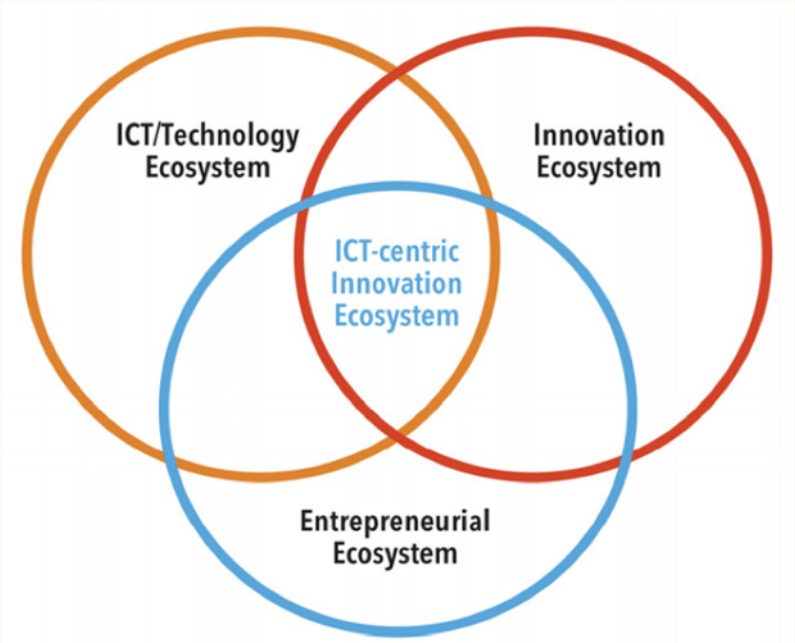
The three main ecosystems essential to Georgia's digital transformation journey are:

(i) the innovation ecosystem (universities, research institutes, and the public sector);
(ii) the entrepreneurial ecosystem (innovators and support organizations); and
(iii) the technological ecosystem (high-tech, ICTs, technology business-to-business (B2B), and manufacturing companies).

Understanding the ICT-centric (digital) innovation ecosystem

The three ecosystems – innovation ecosystem, entrepreneurial ecosystem, and technology ecosystem – are closely linked to developing a country's digital transformation landscape. At the intersection of the three ecosystems lies the ICT-centric innovation ecosystem, also referred to as the digital innovation ecosystem.

Figure 3: Engines of growth



The following sections contain a brief analysis of each of the three ecosystems and ends with a macro level overview of the challenges and opportunities in each of them, as gathered through interviews and group discussions during the co-creation workshops with local stakeholders. Detailed analysis of the challenges has been presented in Chapter 3, while detailed recommendations are covered in Chapter 9 of this report.

4.1 Innovation ecosystem

The innovation ecosystem includes research institutes, universities, public sector entities such as national innovation agencies and public sector funding agencies, the private sector and other actors involved in commercialization. It plays an invaluable role in the national journey of innovation, especially in the launch of an innovation.

Georgia's ecosystem is organized and supported, despite its early stage of development. The government took the initiative by forming GITA to provide the preliminary platform for innovation until the private sector becomes competitive enough to lead. However, stakeholders continue to work in silos and do not see the potential of the ecosystem as a whole. The government could mitigate this by creating a clear innovation vision and strategy that would bring all actors together and help the ecosystem overcome several challenges.

State universities are struggling to foster innovation. With low student fees and no other government funding, universities depend on grants and design projects to meet grant requirements rather than ecosystem needs. The sustainability of these projects is an issue, so benefits are often short-term. The exchange between universities and industry is also limited, reducing digital innovation that can come from research. Meanwhile, research is slow to market, and there is a low success rate in technology transfer. Universities are trying to solve these issues by opening incubators and accelerators, but new global partnerships are needed to accelerate their transformation into leading innovation centres. Another challenge is that universities find it difficult to attract world-class professors and researchers due to limited funding. As a result, academia is not creating optimal human capital to make its way into innovation and entrepreneurship. Having said that, universities have made significant efforts to introduce entrepreneurship courses to students; however, the English language, being the main language for entrepreneurship and innovation literature, is still a barrier.

Support networks are generally well funded and provide appropriate programmes. They are beginning to guide start-ups through the development lifecycle, create a supportive culture and foster a sense of community. The critical issue is awareness, as citizens and established businesses do not understand the benefits of ICT. The public sector would benefit from raising awareness, expanding the budget allocated to the education sector, and developing its national policies to benefit fully from digital technology.

4.2 Entrepreneurial ecosystem

The entrepreneurial ecosystem includes the entrepreneurs, their support systems, and the organizations that nurture business creation through the "valley of death" and subsequently accompany their growth into sustainable SMEs.

Georgia's entrepreneurial ecosystem is small but growing at a fast pace. In recent years, the country has invested in public support programmes and infrastructure to create a fertile ground for innovation. However, it does not yet provide the resources entrepreneurs require to realise their ambitions. Access to growth funding, human capital, collaborative research, and development opportunities are the main challenges facing start-ups.

GITA has formed a partnership with the 500Georgia acceleration programme and the Bank of Georgia to provide access to venture funding and investors to alleviate some of these challenges. However, the lack of access to angel and venture capital funding is a barrier to growth. Some start-ups have secured investors in the United States and have exited the ecosystem to set up operations abroad. Although this is a success, and it helps to raise the aspirations of other entrepreneurs, the local ecosystem is losing some of its best talent to other international ecosystems. In addition, many start-ups follow a bootstrapping strategy to achieve their goals using self-sustaining resources, which slows down innovation and commercialization.

Access to human capital is an issue as the talent pool is small, and competition for digital skills is fierce. A tax policy to attract foreign companies has been controversial with some stakeholders claiming that it has created unfair competition and reduced the availability of labour. Some start-ups hire students before they enter higher education and train them in-house. In the short term, incentives could attract international talent from other countries.

Entrepreneurs need to stimulate innovation by building companies that deliver novel solutions. This is hampered by a low level of research and development and insufficient collaboration between public R&D institutions and SMEs. Some start-ups have gained international recognition due to winning competitions and acting as role models, but more is needed to help them become leaders and champions in the ecosystem.

4.3 Technology entrepreneur

The technology ecosystem includes high-growth technology companies, equipment manufacturers, systems integrators, companies in the ICT sector and B2B technology platforms supporting SMEs, among others. The development of the technology ecosystem is essential to a country's ability to benefit from technological innovation and create high-growth industries and jobs.

The emerging technology ecosystem comprises telecommunication companies, systems integrators, representatives of foreign companies, and a few ICT companies and AI start-ups. EPAM, a leading provider of software product development services, is the most recent member of the technology ecosystem. The government is trying to attract more international companies to develop the ecosystem. In Georgia, banks are digitally advanced ecosystem players who collaborate with AI start-ups and the fintech community. The main challenges for this ecosystem, however, include a lack of connectedness, too few ICT specialists and limited cloud infrastructure.

AI is a natural part of the technology ecosystem and faces some of the same challenges. A recent report (PMC, 2021) describes a few main issues, including a lack of skilled labour, slow industrial development, and a lack of trust between stakeholders. In addition, the lack of local cloud infrastructure is an issue. Some companies are using external cloud services but are experiencing network lags, and there are questions regarding data security and legal compliance with local data regulations. Nevertheless, local cloud computing technologies could improve AI development and support ecosystem growth.

The technology ecosystem is trying to address some of these challenges. For example, the public and private sectors organize events such as DataFest Tbilisi – an annual international conference on data, technology and communications – to bring together the data community from eastern Europe and central Asia to inspire, encourage and create meaningful connections. In addition, the government offers tax incentives to foreign IT companies to relocate, which has had some success in attracting foreign firms.

This ecosystem development is critical to Georgia's ability to leverage technological innovation and create high-growth industries and jobs. To achieve a mature technology ecosystem, the government should consider investing in cloud infrastructure, implementing electronic services, and attracting technology companies that are facing regulatory and bureaucratic restrictions in other countries.

4.4 Macro challenges and opportunities

At a macro level, the three ecosystems face some common challenges:

- Insufficient resources and funding are major challenges for Georgia, directly impacting education, research and innovation capacities.
- Access to human capital is a challenge for all ecosystems as they compete to recruit the best talent.
- The lack of a shared vision leads to unclear roles and limits the multilateral engagement of stakeholders in developing their innovation ecosystem.
- There is a lack of coordination between key building blocks (R&D investment, talent pools, culture, economic conditions, markets and investment) needed to drive results.

Georgia is working hard to establish itself as a growing hub for information and communication technology. The EU-funded SME Development and the Deep and Comprehensive Free Trade Agreement (DCFTA) in Georgia project have set up the Georgia ICT cluster to help drive sector competitiveness. According to GIZ (2020), 90 per cent of customers of ICT companies are local organizations representing banking or retail sectors and governmental agencies. Many IT companies work in the online gaming and gambling industry, only developing new applications to serve that industry. Currently, ICT companies in Georgia are little known in international markets. The government should thus continue to support export and cluster development, which will be vital to the success of the digital innovation ecosystem.

5 Stakeholders

Understanding the stakeholders

Collaboration between key actors in the innovation ecosystem is the foundation of the assessment process and drives the actions taken to build the ecosystem.

An important part of the country review is thus finding ways of identifying and engaging with these stakeholders.

Table 2 lists the many stakeholders who have contributed to this analysis, grouped into entrepreneurs, the finance sector, entrepreneurial support networks, the private sector, academia, and the public sector.

Table 2: Key stakeholders in the ecosystem

	Stakeholders
Entrepreneurs	• Optio.AI • PAYZE.io • Pulsar AI • Stack Browser • TTM Group
Entrepreneurial Support Networks	• Enterprise Georgia • Geolab • Impact Hub Tbilisi • Startup Georgia • Tbilisi Techpark • Total Courage
Private Sector	• Magticom Ltd • Microsoft Georgia • Nexia TA • Silknet JSC
Academia	• BTU University of Business and Technology • Free University of Georgia • Georgian Technical University • Ilia State University
Public Sector	• Georgia Innovation and Technology Agency (GITA) • COMCOM • Ministry of Economy and Sustainable Development of Georgia • Sakpatenti • Shota Rustaveli National Science Foundation of Georgia • West Point Society
Finance	• Bank of Georgia • JSC TBC Bank

6 Ecosystem maturity map

Understanding the ecosystem maturity map

The ecosystem maturity map, also referred to as the innovation journey map, highlights the work that needs to be done in the ecosystem to harness innovation on a transformative journey from pre-ideation to high growth. It describes stakeholder roles and actions in support of entrepreneurs and innovators at each stage of the start-up lifecycle. The colour coding identifies areas that are well-supported (green), inadequate (yellow) and missing or weak (red).

The heatmap of stakeholders in the ecosystem and the current status of their jobs-to-be-done is based on interviews and group discussions in co-creation workshops with local stakeholders and validated by secondary research and literature reviews.

It must be understood that the innovation lifecycle or entrepreneurial journey is not linear. Instead, it is made up of a series of jobs-to-be-done across different stages of the cycles. In the pre-ideation stage, key actors plant the seeds of support in the innovation ecosystem. In the ideation stage, innovations are developed but have not yet been incorporated as businesses. In the start-up stage, innovations evolve from concepts into businesses. The valley of death is a challenging stage of development where entrepreneurs need strong support to survive. In the SME stage, the velocity of start-up growth increases as they expand rapidly into established businesses, reach steady-state, or exit through buyouts or initial public offerings (IPOs).

There is a need for a comprehensive understanding of how ecosystem actors can work together to implement national development priorities within the maturity ecosystem of digital innovation. Initiatives that are constructed in silos might lead to duplication of efforts and wasted resources.

The ecosystem maturity map in Georgia shows an ecosystem in a developing stage. Profiling key stakeholder actions are necessary to accelerate digital transformation.

Table 3: Stakeholders and their roles in the ecosystem

Actors	Cycle stage				
	PRE-IDEA	IDEATION	START-UP	THE "VALLEY OF DEATH"	SME
Entrepreneurs	Entrepreneurial Interest	Engage with Problems	Develop Business Models	Build Collaboration	Expand
Finance	Research Funding	Seed Funding	Angel Investment	Venture Capital	Business Finance and Loans
Entrepreneurial support networks	Entrepreneurial Events	Hackathons and competitions	Co-Working and Support	Incubators and Accelerators	Business Association
Private sector	Success Stories	Research Programmes	Lab Programmes	B2B and Support Services	Skill Training Programmes
Academia	Community of Entrepreneurs	Basic Research	Spin-Off	Soft Skill Trainings	Human Capital
Public sector	Vision and Strategy	IP and R&D Support	Tax Support	Public Procurement	Trade Policy

6.1 Entrepreneurs

Entrepreneurial interest is a growing trend in Georgia, particularly among young people and women. At the pre-idea stage, entrepreneurs start to explore innovation while supporting institutions – such as the Impact Hub and Startup Factory – to help cultivate their interest by fostering an entrepreneurial culture and hosting gatherings. Some start-ups are finding relevant ideas to develop within the digital ecosystem. However, many are playing it safe and focusing on traditional industries with unsustainable business models. Programmes to encourage entrepreneurs to focus on technology-enabled and globally scalable ideas are having some success. Many entrepreneurs are gaining the business skills they need through incubators and start-up programmes. However, finding technical co-founders can often be a challenge, and the English language requirement is sometimes a barrier.

Due to scarce financial resources and market size, there is little collaboration between innovators. Nevertheless, several entrepreneurs – such as the Tbilisi Startup Bureau – are motivated to act as private sector champions and to support ecosystem growth. Access to finance is a challenge and very few start-ups survive the valley of death to gain the status of high-growth SMEs or successfully exit the ecosystem. To be able to accelerate their digital transformation, entrepreneurs must collaborate, learn continuously, differentiate themselves, and learn English, which will open up a global market to them.

6.2 Finance

Currently, GITA is the primary provider of pre-seed and seed funding, including the Digital Services Prototype grant and Innovation Matching Grants programme to promote product, technological, or business process innovation. These grants are popular among innovators, and their uptake is high. The funding supports the potential for early-stage ideas to develop into start-ups, but with limited angel investment, many companies are unsustainable in the long term. The Bank of Georgia provides a range of loans for women founders and start-ups, which helps to slightly alleviate this. High-risk capital is not yet available in Georgia, and high-interest bank loans are unaffordable for most entrepreneurs. Furthermore, if innovators manage to cross the valley of death, they cannot access venture capital to make the transition to SME status.

The banking sector in Georgia has been championing the ecosystem by providing support programmes and investing in digital innovation. However, the government needs to do more to attract international investors. Venture capitalists need a good portfolio of start-ups, and favourable regulation and exit strategies such as a good stock market, private equity, or corporate buyers. Funding needs to be a priority in order for the finance sector to grow.

6.3 Entrepreneurial support networks

Several events organized by both the public and private sectors connect and inspire innovators at the pre-idea stage. However, some entrepreneurs feel these are focused on solving today's problems, rather than innovation. At the ideation stage, hackathons and pitching competitions encourage deep-tech and science-based projects and help innovators validate and develop their ideas. However, these entrepreneurs find it more difficult to survive because of the lack of venture financing required for these types of projects.

On the other hand, there is a plethora of support in the form of incubators, co-working spaces and programmes for start-ups. These allow innovators to work together and access resources and knowledge. These mainly focus on developing the idea, but the real challenge is providing appropriate support to cross the valley of death and scale globally. One international accelerator programme has been successful in bridging this divide. However, support networks need to create more success stories to inspire innovators and develop a vibrant ICT ecosystem.

6.4 Private sector

The private sector stakeholders in Georgia are aware of successful entrepreneurs in the digital ecosystem. Many firms are trying to support them, but more traditional industries need to be brought on board. Georgia has an active business association, which unites more than 600 companies of different sizes. However, the primary purpose of the association is to represent and protect businesses rather than support innovation. Few firms fund research due to a lack of resources and operational focus.

The biggest challenge to the private sector is recruiting and retaining qualified personnel. To mitigate this, some companies have developed comprehensive in-house training programmes. However, this mainly benefits individual businesses rather than the ecosystem as a whole. Training programmes are viewed as a luxury by some SMEs. The prominent investors in advanced technological research are the banks, which also support the start-up community via programmes and sponsorship of external accelerators. Public-private partnerships are the

leading providers of support to develop businesses. To help more start-ups to cross the valley of death, larger private companies could act as angel investors and help to fill the funding gap.

6.5 Public sector

The public sector has adopted a leadership role in developing the digital ecosystem. However, the government is not yet providing and implementing a clear strategy and vision visible to all stakeholders. The non-alignment of stakeholders is slowing down digital innovation. The National Intellectual Property Centre is making efforts to raise awareness of and protect intellectual property. For example, Georgia has strengthened the legislative and institutional framework in this area and has introduced best practices in accordance with the EU-Georgia Association Agreement. However, there still exists a culture of piracy, and innovators are reluctant to protect their ideas if it doesn't benefit them.

The government has implemented a generous taxation framework that supports entrepreneurship, including a range of exemptions for businesses and several free industrial zones. Companies that export IT services can apply for a Virtual Zone Person certificate that exempts them from corporate income tax. In addition, small business status pay tax on only 1 per cent of their revenue, and some transactions that have an innovative component are exempt from value-added tax (VAT). Reforms have made public procurement more accessible and transparent, but it does not yet provide start-ups with digital innovation opportunities. The public sector could strengthen the ecosystem by outsourcing more IT projects, focusing on strong research and development, and creating more success stories to attract investment.

6.6 Academia

Some universities are providing nurturing environments and communities to inspire entrepreneurs. Universities understand their role in the digital ecosystem and have established FabLabs and entrepreneurship centres to provide early-stage support. This vital infrastructure enables young entrepreneurs to test their ideas. In addition, accelerator programmes develop the business skills needed by innovators to create start-ups. There are efforts to offer industry-aligned skills, but graduates are not leaving universities with the skills required by innovative businesses, which often have to train their recruits. The lack of human capital impacts the whole digital ecosystem, as the small talent pool is insufficient to drive innovation.

The main challenge for universities is a lack of funding for academics and research. In addition, there does not appear to be a clear framework to support start-ups based on basic research, so entrepreneurs fail to commercialise research on a large scale. Strategic, long-term partnerships are required to drive academia-industry linkages through internship programmes, research activities or technology transfer.

7 Relevant practices

During the assessment process, the following practices were identified as noteworthy and potentially positive for the ecosystem. As the next step in this process, an in-depth collaborative analysis could lead to the recognition of champions and good practices throughout the ecosystem.

Georgia Innovation and Technology Agency (GITA)

GITA was created under the Ministry of Economy and Sustainable Development (MoESD) to promote the commercialization of knowledge and innovations and stimulate usage in all fields of the economy. GITA aims to create an environment to nurture innovation and high-tech products and develop high-speed Internet nationwide. It is the implementing body of the National Innovation Ecosystem (GENIE) supported by the International Bank for Reconstruction and Development (IBRD) (2016-2021), granting Georgia USD 40 million to implement the innovation ecosystem.

Startup Georgia

The "Startup Georgia" programme was established by the Prime Minister of Georgia and jointly prepared by the Partnership Fund and GITA. The programme consists of an innovative and high-tech component. The high-tech part finances projects up to GEL 100 000 in the following fields: aerospace production, automobiles, artificial intelligence, biotechnology, bioinformatics, computer engineering, computer science, information technology, nanotechnologies, nuclear physics, electromagnetic radiation, robotics, semiconductors, and telecommunications. Startup Georgia has received a total of 726 applications, of which 149 were for high-tech components.

Impact Hub Tbilisi

Impact Hub Tbilisi is part of Impact Hub, the world's leading social entrepreneurial global network (100+ locations) of collaborators focused on prototyping the future of business and society. It is a co-working space to meet, collaborate, produce, learn, network and create. The platform is popular among entrepreneurial circles in Tbilisi. Impact Hub Tbilisi is based in Fabrika, formerly a large textile factory that regularly hosts vibrant networking events for the digital ecosystem.

Data Fest Tbilisi

Data Fest Tbilisi is an annual international conference organized by ForSet, Tbilisi Startup Bureau and Minimaxai. The conference focuses on data and communication and brings together journalists, CSO activists, marketing specialists, business professionals, government officials, data analysts, developers and designers working with data. In addition, it serves as a platform for sharing the most recent developments in the technology ecosystem.

500 Global

500 Global is a world-class accelerator programme designed to promote entrepreneurship in Georgia. It helps develop the technology ecosystem, connects members with international networks, and enables companies in Georgia to raise funds. This collaboration between GITA, 500 Startups and Bank of Georgia supports technology-focused and enabled firms with global potential. The programme is a combination of intensive and remote training over seven months. The top companies are selected to spend four weeks in San Francisco for an

immersion experience focused on elevating a global mindset and helping prepare for cross-border expansion. Since its inception in Silicon Valley, 500 Startups has invested in over 2 400 companies.

Women Startup

For the first time in Georgia, with additional funding provided by the European Bank for Reconstruction and Development (EBRD), the Bank of Georgia offers women a new programme to help them to develop and expand business ideas. So far, GEL 25 000,000 has been allocated for the successful realization of women's businesses in Georgia.

AI Georgia

AI Georgia aims to promote and raise awareness of AI as a separate field in Georgia, conducting studies in this area and introducing AI technologies. AI Georgia's mission is to promote and facilitate the adoption of AI in the private sector and open and maintain the dialogue between businesses, and executive and legislative branches of the State. The purpose of this association is to disseminate AI in the private sector, conduct and support local or international research, find, recruit or up-skill talent, and provide assistance to the State to formulate the legislative framework. In addition, it generates and shares use cases of transforming business operations from traditional methods to advanced AI across different industries.

8 Perspectives on national priorities

Understanding the national vision and key strategies

A clear vision for digital transformation, shared at a community or national level, results in synergizing the resources and efforts towards one shared objective. It is important to understand that the digital economy is a product or outcome of digital transformation in a country. Stakeholder visions and strategies can be aligned with this goal, tearing down legacy silos and enabling a collective understanding of gaps and opportunities. This alignment will lead to the creation of a cohesive common agenda.

Most countries have established their national vision for a digital economy, based on national or international narratives such as the Sustainable Development Goals (SDGs), smart cities, smart societies and the creative economy. The national vision is essential to have a common language among stakeholders to avoid miscommunication or misleading information. Most countries are also enacting various strategies, including digital economy strategies, to achieve the vision. However, the needed enablers in many cases are not present to a sufficient degree, especially with regard to how ICT can drive this acceleration.

Table 4: Digital transformation strategies towards the national vision

National vision		
Georgia's vision is to create a cutting-edge technology-driven economy with an AI hub that will foster innovation and global competitiveness.		
Strategies		
The development of digital strategies that enable the development of advanced digital services and benefit the population, based on: • A digital economy driven by AI innovation and job creation. • Easy access to local angel investment and venture capital. • AI-driven competitive advantage for the key economic sectors supporting the economy (agriculture and tourism), for the new digital sectors (fintech), and for the social sectors (education and health) extended to all regions.		
Economic	**Social**	**Political**
Digital strategies for AI-driven competitive advantage of key economic sectors supporting the non-ICT economy (agriculture, tourism).	Digital strategies for the development of State services with access to education and health extended in all regions.	Digital strategies that support and protect intellectual property and provide safe access to data.
Catalysts		
Six groups of interdependent catalysts are needed to deliver a new digital vision in Georgia. They help develop and mature the digital ecosystem and align vision with strategies and actions.		

Table 4: Digital transformation strategies towards the national vision (continued)

Review and update the digital vision, strategies, data protection law, directives, and regulatory organizational framework are recommended for adoption.	Establishment of cloud infrastructure.	Implementation of flagship AI projects, development of key sectors and access to markets and networks, and direct foreign investment.	Mapping of all stakeholders within the ICT and AI ecosystem and assessment of current resources.	AI technology development programmes, entrepreneurship and AI education. Setting up support frameworks for events and the development of AI digital communities.	Establishment of a permanent body to develop AI policy and strategy with long-term goals.
Project: Revision of vision and strategies.	Project: Cloud infrastructure for digital innovation.	Project: AI initiatives for key sectors.	Project: Digital ecosystem Mapping.	Project: Support programme for AI entrepreneurs.	Project: Permanent body for AI policy and strategy.

9 Key performance indicators

The strategic vision and recommended programme must address the systemic challenges that hinder the development of the digital ecosystem and its impact. To this end, the Table 5 demonstrates how the recommendations can lead to a credible, measurable, and inclusive impact.

This table is based on the theory of change. This theory is generally used as a planning tool in the innovation cycle, as a way of showing how actions taken lead to change in the short, medium, and long terms. It is generally used as a strategic tool for the development of social and sustainable projects but also to measure the concrete impact of government actions.

Desired impact

A Georgia with a cutting-edge technology-driven economy and AI hub that will foster innovation and global competitiveness. Indicators: Improvement of SDG indices: 1,2,4,5,8,9,10,11,12.

Table 5: Strategies for digital transformation

Long-term results	Medium-term results	Short-term results	Recommendations
A vibrant digital ecosystem that is favourable to entrepreneurship and innovation, supporting AI. The Georgian market has an international reputation as a testbed for AI. **Indicators**: Improvement of GII, IDI indices. Improvement of GCI indices. Improvement of AI Readiness index.	The various regulatory tools, mechanisms and supports are operational. Government leading by example in commissioning AI-enabled systems. **Indicators**: Number of regulatory tools, mechanisms and operational support.	A review of the digital vision, strategies, supports, laws and directives as well as the regulatory organizational framework recommended is adopted. **Indicators**: A common long-term vision for ICT focusing on AI as a priority, aligned with adopted strategies and recommendations.	DI 1,2,3,4

Table 5: Strategies for digital transformation (continued)

Long-term results	Medium-term results	Short-term results	Recommendations
A vibrant Innovation ecosystem with AI integrated in key sectors. **Indicators**: Improvement of doing-business indices. Improvement of GEi indices. Improvement of AI Readiness index.	Tools for stakeholders, skills, spaces and know-how are present in abundance and support talents across all of the regions. **Indicators**: The talents of the ecosystem are active and competitive regionally and globally.	Recommendations on infrastructure flexibility, technology development programmes, entrepreneurship and STEM education and digital technology are in place. **Indicators**: Number of recommendations implemented.	CI 1,2,3
	Start-ups and SMEs can deploy their full potential and develop beyond their niche in ICTs. **Indicators**: Number of startups and SME solutions active in key sectors.	Recommendations on flagship AI projects, development of key sectors, market and network access, as well as foreign direct financing, are in place. **Indicators**: Number of initiatives and flagship AI projects developed for innovation in key sectors.	IS 1,2,3

Table 5: Strategies for digital transformation (continued)

Long-term results	Medium-term results	Short-term results	Recommendations
The players are mobilized and collaborate on flagship projects and initiatives. **Indicators**: Improvement of the maturity of the ecosystem based on the stakeholder interaction grid.	The measures and mechanisms to search for information on the ecosystem are operational. **Indicators**: All stakeholders are informed of the activities and resources in the ecosystem.	Mapping of actors and existing resources. **Indicators**: Number of mechanisms put in place for development and information research.	RE 1,2, 3
	The mechanisms and measures allowing the development of digital communities are operational. **Indicators**: Stakeholders work together to achieve the shared vision.	Support frameworks for events and the development of digital communities are in place. **Indicators**: Number of initiatives for collaboration, networking and information sharing.	CE 1
	Mechanisms and measures to promote new models of public and private partnership are operational. **Indicators**: The necessary resources exist with sound governance for the initiatives.	An AI body and a secretariat equipped to supervise flagship public and private projects. **Indicators**: Appropriate governance with a structure equipped to support initiatives.	PE 1, 2, 3

Note: See appendix 1 for a detailed presentation of recommendations.

10 Next steps

Decisive intervention can transform an ICT ecosystem, making it more innovative and a true driver of accelerated digital expansion in all aspects of society – with real gains in public, professional and personal lives.

Stakeholder recommendations, based on co-creation and ecosystem priorities, have helped to conceptualize priority projects and are presented in Appendix 1.

The value of this assessment, which identifies the main obstacles and catalysts that already exist in the ecosystem, is to provide the ideal platform for the launch and development of high-impact flagship projects. Each of these projects, designed to be of unique relevance to the country, would help to accelerate the digital transformation of Georgia.

As a next step, further engagement is needed to generate an in-depth assessment to support the creation of a fundable project document. This digital innovation profile provides a valuable first glimpse of both the ecosystem and the existing practices. The profile is designed to raise awareness about the local challenges and opportunities and engage all stakeholders in implementing flagship projects that can foster an enabling environment for the ICT-centric innovation ecosystem to unleash the full potential of Georgia, and ultimately help bridge the innovation gap.

Appendices

Appendix 1: Detailed recommendations

These recommendations are inspired by the co-creation workshops in which all stakeholders participated. The ITU can help you turn each of these recommendations and strategies into concrete projects with clear key performance indicators to accelerate your ecosystem.

Table 6: Detailed strategies and actions

Type	Recommendation	Sub-recommendations	Actions	Direct key performance indicator
DI-1	Establish a permanent mechanism/body to set vision and long-term artificial intelligence (AI) strategy.	This should involve AI and ICT experts from academia, business, and industry (national and international). This body should be provided with political, administrative, and financial support.	Map out AI and ICT experts in Georgia and internationally. Consult the International Research Centre on AI under the auspices of UNESCO (IRCAI). Gather all AI stakeholders to recruit members and set terms of reference.	A permanent body that meets regularly and is responsible for long-term AI strategy and implementation. A common long-term vision for ICT focusing on AI as a priority, aligned with adopted strategies and recommendations.
DI-2	Develop a long-term AI Action plan to implement the strategy.	Find a good niche, the right focus and competitive advantage where AI can be used.	AI body to identify priorities and strategic economic sectors to focus on AI development and allocate resources. Commission implementation agency.	An AI action plan with measurable goals and financial resources is implemented and visible to all stakeholders.

(continued)

Type	Recommendation	Sub-recommendations	Actions	Direct key performance indicator
DI-3	AI policy goals should support business development, improving government services, and economic growth, especially in key economic sectors.	AI policy should include security, ethics and privacy protection. Develop cybersecurity policies for infrastructure and data as well as blockchain technology.	The main reference point for AI ethics is OECD and UNESCO recommendations. OECD identifies five complementary values-based principles for AI: AI should benefit people and the planet by driving inclusive growth, sustainable development and well-being. AI systems should be designed in a way that respects the rule of law, human rights, democratic values and diversity, and they should include appropriate safeguards – for example, enabling human intervention where necessary – to ensure a fair and just society. There should be transparency and responsible disclosure around AI systems to ensure that people understand AI-based outcomes and can challenge them. AI systems must function in a robust, secure and safe way throughout their life cycles and potential risks should be continually assessed and managed. Organizations and individuals developing, deploying or operating AI systems should be held accountable for their proper functioning in line with the above principles.	A strong AI policy that includes security, ethics and privacy protection. Number of government commissioned AI-enabled systems.

(continued)

Type	Recommendation	Sub-recommendations	Actions	Direct key performance indicator
DI-4	A review of the current digital vision, strategies, supports, laws and directives as well as regulatory frameworks. Ensure a policy environment that will open the way to the deployment of trustworthy AI systems.	Georgian law on Personal Data Protection should be reviewed as a priority to enable AI development. Open data initiatives should be encouraged. Development of AI international standards for public administration bodies.	Government should review existing policies to align with international standards (The EU's Artificial Intelligence Act). Review Proposal for a Regulation Of The European Parliament And Of The Council Laying Down Harmonised Rules On Artificial Intelligence (Artificial Intelligence Act) And Amending Certain Union Legislative Acts.	Updated data protection policy to enable AI development.
		IP Policy and implementation should be reviewed. Awareness of IP should be raised within the business community.	The National Intellectual Property Centre should collaborate with other stakeholders to develop an action plan.	Increase in patent applications from businesses. Number of patent applications related to AI.

(continued)

Type	Recommendation	Sub-recommendations	Actions	Direct key performance indicator
CI-1	Empower people with the skills for software and hardware development. To enable AI by creating an education system focused on STEM skills.	Support grassroots projects working with children and high school students in rural communities to introduce STEM skills.	Identify and engage with current projects. Assess participation levels and provide support where necessary. Use as a testbed for developing STEM skills for school curricula.	Increased number of children participating in outreach programmes. Introduction of programmes to school curricula. Improvement in OECD student assessment scores for science.
		Introduce AI competitions (AI hackathons, robot competitions and STEM Olympics) at schools and universities.	Engage with incubators and support networks to organise and host events. Identify AI experts to support events. Recruit AI entrepreneur in residence. Create AI role models and success stories.	Number of events per year. Number of participants and ideas generated. Number of ideas that register as start-ups. OECD student assessment scores for science.
		Link with international universities to embed their student projects in companies in Georgia.	Consult with Georgia universities and organise a project steering to set up and manage an international placement exchange programme. Build partnership with the International Research Centre on Artificial Intelligence under the auspices of UNESCO (IRCAI). Development and use of open education resources. Jozef Stefan Institute has established a UNESCO Chair on Open Technologies for OER and Open Learning. More about this at https://unesco.ijs.si/about/ Promote placement opportunities to Georgia businesses.	Number of international student placements and companies engaged in Georgia.

(continued)

Type	Recommendation	Sub-recommendations	Actions	Direct key performance indicator
CI-2	Foster accessible AI ecosystems with digital infrastructure	Invest in the development of local cloud infrastructure.	Develop and support the development of local cloud infrastructure and attract global cloud providers to Georgia. Or move government services to the cloud. Government clouds can operate under the direct auspices of the government or could even be completely owned and operated by the government.	Local cloud infrastructure is accessible to all ecosystem players.
		Develop a fully operative and country-wide 5G network.	Engage with and support telecommunication providers to develop 5G infrastructure.	Fully operative and country-wide 5G network.

(continued)

Type	Recommendation	Sub-recommendations	Actions	Direct key performance indicator
CI-3	Prioritise foreign direct investment in the ICT sector.	Continue to offer tax incentives and favourable business regulations for international and local ICT companies, especially in the field of AI.	Review existing policies to ensure they remain attractive to both international and local firms.	Number and size of ICT/AI companies relocating to Georgia. Number of new ICT companies registering in Georgia. Number of foreign direct investments.
		Cooperation with large international ICT companies to encourage them to relocate and attract AI talent to Georgia.	Enterprise Georgia should expand relationships with international ICT companies.	Number of foreign direct investments. Number and size of ICT/AI companies relocating to Georgia.
		Attract international angel and venture capital investors.	Develop relationships with international AI incubators such as Tech Nation in the United Kingdom to attract international investment.	International angel and VC investors in the Georgian ecosystem.
CI-4	Create a local angel network in Georgia and a wider culture of business investment.	Create a scheme and tax incentive for individuals and businesses to invest in startups.	Work with the Business Association and stakeholders to promote the scheme. Review best practice examples including the Seed Enterprise Investment Scheme (SEIS) in the United Kingdom. Commission implementation agency to manage it.	A virtual and physical network of local angel investors is actively in place. Number of startups and investors registered with the scheme. Number of local investments made.

(continued)

Type	Recommendation	Sub-recommendations	Actions	Direct key performance indicator
IS-1	Use AI to improve agricultural output in Georgia.	AI can improve agriculture by helping farmers to grow more crops with fewer resources. AI can improve soil and crop management practices and minimise overall spending by providing farmers with real-time insights from their fields, allowing them to identify areas that need irrigation, fertiliser, or pesticide treatment. The result is reduced use of herbicides, better harvest quality, higher profits, and significant cost savings.	Study best practice examples and assess suitability for Georgia. Pilot small programmes and scale if successful. One best practice example of AI use in agriculture is satellite analysis of Earth from the Copernicus observation system. The pilot project (taking place in Slovenia, Denmark, and Austria from 2018 to 2020) has developed a prototype of yield map prognosis, automatic detection of crop types, moisture analysis, crop damage, and crop cycle (crop evolution among regions with smaller territorial units).	AI is being used in the agricultural sector in Georgia. Number of pilot AI projects in the agricultural sector.
		Aquaculture is another field, where the use of data and AI techniques can help farmers to optimise their processes.	Pilot research project Aquasmart (taking place from 2015 to 2017) developed tools that can help companies estimate daily biomass better, optimise feeding rates, reduce mortalities and improve management practices for fish production. This project developed online training programmes for a highly skilled workforce. The project demonstrated that AI-driven optimization of farming processes and AI-based training programmes can improve the efficiency and profitability of businesses while reducing the negative environmental impacts of agriculture and aquaculture.	AI is used in the aquaculture sector in Georgia. Number of pilot AI projects in the agricultural sector.

(continued)

Type	Recommendation	Sub-recommendations	Actions	Direct key performance indicator
IS-2	Use AI to improve urban water management to improve the lives of people living in Georgia.	The increasing demand for clean and continuous water supply requires constant evaluation of the existing water ecosystems regarding the water supply, wastewater treatment, and reuse potential.	Study best practice examples and assess suitability for Georgia. A pilot project on Skiathos Island in Greece (2017 to 2021) provided monitoring infrastructure for the collection of real-time data across the water lifecycle (for surface water and groundwater), deployment of advanced data mining and data visualization tools, and decision support services for better water management. With the project's solution, stakeholders can monitor urban water resources in real-time while AI technologies support their urban water management decisions.	AI is used to improve the urban water management sector in Georgia.
IS-3	Use AI for mobility data analysis to improve the efficiency of the key sectors.	Artificial intelligence and predictive simulations on anonymised and aggregated data can give organisers of events, transportation planners, policymakers, or businesses insight into their users' mobility and habits.	Engage with mobile operators to provide user data that can be analysed by AI to support strategic sectors. Mobile operators can collect a lot of data about their users, including their locations. This provides an opportunity to analyse the movement flows of mobile network users during the day, at events or at specific locations. Analysis can also distinguish between users of a mobile operator and users using roaming (for instance, tourists).	Pilot AI projects in strategic sectors utilising AI.
RE-1	Map country resources in the area of research and development to support research and development policy.	Gather universities and research centres to analyse strengths and weaknesses and capacity for AI research.	Good practice: A pilot AI project Science Atlas has provided tools for exploring the scientific community and visualising the researchers' collaboration and competencies. The project has integrated data about researchers, projects, and organizations from different sources and provides tools for their visualization and analysis.	A comprehensive map of ICT/AI resources in Georgia that is visible and available to all ecosystem stakeholders.

(continued)

Type	Recommendation	Sub-recommendations	Actions	Direct key performance indicator
RE-2	Map country resources in the area of ICT/ AI development.	Assess AI readiness of Georgia.	Use assessment to support AI strategy and policy being developed by the AI body.	An AI readiness assessment.
CE-1	Twin with AI start-up communities in Europe.	Increase international efforts to establish a strong AI community with solid connections between stakeholders.	Develop relationships with international AI accelerators and communities.	A well-established AI community with solid connections between stakeholders.
		Create public and private sector Initiatives that change failure perception.	Create and publicise entrepreneurial stories that focus on learning from failure. Build on the success of Fuckup Nights Tbilisi.	Number of events focused on failure as a learning tool.
		Organise international events and knowledge exchanges.	Build on events such as DataFest. Organise and host-specific events for Women in Technology.	The number of collaborative AI-related commercial projects. Equal representation of women in the digital ecosystem.
PE-1	Facilitate public and private investment in research and development to spur innovation in trustworthy AI.	Support programmes for developing entrepreneurial culture among researchers.	Learning modules on start-up entrepreneurship need to be provided, and facilitated by the private sector and academia.	An increase in AI research within universities. An increase in the number of AI-related patents.
		Provide research funding and grants for collaborative industry-led applied AI research.	Targeted support should be provided to foster the development of spin-offs from universities and research institutions.	An increase in AI research within universities. An increase in Tech Transfer and commercialization of research.

(continued)

Type	Recommendation	Sub-recommendations	Actions	Direct key performance indicator
PE-2	Open access to government data to support public procurement.	Governments need to be accountable and transparent for their public spending decisions to prevent losses through good governance and build healthy and sustainable economies. Open data acts as a powerful instrument in this respect by enabling authorities, providers, data journalists, transparency activists, and regular citizens to identify fraud or uncompetitive markets through connecting heterogeneous and originally unconnected data sources.	Best practice example: Pilot project TheyBuyForYou (2018 to 2021) has shown that anomaly detection techniques applied over a set of open disparate data sets, including procurement, company, and spending data, provide a viable solution for analysis of public spending. The Slovenia Ministry of Public Administration uses the developed web platform to support decision-making regarding public spending and legislation governing public procurement.	Number of public procurement calls that target innovative AI solutions.
PE-3	Use AI to improve the health service.	There are several successful AI projects worldwide, including medical data analysis (for instance, in medical imagery), improving clinical workflows, improved cost control, and automating and predicting processes in hospitals.	Best practice example: One pilot project in 2005 has shown that AI-based methods can help regional public health institutes perform their tasks more effectively and implement decision support methods to plan the development of public health services.	Use of AI in the Georgia health service.

Appendix 2: Methodology

This study was carried out using a global comparative framework developed by the ITU for the diagnosis and development of ecosystems centred on ICTs. The analysis of a country consists of five steps. The aim is to reduce the disparities in digital innovation using a practical kit to strengthen ICT-centric ecosystems that allow defining of common objectives, diagnosing the ecosystem, formulating recommendations, setting up an implementation framework and proposing a monitoring and evaluation method..

The toolkit for strengthening ICT-centric ecosystems is available here: bit.ly/DIPpolicykit

Building on the ITU innovation toolkit series, another toolkit shares more insights on how stakeholders can undertake rapid ecosystem diagnosis, establish key recommendations, and develop flagship projects that effectively nurture ICT-centric innovation within their digital ecosystems.

The toolkit for developing sustainable ICT-centric projects is available here: bit.ly/DIPtoolkit

Appendix 3: Key words and definitions

Table 7: Key words and definitions

Key Word	Definition
Vision	The vision defines an ideal to be achieved after a given time. Its objective is to mobilize the stakeholders for its realization while giving the necessary direction to obtain the desired situation.
Strategies	A strategy defines the main axes to be developed in order to obtain the objectives and results towards the vision. The transformation of value chains for each sector with the contribution of digital technology is one of the major research objectives. The strategies should also define the roles and responsibilities of non-digital actors and how their contributions reinforce the defined objectives or sub-objectives. Four pillars of strategies are proposed for sustainable development: political, social, economic, and environmental. For each strategy to be developed, it is recommended to develop a theory of change that unites and measures the actors' contributions.
Catalyst – dynamics of innovation (ID) with digital technology	Measures that allow innovation to exist. They support the general environment for innovation. A dynamic innovation environment needs a coherent regulatory and organizational framework that guides, encourages and fosters a culture of innovation, mindset, projects and programmes.
Catalyst – capacity for innovation (IC) with digital	Measures that make it possible to have sufficiently developed infrastructures and talents within the ecosystem, which will be conducive to digital transformation. They give innovators the tools, skills, spaces and know-how they need to be successful.
Catalyst – innovation in key sectors (IS) with the contribution of digital	Measures that integrate innovation in key sectors, so that start-ups and SMEs can unleash their full potential and expand beyond their niche, making transformation in other sectors possible.
Catalyst – research in the digital ecosystem (ER)	Measures and mechanisms to search for information on the ecosystem, in particular the mapping of actors and existing resources.
Catalyst – knowledge sharing in the digital ecosystem (EK)	Mechanisms and measures to share knowledge to accelerate the mobilization and collaboration of stakeholders.
Catalyst – partnership and Governance in the digital ecosystem (EP)	Measures and mechanisms allowing access to resources and networks, to develop a public-private partnership model, to focus actors on ecosystem projects.
Theory of change and indicator development	Measures and mechanisms allowing access to resources and networks, to develop a public-private partnership model, to focus actors on ecosystem projects.
Valley of death	A post-ideation period when innovators need significant investments and a lot of support, and the risk of business failure is high.

Appendix 4: Acronyms and abbreviations

Table 8: Nomenclature of abbreviations

Key word	Definition
AI	Artificial Intelligence
DCFTA	Deep and Comprehensive Free Trade Agreement
EBRD	European Bank for Reconstruction and Development
EU	European Union
FDI	Foreign direct investment
GDP	Gross Domestic Product
GENIE	Georgia National Innovation Ecosystem
GITA	Georgia Innovation and Technology Agency
ICT	Information communication technologies
MoESD	Ministry of Economy and Sustainable Development of Georgia
NBDS	National Broadband Development Strategy
OECD	Organisation for Economic Co-operation and Development
SDG	Sustainable Development Goals
SME	Small and medium enterprise
STEM	Science, technology, engineering and mathematics
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
WIPO	World Intellectual Property Organization

Office of the Director
International Telecommunication Union (ITU)
Telecommunication Development Bureau (BDT)
Place des Nations
CH-1211 Geneva 20
Switzerland

Email: bdtdirector@itu.int
Tel.: +41 22 730 5035/5435
Fax: +41 22 730 5484

Office of Deputy Director and Regional Presence
Field Operations Coordination Department (DDR)
Place des Nations
CH-1211 Geneva 20
Switzerland

Email: bdtdeputydir@itu.int
Tel.: +41 22 730 5131
Fax: +41 22 730 5484

Digital Networks and Society (DNS)
Email: bdt-dns@itu.int
Tel.: +41 22 730 5421
Fax: +41 22 730 5484

Digital Knowledge Hub Department (DKH)
Email: bdt-dkh@itu.int
Tel.: +41 22 730 5900
Fax: +41 22 730 5484

Partnerships for Digital Development Department (PDD)
Email: bdt-pdd@itu.int
Tel.: +41 22 730 5447
Fax: +41 22 730 5484

Africa

Ethiopia
International Telecommunication Union (ITU) Regional Office
Gambia Road
Leghar Ethio Telecom Bldg. 3rd floor
P.O. Box 60 005
Addis Ababa
Ethiopia

Email: itu-ro-africa@itu.int
Tel.: +251 11 551 4977
Tel.: +251 11 551 4855
Tel.: +251 11 551 8328
Fax: +251 11 551 7299

Cameroon
Union internationale des télécommunications (UIT)
Bureau de zone
Immeuble CAMPOST, 3e étage
Boulevard du 20 mai
Boîte postale 11017
Yaoundé
Cameroon

Email: itu-yaounde@itu.int
Tel.: + 237 22 22 9292
Tel.: + 237 22 22 9291
Fax: + 237 22 22 9297

Senegal
Union internationale des télécommunications (UIT)
Bureau de zone
8, Route du Méridien Président
Immeuble Rokhaya, 3e étage
Boîte postale 29471
Dakar - Yoff
Senegal

Email: itu-dakar@itu.int
Tel.: +221 33 859 7010
Tel.: +221 33 859 7021
Fax: +221 33 868 6386

Zimbabwe
International Telecommunication Union (ITU) Area Office
USAF POTRAZ Building
877 Endeavour Crescent
Mount Pleasant Business Park
Harare
Zimbabwe

Email: itu-harare@itu.int
Tel.: +263 242 369015
Tel.: +263 242 369016

Americas

Brazil
União Internacional de Telecomunicações (UIT)
Escritório Regional
SAUS Quadra 6 Ed. Luis Eduardo Magalhães,
Bloco "E", 10º andar, Ala Sul (Anatel)
CEP 70070-940 Brasilia - DF
Brazil

Email: itubrasilia@itu.int
Tel.: +55 61 2312 2730-1
Tel.: +55 61 2312 2733-5
Fax: +55 61 2312 2738

Barbados
International Telecommunication Union (ITU) Area Office
United Nations House
Marine Gardens
Hastings, Christ Church
P.O. Box 1047
Bridgetown
Barbados

Email: itubridgetown@itu.int
Tel.: +1 246 431 0343
Fax: +1 246 437 7403

Chile
Unión Internacional de Telecomunicaciones (UIT)
Oficina de Representación de Área
Merced 753, Piso 4
Santiago de Chile
Chile

Email: itusantiago@itu.int
Tel.: +56 2 632 6134/6147
Fax: +56 2 632 6154

Honduras
Unión Internacional de Telecomunicaciones (UIT)
Oficina de Representación de Área
Colonia Altos de Miramontes
Calle principal, Edificio No. 1583
Frente a Santos y Cía
Apartado Postal 976
Tegucigalpa
Honduras

Email: ituteguciglapa@itu.int
Tel.: +504 2235 5470
Fax: +504 2235 5471

Arab States

Egypt
International Telecommunication Union (ITU) Regional Office
Smart Village, Building B 147,
3rd floor
Km 28 Cairo
Alexandria Desert Road
Giza Governorate
Cairo
Egypt

Email: itu-ro-arabstates@itu.int
Tel.: +202 3537 1777
Fax: +202 3537 1888

Asia-Pacific

Thailand
International Telecommunication Union (ITU) Regional Office
4th floor NBTC Region 1 Building
101 Chaengwattana Road
Laksi,
Bangkok 10210,
Thailand

Mailing address:
P.O. Box 178, Laksi Post Office
Laksi, Bangkok 10210, Thailand

Email: itu-ro-asiapacific@itu.int
Tel.: +66 2 574 9326 – 8
+66 2 575 0055

Indonesia
International Telecommunication Union (ITU) Area Office
Sapta Pesona Building
13th floor
Jl. Merdan Merdeka Barat No. 17
Jakarta 10110
Indonesia

Email: itu-ro-asiapacific@itu.int
Tel.: +62 21 381 3572
Tel.: +62 21 380 2322/2324
Fax: +62 21 389 5521

India
International Telecommunication Union (ITU) Area Office and Innovation Centre
C-DOT Campus
Mandi Road
Chhatarpur, Mehrauli
New Delhi 110030
India

Email: itu-ro-southasia@itu.int

CIS

Russian Federation
International Telecommunication Union (ITU) Regional Office
4, Building 1
Sergiy Radonezhsky Str.
Moscow 105120
Russian Federation
Email: itumoscow@itu.int
Tel.: +7 495 926 6070

Europe

Switzerland
International Telecommunication Union (ITU) Office for Europe
Place des Nations
CH-1211 Geneva 20
Switzerland

Email: eurregion@itu.int
Tel.: +41 22 730 5467
Fax: +41 22 730 5484

International Telecommunication Union
Telecommunication Development Bureau
Place des Nations
CH-1211 Geneva 20
Switzerland

ISBN: 978-92-61-37781-6

Published in Switzerland
Geneva, 2023

Photo credits: Adobe Stock