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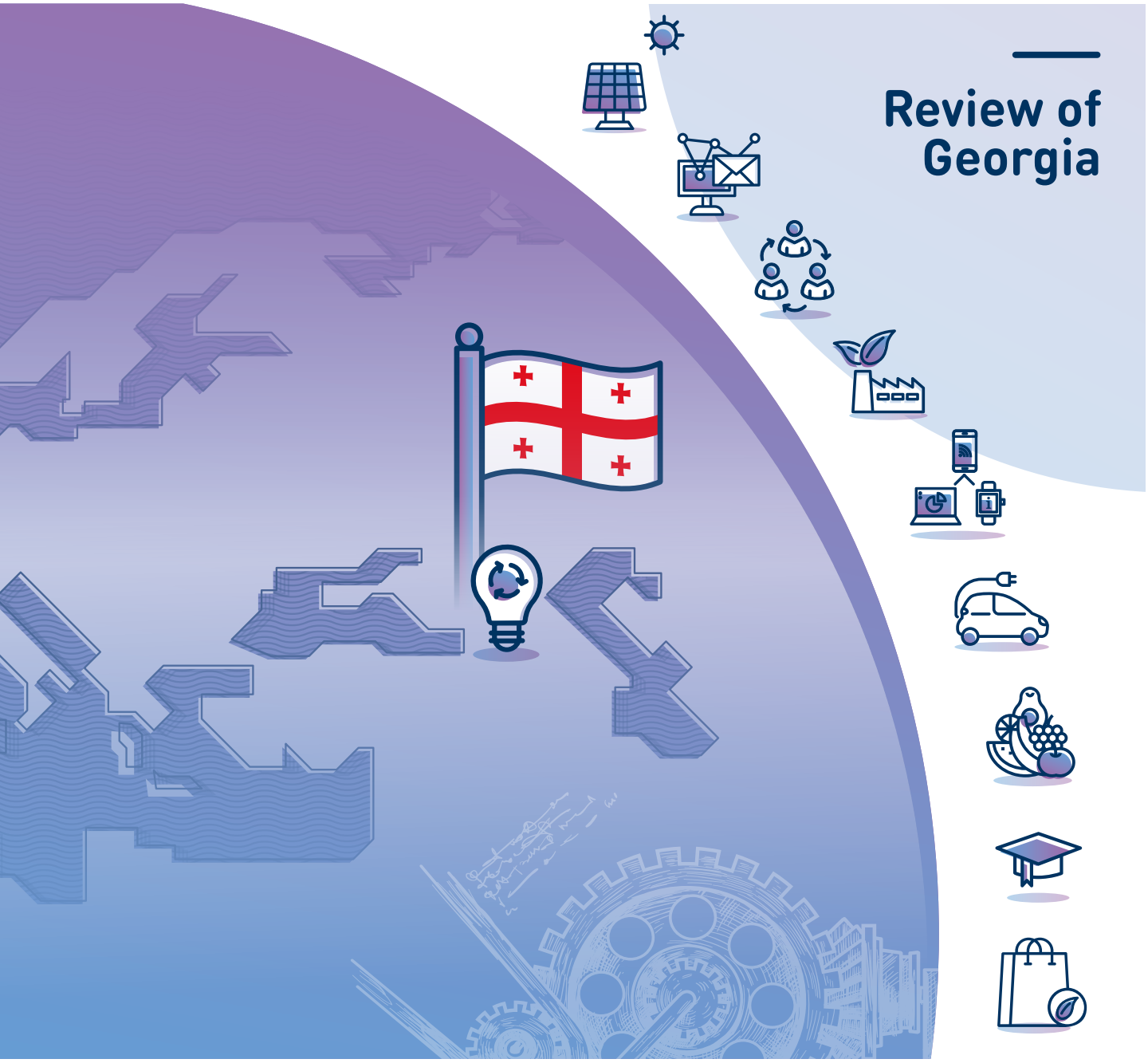
Innovation for Sustainable Development

Review of Georgia



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Innovation for Sustainable Development

Review of Georgia

Advance copy
for discussion

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FOREWORD

Georgia engaged in an impressive array of reforms during the past two decades, turning it into one of the most open, well-governed countries with economies in transition in the UNECE region. The regulatory climate for doing business ranks among the best globally, and Georgia has become a vibrant trade hub, attracted significant investment, and clocked up strong growth over the past decade. One particularly notable area of recent success has been in support schemes to promote innovative start-ups, and the creation of an entrepreneurship culture.

The growth drivers that these reforms unleashed, such as consumer spending and construction, are, however, losing momentum. The next stage of growth will require broad experimentation with new ideas to diversify and upgrade the economy. Current challenges, such as COVID-19, environmental sustainability, and rising inequality, make it imperative to reform policies and institutions not only to enable and support this dynamic – but to do so more efficiently in the context of shrinking fiscal space for manouevre. That is why innovation is so central to the sustainable development goals (SDGs) of the United Nations 2030 Agenda for Sustainable Development.

This *Review* takes an in-depth look at the factors that will underpin innovation-led sustainable development in Georgia. This includes building on a wide range of opportunities for Georgia to catch up with more developed economies while avoiding, mitigating, or compensating for the risks and challenges posed by structural transformation.

The *Review* identifies strengths to build on, and priorities for reform. Georgia has a tradition of high levels of educational attainment, but skills shortages and mismatches in the labour market constrain private sector innovation. Closer coordination and regular monitoring and evaluation of science, innovation and private sector development policies and instruments will be essential to ensure policy effectiveness. Public procurement is a potentially potent but underused lever to catalyse innovation, while improving managerial, technical, and organizational capacities in the private sector will be essential to absorb and put into practice new ideas.

UNECE advisory work in this area draws on longstanding engagement across the region. The Innovation for Sustainable Development Review is the result of a concerted, comprehensive approach, with strong and regular country involvement and peer review.

PREFACE

Research, analysis and advisory work on innovation and competitiveness policies is part of UNECE work on economic cooperation and integration that aims to harness innovation as a driver of sustainable development. National reviews of innovation policy, carried out upon the request of member States, have developed significantly since their inception more than a decade ago, and follow a recently updated methodology and approach that has resulted in Innovation for Sustainable Development Reviews. This new approach addresses national priorities under the United Nations 2030 Agenda for Sustainable Development.

The research for the Innovation for Sustainable Development Review of Georgia began in May 2019 with a preparatory mission to agree the scope of the *Review* with the national authorities and other stakeholders. National priorities for sustainable development were selected for in-depth consideration in elective chapters on public procurement and enterprise dynamics.

The *Review* expands on and complements the findings of the Sub-regional Innovation Policy Outlook (IPO), which assesses the scope and quality of innovation governance, policy tools, and policy processes across six countries in Eastern Europe and the Caucasus (Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine). The *Review* provides detailed policy recommendations that reflect the national specificities and sustainable development priorities of Georgia.

The *Review* is the result of in-depth dialogue and consultation among the UNECE Secretariat, leading subject matter experts, Government officials, academia, the private sector, and other innovation stakeholders in Georgia. In April 2020, the draft text was submitted for comments to the national authorities and to a group of independent international experts not otherwise involved in the *Review* process. The findings and recommendations were endorsed by the UNECE Team of Specialists on Innovation and Competitiveness Policies by intersessional decision in November 2020.

The final text of the *Review* was prepared for publication by the UNECE Secretariat reflecting the outcome of these discussions as well as other comments and suggestions from various stakeholders.

Elisabeth Tuerk

Director, Economic Cooperation and Trade
United Nations Economic Commission for Europe

ACKNOWLEDGEMENTS

The UNECE Innovation for Sustainable Development Review of Georgia was developed under the auspices of the Committee on Innovation, Competitiveness and Public-Private Partnerships and with generous financial support of the Swedish Government.

The publication was written under the leadership of Elisabeth Tuerk, Director of the UNECE Economic Cooperation and Trade Division, and under the overall supervision and guidance of Anders Jönsson, Chief of the UNECE Innovative Policies Development Section. Christopher Athey and Ralph Heinrich developed the conceptual framework. The authors of the chapters were: Anders Jönsson and Stefani Stefanova (Chapter 1); Ralph Heinrich and Stefani Stefanova (Chapter 2); Rumen Dobrinsky (lead) and Christopher Athey (Chapter 3); Thomas Stahlecker (lead), Rumen Dobrinsky and Ralph Heinrich (Chapter 4); Jon Mikel Zabala Iturriagagoitia (lead) and Christopher Athey (Chapter 5); and Hana Daoudi (Chapter 6). Tatiana Rosu carried out research for chapters 1, 2 and 6 and provided coordination support throughout the project. Irina Guruli, as a national consultant, provided essential background research. Ludmila Boichuk provided technical and administrative assistance throughout the project.

The continuous engagement of Georgia's Innovation and Technology Agency (GITA), the lead national partner for this review, has been essential throughout this process. Special thanks go to Annie Vashakmadze (Head of Donor Relations and International Relations Department, GITA) as well as to Avtandil Kasradze (Chairperson, GITA) and Mariam Lashkhi (Deputy Chairperson, GITA). The UN Resident Coordinator Office in Georgia provided useful support at various stages, in particular Sabine Machl.

Several experts and organizations reviewed and commented on the findings and recommendations, including the United Nations Resident Coordinator Office in Georgia, OECD Eurasia Division, UNDP Georgia, Rafis Abazov, Yelena Kalyuzhnova, Ana Kresik, Despina Pachnou, Jose Palacin, Slavo Radosevic and Manfred Spiesberger.

June White edited the review, and Thierry Alran created the graphic design and infographics.

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF BOXES

ABBREVIATIONS

AA	Association Agreement
APMA	Agriculture Project Management Agency
BBG	Bundesbeschaffung, Austrian Federal Procurement Agency
BEEPS	Business Environment and Enterprise Performance Survey
BoP	Balance of Payments
CAB	Conformity Assessment Body
CIP	Competitive Industrial Performance
CRDF	Civilian Research and Development Fund
DCFTA	Deep and Comprehensive Free Trade Area
DEA	Data Exchange Agency
EBRD	European Bank for Reconstruction and Development
ECA	Europe and Central Asia
EEAS	European External Action Service
EEC	European Economic Community
EESC	European Economic and Social Committee
EIF	European Investment Fund
ENP	European Neighbourhood Policy
EU	European Union
FDI	Foreign Direct Investment
FIZ	Free Industrial Zone
FTA	Free Trade Agreement
GAC	Georgian Accreditation Centre
GCCI	Georgian Chamber of Commerce and Industry
GCI	Global Competiveness Index (WEF)
GCR	Global Competiveness Report (WEF)
GDP	Gross Domestic Product
GENIE	Georgian National Innovation Ecosystem project
GERD	Gross Expenditure on Research & Development
GITA	Innovation and Technology Agency – Georgia
GIZ	German Agency for International Cooperation
GMP	Good Manufacturing Practice
GNAS	Georgian National Academy of Science
GPA	Agreement on Government Procurement
HACCP	Hazard Analysis Critical Control Points
HEI	Higher Education Institution
ICT	nformation and Communications Technology
IEF	Index of Economic Freedom
IEP	Innovation-enhancing Procurement
ILO	International Labour Organization
INSEAD	Institut Européen d'Administration des Affaires
IP	Intellectual Property
IPCG	Intellectual Property Centre of Georgia, Sakpatenti
IPR	Intellectual Property Rights
ISO	International Standardization Organization

KUC	Kutaisi University Complex
LEPL	Legal Entity of Public Law
MEAT	Most Economically Advantageous Tender
MES	Ministry of Education and Science
MFI	Microfinance Institution
MJ	Ministry of Justice
MOESD	Ministry of Economy and Sustainable Development
MRDI	Ministry of Regional Development and Infrastructure
MSME	Micro-, Small and Medium-sized Enterprises
NAICS	North American Industry Classification System
NBFI	Non-Bank Financial Institution
NIC	National Innovation Council
NTM	Non-Tariff Measure
NUTEK	National Board for Industrial and Technical Development (Sweden)
OECD	Organisation for Economic Co-operation and Development
OPSI	Observatory of Public Sector Innovation
PCP	Pre-commercial Procurement
PCT	Patent Cooperation Treaty
PISA	Programme for International Student Assessment
PPP	Public-Private Partnerships; or Purchasing Power Parity
PPPI	National Competence Centre for Innovation Procurement (Austria)
PSDA	Public Service Development Agency
R&D	Research and Development
RIC	Research and Innovation Council
RPBT	Regulatory and Procedural Barriers to Trade
SBIR	Small Business Innovation Research
SBRI	Small Business Research Initiative
SDG	Sustainable Development Goals
SERGAS	Servizo Galego de Saúde (Galicia)
SME	Small or Medium-sized Enterprise
SPA	State Procurement Agency
SRNSF	Shota Rustaveli National Science Foundation
ST&I	Science, Technology and Innovation
STEM	Science, Technology, Engineering and Mathematics
STPP	Swedish Technology Procurement Programme
TBT	Technical Barriers to Trade
TFP	Total-Factor Productivity
TNC	Transnational Corporation
TTO	Technology Transfer Offices
TVET	Technical and Vocational Education and Training
UAV	Civil Unmanned Aerial Vehicle
UNIDO	UN Industrial Development Organization
VAT	Value Added Tax
VET	Vocational Education and Training
WEF	World Economic Forum
WIPO	World Intellectual Property Organization
WITS	World Integrated Trade Solution
WTO	World Trade Organisation

EXECUTIVE SUMMARY

After impressive reforms, Georgia has emerged stronger

After the 2003 Rose Revolution, Georgia embarked on a path of impressive and comprehensive reforms. It radically improved governance, reduced corruption, and cut regulation – becoming, in less than a decade, one of the most open economies in the region. This sparked strong investment in a range of new opportunities, which, together with rising consumer spending, drove strong, albeit volatile, economic growth over the past decades.

Keeping up this momentum requires diversification and upgrading

Investment in market-seeking opportunities, such as banking and construction, and consumer spending are reaching diminishing returns, unable to underpin growth and sustainable development in the long term. Low and at times negative productivity growth point to more systemic problems in the private sector that require attention. Diversifying and upgrading export-oriented economic activities, and taking advantage of the manifold opportunities created by trade and investment, will be central over the next decade. There are a number of high-potential economic activities in Georgia, and scope to target public support to promote innovative development in these areas while respecting fiscal constraints.

Innovation is central role in this process – and in sustainable development overall

Experimenting with new ideas, or innovation, is the mechanism by which Georgia can explore what works and what does not in these efforts. With its strong political commitment to innovation, competitive wages, strategic location and attractive business environment, Georgia has a solid starting position. Several success stories not only in the private sector but also in governance, including leading e-Government reforms, point in the right direction. The challenge, rather, is enabling and promoting such innovation systematically and across economy and society.

Several structural factors constrain innovation in Georgia

Several structural factors hold back such dynamics from emerging on their own. Central among these is the ability of the private sector to absorb ideas, technologies, or business models that have worked elsewhere. Indicators such as prevalence of linkages (or absence thereof), limited use of international standards and certifications, and assesments of technical and organisational skills among SMEs, point to systemic deficiencies in such absorptive capacities. At the same time, despite relatively solid levels of education attainment, educational quality has fallen over recent decades – and difficulties in finding the right skills has risen to the top of leading constraints in business surveys.

Although inheriting a tradition of and commitment to science, this important base is waning. Gross domestic expenditure on research and development (GERD) is

persistently low, while public research is fragmented across many areas. Investment in hard infrastructure, especially information and communication technology, especially in peripheral areas, will be critical to enable and ensure positive spill-over effects from Georgia's strategic location and growing role as a transit hub.

COVID-19 creates uncertainty and additional fiscal strain

A strong reliance on remittances and credit to finance consumption, rising public expenditure liabilities, and export revenue based on a small range of commodities lead to vulnerability to external shocks – structural issues demonstrated and exacerbated by the COVID-19 pandemic. UNECE research[1] shows that, although Georgia's efforts to contain the spread were among the most successful in the UNECE region, the economic fallout is considerable and will increase pressure on public finances as social spending rises rapidly. Innovation will be central to help Georgia build back better after the crisis.

Fashioning innovation policies and institutions to better promote innovation requires a concerted, comprehensive approach

The importance of innovation to sustain growth in Georgia, building on its reform momentum and substantial potential, implies reforming innovation policies and institutions to address these challenges, while using scarce fiscal resources prudently.

Closer, continuous and structured coordination of science, innovation, and private sector development policies and instruments are important to ensure coherence and efficiency. Policy remits central to innovation, such as public research, business regulation, SME development, and start-up development interact and overlap strongly.

A national innovation strategy should articulate the intended roles of different policy areas in enabling and promoting innovation as a central element in overall sustainable development planning. Policies should cover the entire innovation cycle, and support entrepreneurs and investors in undertaking high risk technology-frontier innovation. There is a more general need to strengthen business sector capacity to develop, adopt and adapt productivity-enhancing innovation. This requires broadening the scope of innovation policy from a narrow focus on high-tech start-ups towards enabling and supporting experimentation in the economy overall.

To put this strategy into practice, Georgia needs a streamlined innovation governance structure. Central to this effort is a ministerial level body. The currently inactive Research and Innovation Council (RIC) could be transformed into a mechanism that meets regularly, supported by an adequately resourced secretariat. The RIC would have a clear mandate to coordinate implementation, monitor impact and developments, engaging in regular innovation foresight exercises, and adjusting and developing new strategies and action plans across Government.

Enabling and promoting linkages, especially between the private sector and applied research, carries significant potential

A particularly salient deficit in the innovation ecosystem in Georgia is the low level of strong, systematic international and national linkages and cooperation – both within the private sector and between business and science. Despite public investment into applied

research and clear private sector needs, there are few systematic efforts to engage science to solve problems and grasp opportunities in the private sector; or to continuously explore the potential for commercialisation of scientific outputs.

Clearing hurdles to innovation while getting the incentives right should be central to policy reforms aiming to exploit this potential systematically. A range of restrictions constrain vibrant linkages, such as rules constraining entrepreneurial activities for academic and research staff and the use of scientific findings in commercial ventures. Removing these barriers is an important first step. Similarly, there is substantial potential in tweaking existing support mechanisms for research and private sector development to reward more clearly innovative partnerships with clear potential demonstration effects. Public research funding mechanisms should be restructured, away from funding salaries and fixed costs to funding innovative projects with strong elements of actual or potential linkages.

An initial step in this direction is the match-making scheme that GITA developed under the GENIE project, which is important to sustain and gradually improve beyond the scope of the World Bank financing that set it up. Important further steps could involve funding instruments jointly operated by GITA and the Shota Rustaveli National Science Foundation (SRNSF), which oversees most public research funding in Georgia, that target industry-science linkages. These could include innovation and technology upgrading project grants covering the full innovation cycle, from applied research through developing new products and services to commercialization and scale-up. Similarly, the Georgian National Academy of Sciences (GNAS) and GITA could set up a match-making space for industry-science collaboration – a prototype for the future market for knowledge and technologies that could be supported by grants targeting business-science cooperation.

Public procurement could become the single most powerful driver of innovation

Making up over 10 per cent of GDP, public procurement has significant, radically underused potential to promote experimentation with new ideas in Georgia. Employing the principles of innovation-enhancing procurement (IEP) as part and parcel of a comprehensive procurement reform package provides a clear avenue for using this potential – creating little or no additional cost in the short-term, and savings and positive spill-overs in the medium and long-term.

IEP is fundamentally different in approach. Standard public procurement practices in Georgia specify the technical details and standards in tender documents. IEP, on the other hand, calls for tender documents and evaluation criteria to clarify and quantify the intended impact and related objectives and performance indicators. This would allow bidders to come up with innovative solutions to meet and achieve them. Similarly, if successful, companies would have strong incentives to meet and outperform them during implementation, as revenue streams could be linked to the performance indicators in a transparent fashion. This shift towards functional procurement is particularly important to promote the innovation needed for the circular economy transition – and sustainable development overall.

Putting this into practice requires small-scale pilot demonstration projects that serve as experiments to be benchmarked against traditional procurement as "control groups" for

delivering similar public services. Success stories can then be scaled up, with IEP applied to a growing number of areas of public procurement – while gradually building the skills, capacities, and institutions needed.

Market support institutions should play a central role in improving absorptive capacities in the private sector, enabling business to drive innovation across the economy

The low level of absorptive capacity in the private sector in Georgia, or the ability to scout, adapt and try out ideas, organizational models, and technologies that have worked in other contexts, is a central constraint to the systematic experimentation with new ideas in the economy. Business surveys shows very low levels of business research and development and innovation overall. Substantial deficiencies in organizational and managerial capacities limit the ability of the private sector in Georgia not only to innovate, but also to scale up what works. This compounds the effects that already, even in well-functioning markets, hold back innovation, such as the cost of self-discovery and co-ordination externalities.

Market support institutions have an important role to play in improving these capacities and promoting innovation. The most important are GITA, Enterprise Georgia, and business and industry associations. Central to a comprehensive innovation strategy will be a coordinated package of support services with strong, cumulative impact. The goal is simple: public support should be catalytic. In other words, it should enable innovation to happen that would probably not have taken place without it.

Current support services are insufficiently adapted to private sector needs in general – and towards this important catalytic role in particular. Several elements require concerted focus. Targeted mechanisms to enable and boost path-breaking, innovative entrepreneurship, responding to the at times highly specific needs and constraints of this small sub-group, are important to ensure that more experimentation takes place than otherwise would be the case. More broadly, market support institutions should promote, through subsidies and training activities, the adoption of product and quality standards, improving both export potential and organizational capacities. Export promotion will enable companies to take advantage of the manifold opportunities recently open to Georgia. Networking events and platforms coupled with targeted support should aim to enable and promote vibrant national and international linkages. Sector-focused interventions would enable companies to experiment with new ideas, technologies, products, services, and business models.

Note

[1] "The impact of COVID-19 on Trade and Structural Transformation in Georgia" https://www.unece.org/index.php?id=55225

Chapter 1

ECONOMIC OVERVIEW OF GEORGIA

1.1 Economic profile

Georgia – a small, open economy with an impressive recent growth record...

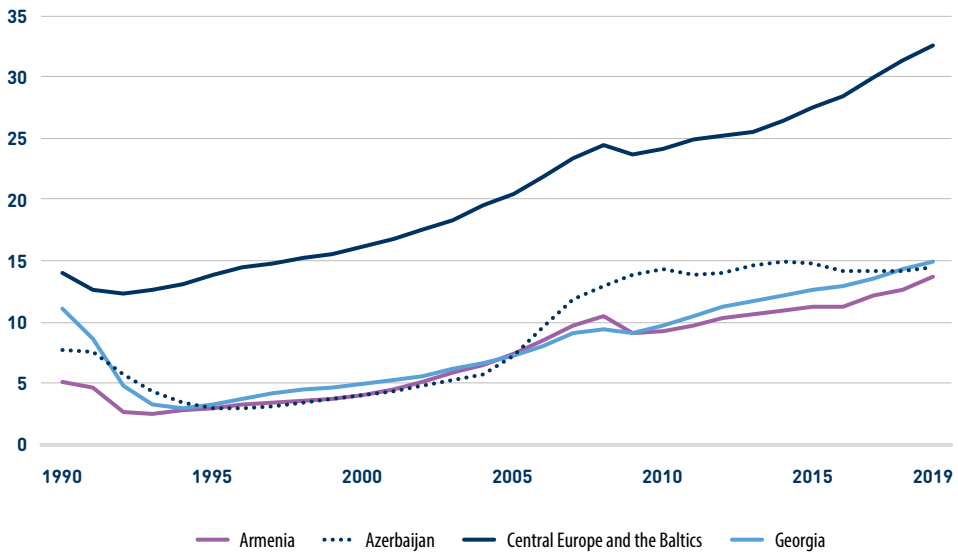
As a small, open economy in the South Caucasus at the crossroads of Europe, Iran, Russia, the Middle East and Central Asia, the post-independence transition of Georgia towards a market economy has been tumultuous. The collapse of the Soviet economic structure, armed conflict and political turmoil, hamstrung the economy and governance for the first decade.

The Rose Revolution in 2003 triggered a remarkable turn-around: following far-reaching governance reforms, Georgia became, by many measures, one of the most open, least corrupt economies in the post-Soviet space, paving the way for robust GDP growth of 4.5 per cent on average since 2007, well above the ECA average and a tripling in the size of the economy since 1999 (figure 1.1).

Growth, nonetheless, has often been sustained by credit and remittance-fuelled consumption, government spending, and market-seeking investment. This, coupled with fluctuating economic growth and rising public debt, continues to undermine the country's ability to bring about the diversification and capital accumulation the economy needs for long-term, sustainable growth - in other words, to enable and promote innovation.

The need for a long-term, comprehensive and resilient approach to economic governance in general, and innovation in particular, becomes even clearer as Georgia faces the economic consequences of COVID-19 containment measures, both domestically and abroad (see Box 1.1).

Figure 1.1 · GDP per capita, PPP, 1990–2019 (Constant 2017 $ thousand)



Source: World Development Indicators - World Bank Open Data.

Box 1.1 Impact of COVID-19 on the Georgian economy

The UNECE assessment, "The impact of COVID-19 on Trade and Structural Transformation in Georgia",[i] shows that the Government's measures to mitigate the impact of the first wave of the COVID-19 pandemic were among the very most successful in the ECE region. The economic fallout is however considerable, representing a threat to previously planned economic reforms and putting significant pressure on SMEs and self-employed workers with limited savings. According to Geostat, GDP declined by 13.5 per cent in May 2020 year-on-year, and by 5.4 per cent in the first five months of 2020 year-on-year. Government revenues have seen a 20 per cent shortfall, which puts in jeopardy some of the Government's planned reforms. The long-term effects of the global economic recession will impact remittance flows, domestic investments and FDI levels. The short-term effects can already be seen in the economic outputs of the service-related sectors (led by tourism, construction and proximity services), and merchandise trade. Between January and August 2020, merchandise exports decreased by 14.7 per cent while imports decreased by 17.5 per cent compared to the same period of 2019.

Declining national and international demand puts significant pressure on SMEs (99.7 per cent of all firms in Georgia in 2017 were SMEs), and self-employed workers with low levels of liquidity and savings. The unemployment rate was 11.9 per cent during the first quarter of 2020, and is expected to soar by the end of 2020, affecting particularly low-skilled workers. The informal economy - 50 per cent of GDP in 2018 (according to IMF estimates) - as well as the service sector more broadly, are all highly dependent on consumer demand and with few options for teleworking are particularly vulnerable. Innovation will be central to help Georgia build back better after the crisis.

Sources:
[i] The impact of COVID-19 on trade and structural transformation in Georgia:Evidence from UNECE's survey of Micro, Small and Medium Enterprises, see https://www.unece.org/index.php?id=55225
[ii] Geostat estimates of Economic Growth, May 2020 https://www.geostat.ge/media/32374/Rapid-Estimates-of-Economic-Growth%2C-May-2020.pdf,
[iii] Geostat express release on External merchandise trade January-August 2020 https://www.geostat.ge/media/33618/External-Merchandise-Trade-of-Georgia-in-January-August-2020-%28Express-release%29.pdf
[iv] https://read.oecd-ilibrary.org/view/?ref=129_129637-ttbr2lwvsh&title=COVID-19-Crisis-Response-in-EU-Eastern-Partner-Countries

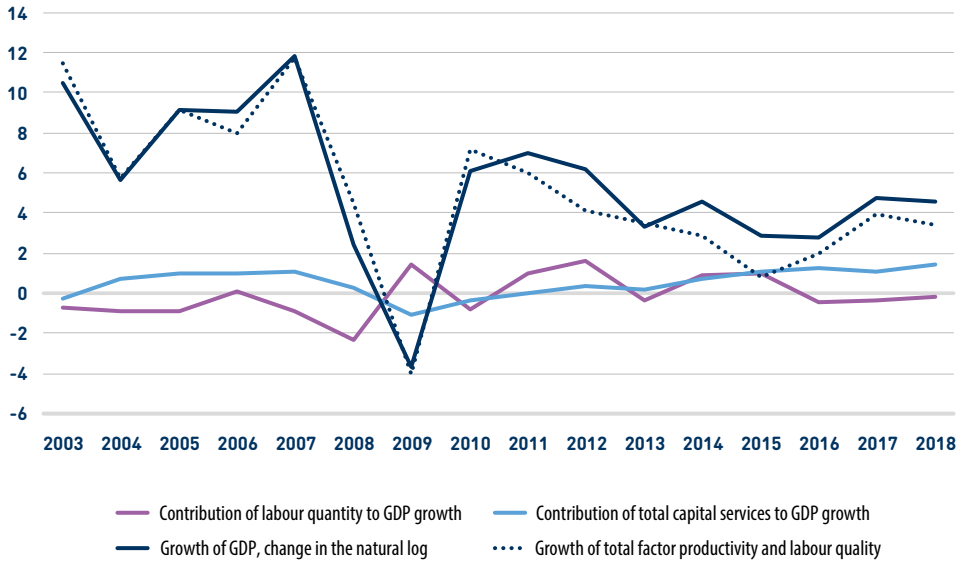
… although emerging challenges include slowing productivity growth and COVID-19

Post-2003 growth in large part stemmed from annual growth in labour productivity of around four per cent, above Georgia's middle-income group peers. This was partly a "catch up" effect, seeing investors adding and upgrading physical capital and infrastructure (roads, telecommunications, financial systems and construction), and further progress will require reforms and policies that encourage and enable broader experimentation with ideas; in other words, innovation.

Total factor productivity (combined with the contribution of labour quality to GDP growth[1]), a measure of the ability of the economy to improve how it uses resources, or innovation broadly defined, drove growth during 2004-2012, in part due to one-off gains from large-scale restructuring, but has since fallen. This leaves capital accumulation to play the leading role – but as public debt rises due to radical increases in social spending and the need to counteract the fallout from the COVID-19 response (see Box 1.1), it will likely also stagnate over the next years (Figure 1.2).

Identifying potential drivers of productivity growth at the aggregate-, firm-, and individual level is essential for long-term sustainable development - putting innovation front and centre of the political and SDG agenda.

Figure 1.2 · Trends in percentage GDP growth components, 2003–2018



Source: UNECE, based on the Conference Board Total Economy Database™ (Adjusted version), 2019.
Note: Total factor productivity values comprise the contribution of labour quality to GDP growth.

Georgia has led on economic restructuring, but now needs to move up the value chain and diversify

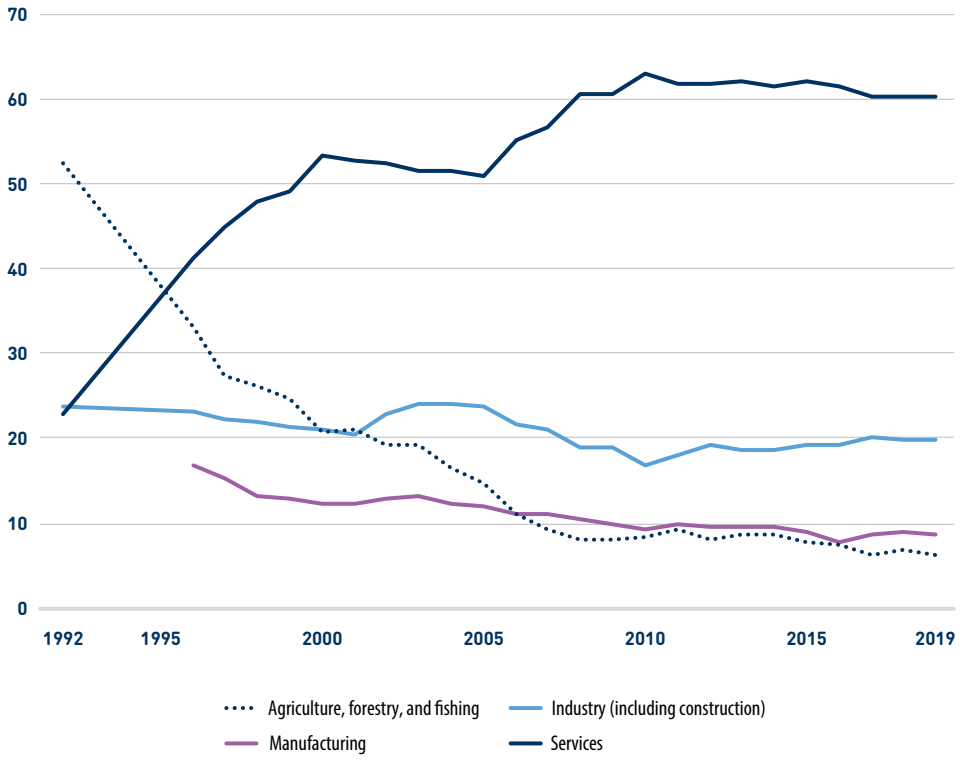
The post-independence transition saw massive reallocation of resources from agriculture and, to a lesser extent, manufacturing to services, which now make up around 60 per cent of GDP (Figure 1.3).

While this makes Georgia the most service-based economy among its trading partners, the current economic structure leaves much potential untapped. Tourism and hospitality, one of the leading service exports, remains hampered by limited investment in infrastructure and quality standards (with the exception of the Black Sea resorts). The recent rise of ICT services, as well as the manifold benefits of the digital economy, is a promising trend with substantial, underused potential, both in developing clear niches and in spreading technology use to the rest of the economy (see Box 1.2).

While the agricultural sector, especially viticulture, has great potential, low investment, uncertain and fragmented ownership, and a predominance of small-scale farms make it a drag on productivity: in 2019, agriculture accounted for less than 10 per cent of output but 42.7 per cent of employment. Manufacturing, around 10 per cent of GDP, is largely resource-based (57.7 per cent), including agri-food products such as wine, with 8.8 per cent of output in high-tech and 30 per cent in medium-tech products[2] – pointing to an existing base of productive capabilities that could be used for upgrading, innovation, and diversification. With some exceptions, however, few manufactured products show among Georgia's exports (after correcting for the effect of transit trade), indicating that most production is for the domestic market and manufactured products in their current form are less able to compete internationally.

This lack of diversification and sophistication in production is reflected in the UNIDO Competitive Industrial Performance Index, where Georgia scores a modest 0.02,[3] above Armenia and Azerbaijan, but below Ukraine and Belarus. This performance has improved somewhat over time, but significant further gains will be essential to maintain growth.

Figure 1.3 · Composition of GDP, per cent, 1992–2019



Source: UNECE, based on World Development Indicators - World Bank Open Data.
Note: All sectors measured by valued added (per cent of GDP). Data for manufacturing unavailable for 1992-1996.

Box 1.2 ICT services in Georgia

The Georgian ICT sector has developed steadily during recent decades, with the telecoms subsector accounting for half of turnover. The number of employees in the sector has grown from 19,700 in 2016 to 22,400 in 2018, representing about 3 per cent of total workforce, driven in part by public investment into digitization since 2000.

Much of the sector's potential remains untapped due to the small size of the domestic market and limited experience in international markets. According to the World Bank Development indicators, Georgian ICT service exports of total services exports dropped from 4.7 per cent in 2003 to 2.25 per cent in 2017. Investment in hardware production facilities and improved access to finance for non-telecom subsectors could enhance its development. In addition, Georgia needs to boost its managerial and business development skills to take advantage of its geographical position and become an ICT hub in the South Caucasus Region.

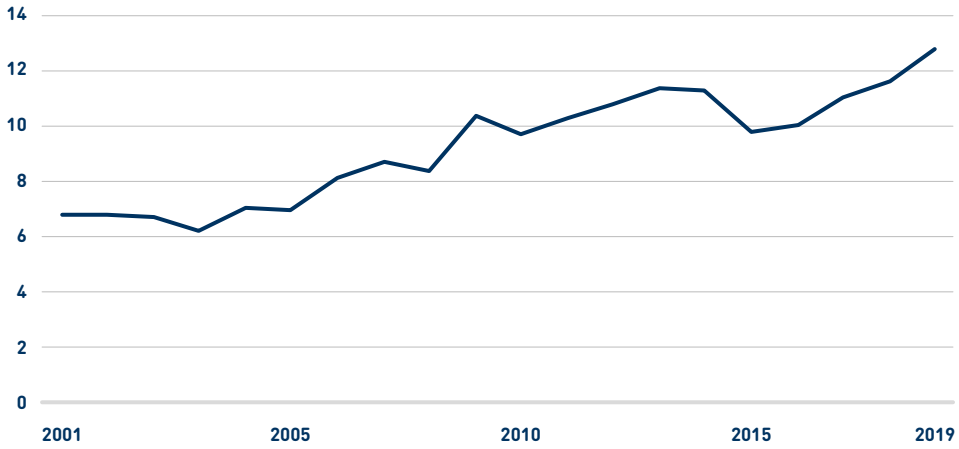
Sources: Market research on the IT sector, M4EG, 2019 https://www.m4eg.eu/media/4843/market-research-of-the-it-sector-eap.pdf

External shocks, public finances and reliance on remittances are risks to innovation

As most of the large Georgian service sector is non-tradable, its growth relies heavily on domestic demand: wages, government spending, and remittances from abroad have all grown at rates that exceed GDP growth for decades. After a decade of fiscal constraint, social policy expansion and increased investment saw government spending rise rapidly over the past decade that, coupled with stagnating tax revenues due to far-reaching exemptions and subsidies and net out-migration in the working age population, saw the annual deficit reach 6.8 per cent of GDP (2018). This will increase macroeconomic instability and curtail investment into infrastructure and innovation.

Remittances, 12,7 per cent of GDP in 2019, are highly variable and pro-cyclical, and tend to drive consumption rather than employment and innovation-generating investment – fuelling, *inter alia,* rapid and unsustainable rises in real estate prices (Figure 1.4).

Figure 1.4 · Personal remittances, 2001–2019 (Per cent of GDP)



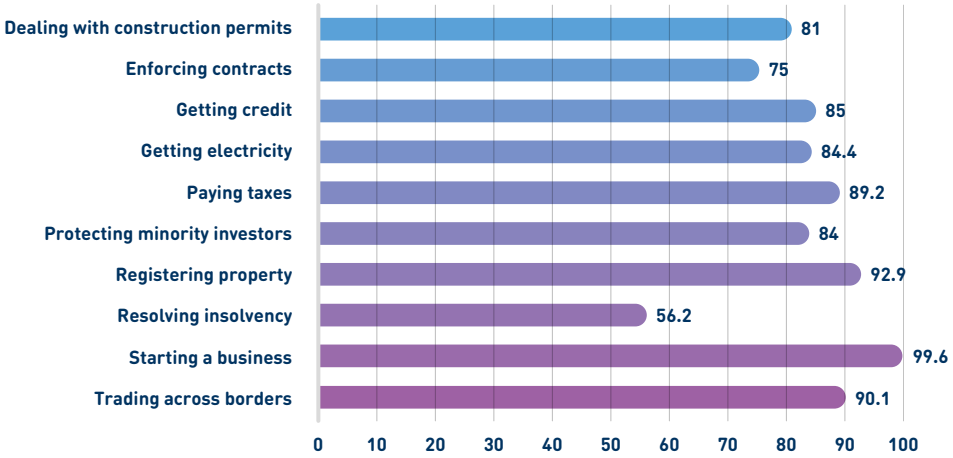
Source: World Development Indicators - World Bank Open Data, personal remittances received.

1.2 Economic reforms

Georgia became a star reformer after the 2003 revolution...

Often cited as a leading example of swift governance reform, Georgia has quickly, on several measures, transformed into one of the most open and well-governed countries of the former Soviet Union. The Rose Revolution in 2003 paved the way for sweeping reforms to combat corruption and improve governance, and Georgia now ranks as the leading reformer in domains such as rule of law, and trade and investment openness. The World Bank's Doing Business Report (2020) ranks Georgia 7th (out of 190), ahead of many developed economies. Among the ten dimensions, only Enforcing contracts and, in particular, Resolving insolvency, deviate from this trend (Figure 1.5).

Figure 1.5 · "Ease of Doing Business" scores by topic, 2020



Source: World Bank Doing Business 2020, Washington, DC: World Bank. DOI:10.1596/978-1-4648-1440-2. License: Creative Commons Attribution CC BY 3.0 IGO, Economy profile Georgia accessible at https://www.doingbusiness.org/content/dam/doingBusiness/country/g/georgia/GEO.pdf

... but addressing remaining barriers to innovation will be equally challenging

The country's low performance on Resolving insolvency is indicative that some of the thornier reform challenges remain – many of which significantly inhibit the risk-taking that innovation requires. The gap between the exceptional performance in Doing Business, which measures business regulation, and the performance in the Global Competitiveness Index (GCI) 2019 shows this in a stark fashion: here, Georgia ranks 74th among the 141 countries covered by the GCI.

Details of the GCI show moderate performance on pillars such as the labour market (37th), institutions (43rd), and business dynamism (58th), partly reflecting these reforms. But several of the weaker pillars and related indicators point to problems likely to inhibit long-term, innovation-driven sustainable development. These include the innovation capability pillar, where Georgia ranks 91st, due to low levels of private sector cooperation (interaction and diversity – 117th), with vibrant interaction and links across sectors and countries essential for a functioning innovation system. Performance on indicators such as venture-capital availability (119th), entrepreneurial culture (93rd), and growth of innovative companies (108th) show clearly that the systematic exploration of new ideas is limited, albeit with notable exceptions, and despite concerted efforts and commitment from Government.

Georgia has opened its borders to trade and investment and become a vibrant trade hub...

Part and parcel of its ambitious reform efforts, Georgia has become one of the economies in the region most open to trade and investment, ranking 12th in the world and 6th (among 45 countries) in the Europe region of the Heritage Foundation Index of Economic Freedom (IEF) in 2020. The country scored better than its peers on both trade (88.6) and business freedom (85.3), and its overall score is well above the regional and world averages.

In addition, Georgia has put in place a range of FTAs, including its Deep and Comprehensive Free Trade Agreement (DCFTA) with the EU (Box 1.3), which has driven the reform momentum in areas such as standardization, accreditation, conformity assessment, technical regulation and metrology, competition policy and dispute settlement.[4]

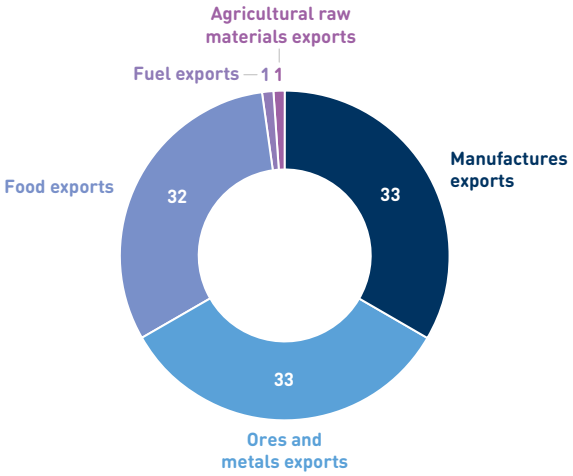
The agreement has given the country far-reaching access to foreign markets that, for the structural reasons discussed, leave substantial potential underused. The Georgia-China FTA, which was the first bilateral FTA between China and the Eurasia region and entered into force in 2018, could further add to the trade volumes of the small Caucasian economy. This has yielded some results: according to World Development Indicators, and Georgia has reached a trade intensity of 121.7 per cent of GDP in 2018, far above neighbouring Turkey (60.4 per cent) and Russia (51.5 per cent).

Box 1.3 EU Deep and Comprehensive Free Trade Area (DCFTA)

To enhance integration and trade with Eastern Partnership countries the EU established three Deep and Comprehensive Free Trade Agreements (DCFTA) with Georgia, Ukraine and Moldova, ensuring tariff-free access to the EU market in selected sectors.

With the EU being its main trading partner, Georgian trade with the EU grew to €2.8 billion in 2018, accounting for nearly one third of the country's total trade. The EU Commission estimated FDI outflows to Georgia at €1.6 billion in 2017. The DCFTA also includes the possibility of future EU membership through the adoption of EU approaches to policymaking and the pursuit of trade reforms.

Figure 1.6 · Structure of Georgian merchandise exports, 2019 (Per cent)



Source: UNECE, based on World Development Indicators - World Bank Open Data.

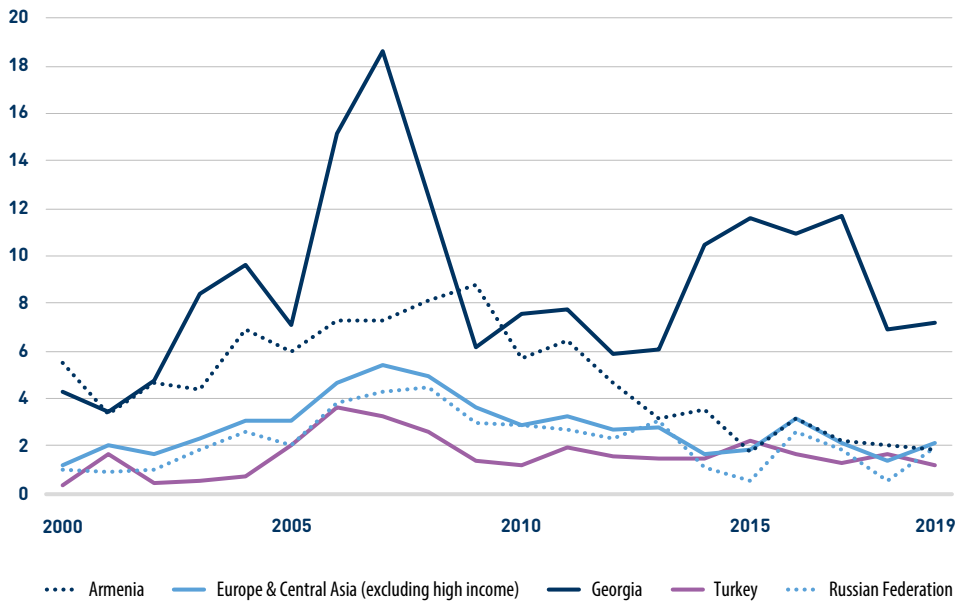
… although a relatively narrow export base remains a challenge

The volume of trade is, however, only part of the story: its composition, diversification, and complexity are equally important from a long-term perspective. Georgian trade is concentrated within a relatively small set of products with modest levels of economic complexity, with raw materials and agricultural products accounting for over half of the total, while transit trade and the refurbishing and re-export of motor vehicles, with little value added or scale-up potential, account for a third of manufacturing exports. As the discussion above shows, the existing but currently non-exported production of medium- and high-tech goods may provide unexploited potential (Figure 1.6).

Openness and reforms have also attracted substantial FDI inflows...

This openness and a range of attractive investment opportunities triggered, following the post-independence slump and the early 2000 reforms, large FDI inflows over the past two decades (Figure 1.7).

Figure 1.7 · Net FDI inflows, 2000–2019 (Per cent of GDP)



Source: UNECE, based on World Development Indicators - World Bank Open Data.

... and now needs to leverage FDI to trigger innovation and diversification

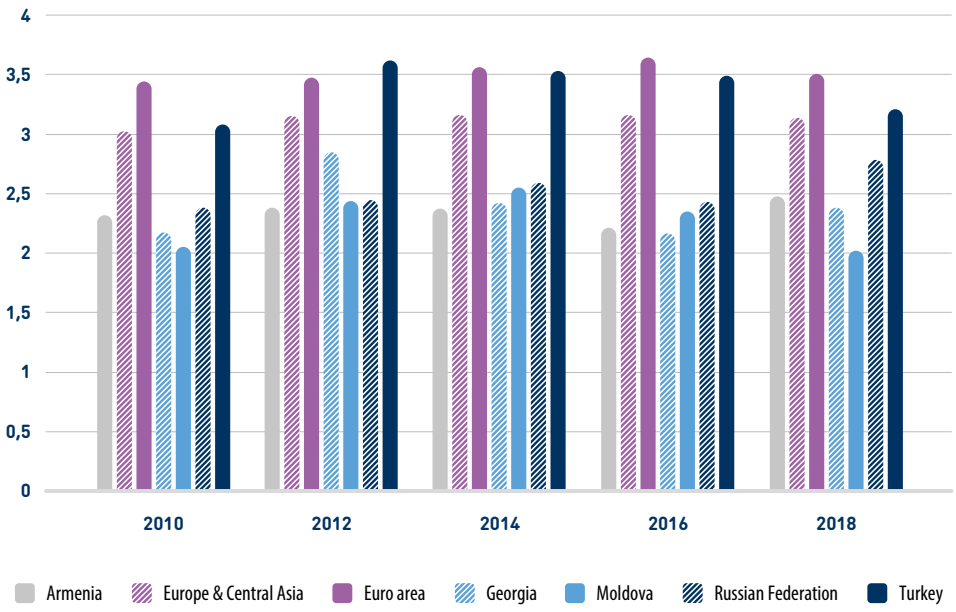
The nature of these inflows shows a more mixed picture - demonstrating that FDI openness is only part of the solution. While outperforming its neighbours, these flows are volatile and largely driven by market or resource-seeking investment, subject to both short-term fluctuations and, increasingly, diminishing returns, with the 2018 drop indicating that most attractive market-seeking investment opportunities on the Georgian market, such as banking and construction, have waned, and mega-projects such as Anaklia are stalled.

To counter this decline, a substantial shift towards efficiency-seeking, export-oriented investment -the kind that brings innovation, spillovers, capacities, and opportunities for supply and diversification - could be an essential driver of innovation and sustainable development as most other sources of growth recede in the medium-term. Some recent examples show that this is possible: Turkey, a diversified country and a leading trade and investment partner, attracted Adjara Textile in 2008 - sparking a range of further investment into this sector in the country - textile exports brought in $194 million, or around five per cent of the total, in 2018, up from only $7 million in 2003.

Improved transport infrastructure will be essential for economic integration and innovation

Infrastructure has emerged as a leading constraint for Georgia to make better use of the potential inherent in its strategic location and openness to trade and investment. Four seaports, railway links to neighbouring countries and highways, pipelines and several airports are in place - with several mega projects underway, such as Anaklia and the Free Industrial Zone (FIZ). Even so, this remains insufficient: Georgia's transport infrastructure ranks 83rd of 141 countries in the 2019 World Economic Forum's Global Competitiveness Index (GCI), with efficiency of seaport services and airport connectivity scoring lowest. The Logistics Performance Index even shows declining quality of trade and transport-related infrastructure in Georgia since 2012, performing lower than neighbouring, land-locked Armenia (Figure 1.8).

Figure 1.8 · Logistics Performance Index: Quality of trade & transport-related infrastructure



Source: UNECE, based on World Development Indicators - World Bank Open Data.
Note: 1=low, 5= high.

Recognizing these weaknesses as well as its potential, Georgia intends to invest heavily in the Anaklia Deep-Sea Port and the Trans-Caspian International transport route China-Turkey-Europe. Strengthening this momentum is central not only to unlock its transport hub potential, but also to create substantial opportunities for innovation and spillover effects.

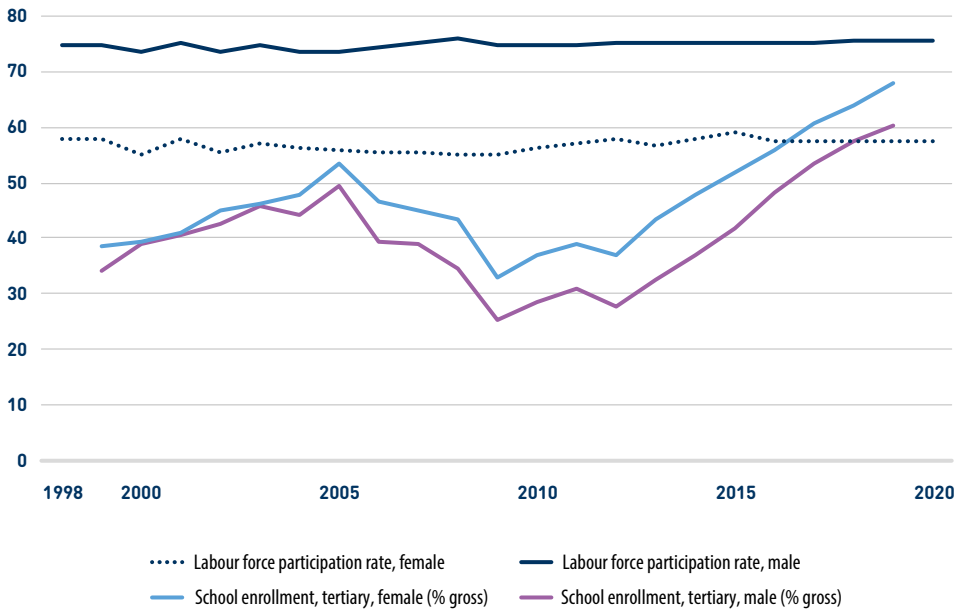
1.3 Innovation and sustainable development

Given the constraints of zero population growth, aging, and high outward migration, the population, and especially the active labour force, is declining. Economic dualism[5] poses a further threat to productivity-driven industrial growth as the pool of talent declines below potential, and the traditional agricultural sector remains underdeveloped. The sharp divide between urban and rural areas and a lack of universal access to quality education and opportunities perpetuate inequalities, despite decreasing poverty rates (from 35 per cent in 2006 to 19.5 per cent in 2019).

The role for innovation here is clear: only by experimenting with new activities to find out what works, can the country provide opportunities that will put its human resources to better use, including for rural residents, actual and potential migrants, and the large parts of the workforce currently engaged in low-productivity agriculture.

Much potential remains in increasing the participation of women in the labour force and as entrepreneurs. Although women outperform men on educational attainment (Figure 1.9), they make up only 10 per cent of students in engineering, manufacturing and construction, while lagging behind in certain other key areas for developing the skills important for innovation. Furthermore, as Geostat data shows, nearly 40 per cent of unemployed women and around 34 per cent of unemployed men had higher education in 2018, underlining the education and labour market mismatch.

Figure 1.9 · Tertiary school enrolment and labour force participation by gender



Source: UNECE, based on World Development Indicators – World Bank Open Data.
Note: Labour force participation rates are based on ILO modelled estimates for ages fifteen and above.

There are significant environmental challenges, for example in relation to air pollution, illegal logging and cattle grazing in protected areas, and floods. Georgia has taken rigorous steps to improve environmental sustainability, including concerted measures to reduce air pollution in large cities, reducing carbon emissions, and firming up legislation and enforcement on waste management, environmental liability and soil protection. Innovation will play an important role in these efforts, as much environmental damage stems from practices that could easily be replaced with more efficient, and often profitable, alternatives, with emerging platforms allowing consumption to increase while radically reducing resource use.

Innovation as the force that drives sustainable development.

To maintain the momentum and growth seen after far-reaching reforms post-2003, Georgia needs a fresh growth paradigm. As this overview has shown, certain drivers of recent growth are likely to recede in the medium-term, and on current trends it will be difficult to find other, equally powerful drivers on the road towards Agenda 2030.

This requires innovation, or broad, systematic experimentation with new ideas across the economy and society. This raises the imperative for innovation policy and institutions to play a leading role not only in funding research and housing high-technology start-ups, but in enabling and promoting innovation across the economy - and in governance itself. Only through promoting experimentation, ensuring knowledge diffusion across sectors, using technology well, and making the most of the potential inherent in efficiency-seeking FDI and far-reaching export opportunities, while investing into hard and soft infrastructure, will Georgia be able to identify and nurture the elements that will become the foundation of its long-term sustainable development.

Notes

1 The Conference Board does not report values for labour quality contribution to GDP growth for Georgia. The reported TFP values thus serve as a consolidated variable comprising the omitted share of labour quality.

2 UNIDO - CIP Report 2018

3 The CIP Index ranges between 0 and 1.

4 http://www.dcfta.gov.ge/en/implementation

5 A dual economy is characterized by the coexistence of subsistence agriculture and cash production of basic commodities alongside the production of industrial goods for international markets.

Chapter 2

INNOVATION PERFORMANCE OVERVIEW

The capacity to generate innovative ideas and new business models is a key engine of economic growth. Georgia's far-reaching reforms over the past two decades have created a favourable environment for innovation and entrepreneurship. Simplifying business regulations, strengthening institutional quality and opening the economy to foreign trade has boosted job creation and attracted foreign investment. However, the economy still faces challenges in its innovative development with a need to improve educational quality standards and address skills mismatch on the labour market, low public and private funding of R&D, and scarce industry-science linkages. As a result, innovation inputs are not efficiently translated into outputs, leaving Georgia's strong research tradition underutilised.

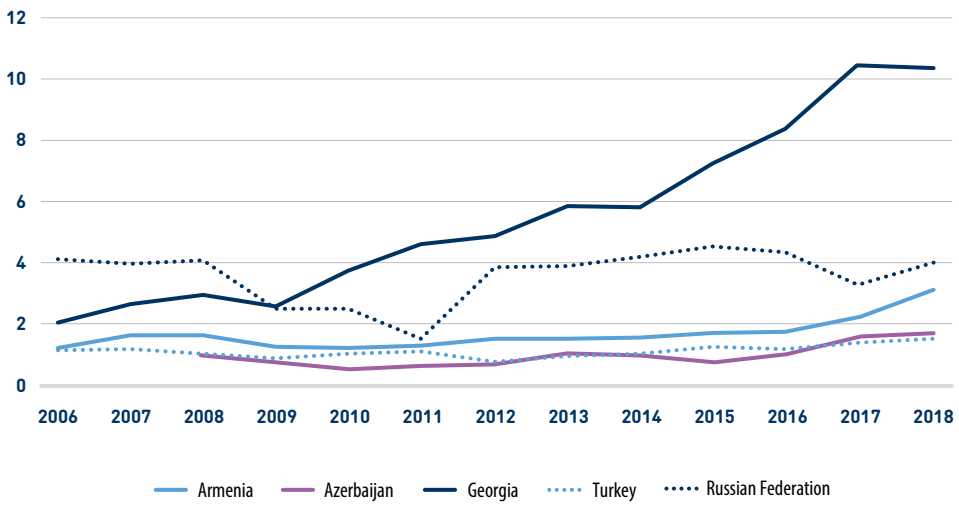
2.1 The business environment

A favourable regulatory environment encourages investment and business creation...

Georgian companies enjoy a relatively favourable regulatory environment. There are few countries where starting a new business is easier, and minority investor protection is strong.[1] In part as a result, domestic capital spending has been relatively high, and the country has also attracted more foreign direct investment (FDI) as a percentage of GDP than its neighbours. The ICT sector is growing, and a vibrant start-up community has emerged[2] which is well integrated with international networks and has succeeded in attracting some financing from leading international accelerators and venture funds.

Business registrations per thousand people have increased dramatically to 8.5 - two times the value in Russia and about five times the new business densities of Armenia, Azerbaijan and Turkey (Figure 2.12).

Figure 2.1 · New business density, 2006–2018



Source: UNECE, based on World Development Indicators - World Bank Open Data.
Note: Measured by new registrations per thousand people aged 15-64.

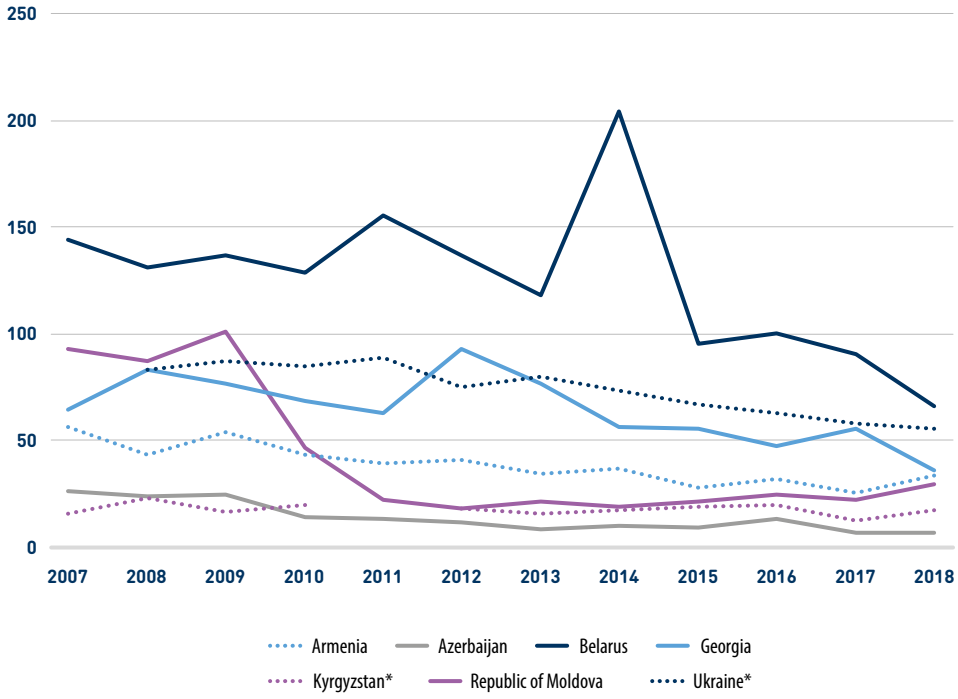
Based largely on these achievements, Georgia has scored well in some global rankings.[3] These strengths, however, could be the result of the low-risk, high-yield opportunities that arose in the first decade after the Rose Revolution. A more detailed analysis reveals weaknesses in innovation performance and the national innovation system that need to be addressed to complete the transition to a knowledge-based economy.

... but relatively few businesses innovate successfully...

Despite the above achievements, at the aggregate level, Georgian enterprises still struggle to innovate, particularly outside the ICT sector, and to access international markets.[4] According to the 2019 EBRD BEEPS V report, 43.2 per cent of Georgian firms introduced at least one product or service innovation in 2018.[5] However, the business sector does not appear to employ researchers, and the share of high- and medium-high-technology products has been declining over time, standing at around 13 per cent of total manufacturing value added in 2018. Georgia does rank third among EESC countries in patents granted per million population (Figure 2.2), but patenting has been declining over time, and almost three quarters of patents are granted to foreigners.[6]

Moreover, Georgian technology is losing international competitiveness. High-technology net exports have declined from their recent peak of over 6 per cent of total trade in 2015 to only 2.6 per cent in 2019 (World Bank 2020) - equivalent to Turkey, but below the levels of Armenia (6 per cent) and Russia (12 per cent), as well as the regional average,

Figure 2.2 · Total patents granted per million population, 2007–2018 (Direct and PCT national phase entry)



Source: UNECE based on data from WIPO Statistics Open Database and World Development Indicators (population) – World Bank Open Data.
* missing data points in 2007 and 2011

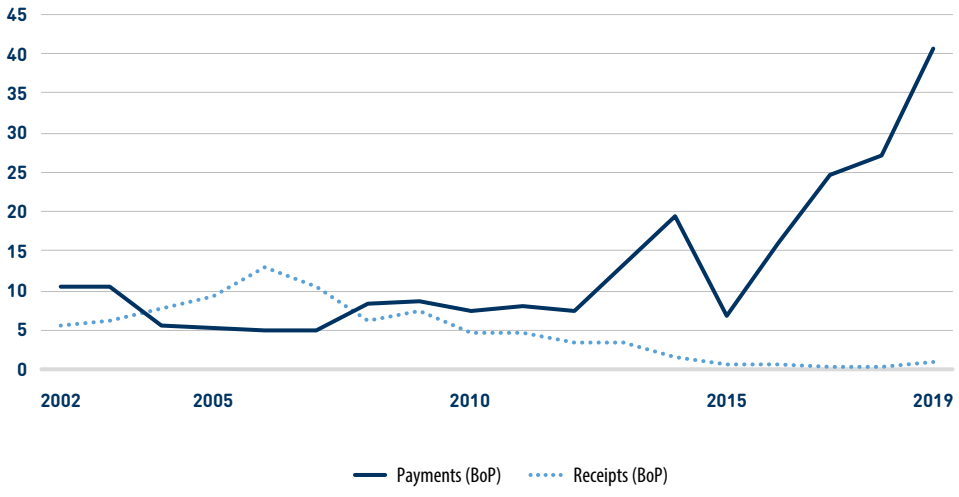
excluding high income countries (9 per cent).[7] Georgia is also not generating any significant revenues from licensing technologies to foreign companies (Figure 2.3). The country still relies heavily on low value-added resource exploitation, with intermediate goods accounting for 25.4 per cent of total value added.[8] The ICT sector has by far the largest share of the domestic market, with nearly 90 per cent of total services provided locally.[9] But it still contributed only about 2.5 per cent to total services exports in 2017 (World Bank 2020).

... and foreign knowledge imports are increasing from a low base

For a small middle-income economy like Georgia, importing knowledge and technology from abroad and adapting and applying it domestically should be a priority. This is because the Georgian economy is still relatively far from the global technology frontier, and so building on existing knowledge from abroad can generate significant productivity gains at low risk. The three main channels for importing knowledge are knowhow transfers from foreign direct investment (FDI), imports of advanced machinery and equipment, and licensing of intellectual property from abroad.

Georgia has been highly successful in attracting FDI, particularly in transport, finance and energy. These are sectors that provide critical services to the entire economy. If this FDI leads to productivity and quality improvements in these sectors, this should also benefit the wider economy. The manufacturing sector however has been less successful at attracting FDI. Moreover, Georgia has significant scope for improvement on the other two channels for foreign knowledge transfer. Although spending on foreign intellectual property has increased significantly in recent years, it remains relatively low at around $40 million a year, or less than 0.5% of total trade. High-technology imports stood at 7.6 per cent of total trade, comparing favourably to Armenia (6.7%) and Azerbaijan (4.0%),[10] but still some way behind the European Union average (19%).

Figure 2.3 · Intellectual property imports and exports of Georgia, 2009-2019, (Millions of current US dollars)

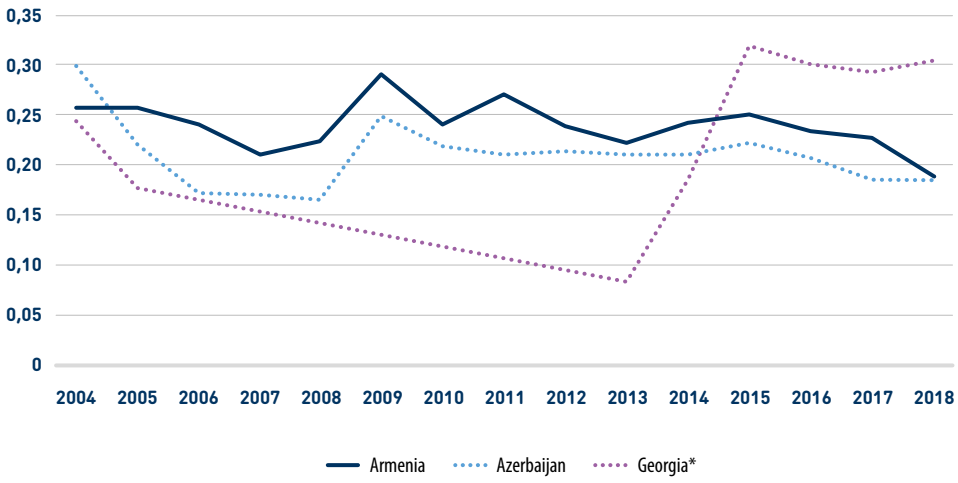


Source: UNECE, based on World Development Indicators - The World Bank Open Data.

Despite recent increases, business investment in R&D remains low...

An underlying factor for innovative development is strong R&D spending by the business sector, whether to develop technology from scratch, or to adopt, adapt and apply knowledge imported from abroad. Georgia's private investment in R&D remains modest, in part because businesses have limited access to suitable forms of finance, and in part due to a (perceived) lack of demand for innovative products.[11] The bulk of gross domestic expenditure on R&D (GERD) is government-financed and is spent on R&D in public scientific institutions. Overall spending was increased drastically from 2013 to 2015, and has since hovered around 0.3 per cent of GDP (Figure 2.4). Although this is higher than in neighbouring Armenia and Azerbaijan, it is still not sufficient to create a critical mass of sustainable R&D. With higher spending, the number of researchers per million of people has also risen to 1,337, exceeding that of Turkey - 1,215.[12] However, because Georgia's R&D funding is focused almost entirely on research institutes and universities, nearly 90 per cent of Georgia's R&D labour force is concentrated in higher education, and the rest in Government agencies, while no researchers are recorded as working in the business enterprise or private non-profit sector.

Figure 2.4 · R&D expenditure, 2004–2018 (Per cent of GDP)



Source: UNECE. based on World Development Indicators - World Bank Open Data.

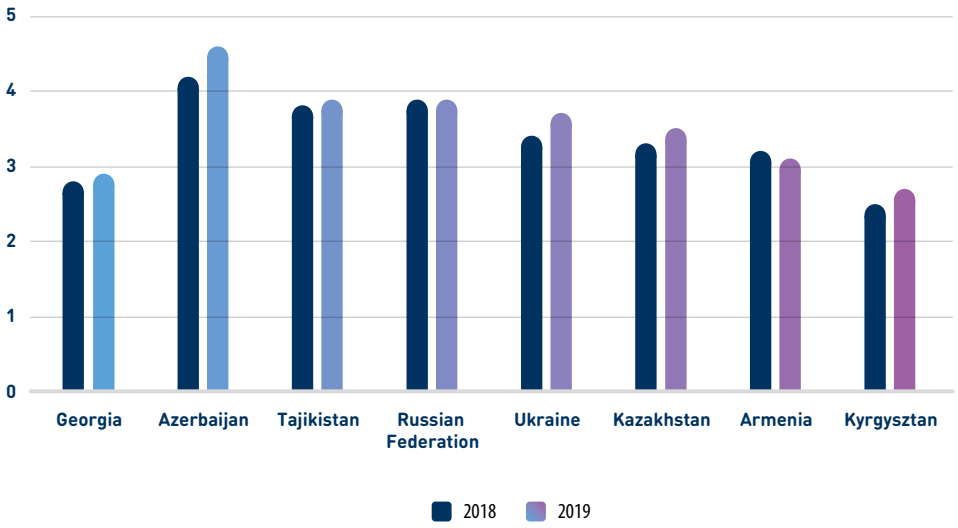
... and industry-science linkages require further development

Given the strong concentration of R&D spending and employment in the public science sector, it would be particularly important that the resulting new knowledge and technology be transferred to the business sector, so that it could be used to create new or improved products, services and production processes. However, business-science linkages in Georgia are weak, and there is limited evidence of cooperation in commercializing scientific knowledge.

An overall rank of 63rd among 131 countries in the WIPO Global Innovation Index 2020[13] puts Georgia "above expectations" among upper middle-income countries. However, it ranks only 104th on *University-industry research collaboration*. Regarding the state of cluster development - another indicator to measure innovation linkages - Georgia ranks 113th. Georgia also performs relatively poorly on research collaboration (104th place vs. 97th place for Armenia and 23rd place for Azerbaijan) and on the state of cluster development (113th place vs. 71st place for Armenia and 29th place for Azerbaijan).

This is also confirmed by the World Economic Forum's Global Competitiveness Index 2019, where Georgia's score for the indicator *University-industry collaboration in R&D* is 2.9, indicating a comparatively weak performance on cooperative R&D at the interface of science and business (Figure 2.5). Regarding the state of cluster development, in the WEF GCR 2019 Georgia ranks in 120th place with a value of 3.1.[14]

Figure 2.5 · University-industry collaboration in R&D: Scale 1-7



Source: World Economic Forum 2019, *The Global Competitiveness Reports (GCRs) 2018, 2019.*
Note: Values from 1-7 with 1= do not collaborate on R&D at all, 7=collaborate extensively.

In line with the above data and rankings, other more qualitative studies come to similar conclusions regarding Georgia's performance in science-business cooperation. For instance, the H2020 Report on specific support to Georgia (2018) points out that the Georgian knowledge market as such is not very well developed, resulting in weak science-business relations, with very few research findings turned into commercial projects. On the demand side for scientific competencies, the authors underline that the high-tech sector is under-developed with the exception of the ICT sector. Potential exists in biotechnology, automotive and the aviation sector, but none of these industries have yet initiated significant links with the science sector.

The 2017 Report on Innovation and Technology in Georgia by USAID[15] points out that this is in part because Georgian science does not produce enough results with

commercialization potential. Georgian science has been quite successful in international research collaboration, suggesting that it has the potential to play a significant role in the country's innovation eco-system. But there appears to be a certain mismatch between the economic sectors with the highest potential and the research fields that Georgian science focuses on. According to the EU-funded Horizon2020 report published in 2018, Georgia exhibits the highest share (69 per cent) of international co-publications among benchmarked countries (Armenia, Austria, Azerbaijan, Croatia, Slovenia), but with particular strengths in fields of fundamental science such as mathematics, planetary sciences, and especially physics and astronomy, rather than in applied research.[16] Still, international cooperation, especially in EU programmes, could improve the presence of innovation and entrepreneurship in academia (e.g. Innovation Competencies and Entrepreneurial Skills), especially in STEM disciplines.

The Georgian authorities recognize the problem posed by weak business-science links for knowledge-based development in the country. Two public-private joint funding programmes exist - the State Grants for Applied Research, and, together with CRDF Global, the Science and Technology Entrepreneur Programme where business partners are obliged to contribute a share of the projects' budgets. In addition, the Georgia Institute of Technology offers a variety of projects connecting students to entrepreneurship networks, industry panels, start-ups and business labs. In addition, special classes are held to prepare students looking to develop their own venture, such as technology commercialization and innovation leadership.

2.2 Access to skills

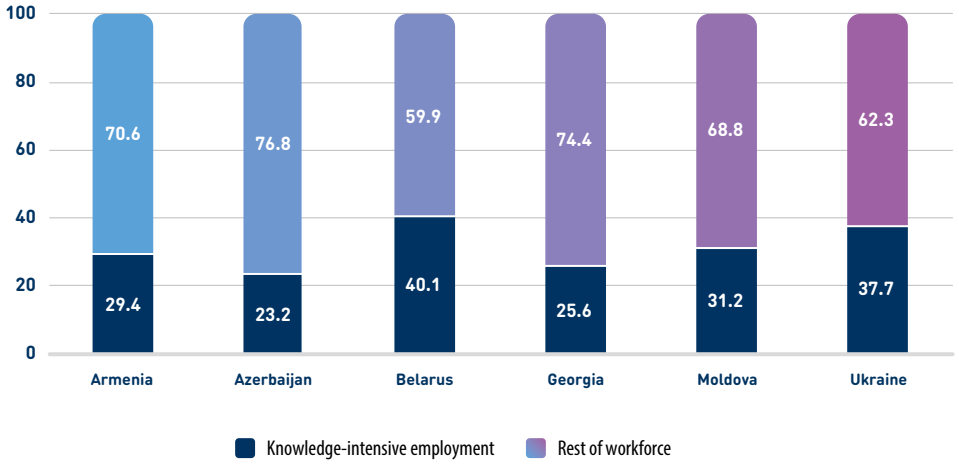
Georgian businesses seek employees with the right skills

Businesses need the right mix of both technical and managerial skills to successfully bring new products and services to market. Human capital is needed to absorb knowledge from abroad, to collaborate successfully with scientific institutions in the commercialization of research results, and to develop new technology and business models in-house.

According to the EBRD Business Environment and Enterprise Performance Survey, a lack of innovation-specific managerial skills is a key constraint to Georgian firms collaborating with foreign and domestic knowledge partners, investing in R&D, and innovating more generally.

But the problem extends to the labour force overall. Knowledge-intensive jobs account for 25.6 per cent of the national workforce – similar to neighbouring countries but with scope for improvement (Figure 2.6). Only 32 per cent of firms offered formal training in 2019, which is slightly lower than the EEC average. Without sufficiently qualified workers, firms find it difficult to meet the international quality standards necessary to participate in and move up international value chains. The number of ISO 9001 quality management certificates in Georgian firms has fluctuated between 2.4 and 4.1 per $1 billion GDP adjusted for differences in the purchasing power of currencies (World Bank 2020), which is in line with several regional peers, but less than one fifth the level of ISO 9001 certification in Belarus.

Figure 2.6 · Knowledge-intensive jobs in Georgia and peer countries (Per cent)

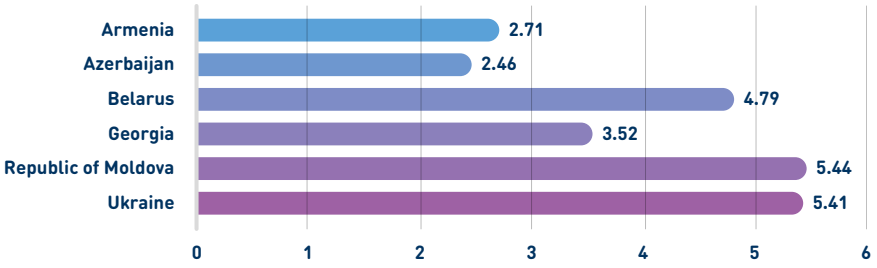


Source: UNECE based on data from WIPO, Cornell University and INSEAD, Global Innovation Index 2020.

The global recognition of human capital development as a principal building block of a sustainable knowledge-based economy calls for reforms in the Georgian education system. Government expenditure on education has increased from previous years to reach 3.9 per cent in 2018 and exceeds the levels of Armenia and Azerbaijan (Figure 2.7). However, it remains lower in Georgia than in Belarus, Moldova and Ukraine.[17]

PISA scores in reading, maths and science, as well as foreign language knowledge are below average for the region.[18] The number of people enrolled in tertiary education in Georgia is above that of Armenia and Azerbaijan, however, it remains below the regional average. The number of women with advanced education in the country is consistently higher than that of men. Yet, male labour force participation is nearly 20 percentage points higher than female labour force participation, reflecting the underlying gender gap in Georgia.

Figure 2.7 · Government expenditure on education, 2018 (Per cent of GDP)



Source: UNESCO Institute for Statistics.
Note: Data for Armenia, Belarus and Ukraine are for 2017.

In light of these issues reforms in the education system are being undertaken over the period 2019-2022. The design and development process of the *Education System Complex* Reform is supported by Georgian experts and education subject-matter specialists to include changes in the pre-school, secondary, vocational, higher-education and science areas. The Government has prioritised STEM subjects, with targeted funding aimed at supporting high standard international scientific publications. In addition, a School Readiness Programme will be provided to all children for 2021-2023 as part of the education reform framework.[19]

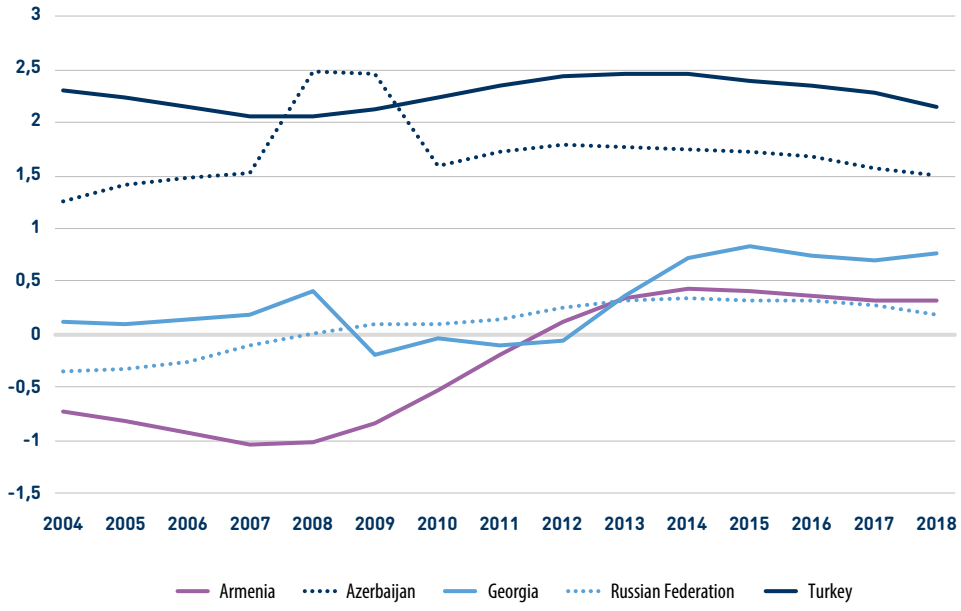
2.3 ICT infrastructure

Investment in ICT infrastructure will be central to bridging the digital divide...

Investments into information and communications networks, such as broadband internet, and transport infrastructure are important inputs for innovative development, and particularly for bridging urban-rural and digital divides and ensuring social inclusion.

This is a particular concern for Georgia because, in contrast to most neighbouring countries, urban population growth has been an increasing trend since 2012 (Figure 2.8), as conditions in the rural areas and low wages in the agricultural sector push people to move to the cities in search of opportunities. According to Geostat, the urban population of Tbilisi in 2019 was 2.2 million – nearly 60 per cent of the country's total population (3.7 million).[24]

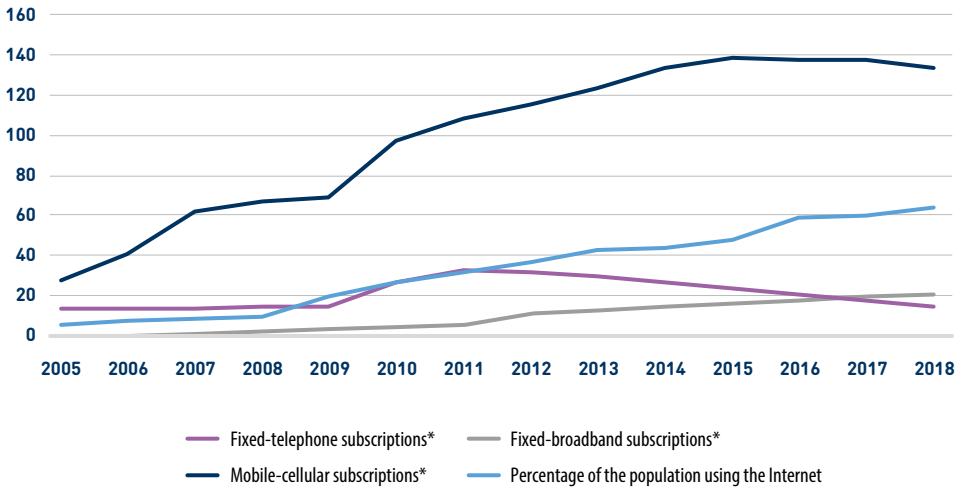
Figure 2.8 · Urban population growth (Annual, per cent)



Source: UNECE, based on World Development Indicators - World Bank Open Data.

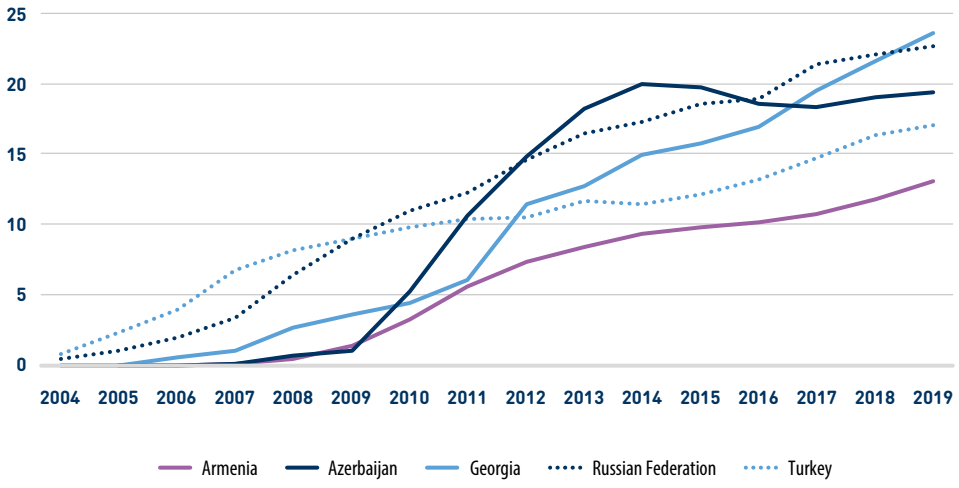
ICT infrastructure has improved in recent years in parallel with gross capital formation, which accounted for 26.8 per cent of GDP in 2019,[20] although overall, infrastructure is still considered a weak point in Georgia's business environment.[21] Internet is gradually replacing the telephone as the main means ofcommunication (Figure 2.9). While ICT usage and access have remained stable in recent years, broadband subscriptions have seen an increasing trend, reaching 23.5 out of 100 inhabitants to surpass most neighbouring countries by 2019 (Figure 2.10).

Figure 2.9 · ICT infrastructure indicators in Georgia, 2005-2018



Source: ITU Statistics 2019.
*Per 100 habitants.

Figure 2.10 · Fixed broadband subscriptions, 2004–2019
(Per 100 people)



Source: UNECE, based on World Development Indicators - World Bank Open Data.

... and to expand opportunities for ICT-enabled innovation

This indicates the potential for development of new products and services within the ICT sector, as well as enabling mechanisms for network technologies. In 2018, an ICT cluster was established by 11 domestic service providers, with the support of the EU-funded "SME Development and DCFTA in Georgia" project, to create a unified cooperation platform for companies operating in the country's ICT sector.[22] With mobile services dominating the market, more opportunities have arisen for platform-based economic development, including for innovations to improve service quality in transportation and logistics, hospitality (the rise of micro-hotels), and tourism (rapidly growing use of social media marketing and branding). However, the ICT sector is not yet developed to its full potential, with a lack of managerial and soft skills identified as the principal impediment in enterprise surveys.[23]

2.4 Policy mesages

With the foundations for a competitive economy in place, now is the time to unlock innovation-driven growth.

Overall, Georgia has laid out the foundations of a strong innovation environment. Business-friendly regulation, effective institutions, adequate investor protection and open access to foreign markets have underpinned substantial growth over the past decades. However, a set of challenges stand in the way of its transition to an increasingly innovative, knowledge-based economy. Areas for attention include improving the capacity of the private sector to absorb innovation, public and private sector investment in R&D, educational quality, business-science linkages, and skills in the workforce. After gaining from a transformational reform process, Georgia must now intensify efforts to strengthen cross-sectoral and cross-border knowledge flows, and step up investment in R&D and human capital.

The table below presents the main achievements and challenges for innovation-driven development in Georgia, based on the above findings.

Strengths and opportunities	Next development milestones
• Strong GDP growth	• Diversify and increase value added of production, especially in tradable products and services
• Business-friendly environment with simplified regulatory procedures, adequate investor protection, and an open economy	• Make optimal and strategic use of trade and investment opportunities • Improve infrastructure, both hard (transport and ICT), and soft (education, financial intermediation)
• Several high-potential economic activities	• Improve use of scarce public resources to promote innovation while respecting fiscal constraints
• Significantly improved institutional quality	• Address the mismatch of skills on the labour market, and boost managerial and entrepreneurship skills • Improve the quality of and generation of appropriate skills in the education system, in particular for higher education and STEM subjects
• Dynamic increase in new businesses	• Improve the capacity of firms to absorb and apply foreign knowledge and apply international quality standards
• High standards of governance and institutional quality and low levels of corruption	• Reduce poverty, increase gender equality and promote environmental sustainability
• Good performance in attracting FDI in key sectors	• Provide incentives for private sector investment in R&D and increase public R&D spending • Improve industry-science linkages

Source: UNECE.

Notes

1 Doing Business, The World Bank Group (http://www.doingbusiness.org)

2 National Statistics Office of Georgia (GeoStat) 2019, *Business Demographics*.

3 For instance, Georgia is rated as an innovation achiever in the 2020 Global Innovation Index. However, the favourable rating is due more to high scores on political and business environment indicators than to actual innovation performance [WIPO, Cornell and INSEAD, Global Innovation Index 2019]. The Global Competitiveness Index identifies innovation capabilities as a weakness (WIPO, Cornell and INSEAD, Global Innovation Index 2019].

4 Chapter 6 provides further evidence and recommendations aimed at enhancing innovation and growth dynamics in Georgian enterprises.

5 European Bank for Reconstruction and Development (EBRD) 2019, Business Environment and Enterprise Performance Survey (BEEPS V)

6 Total patent grants (direct and PCT national phase entries) by filing office, WIPO Statistics Database.

7 UN Comtrade 2019, *International Trade Statistics Database*

8 World Integrated Trade Solution (WITS) 2019, The World Bank Group

9 EU4Business 2017, Georgian ICT Cluster Potential: Strengths, Weaknesses and Internationalization Opportunities

10 WIPO Global Innovation Index 2020.

11 Chapter 5 will discuss the role which public procurement can play in stimulating innovation demand.

12 UNESCO Institute for Statistics (UIS) Database (2019)

13 Cornell University, INSEAD, and WIPO (2020): The Global Innovation Index 2020: Who Will Finance Innovation? Ithaca, Fontainebleau, and Geneva, 2020.

14 According to the WEF methodology: Response to the survey question: "In your country, how widespread are well-developed and deep clusters (geographic concentrations of firms, suppliers, producers of related products and services, and specialized institutions in a particular field)?" (1 = non-existent; 7 = widespread in many fields).

15 USAID, Innovation and Technology in Georgia. Annual Report: 2017. USAID Governing for Growth (G4G) in Georgia. Publication prepared by Deloitte Consulting LLP, 2017.

16 Horizon 2020 Policy Support Facility 2018, Background Report – Specific Support to Georgia: Improving the effectiveness of Georgia's research and innovation system through prioritiation, selectivity of funding and science-business links. European Commission, Brussels, 2018

17 National Statistics Office of Georgia (GeoStat) 2019, *Population*.

18 OECD, Programme for International Student Assessment (PISA), 2018, country note available at https://www.oecd.org/pisa/publications/PISA2018_CN_GEO.pdf

19 Ministry of Education, Science and Sport of Georgia, 2018. Press release.

20 World Bank Development Indicators 2019.

21 Global Innovation Index 2020.

22 EEAS, Delegation of the European Union to Georgia (2018) *Meet the Georgian ICT Cluster – a new player in the field.* Online article. Available at: https://eeas.europa.eu/delegations/georgia/54729/meet-georgian-ict-cluster-%E2%80%93-new-player-field_en

23 World Economic Forum 2019, The Global Competitiveness Report 2019.

Chapter 3

INNOVATION ECOSYSTEM AND ITS GOVERNANCE

Summary and recommendations

Challenge	Objective of intervention	High-level recommendations
Innovation policy falls short of achieving maximum impact because of unclear priorities, limited co-ordination, and insufficient synergies between different policy interventions	Improve innovation policy governance and coordination	• Adopt a government strategy articulating how science, technology and innovation will support the country's overall sustainable development priorities • Create an effective governance structure at the national level coordinating and monitoring policies across departments • Ensure stable public funding sufficient to effectively implement policies • Create a suite of coordinated policy instruments across the entire innovation cycle • Support entrepreneurs and investors in undertaking high-risk technology-frontier innovation • Strengthen business sector capacity to develop, adopt and adapt productivity-enhancing innovation

Source: UNECE.

Georgia has made significant progress in establishing the building blocks of a vibrant innovation system. The main strategic challenge in the medium-term is how to make this system work better. This involves, in particular, clarifying and consolidating strategic priorities across a broad range of policy areas, creating effective coordination mechanisms for putting strategy into practice, committing and mobilising adequate financial resources and using them as efficiently as possible, as well as reforming and expanding a flexible range of innovation policy tools.

While Georgia adopted a number of strategic documents in recent years that are relevant for innovation, none of them extend beyond the year 2021, and, despite discussions on a draft, there is no comprehensive national innovation strategy in place. Existing strategic documents also often do not set clear, achievable priorities. For instance, according to the UN Current Country Assessment, Georgia considers all 17 Sustainable Development Goals as priorities. Similarly, more than 80 scientific fields are identified as high priority, and it is not clear how these priorities would align with industrial or sustainable development priorities. The potential for innovation to transform short-term perceived trade offs, such as that between economic growth and environmental sustainability, into new economic opportunities is therefore not fully realised.

The Government should revisit its strategic priorities and, on this basis, adopt a national strategy articulating how science, technology and innovation will support these priorities.

Innovation is the result of a complex process of risky experimentation with uncertain results - requiring enabling rules of the game, aligned incentives, and targeted policy support along many dimensions and from many different Government departments, ranging from education and science to business development, finance and taxation. Georgia has created a Research and Innovation Council to advise the Government on science, technology and innovation policy. However, in practice this Council has been largely inactive. As a result, policies that are essential for innovation are often developed in isolated silos without sufficient regard for creating synergies and avoiding overlaps and contradictions. The Government should create a more effective structure for innovation policy governance, coordinating the development of strategic priorities, the design of policies and their implementation, to ensure that the cumulative effect of policies administered by different ministries and agencies achieves maximum impact in putting the National Innovation Strategy into practice.

While Georgia has significantly increased its public spending on education in recent years, PISA results and business surveys point to substantial problems with quality and a labour market skills gap, and further significant planned increases in education expenditure may be leveraged to address these issues. At the same time, spending on public basic and applied research has declined and is low by international standards, and private sector investment in R&D remains marginal, despite several efforts to promote it. Many of the central innovation policy instruments in place depend on donor funding, and are under threat of discontinuation, should donor funding run out. Moreover, some existing funding instruments are insufficiently targeted at truly innovative activities and not fully aligned with strategic priorities. As a result, there is a risk that policy intentions will not translate into actual policy action. The Government should therefore create stable public funding at a level sufficient to effectively implement policies intended to stimulate innovation in line with the innovation strategy.

Georgia has in place policy instruments that support fundamental and applied science, and policy instruments that support innovative entrepreneurs. But the overall scale and scope of innovation policy could be expanded to address significant gaps in the suite of policy instruments, including in terms of stimulating business R&D, improving access to finance for innovative firms, facilitating cooperation between science and industry, supporting businesses to improve their competitiveness through adaptive innovation and technology upgrading, and addressing specific national sustainable development challenges. Given these policy gaps, it is difficult for existing islands of excellence in the country to grow into a thriving ecosystem, systematically enabling scientific findings and inventions to turn into innovation, and the private sector to improve its productivity and experiment with new products, processes and business models. The Government should therefore create a suite of coordinated policies across the entire innovation cycle (from knowledge generation through market commercialization to scale-up and possible exit of the initial investor), that nurture an environment in which science, entrepreneurs and established firms can thrive in developing and scaling innovative solutions addressing strategic priorities, including the support of high-risk frontier innovations and productivity-enhancing technology upgrading.

Recommendations in detail

Chapter 3: Innovation ecosystem and its governance

Recommendation 3.1: Turn Hard Choices into Opportunities

Adopt a government strategy articulating how science, technology and innovation will support the country's overall sustainable development priorities through new products, services and production processes that generate the foundation for long-term sustainable and inclusive growth.

- Adopt a National Innovation Strategy as a comprehensive, cross-ministerial guiding document at Government level and incorporating in a horizontally coordinated manner the related activities of all major national authorities engaged in ST&I policy design, implementation, monitoring and evaluation;
- To inform and, on a regular basis, update the National Innovation Strategy, set up a process of identifying a limited set of realistic national ST&I priorities for the medium- and long-term aligned with Georgia's overarching sustainable development priorities;
- As part of the strategy, align priorities in education, science and innovation, and private sector development with a key role for SME policy;
- Reflect in the strategy the role of social policies to both support innovation and mitigate potential negative, short-term effects resulting from the structural changes of the economy that innovation will bring about – including education policies to support life-long learning and retraining for those whose jobs become redundant; as well as social protection and welfare policies;
- Organise regular foresight exercises to update the Innovation Strategy;
- Request technical assistance from international development partners during the strategy development, as necessary.

Recommendation 3.2: From Silos to Synergies

Streamline the top innovation governance structure at the national level coordinating and monitoring ST&I policies across departments to maximize their cumulative effect in putting the National Innovation Strategy into practice.

- Reorganize the Research and Innovation Council (RIC) with a view to transforming it into an efficient and adequately resourced body mandated to coordinate the ST&I policy design and implementation.
  - The level of representation at the new RIC would be at the Prime Minister's Office, as well as deputy minister level of line ministries with functional responsibilities in managing ST&I activities.
  - Under this structure, subordinate working-level bodies would provide regular and more frequent oversight and guidance on specific remits.
  - A well-resourced secretariat would be needed to support the functioning of the RIC and the operationalization of its coordination and monitoring activities.
- Mandate and authorize the new RIC to:
  - Support and drive Government strategic decision and policy making, in particular by developing the draft National Innovation Strategy and other key ST&I policy documents;
  - Perform day-to-day coordination of the implementation of ST&I policy across all public bodies and oversee the allocation of resources earmarked for this purpose in accordance with the respective regulations;
  - Organise foresight and smart specialization exercises for identifying and updating policy priorities and the strategic directions of ST&I activities in Georgia;
  - Hold regular meetings that ensure timely decisions and prepare regular reports on its activity (including problems in policy implementation that it has identified), to be submitted to the Government for decision;
- Develop a comprehensive set of tools and processes to monitor and evaluate the impact of policy interventions on a regular and transparent basis, with the clear aim to identify what is working and what is not and adapt policies and redirect resources accordingly.

Recommendations in detail

Chapter 3: Innovation ecosystem and its governance (Continued)

Recommendation 3.3: Turn Intentions into Actions

Ensure stable public funding sufficient to effectively implement policies intended to stimulate innovation in line with the innovation strategy.

- Increase the overall level of funding for science and innovation, both by increasing funding for policy support from public budgets and by strengthening policies that crowd in private investment, including from abroad;
- Increase the efficiency of funding through clear performance objectives and regular, multi-level monitoring and evaluation of outputs, outcomes, and impact, with a view to continuous readjustment of spending and priorities towards the most effective interventions;
- Match budget allocations to overarching strategic priorities;
- Within the overall funding envelope for pursuing the objectives of the National Innovation Strategy, ensure that each implementing entity receives adequate funding in order to prevent implementation gaps and include adequate funding in medium-term multi-year Government budget plans in order to ensure policy continuity and predictability;
- To provide continuity in innovation policy delivery, ensure that the highest impact GITA innovation support instruments and programmes can be sustained and expanded, including once donor-supported projects such as GENIE are completed, following impact evaluation;
- Create room in the budget to adequately fund the additional innovation policy measures recommended in this report to cover the entire innovation cycle;
- Identify areas and programmes where funding can be re-allocated to target more effectively truly innovative activities that would not happen without public support.

Recommendation 3.4: From Islands of Excellence to Innovation Ecosystems

Create a suite of coordinated policies across the entire innovation cycle (from knowledge generation through market commercialization) that nurture an environment in which science, entrepreneurs and established firms can thrive in developing and scaling innovative solutions addressing strategic priorities.

- Ensure greater alignment between the existing policy instruments of Enterprise Georgia, GITA and SRNSF in line with the innovation strategy;
- Identify priority areas to allocate scarce resources where new policy instruments should be created, or existing ones expanded, including:
  - Instruments supporting science-industry collaboration (Chapter 4);
  - Early stage financing instruments for innovative small businesses (such as start-up grants, credit guarantees and equity instruments, among others);
  - More generous tax relief for business R&D expenditures;
  - Recognition instruments (for example, competitions among the industry for best innovative products and services) for motivating the business sector to innovate;
  - Public measures for strengthening the demand for innovation, including through public procurement (Chapter 5);
  - Funding programmes for R&D and innovations, including mission-oriented innovation, addressing so-called grand societal challenges emerging from Georgia's national sustainable development policies;
- Ensure that innovation governance arrangements include a platform for interagency consultations on the design and implementation of the new policy instruments supporting innovation activity.

Recommendations in detail

Chapter 3: Innovation ecosystem and its governance (Concluded)

Recommendation 3.5: Turn Inventions into Innovation

Support entrepreneurs and investors in undertaking high-risk technology-frontier innovation projects through policies that share risks and crowd-in private innovation finance.

- Further strengthen the capacities of the network of incubators, accelerators and science parks;
- Provide targeted support to the development of existing organizations such as Georgian Business Angels Association and the Georgian Venture Capital Association and the expansion of their activities;
- Design and put in place tax incentives (such as exemption from income taxes on investment dividends), for business angels operating in the Georgian market;
- Develop and put in place targeted incentives (such as risk capital guarantees), to attract foreign venture capital investors to operate in Georgia;
- Consider establishing a publicly-supported venture finance institution and invite experienced venture capital managers to run it as a private or hybrid venture capital fund, which could be based on the existing GITA Venture Capital grant scheme.

Recommendation 3.6: From Subsistence to Competitiveness

Strengthen business sector capacity, including in SMEs and enterprises in rural areas, to develop, adopt and adapt productivity-enhancing innovations, including those already proven elsewhere, and to move up the value chain.

- Raise awareness about, and support training for Georgian companies to acquire international quality certifications;
- Develop and strengthen the network of independent testing laboratories that can certify that Georgian exports meet international quality standards;
- Expand efforts to attract innovative, diversifying, and efficiency-seeking FDI, with a focus on creating supply opportunities for Georgian companies as well as other positive spillover effects;
- Strengthen the incentives and capacities of Georgian companies to absorb more advanced technology, including through:
  - Expanded matchmaking services to help Georgian companies in finding international partners for technology upgrading;
  - Expanded training for entrepreneurs and SMEs in innovation management and technology;
- Provide policy support to young people, women, and entrepreneurs from disadvantaged groups;
- Localise policy support by creating or strengthening outposts of implementing agencies (including Enterprise Georgia), catering to local needs; support local entrepreneurs in identifying their local development niches; entrepreneurship in agriculture and food processing can be a specific target of this support scheme, given both the strong potential of this sector and current low levels of productivity.

Source: UNECE.

3.1 The innovation ecosystem of Georgia

As a broadly defined concept, innovation targets the successful social or economic application of knowledge. The OECD defines four main types of innovation: product innovation; process innovation; marketing innovation and organizational innovation.[1] In turn, each of these types of innovation may be associated with different undertakings and a specific product or service can be interpreted differently (as an innovation or not) in a different context. Thus, a product which already exists in one market (and therefore is not an innovation), may be an innovation when introduced to a market in which it was not present before. In this context, importing new-to-the-market technology from abroad or introducing a new organizational model in a firm that imitates existing managerial models in established firms are also examples of innovation.

The methodological approach followed in the Innovation for Sustainable Development Review of Georgia is based on the systemic view of innovation and the notion of an "innovation ecosystem" (see Box 3.1). Such an approach reflects an understanding

Box 3.1 Innovation ecosystems

A widely used definition of an innovation ecosystem is: "the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies".[i] Within the overall innovation system, several subsystems can be distinguished such as: the (national and international) market for innovative products and services; the (national and international) business sector; the subsystem of knowledge generation which includes academic and research and development (R&D) institutions; the subsystem of innovation intermediaries providing innovation support services at the various stages of market uptake of innovative ideas as well as the subsystem of the business environment and framework conditions that shape the incentives and motivation of all participants in the innovation process. Vibrant linkages among these actors are essential.

A well-functioning innovation ecosystem is not static.[ii] Both the identity of the stakeholders and the nature of their interactions within the innovation ecosystem evolve constantly, as the ventures they engage in evolve.[iii] Hence, the innovation ecosystem itself is regarded as a living entity that evolves over time and may adapt to a changing environment.[iv]

Contemporary innovation ecosystems are considered as dynamic and agile collaborative structures that enjoy self-governance as a prerequisite for innovation based on interaction and collaboration. Such networked actors rely on a common vision and strategy as well as joint obligations. The ecosystem embodies the milieu that facilitates the co-creation of value through collaboration among the actors.

While the present analysis concentrates on the national level, an innovation ecosystem can be defined at different levels of geographic aggregation (local, regional, national, supranational, or even global), depending on the analytical purpose, but always stressing the role of interactions and collaboration for the innovation process(es). Innovation ecosystems can have different scale and design such as small, *ad hoc* groups of individuals, regional innovation hubs, local inter-firm networks, nationwide innovation communities or global networks.

[i] Freeman. C., (1987). Technology Policy and Economic Performance - Lessons from Japan, London: Pinter Publishers.
[ii] National Research Council (2007), Innovation Policies for the 21st Century. Report of a Symposium. Washington, DC: The National Academies Press.
[ii] Autio, E., L. Thomas. (2014), Innovation Ecosystems: Implications for Innovation Management. In: Dodgson, M, D. Gann, N. Phillips. (Eds.), Oxford Handbook of Innovation Management: Oxford: Oxford University Press, pp. 204–228.
[iv] Smorodinskaya, N., M. Russell, D. Katukov, K. Still. (2017), Innovation Ecosystems vs. Innovation Systems in Terms of Collaboration and Co-creation of Value. Proceedings of the 50th Hawaii International Conference on System Sciences, 2017.

that the innovation process takes part in a complex system and characterizes the systemic interdependencies that influence the generation and diffusion of innovation in the economy. This approach also considers the multitude of actors or stakeholders in the innovation process and the complex linkages and interactions among them. The ease and speed of moving from the innovative idea to the market in the form of a new product or service defines the efficiency of the innovation process.

The innovation ecosystems of small open economies such as Georgia have some specific features. In the first place, the limited local market calls for a high degree of integration into the global economy and fully-fledged participation in the international division of labour. Well-functioning two way linkages to large international markets are preconditions for local firms to grow and necessary for the inflow of new technologies and ideas. These links are important for the connection of local innovation stakeholders to international partners, and for the establishment of stable partnerships within global value chains. The existence or absence of such links can be partly attributed to geopolitical factors and other national specificities. But they are also to a large degree shaped by - and the result of - national policies to develop international linkages.

These features have a bearing for both the assessment of Georgia's innovation ecosystem and policy recommendations to strengthen it. The Review seeks to identify missing or weak elements in the innovation ecosystem that may have a critical role for the emergence of vibrant innovation processes. However, administrative capacities to implement a wide set of recommendations and the resources available for this purpose are limited. Therefore, the Review focuses on a core of key measures likely to have the most significant and immediate positive effects on innovation performance given existing constraints to financial and human resources.

The innovation legal framework and institutional reforms

Georgia has undertaken wide-ranging reform og its institutional and regulatory framework with support from the EU and other international development partners. As a result, the overall business environment has improved greatly, removing a key obstacle for innovation to flourish.

At the highest policy level, the Socio-Economic Development Strategy of Georgia - Georgia 2020 identifies facilitating the transfer and introduction of modern technologies and the development of entrepreneurial skills as among the Government's top policy priorities. The Unified Strategy for Education and Science 2017-2021 re-emphasizes Government support for sustainable development by fostering innovation and technological development. The document stresses the need to upgrade the institutional infrastructure of the innovation ecosystem and the internationalization of ST&I and innovative activity, as well as diversification of their funding.

The national authorities are currently elaborating, with the support of international donors, a new National Innovation Strategy that will outline the main objectives in the further development and upgrading of Georgia's innovation ecosystem and the country's priorities for future technological development. The latest draft at the time of writing called for identifying a limited set of priority areas, focusing funding for applied research on these priorities, strengthening science by creating better career opportunities

for young scientists, strengthening entrepreneurship education, and improving the commercialization of scientific research and collaborative research between science and industry.

Several other strategic documents relevant to innovation have been adopted in recent years, reflecting a strong emphasis on formal strategic planning at all levels of administration: national, sectoral and regional. These include the E-Georgia Strategy and Action Plan 2014-2018, the Vocational Education and Training Development Strategy 2013-2020, the SME Development Strategy of Georgia 2016-2020, and others (Table 3.1). A number of public agencies (for example, the Public Service Development Agency) have also developed, or are developing (GITA), their own sectoral strategies defining their medium-term goals. Most of the key legislative acts that lay the ground for the establishment of the national innovation system were adopted during the 2000s (Table 3.1).

Table 3.1 Recent legislative and programmatic documents affecting innovation activity

Policy document	Year	Implementing agency
Law on Entrepreneurs	1994–2009	
Law on Grants	1996, 2016	
Law on Science, Technology and their Development	1997, 2005	Ministry of Education and Science
Law on the Georgian National Investment Agency	2002	Ministry of Economy and Sustainable Development
Law on Higher Education	2004	Ministry of Education and Science
Law on General Education	2005–2014	Ministry of Education and Science
Law of Georgia on Public Procurement	2005–2017	Government of Georgia
Law on Promotion and Guarantees of Investment Activity	2006	Line ministries
Law of Georgia on Microfinance Organizations	2006	National Bank of Georgia
Law on Vocational Education and Training	2007, 2018	Ministry of Education and Science
Law on the Georgian National Academy of Sciences	2008, 2013	Ministry of Education and Science
Law of Georgia on the Creation of the Legal Entity of Public Law (LEPL) – Data Exchange Agency	2009–2015	Ministry of Justice
Law on Education Quality Improvement	2010	Ministry of Education and Science
Tax Code of Georgia	2010	Ministry of Finance
Ministerial decree № 62/N on the establishment of the Shota Rustaveli National Science Foundation	2010	Ministry of Education and Science
Law of Georgia on a Unified State Registry of Information	2011–2015	Ministry of Justice
Law of Georgia on Information Security	2011–2015	Ministry of Justice
Law on Collective Investment Undertakings	2013	National Bank of Georgia

Table 3.1 Recent legislative and programmatic documents affecting innovation activity (Concluded)

E-Georgia Strategy and Action Plan 2014–2018	2013	Ministry of Justice
Vocational Education and Training Development Strategy, 2013–2020	2013	Ministry of Education and Science
Association Agenda between the European Union and Georgia 2014–2016	2013	Government of Georgia
Ordinance of the Government of Georgia No. 400 on Approving the Socio-Economic Development Strategy of Georgia – Georgia 2020	2014	Government of Georgia
SME Development Strategy of Georgia 2016–2020	2015	Ministry of Economy and Sustainable Development
Law on Innovations	2016	Georgia's Innovation and Technology Agency
Government Platform 2016-2020 Freedom Rapid Development Prosperity	2016	Government of Georgia
Unified Strategy for Education and Science for 2017-2021	2016–2017	Ministry of Education and Science
Public Service Development Agency Strategy 2017-2019	2016	Ministry of Justice
Association Agenda between the European Union and Georgia 2017–2020	2016	Government of Georgia
National Innovation Strategy	draft	Georgia's Innovation and Technology Agency
Regional Development Programme of Georgia	2018–2021	Ministry of Regional Development and Infrastructure

Source: Author's compilation, acts in chronological order.

The Law on Innovations

The Law on Innovations of 2016 introduced the main concepts and terms defining the innovation process as well as the various innovation-support institutions and formulated the functional responsibilities of the public bodies tasked with innovation management. The formulation of state strategy in the area of innovation is the legal prerogative of the Government. As part of the process of strategic management, the law decreed the establishment of a consultative body, the Research and Innovation Council under the Prime Minister, whose role is to advise the Government on the national priorities and the implementation of state strategy in the area of innovation. The Council was also tasked with coordinating the development of the national innovation ecosystem.

A key novelty envisaged in - and triggered by - this law was the establishment of a new public body, Georgia's Innovation and Technology Agency (GITA) under the Ministry of Economy and Sustainable Development (MOESD), which was tasked with a range of responsibilities in the implementation of innovation policy, in particular, the development of innovation infrastructure and the promotion and commercialization of innovations. For this purpose, GITA was delegated the authority to implement a range of policy instruments, corresponding to its objectives and functional responsibilities. Under the lead of MOESD, GITA is to contribute to the further development of the regulatory framework concerning innovation activity.

The Law on Innovations (2016) gave a strong push to the development of Georgia's innovation ecosystem. Importantly, it facilitated the emergence of new innovation actors that are indispensable for the successful and smooth running of innovation processes. In particular, it set the stage for the establishment of innovation support institutions listed in the law as part of GITA's functional responsibility such as science and technological parks, business incubators, accelerators, technology transfer centres, laboratories of industrial innovations (FabLabs), innovation laboratories (ILabs) and innovation centres. GITA initiated and executed the first open competitive calls for grant financing of innovative start-ups and innovation projects. Practical implementation was greatly supported by the GENIE project, implemented by GITA with technical assistance and funding provided by the World Bank (see Box 3.2)

Box 3.2 The GENIE project

The Georgia National Innovation Ecosystem (GENIE) project is supported by the World Bank and implemented by GITA.[i] The project's main objective is to boost GITA's capacity to coordinate the formulation and implementation of public innovation and entrepreneurship policy. GENIE aims to create integrated instruments to support the strengthening and further development of the innovation ecosystem in Georgia and help start-ups and innovators to get information and support for their future growth.

The GENIE project comprises four components. The first component focuses on the development of Georgia's *innovation infrastructure* including innovation hubs and centres, as well as the expansion of broadband internet services and advanced information technology. The second component is centred on the widening and broadening of the provision of *innovation services* including through community innovation centres and regional innovation hubs as well as the delivery of structured training programmes in high demand areas of ICT, such as AI, Big-data, UX/UI, front and back-end development. The second component is also responsible for the first regional Start-up Accelerator Programme which is co-organized with the San Francisco-based "500 Start-ups". The third component includes instruments for *innovation financing* support such as matching grants as well as the provision of technical assistance related to these instruments. The fourth component is *project implementation support* and targets the efficient and effective implementation of all project components.

The project was launched in 2016 with a five-year horizon to 2021. The total project cost is estimated at $42 million, of which the World Bank is providing $40 million, with $2 million to be raised from other sources. The GENIE project has been instrumental in supporting the development and strengthening of Georgia's innovation ecosystem, and has been the main funding source for the country's innovative start-ups at the pre-seed stage. It also pioneered the funding of innovation projects linking local innovative researchers with potential foreign partners interested in the commercialization of Georgian technologies.

While the GENIE project supported the launch of a range of practical and beneficial activities, highly relevant for the promotion of innovation, there is significant uncertainty regarding their sustainability after the completion of the project. So far, the Georgian authorities have relied heavily on donor support for the conduct of these activities and GITA has not seen a notable increase in its funding from the state budget.

The project was restructured by the end of 2018 and since early 2019; the GENIE Project Implementation Unit has been strengthened with the appointment of a new GENIE Project Manager with an enhanced mandate and the official appointment of GITA's chairperson and their deputy. These changes allowed catch up in project implementation, which has been recognized by the World Bank Group. In Q1 2020, GITA was discussing the project's extension until Q1 2023.

[i] https://projects.worldbank.org/en/projects-operations/project-detail/P152441?lang=en

Reforming the research and education system

Other key laws, underpinning the nascent innovation ecosystem, are those reforming the research and education system, such as the Law on Science and Technology (2005), the Law on the Georgian National Academy of Sciences (2013) and several laws concerning the reform of education. One important outcome of these reforms was alignment of the higher education in Georgia with the Bologna Process, by establishing a three-cycle higher education system consisting of bachelor's, master's and doctoral studies. This ensures mutual recognition of qualifications and learning periods completed at other universities within the European Higher Education Area. The reform also included the reorganization of doctoral and post-doctoral education, abolishing the possibility of awarding PhD degrees at research institutes (as inherited from Soviet times), and delegating such authority only to universities. A special Law on Education Quality Improvement (2010) sought to install a system of Government-run quality assurance in the implementation of these reforms. However, these reforms have not so far translated into better educational outcomes overall (see Chapter 2).

The Law on the Georgian National Academy of Science (GNAS) triggered an overhaul and downsizing of scientific and R&D institutions in the country, following years of declining public funding. GNAS previously acted as an umbrella organization overseeing more than 50 research institutes and their funding. This system was entirely transformed with functions of organizing and managing scientific research removed from GNAS. The research institutes were either downsized and transferred to other supervisory bodies, or closed down: most institutes were integrated into seven Georgian universities; some were transferred to the supervision of the Ministry of Education and Science and another group was transferred to the Ministry of Defence. GNAS lost most of its former functional responsibilities: while retaining its role as a formal centre of evaluation and recognition of scientific excellence, it was only tasked to act as an advisor to the Government on science and technology policies. The reorganization of research, in particular, the integration of research institutes with universities, has been accompanied by administrative difficulties and is still not fully finalized. Some institutes still operate as independent units with their own internal rules and management practices.

The change in funding of scientific research was another component of the reform of Georgia's ST&I system. The Government established a new institution in 2010, the Shota Rustaveli National Science Foundation (SRNSF), as an agency under the Ministry of Science and Education tasked with the management of funds for scientific research. Research institutes now receive their base funding from SRNSF, which covers the researchers' salaries at a fairly low level. For research projects, scientists have to prepare project proposals and participate in competitive bids organized by SRNSF or other sources of finance (for example, university funds etc.).

3.2 Innovation governance

Innovation governance refers to the decision-making rules affecting the innovation process and the interactions between innovation stakeholders. It has both a formal component related to existing legislation, regulations and other policy decisions and an informal or behavioural component, related to the incentives and motivation of innovation actors. Innovation governance includes both public sector bodies tasked with innovation management and private sector innovation stakeholders (businesses, financial institutions, innovation intermediaries, etc.).

One specific public sector function in innovation governance is the coordination of policy design and implementation. The need for this arises from the horizontal nature of innovation policy which affects many actors at a similar level of governance. Effective policy coordination depends on the design of the overarching elements of innovation policymaking, and on the existence of efficient linkages within the innovation ecosystem that enable (or hinder) interactions among them. Figure 3.1 presents the main components of the innovation governance system in Georgia.

The Regional Development Programme of Georgia (2018-2021) identifies several deficiencies and priorities for regional governance. These include an absence of innovation and technology statistics at the regional level, and a need to strengthen the innovation capacity of local companies and their cooperation with the science sector, while increasing private investment in all regions, alongside increased spending on innovation as a share of GDP. Such developments will require measures to strengthen governance at the regional and municipal levels.

E-governance

Another specificity of Georgia's innovation ecosystem is the strong priority that has been assigned to e-government and the provision of public services in e-form. These efforts have been underpinned by a number of legislative acts and strategic programmatic documents such as the law on the creation of the Data Exchange Agency, the laws on the state registry of information and on information security as well as the E-Georgia Strategy and Action Plan 2014-2018 (Table 3.1). A consistently strong policy commitment has given birth to a remarkably abundant example of public sector innovation, especially when comparing Georgia to neighbouring and other peer countries. Some examples are described below.

The Ministry of Justice (MJ) is the executive branch responsible for development and improvement of national legislation and strengthening of the rule of law; it also serves as a key driver of innovative activity. The latter may appear as a rather unusual function for a public body in charge of the judiciary but for historic reasons the provision of public e-services and later the development of e-government was initiated and implemented within that Ministry in accordance with the Public Administration Reform Roadmap. In fact, Georgia is remarkably advanced in the provision on public e-services and in e-government, both of which are based on extensive public sector innovation.

Georgia's progress in this area is commendable but in terms of innovation governance (as part of developing and managing public sector innovation within the functional

responsibilities of the MJ), its experience is probably quite unique. Public sector innovation has been flourishing in Georgia largely thanks to the initiative and entrepreneurship of the management and staff of its two agencies under this Ministry: the Public Service Development Agency (PSDA) and the Data Exchange Agency (DEA) are delegated with the authority necessary for the provision of innovative public services (public sector e-services and e-government, respectively). (Box 3.3).

Box 3.3 Public sector innovation in Georgia

Innovation in the public sector refers in most cases to significant improvements in public services based on new approaches in designing a service and/or new organizational or technological models of offering the service. It takes place in a variety of ways but is always based on entrepreneurial activity in the public sector. Public sector entrepreneurs are innovators who willingly bear a specific type of risk when they perceive an opportunity to improve significantly an existing operational model. In contrast to private sector innovation where the expected benefit of the business innovation is usually expressed in pecuniary form, the potential benefits for the public sector entrepreneur typically manifest themselves in terms of possible recognition of effort and career enhancement.

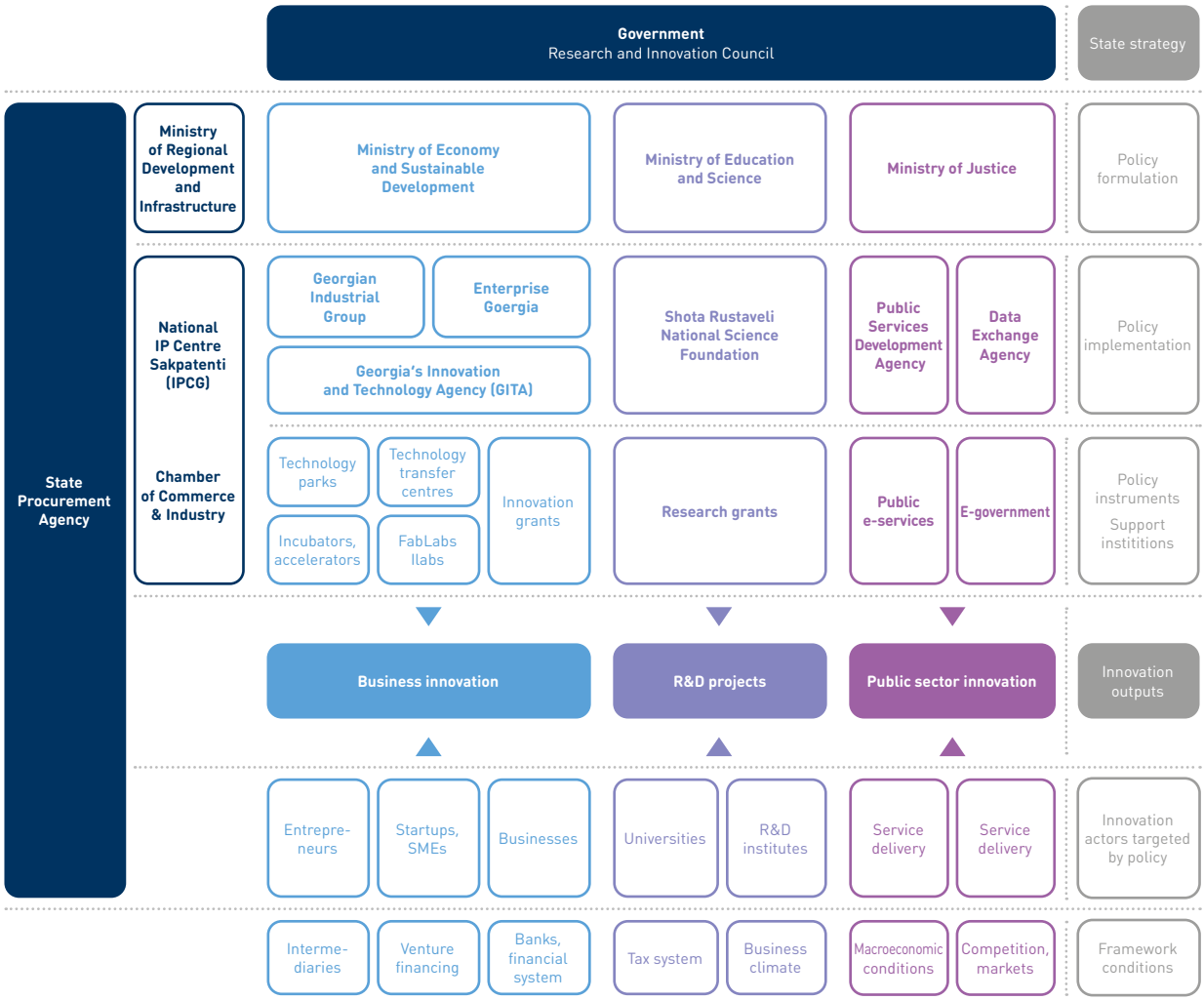
The provision of public services in Georgia has many examples of public sector innovation. The current design of service provision (mostly within the realm and under the authority of the Ministry of Justice – see Figure 3.1) is an example of public sector innovation, with a critical mass of expertise on public services provision available for deployment across a range of policy areas. The mandate and functioning of the two key agencies tasked with public service design and provision, the Public Service Development Agency (PSDA) and the Data Exchange Agency (DEA), is another such example.

The DEA, which started operation in 2010, has three core functions: E-governance; Data Exchange Infrastructure and Information Security. At present, some 128 public entities are linked with the DEA, mostly through the unified Georgian Governmental Gateway (3G) which enables the public sector as a whole to provide some 500 different public services in electronic form. The DEA also sets ICT standards for the public sector entities and designs information security policies for the public sector. Furthermore, the DEA develops an interoperability framework allowing different public bodies to communicate among themselves in electronic form. The fast growth and expansion of the DEA's operations benefited significantly from the EU supported E-governance Development Project launched in 2011 within the frames of an EU TWINNING programme. The E-Georgia Strategy and Action Plan 2014-2018 (Table 3.1) was also prepared with international technical assistance under this project.

The PSDA, which was established in 2012, is mandated to support the development of public services and introduce innovative services in the public sector. Such services include the maintenance of a general register of the population, the registration of civil acts as well as the issuance of identity documents. A significant range of these services is provided through the Public Service Hall as a separate legal entity under the authority of the Ministry of Justice that operates as a "one-stop-shop" for members of the public. PSDA is engaged in a range of new innovative public services such as the introduction of e-governance in local government, the development of multifunctional community centres to provide various services to the local population, the establishment of a unified address system, etc.

Source: UNECE, Innovation in the Public Sector, New York and Geneva, 2017.

Figure 3.1 · Innovation governance in Georgia



Source: Author's compilation.

Policy-making process

Policy making and implementation in Georgia has several levels and is distributed among several public bodies. Key strategic decisions concerning science, technology and innovation (ST&I), including the directions of policy reforms, the setting of priorities as well as policy coordination, are taken by the Government, supported by the Research and Innovation Council that was established in 2015 in accordance with the Law on Innovations. Apart from advising the Government on strategic decisions, the Council is mandated with coordination functions in both policy formulation and implementation. This cooridnation is especially important due to the predominantly horizontal nature of innovation policy.

Innovation policy formulation (in terms of drafting policy documents most of which are subject to further approval by the Government) is mandated to three main line ministries. The Ministry of Economy and Sustainable Development (MOESD) is in charge of policy making regarding business innovation; and with a broad portfolio of functions

in economic policy and sustainable development including support to industry, services, trade, investments, etc. Support to R&D and innovation is in principle also part of this broad portfolio but in the Georgian context these functions are shared with other public bodies. The Ministry of Education and Science (MES) - in charge of science and research policy - and the Ministry of Regional Development and Infrastructure (MRDI) - innovation at the regional level.

3.3 Policy implementation

Another specificity of Georgia's public administration structure is that a large share of the policy implementation functions is delegated to agencies. Most agencies are under the supervision of the respective line ministries but established as separate legal entities. Such a model of subordination guarantees the possibility of vertical line management but also allows for a significant degree of autonomy of the agencies. Thanks to the latter it is usually the agencies that are delegated with direct responsibility and authority for policy implementation, including administration of the relevant policy instruments.

An important part of innovation policy implementation is delegated to GITA, under MOESD, with wide ranging powers to administer the majority of policy support instruments related to business innovation and the promotion of innovation activity. The Law on Innovations mandates GITA with a lead role in shaping Georgia's innovation ecosystem and, in particular, establishing its innovation infrastructure. During a relatively short period, GITA has contributed to setting up a number of innovation support institutions within this ecosystem. There are five functioning technoparks and innovation centres in Georgia (Tbilisi Techpark; Zugdidi Techpark; Telavi Techpark; Akhmeta Innovation Centre; Rukhi Innovation Centre) that provide incubation support to innovation start-ups and SMEs.

GITA also supported the establishment of a network of Innovation Laboratories to build the skills of innovative entrepreneurs to bring their ideas to market. The so-called FabLab is in itself an innovative concept (borrowed from the Massachusetts Technopark), that was implemented at GITA's own premises in the form of a small-scale laboratory fully equipped with flexible, computer-controlled tools that allow high-tech entrepreneurs to transform their innovative idea into a prototype. The concept has now spread and similar laboratories are functioning elsewhere, e.g. Future Laboratories established at the University of Georgia. FabLabs have been established also at other universities and more than 20 FabLabs are operational in Georgia.

Aside from innovation support infrastructure, GITA is also mandated with the implementation of policy instruments for direct pre-seed financial support to innovative entrepreneurs and start-ups. At present, GITA's support programme comprises two types of grants (see next section on innovation policy support instruments for more detail):

- Small start-up matching grants for individuals or SMEs to support entrepreneurs in developing their ideas in the pre-seed or seed stage (e.g., designing, testing and refining a prototype);
- Innovation matching grants to co-finance existing companies in developing new products, processes or services.

GITA also supports networking among innovation stakeholders and participates in the organization of networking events, e.g. hosting a Start-up Grind regional conference Europe-Asia Connect in Tbilisi in November 2019 that was attended by more than 1,500 innovation practitioners.[2] Most of GITA's main areas of activity (in particular, the development of innovation support infrastructure as well as the innovation grant funding) have been supported by the World Bank under the GENIE project (Box 3.2).

The MOESD supervises Enterprise Georgia and the Georgian Industrial Group, which influence (directly or indirectly) innovation activity and performance. Enterprise Georgia is tasked with public support to Georgian firms in three areas: entrepreneurial activity, export promotion and attraction of FDI to local businesses. Supporting the innovation activity of Georgian businesses is not formally part of the agency's mandate but its programmes have an indirect positive impact, with many firms supported by Enterprise Georgia upgrading their business portfolios thanks to both public support and/or FDI-induced spillover effects that encourage innovation development.

Enterprise Georgia has three divisions: the Business division promotes entrepreneurial activity by helping entrepreneurs create new enterprises, as well as to expand and refurbish existing enterprises. The Export division promotes the export potential of Georgia by increasing the competitiveness of local products and the overall volume of goods directed towards international markets.

The former Georgian National Investment Agency was recently merged with Enterprise Georgia and became its Invest division. The Invest division's primary role is to attract, promote and develop FDI in Georgia. As an interface between foreign investors and the Government of Georgia, the Invest division ensures access to updated information, provides an efficient means of communication with Government bodies, and serves as a "one-stop-shop" to support investors throughout the investment process.

The Georgian Industrial Group is a public industrial holding whose portfolio is dominated by energy generation (hydro- and natural gas power plants), natural gas distribution, retail fuel trade and real estate. The holding's activities also have an indirect effect on innovation activity, as its declared strategy is to support the introduction of modern technologies.

The Ministry of Education and Science of Georgia (MES) is responsible for the implementation of academic and applied research. It is the main body formulating and implementing Government policy in education and science. The ministry identifies priorities for the development of Georgian science and implements policies consistent with these priorities, while supporting international cooperation in science, research and education. Within the MES structure, two departments are tasked with operational functions in these areas: the department of higher education and science development and the department of international relations and programmes. However, the key policy implementation functions in the conduct of the respective policies are delegated to the Shota Rustaveli National Science Foundation (SRNSF).

SRNSF implements science and research policy and – with the MES – is the national public body mandated with the funding of scientific research. The foundation does not have the formal status of an agency, but performs a similar role to GITA in its respective area, with a mission to support high-quality research and the international integration of Georgian science. The International Policy Board of the foundation formulates its strategic

priorities in line with national scientific priorities and monitors the implementation of the foundation's plans. The SRNSF implements competitive grant calls in support of academic and applied research and administers more than 20 targeted programmes and projects. The grant calls are structured in five clusters but two among them account for the largest share of public research funding: the call for fundamental research grants and the call for applied research grants.

The Georgian National Academy of Sciences (GNAS), previously the flagship of academic research in the country, nowadays plays only a marginal role in innovation governance, after its complete overhaul in 2008. GNAS has no responsibilities in policy formulation and implementation; it only provides advice to the Government on science and technological development and contributes to the assessment and dissemination of research results and awareness raising.

Georgia's innovation governance system also includes several public bodies with auxiliary governance functions, including the National Intellectual Property Centre of Georgia Sakpatenti (IPCG), and the Chamber of Commerce and Industry (Figure 3.1). IPCG is a government agency tasked with the formulation and implementation of public policy in the field of intellectual property. Its focuses on the support of intellectual property rights, including raising public awareness. As a positive trend, in recent years inter-agency cooperation on IP-related issues has been growing, and there have been several calls jointly organized by SRNSF, GITA and Sakpatenti for applied research grants and matching funds. Also, Sakpatenti has supported GITA in the development of innovation infrastructure, in particular, technology transfer offices and business incubators.

The Georgian Chamber of Commerce and Industry is an association of local companies supporting its members to protect their interests and develop their businesses. It blends lobbying with public relations vis-à-vis the Government, civil society and local media. The Chamber's business events contribute to networking among local businesses and so to improved connectivity within the innovation ecosystem. There is also the Georgian Small and Medium Enterprises Association which is an independent institution established by its members to help protect their interests and support them with consultancy services and skills development.

The State Procurement Agency plays a special role in the system of innovation governance and in Georgia's public governance in general. It was established in 2001 as an independent body under the Government to implement a fully transparent public procurement process. This was made possible thanks to the introduction in 2010, with support from the World Bank, of an e-procurement system through which the entire flow of public procurement requests in the country is channelled.[3] The implications of this novel way of managing public procurement – which is another example of public sector innovation –are discussed further in Chapter 5.

3.4 Framework conditions

The business environment

Framework conditions refer to economic, regulatory or other factors or conditions that are not necessarily part of the innovation policy mix but which enable business to transform knowledge and innovative ideas into new market products and services. In this section we briefly review some aspects related to the environment for entrepreneurship in Georgia (see Chapter 1).

The business environment plays an important role in shaping the innovation ecosystem and its efficient functioning. A business-friendly and enabling environment is a necessary precondition for the formation of sustainable, collaborative interlinkages between innovation actors. Given that innovation ventures take time to materialize and innovation collaboration is dynamic, predictability of the business environment is of utmost importance.

The Georgian authorities assign high priority to improving the business environment as reflected in policy documents including the Socio-Economic Development Strategy of Georgia - Georgia 2020. Generally, economic policy has been very liberal with the state deliberately withdrawing from direct management of the economy. Policy processes are transparent largely thanks to e-government and wide proliferation of public e-services. Consequently, the policy environment in Georgia is business-friendly and is rated very highly by a number of international rankings such as the World Bank's Doing Business and the OECD's SME Policy Index Assessment (Chapter 1 and 2).

A recent UNECE study found that the regulatory and procedural barriers to trade in Georgia are relatively limited, and that Georgia can be regarded as a top reformer that has effectively consolidated a market based, private sector-led economy.[4] Another conclusion was that Georgia has commendable achievements in the introduction of international best policy practices, especially those related to the Association Agreement with the EU.

These accomplishments reflect the positive outcomes of the public administration reforms implemented since the early 2000s. Furthermore, in 2015, the Government approved the Public Administration Reform Roadmap to 2020, which is aligned to the EU-promoted principles of public administration.[5] This Roadmap aims to establish a conceptual framework and tools for a transparent, predictable, responsible, and efficient public administration. Public administration reforms contributed to a radical simplification of administrative procedures. Most public services, including business-related services, are provided according to the "one stop shop" principle, both at the Public Service Hall and in similar outlets around the country. Thanks to the development of e-government, most services are available online. This has resulted in a sharp reduction in the cost and time to obtain public business-related services and reduced corruption.

This shift towards overall business environment improvement, fiscal sustainability, and liberalization, or horizontal policies, has come with a concomitant reduction in vertical policies, or direct public support and subsidies for individual companies and sectors. In 2006, the authorities abolished the Law on Small and Medium Enterprise Support which envisaged a range of policy measures of direct support to entrepreneurship and SMEs.

The public body that had been tasked with the implementation of these policies, the Centre for Small Enterprise Development and Assistance, was closed down.

Partly in response to stagnating SME performance,[6] the Georgian Government in 2015 adopted the SME Development Strategy of Georgia 2016-2020 with three main objectives: enhancement of SME competitiveness in domestic and international markets; improvement of SME skills and establishment of a modern entrepreneurial culture; and modernization and technology upgrading of SMEs. The strategy which was prepared in cooperation with the OECD and GIZ identified 33 actions under five strategic directions targeting SME development, such as further improvement of the legislative, institutional framework and operational environment for SMEs: improvement of access to finance; skills development and promotion of entrepreneurial culture; export promotion and internationalization; and facilitation of SME innovation and R&D.[7]

The tax regime

Georgia has an attractive tax regime for businesses. The corporate income tax is at a flat rate of 15 per cent; VAT amounts to 18 per cent and import duties vary between zero and 12 per cent. The Government has also introduced two main tax incentives to promote exports and the internationalization of business activity: taxation in Free Industrial Zones (FIZs) and a special customs regime for exporting companies. Companies that operate within the three Georgian FIZs (Tbilisi, Kutaisi and Poti) can benefit from zero per cent tax on corporate income, zero per cent import duties, and significantly reduced VAT rates. Firms exporting manufactured goods can opt for the so-called "internal processing customs regime license," which allows them to import raw materials used in the production of export goods, free of customs duties and VAT.

SMEs were also offered a range of tax incentives that recently were made even more generous. Thus, in 2018 the turnover tax rate for SMEs was reduced from 5 per cent to one per cent. Furthermore, the range of firms that are treated as SMEs for tax purposes was broadened by raising the definitional ceiling of firms' turnover from GEL100,000 to GEL500,000. SMEs were also granted a range of additional tax benefits.[8]

One issue is that tax exemptions tend to be sector wide and generous, meaning there is scope for better targeting. At present, there are no tax-based incentives for R&D spending by businesses. This may be a factor behind the poor R&D and innovation performance of Georgian firms, although an overall business friendly tax environment will make such measures less significant, with stimulus measures for industry-science linkages also needed.

Access to finance

Access to finance is a significant constraint for Georgian SMEs. Georgia's financial system is incomplete and dominated by commercial banks, with bank credit the main source of external funding for Georgian firms including SMEs (see Chapter 6). As of December 2019, there were 15 commercial banks active on the Georgian financial market,[9] with the two largest banks accounting for about 60 per cent of banking sector assets. Access to bank credit is constrained for several reasons - such as very rigid collateral requirements (up to 200 per cent of loan value), and high interest rates (typical interest rates on

GEL credits in 2019 were around 15 per cent against an average inflation rate of some 6.5 per cent). Lending in local currency is in general limited and most lending takes place in U.S. dollars (approximately three quarters of loans to SMEs are in foreign currency).[10] Credit guarantee schemes supported by the Government or by international financial institutions are limited; partial collateral guarantees are only available under the state programme Produced in Georgia.

On the positive side, microcredit is relatively well developed in Georgia and is growing in importance for small businesses. As of December 2019, there were 48 active microfinance organizations registered in the country and supervised by the National Bank of Georgia.[11] Between 2012 and 2019, the amount of total outstanding loans extended by microfinance organizations more than doubled.[12]

Venture financing in Georgia is at a very early stage. Some enthusiasts are trying to support the local market, as evidenced by the establishment in 2017 of organizations such as the Georgian Business Angels Association and the Georgian Venture Capital Association. However, in terms of the scope of their activity, this form of early-stage financing for innovative start-ups and SMEs is an exception rather than a realistic possibility. On the other hand, crowdfunding, an innovative form of early-stage financing, has been gaining ground in Georgia: more and more start-up ventures seek to secure finance for the expansion of their activities through crowdfunding platforms – though clear regulation and efficient intermediary functions will be needed for such instruments to work at scale.

A number of international donors and development support institutions operate in Georgia. The World Bank has been present in the country since independence and engaged actively in the transformation process both in terms of financial support and technical assistance. The EU has also been actively engaged with Georgia since 2003 in the context of the European Neighbourhood Policy (ENP). In 2014, the EU and Georgia signed an Association Agreement, including a Deep and Comprehensive Free Trade Agreement, which entered into force in July 2016, that provides access to a number of ENP support instruments and programmes. Also, the European Investment Fund (EIF) in 2017 signed an agreement with a Georgian bank worth €50 million under the InnovFin initiative (EU Finance for Innovators) aimed at providing loans to innovative local small businesses.

Intellectual property rights

Intellectual property rights (IPR) are protected by a series of legislative and regulatory measures such as the Law of Georgia on Patents; the Trademark Law of Georgia; the Law of Georgia on Design; the Law of Georgia on Copyright and Neighbouring Rights and several others. Georgia is also signatory to a number of international IPR treaties. Oversight IPR laws and regulations is entrusted to the National Intellectual Property Centre of Georgia Sakpatenti. While challenges remain with respect to IP enforcement, the entry into force of the Deep and Comprehensive Free Trade Area Agreement (DCFTA) with the European Union (EU) has seen Georgia improve its system of intellectual property (IP) enforcement, build respect for IP and tackle the detrimental impact of counterfeiting and piracy.

3.5 Innovation policy support instruments

A liberal approach to economic policy has seen a rather limited set of innovation policy instruments instituted by the Georgian authorities, and relatively low levels of public funding. This concerns both academic and applied research and, especially, the funding of own innovation activities.

SRNSF instruments

SRNSF activities are organized into about 20 different topic groups and performed through specific competitive calls within each topic. These include programmes aimed at the funding of fundamental and applied research and support to research by young scientists. SRNSF also supports the mobility of scientists and international ST&I cooperation.

The SRNSF draft budget is prepared by the Foundation's Scientific Council, with advice from the International Coordination Board and is then subject to approval by the Government. Approximately half of available SRNSF funding is provided directly from the state budget in the form of subsidies to R&D institutes and the other half through competitive calls. The first part is the only form of direct institutional funding of these institutes and is intended to cover a portion of their operational costs as well as part of staff salaries. Researchers employed by the institutes are expected to raise funding for undertaking research projects by applying for research grants under competitive calls administered by the SRNSF as well as from other funding sources, including international sources. Importantly, (national) funding allocated to research projects by SRNSF as a rule only covers the staff costs of researchers involved in the project as well as the costs of activities directly attributable to the implementation of the project, while some international projects will also cover indirect costs.

The allocation and administration of R&D project funding is based on the Law on Grants and funding rules developed by the SRNSF and approved with special decrees by the Minister of Education and Science. The funding is allocated almost evenly among basic R&D areas. In principle, the funding rules allow for the incorporating of R&D priorities in the allocation process so that more funding would be allocated to priority research disciplines but at present this is not being done as for practical purposes R&D priorities are not clearly defined. Evaluation of research proposals is conducted by external (international) experts for the purpose of objectivity and to reduce the risk of corruption.

SRNSF competitive calls for research grants cover either fundamental or applied research. Participants in research proposals should be individuals (not institutions) but they need the explicit permission of their employer to participate in the call and for project implementation. There have also been calls for "R&D commercialization" but these in fact refer to applied research rather than innovation. So far, SRNSF has not initiated calls for innovation proper, involving the requirement for industry-science collaboration where the expected project outcome would be a new marketable product or service.

SRNSF project funding cannot usually be used to finance investment items (such as the acquisition of new research equipment); nor can it be used to cover other running costs of the institutes employing the researcher. SRNSF has some limited funds allotted for the purchase of scientific equipment that can be allocated on a competitive basis through

grants but its overall impact is marginal. As a result, most Georgian R&D institutes are poorly endowed with the modern equipment needed for undertaking advanced research. Only a handful of institutes that have been able to sell some of their output internationally or raise funding from abroad (e.g. the Eliava Institute of Bacteriophage, Microbiology and Virology).

GITA instruments

GITA is in charge of most innovation policy instruments available in Georgia. It should be noted though that these instruments are limited in scope and scale; they were designed and developed through international technical assistance (mostly in the context of the GENIE project, Box 3.2), and GITA started implementing them only very recently (after 2017). Within its limited budget, GITA is funding only small-scale, early stage innovation projects. Apart from the GENIE instruments, GITA participated together with the SRNSF and the National Intellectual Property Centre of Georgia in the design and implementation of several joint calls for applied research grants and matching funds. In 2020, for instance, GENIE staff members have been actively working with the SRNSF to accelerate the progress of the $3 million "Rustaveli Research Grants" programme.

GITA's operations (both its running costs and the funds allocated to support innovation), are in principle to be financed through the state budget. However, since the start of the GENIE project, state budget allocations to GITA have tended to decrease with very limited allocations for administration of the calls operated from GENIE funds. Consequently, GITA has often been compelled to use GENIE funds to finance some of its own running costs related to the administration of project instruments.

As of the beginning of 2020, GITA was implementing three main instruments under the GENIE project that involve financial support:

- **Start-up Matching Grants** (up to GEL100,000) aim to support seed stage innovative business (start-ups or companies younger than two years) with good growth potential and prospects to grow internationally. The duration of such a project is 12 months and participants are expected to cover at least 10 per cent of project costs from internal or other private sources. Applicants are expected to submit a project proposal that is then evaluated in three stages: desk review, pre-evaluation and final evaluation. Applicants whose proposals pass the first two stages are invited to pitch to an independent investment committee of international experts, which selects the winners who receive grants. As at the end of 2019, three such rounds had been completed with a total of 76 final winners. The funds under the grant scheme are released in portions (on a quarterly basis), upon satisfactory progress reports submitted by the grantees.
- **Innovation Matching Grants** (between GEL150,000 and GEL650,000) are intended to co-finance innovation projects of existing Georgian small companies to help them expand their business in local and international markets and contribute to strengthening the Georgian innovation ecosystem. The duration of the projects is 24 months and applicants are expected to co-finance at least 50 per cent of total project costs, which in most cases involves investment in new technology. Application, evaluation and monitoring procedures are similar to those applied in

the Start-up Matching Grants scheme. The Call for Proposals for Innovation Matching Grants was announced in May 2019 and applications are being accepted on a rolling basis. Between May 2019 and March 2020 a total of 82 applications were evaluated and nine applicants awarded grants.

- **Accelerator Programme**, (a private-public partnership of GITA, 500 Start-ups and Bank of Georgia with $1.05 million of investment and additional EU financial support), aims to assist local companies integrate into international value chains and global markets and raise growth capital. It also seeks to support the commercialization of Georgian ST&I outputs through partnerships between local research institutes and companies and with international partners. The Accelerator Programme focuses on local companies with key characteristics indicating growth potential. The geography of prospective participants in the programme is not restricted to Georgia but candidates are required to be present in the local market as a condition of funding. Funds are earmarked to support project maturation and matchmaking with international partners. This can include procuring business services (such as legal, patenting, consulting, etc.). The programme was officially launched in September 2019. At the time of writing there were 13 applications and the selection process was due to be carried out at the beginning of 2020. Project maturation is expected to last for one year (2021) with the following two years for matchmaking and negotiation with potential international partners (2022-2023).

In addition to the GENIE instruments GITA also provides **small (micro) grants** (up to GEL5,000) for individuals to support pre-seed, innovation-related activities such as travel, participation in events and prototyping. Thus, prototype grants are awarded for purposes such as designing, testing and refining prototypes in the field of innovation and technology.

3.6 Policy messages

Georgia has succeeded in establishing a strong business environment and made commendable progress on its innovation ecosystem. Efforts include a number of legislative and regulatory measures, coupled with practical actions to build a a supportive innovation infrastructure and reform the institutional environment. At the same time, innovation activity lags behind the ambitious aspirations of the authorities. This section analyses some of the existing problems in the Georgian innovation ecosystem and how innovation performance may be improved.

Policy approach

A generally liberal approach to economic policy has delivered significant results, such as a radical reduction in administrative hurdles to doing business and creating space for spontaneous, demand-driven solutions, but leaves a reduced role for a proactive policy stance. The key will be to retain the benefits of previous liberal reforms while achieving the coordination needed to respond to the "grand challenges" identified by a more mission-oriented innovation policy based on effective stakeholder participation.

Much of the policy focus in Georgia has been on improving the business environment by removing excessive regulations, combating corruption, and removing barriers to trade, and in this way unleashing the entrepreneurial drive of private business to invest, expand and become the engine of economic growth.

However, market forces alone are often not sufficient to bring innovative ideas to market due to the great uncertainties inherent to the innovation process. Various public policy interventions are needed to deal with such market failures. Moreover, innovation takes place in a system that is potentially prone to coordination failures, institutional failures, framework failures, network failures, etc. which also may inhibit the transformation of innovative ideas into market products or services. Addressing such failures calls for targeted public policy interventions.

Global "innovation leader" countries have achieved success thanks to comprehensive, proactive public policies targeting the support of innovation. There are no universal recipes as to the "best" policy approach to support innovation and no "one size fits all" policy models. Contemporary thinking tends to favour an approach combining a lasting commitment by policy makers to the pursuit of innovation-related policy objectives and relatively limited direct intervention by the Government in economic processes. Such an approach is often referred to as "new industrial policy" to distinguish it from traditional industrial policy where the Government applies vertical policy instruments targeting - and favouring - concrete economic sectors and/or businesses to establish what were dubbed "national champions".[13]

By contrast, new industrial policy relies mostly on horizontal instruments to direct the behaviour of economic agents in the desired direction by establishing appropriate incentives. It is a systemic policy approach that aims to improve interactions and facilitate risk-sharing among agents and stakeholders, thus affecting a wide spectrum of actors and not only some selected targets.[14] It has been suggested that when applied to lower income countries such policies usually target the following objectives: import-substitution as well as export-oriented or resource-based industrialization.[15]

A paradigm change aligned with this approach would require a revision of a number of strategic policy documents, legislative and regulatory acts as well as the design of new policy instruments, alongside additional public resources. Such a change would require a gradual increase (in both absolute and relative terms) in the level of public funding allocated to the support of ST&I activity, in both direct public funding for ST&I activities and for policies that may lead to crowding-in of private investment (such as programmes to develop skills).

Innovation governance

Innovation activity involves the interaction and collaboration of many innovation stakeholders, requiring efficient governance within the innovation ecosystem. The innovation governance system in Georgia (Figure 3.1) reflects a fairly well-designed division of functional responsibilities in policy formulation and of delegation of authority in policy implementation. It also incorporates understanding of the need of strategic governance and coordination in both policy formulation and implementation. In terms of the conceptual design of the system of governance, the main body tasked with strategic policy advice and policy coordination is the Research and Innovation Council (RIC).

The RIC is chaired by the prime minister and its broad membership includes high level government officials and experts (key line ministers, heads of parliamentary committees, business representatives, GNAS president, directors of the SRNSF and of Sakpatenti, and leading academics). GITA acts as the secretariat to the RIC and provides an operational support structure. The RIC's extensive membership was seen as necessary to be representative of all innovation stakeholders ensure their participation in the coordination mechanism. In practice, this broad membership turned out to be a handicap, hindering the efficient functioning of the RIC in both strategic policy advice and policy coordination.

Experience since RIC inception has revealed two main practical problems. Firstly, the presence of numerous high-level officials makes it very difficult to assemble the quorum needed for operational functioning of the RIC, meaning the frequency of RIC meetings decreased and lately it has effectively stopped meeting. Secondly, the extensive membership of the RIC made the decision-making process difficult when it did hold sessions more regularly.

One consequence is that Georgia has been unable to formulate a clear vision of its scientific and innovation priorities. According to the existing - clearly outdated - official documents, there is an unfeasible number of research areas (more than 80) that are considered "high priority". Despite progress in other areas and the existence of well-established international best practices of prioritizing science (such as foresight and smart specialization), the authorities have yet to address this issue in a systematic manner. Formulating a broadly agreed set of scientific and innovation priorities also requires achieving some level of consensus between innovation stakeholders. This is an important part of strategic policy coordination which, in principle, should be performed by a body such as the RIC.

More generally, there is a gap between legislative and regulatory reforms and their enforcement and implementation. While the existing set of rules governing public administration is very advanced and follows best international practice, the practice can deviate considerably. Consultations among public bodies of the innovation governance system are not carried out on a regular basis, which sometimes results in poor coordination of their actions. The various public bodies can be poorly informed about what others are doing, which fragments innovation governance at the operational level. There could be scope to address this problem through the otherwise advanced system of e-government.

There is scope to improve coordination between MES and MOESD, two of the main public bodies in the system of innovation governance. The present organization of innovation governance in Georgia (Figure 3.1) decouples public R&D policies (under the functional responsibility of MES) from policies supporting innovation (mandated to MOESD). This creates a governance gap in areas that should be the joint responsibility of the two institutions, e.g. large innovation projects that involve both a significant R&D input and a key commercialization phase and requiring close industry-science collaboration.

There are cases of well-functioning innovation governance practices. For example, Georgia has established the practice of delegation of authority at fairly low levels of line management which are in direct touch with the policy targets. This is the case at GITA and SRNSF, both of which have full authority to administer a range of policy support instruments. This allows for a high degree of flexibility, simplifies the process of decision-making (by eliminating the need for authorising operational decisions at the ministerial level), and contributes to greater efficiency in policy implementation.

However, inadequate coordination in policy implementation constrains the full potential of operational freedom in innovation governance. As an example, SRNSF has sufficient freedom to develop the specific details of competitive calls. However, the rules governing SRNSF calls need to be approved by MES and in some cases a higher-level public body. In principle, this framework could allow for the launch of calls for innovation projects, but this would require several preparatory steps. The first step would be for the authorities to identify such activity as a priority. The second would be for inter-agency cooperation in designing such new, targeted calls. The third step would be the approval of the rules of such calls at the appropriate administrative level (either by MES or by the Government). The final step would be the actual launch of such calls. So far, despite initial experimentation with smart specialization approaches, this has not happened due to inefficient policy coordination within the innovation governance system.

Innovation at the macro-level requires a dynamic flow of spontaneous, bottom-up initiatives from innovative entrepreneurs to create a pipeline of innovation projects. From this perspective, GITA should play - and does play - a central role. Thanks to international technical assistance, GITA has established itself as the lead innovation agency. By its conceptual design, GITA should also serve as point of contact to help innovation stakeholders collaborate in transforming their ideas into marketable innovative goods and services.

However, the geographic location of the agency - in an area outside Tbilisi not well served by public transport - may impede development of this "point of contact" function. Despite the progress of Georgia in ICT, face-to-face communication is often indispensable both for the promotion of innovation and for efficient collaboration among innovation stakeholders. In addition, not all people (especially young people who are the main targets of its activity) can afford to own a car. Thus, GITA does not always play the role of an attractive meeting point for such face-to-face communication, and it may benefit from an outpost closer to the city centre.

On the other hand, GNAS, which at present plays only a marginal role in Georgia's innovation governance system, has an impressive office in the centre of Tbilisi - in a location which is at a natural and historic crossroads of people's habitual routes of daily mobility. The available space in this office building probably exceeds the needs stemming from the current functions of GNAS, and these premises obviously have an untapped potential to play a much more significant role in promoting live networking and collaboration among innovation stakeholders. The potential to draw on these opportunities is discussed further in Chapter 4.

Systemic issues

Despite notable progress in building Georgia's innovation infrastructure, there remains significant scope for further improvement. Certain building blocks are either nascent or missing in the ecosystem. A well-functioning ecosystem implies connectivity and efficient linkages among innovation stakeholders, which is an area of weakness. This, along with limited domestic supply and demand for innovation, means that the innovation infrastructure that has been established, or is in the process of being established, does not always perform at full potential and reduces the outreach of support activities.

The innovation ecosystem is a complex system which is subject to failures, particularly at the early development stage. The fragmentation of innovation governance can be regarded as a systemic coordination failure. Poor linkages and insufficient connectivity of innovation stakeholders partly results from limited policy coordination. Ultimately this results in the absence of spontaneous, bottom-up collaboration among innovation stakeholders.

The current policy mix in the country includes very few instruments addressing such systemic weaknesses (such as, instruments stimulating collaborative research and innovation between the research and business communities). There is a need for targeted policy efforts to strengthen formal and informal linkages both among and between local Georgian actors and foreign partners. This would open up new opportunities for local actors in more more demanding markets, facilitating technology transfer and helping Georgian businesses to innovate and grow.

Policy instruments

Policies are operationalized through policy instruments, meaning any desired change in policy approach must be accompanied by effective instruments. This is also valid for any possible move to a more proactive policy stance and would imply enriching the set of innovation policy instruments as well as widening the scope of their action. Although such an approach inevitably entails increases in public funding, the greatest potential lies in finding ways to increase the impact of existing instruments, including through effective monitoring and evaluation, continuous improvement and "learning from experience".

The policy instruments implemented by GITA in the context of the GENIE project are close in spirit to the "new industrial policy" approach. The next step is to integrate the most effective of these policy instruments - which currently resemble an exclave of policy experimentation - into the national policy-making system. The GENIE project is of limited scope and duration, without confirmation that after the completion of the project similar instruments will be integrated into the national policy mix with funding from the state budget to replace expiring donor support. An evaluation of the policy instruments introduced under the GENIE project would help identify the most sustainable and promising for scale up and long run integration into the national policy mix.

Mainstreaming the proactive policy instruments of the GENIE project will require closer public sector involvement in the support of innovative entrepreneurship and innovative SMEs, in particular, in early-stage financing. This would imply earmarking new public funds from the state budget to continue GITA operations under the current matching grant schemes and acceleration programme after completion of the GENIE project. Ideally, drawing on the positive experiences in the application of these schemes, GITA, possibly in cooperation with SRNSF, could also put in place new policy instruments supporting business-science linkages and collaboration.

One aspect needing further policy attention is the disconnect of publicly-funded research from the market. At present there are no instruments that cover not only the research phase but also the later phases of the innovation cycle, namely the transformation of research results into new products and services for market. It would be desirable to design such instruments to cover the complete innovation cycle.

Another instrumental problem in the current Georgian policy environment is support to institutional collaboration on innovation projects. Some innovation projects, especially large-scale ones, cannot be implemented without formal collaboration between the respective institutional partners (e.g., academic institutions and firms), soundly grounded in legally binding contracts. However, the ST&I policy instruments in Georgia do not envisage the possibility of public support to innovation projects initiated by and implemented by institutional partners. Thus, while the applied research grants operated by SRNSF are in principle intended to support applied research projects with commercial potential, these projects are presently only awarded to teams of individual researchers and do not support legal entities.

Addressing systemic failures is a key rationale for policy intervention through relevant instruments that are currently absent. There is abundant international good practice of innovation policy instruments that promote collaboration among stakeholders in the innovation process, e.g. by making funding conditional on the establishment, prior to the project start, of collaborative linkages between innovation stakeholders (e.g., between R&D institutions and industry).

The promotion of connectivity, linkages and stakeholder collaboration should not be limited to domestic stakeholders. Georgia lacks the scale to develop some innovative activities on a purely national level and it is important to support both local and international linkages and cooperation in all stages of the innovation process, including commercialization. Similar funding schemes could also be applied to encourage the establishment of cross-border industry-science linkages.

In terms of the outreach of the policy instruments, the business sector in Georgia at present is largely outside the scope of existing instruments. With the exception of SRNSF project calls, there are no instruments specifically aimed at incentivising the business sector to pursue ST&I activities or technological modernization. This is also an area that would merit policy attention and specific instruments.

Access to finance is one of the most acute problems faced by innovating Georgian firms, especially SMEs. The reluctance of commercial banks to finance risky innovative activities by the business sector is a typical case of market failure which is by no means unique to Georgia; it occurs in all economic environments. Good international practice indicates various ways to address this failure through public sector intervention that supports lending at preferential terms to such firms. This can be done by specialized finance institutions supported by the state or by providing state credit guarantees or credit subsidies to innovating firms. This type of support is existent in Georgia through the EU Finance for Innovators (Innovfin[16]) programme. It would be highly desirable to develop additional policy instruments for such support.

Georgia has a strong tradition in establishing and operating microfinance institutions, and this could be developed further with the specific objective to support innovation. Although microfinance institutions cannot substitute for proper early stage innovation financing agencies (the latter extend non-debt finance to entrepreneurs in various forms whereas the former operate only with credit), they can serve as complementary funding bodies. Moreover, targeted public support through loan guarantees or subsidized loans can make microfinance more attractive to innovative entrepreneurs and SMEs.

Microfinance at preferential terms would be well-suited to support university start-ups and/or spinoffs as well as young entrepreneurs and those from disadvantaged groups.

Policy could also support the development of private sector early-stage finance, such as business angels and venture capital firms, which are still very limited in scope in Georgia. Best international practice suggests that public policy can serve as a catalyst for the invigoration of private early-stage financing though appropriate intervention. Thus, targeted public support (e.g., by providing such entities with adequate tax incentives), could encourage both new entries and the growth of existing business angels and venture entities.

Notes

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2 Startup Grind is the one of the largest international networks of start-up founders, with over 600 chapters in different countries and an outreach of some two million participants.

3 Gaprindashvili. G., "Public Procurement Development Stages in Georgia", International Journal of Economics and Management Engineering, Vol.9, No.3, 2015.

4 UNECE, Regulatory and Procedural Barriers to Trade in Georgia: Needs Assessment, United Nations, New York and Geneva, 2018.

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6 See Rudaz. P., "Entrepreneurship in Georgia", Caucasus Analytical Digest, No. 45, 15 December 2012.

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8 http://www.economy.ge/uploads/publications/economy_465914115bb1eb31810004.13302846.pdf

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10 European Investment Bank. "Georgia. Neighbourhood SME financing", February 2016.

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13 See Rodrik, D., "Industrial policy for the twenty-first century." CEPR Discussion Papers No. 4767, Centre for Economic Policy Research: London, 2004; Aiginger, K., "Industrial policy for a sustainable growth path". Bailey, D, K. Cowling, P. Tomlinson., *New Perspectives on Industrial Policy for a Modern Britain*, Oxford University Press, 2015.

14 Dobrinsky, R., "The paradigm of knowledge-oriented industrial policy", *Journal of Industry, Competition and Trade*, 9(4), 2009.

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Chapter 4

INDUSTRY-SCIENCE LINKAGES AND COLLABORATION IN THE INNOVATION PROCESS

Summary and recommendations

Challenge	Objective of intervention	High-level recommendations
Public spending on R&D often does not catalyse private spending or translate into innovation because of a lack of market orientation and vibrant linkages	Strengthen industry-science linkages	• Mainstream industry-science linkages as a strategic priority for ministries and agencies responsible for scientific research and education and for private sector development, respectively • Include innovative entrepreneurship and skills sought after by innovative companies into curricula and enable two-way knowledge flows between scientific institutions and industry • Enable, catalyse, and support commercialization of research results through start-ups, spinoffs and licensing • Support contract research and joint applied research projects between established companies and scientific institutions to harness synergies, such as outside funding and industrial expertise making science stronger, and scientific expertise making industry more competitive

Source: UNECE.

As argued in Chapter 3, while Georgia has succeeded in creating many of the building blocks of an innovation ecosystem, significant gaps remain. One of the most critical is that scientific institutions and the private sector do not cooperate as effectively as they should. In a vibrant innovation ecosystem, science and business engage in strong partnerships with scientific and practical knowledge flowing both ways. Businesses put the results of academic research to commercial use, while scientific institutions earn revenues through contract research, joint research projects, licensing revenues and co-ownership of spinoff companies.

Innovation support measures in Georgia by and large target research institutions and innovative private sector initiatives separately, with responsibilities divided between the Shota Rustaveli National Science Foundation, Georgia's Innovation and Technology Agency, and Enterprise Georgia. Few policy instruments specifically support science/industry co-operation, and there is little alignment between priorities and objectives in the areas of research, education, innovation, industry, and private sector development.

To foster strong win-win partnerships between science and industry, and to avoid the risk of a one-sided science-push approach driven only by the research community, the Government should establish industry-science linkages as a strategic priority for policy-making entities responsible for science and for business sector development, respectively, in line with the forthcoming national innovation strategy and governance structure. This will ensure resources are directed to areas where market demand exists.

Science and industry benefit from mutual cooperation through two-way knowledge flows. Industry may benefit from ideas and expertise from the applied research community to increase productivity and develop new products and business models - as well as by recruiting graduates with new skills. Education and research institutions can also benefit from the experience and potential revenue from putting scientific knowledge into practice. This helps them to develop new areas of promising research and to adapt and reform educational curricula to improve quality and align the graduate skills more closely with the labour market. This may help improve educational quality and tackle the labour skills mismatch highlighted by many employers in Georgia. The Government should ensure that curricula cover innovative entrepreneurship and skills sought after by innovative companies and enable two-way industry-science knowledge flows through occupational mobility and life-long learning opportunities.

Cooperation between science and industry in R&D is key and can involve commercialization of new academic research through technology transfer, scientific contract research on applied problems defined by the industrial partner, and joint research projects. Georgia has made significant progress in creating some of the infrastructure necessary for successful research commercialization, such as university-affiliated technology transfer offices, incubators, accelerators and science parks. But more should be done, including through additional capacity building to increase impact and outreach. There is also insufficient policy support for contract research and joint R&D. Indeed, some of the current rules on research funding preclude cooperation with industry, and there is almost no business-funded R&D at present. The authorities should support commercialization of academic research results (start-ups, spinoffs, licensing contracts) to ensure publicly-funded research finds its way from the lab to the market, benefiting researchers, commercial partners and society at large. They should facilitate contract research through adequate regulation, and support joint applied research projects between existing companies and scientific institutions as win-wins that strengthen science while making industry more competitive.

Recommendations in detail

Chapter 4: Industry-science linkages and collaboration in the innovation process

Recommendation 4.1: From Science Push to Science Industry Partnerships

Mainstream industry-science linkages as a strategic priority for ministries and agencies responsible for scientific research and education and for private sector development, respectively, in line with the national innovation strategy and governance structure.

- Engage the business sector in defining national ST&I priorities in the proposed National Innovation Strategy, focusing on setting up a system that systematically explores and supports areas where both the business and science sector can join forces to reach a higher level of development;
- Support cluster development, with strong elements of science-industry cooperation, as part of instruments for supporting these ST&I priorities, built around promising industries or locations, such as the Anaklia Free Zone;
- Identify pilot projects for business-science collaboration in promising niches building on potential competitive advantage and sustainable development priorities, and launch them with coordinated public support to create demonstration effects;
- Allocate adequate public resources in the state budget, either by adapting existing or creating new instruments, for stimulating industry-science collaboration through relevant policy instruments;
- Specify concrete and measurable objectives for industry-science links in future strategic policy documents such as the Socio-Economic Development Strategy, the Education & Science Strategy, the proposed National Innovation Strategy, the Smart Specialization Strategy and other relevant documents;
- Complement the current National Innovation Survey with indicators explicitly addressing industry-science linkages, covering different modes of cooperation and constraints faced;
- Establish a monitoring system for universities and research centres representing the supply and focusing on the output-side of innovation and the respective contribution of the institutes;
- Select output indicators for GITA and SRNSF current and future grants and other schemes as statistical information that beneficiaries would be required to submit during and after project implementation to be used for evaluating the results/outcomes of the different funding projects based on overall, measurable performance metrics at programme level, as well as qualitative evaluation elements (for example, case studies of research-business collaborative projects, interviews);
- Consider the compilation of annual Innovation Performance Reports of Georgia with analytical results complemented by selected successful case studies of joint research to be shown to the broader public and used as role models;
- Undertake a targeted awareness-raising campaign among Georgian businesses and researchers using success stories of business-science cooperation to illustrate the potential for mutually beneficial cooperation with the science sector.

Recommendation 4.2: Learning to Work and Working to Learn

Include innovative entrepreneurship and skills sought after by innovative companies into curricula and enable two-way knowledge flows between scientific institutions and industry through occupational mobility and life-long learning opportunities.

- Provide incentives for professors and academic scientists to cooperate with the business sector, for example, by incorporating successful cooperation as a criterion into hiring, promotion and tenure decisions and removing or mitigating regulatory or legal obstacles or disincentives for doing so;
- Support the temporary or part-time exchange of R&D staff between business and science institutions ("embedded scientists"); publicise and regularly exchange good practices from the experience made with such instruments;
- Promote and enable broader and systematic use of internships and student work programmes at innovative companies and integrate this into university curricula;

Recommendations in detail

Chapter 4: Industry-science linkages and collaboration in the innovation process (Concluded)

- Provide financial support to kick-start the involvement of industry scientists and entrepreneurs in teaching at scientific institutions;
- Extend the above support also to knowledge and staff exchanges with foreign companies and scientific institutions;
- Align existing and develop new measures aiming to further mobilise the potential of women in science, technology and innovation, including:
  - Promote science, technology, engineering, and mathematics (STEM) among women (through scholarships, apprenticeships, career development);
  - Strengthen policies to improve access and representation for women among senior research and management positions;
  - Improve gender-disaggregated statistics to inform policies aimed at supporting women in science, technology and innovation.

Recommendation 4.3: From the Lab to the Market

Enable, catalyse, and support commercialization of research results (through, *inter alia*, start-ups, spinoffs, and licensing contracts based on applied research).

- Consider legislative changes aimed at increasing the flexibility of public universities and research institutes, as well as their employees, to start their own ventures or act as stakeholders in ventures aiming to exploit the potential of their research;
- Facilitate the establishment and development of FabLabs and ILabs at Georgian universities by providing support to management assistance and entrepreneurship training; support the exchange of experiences and good practices in operating the Labs;
- Provide public support for research-business collaboration in joint projects; establish or strengthen technology transfer offices at Georgian universities and research centres; develop a culture of "innovation scouting" as an integral part of the capacity of technology transfer offices; technical assistance could be requested from international development partners to build capacity for innovation scouting;
- Consider the establishment of a national technology transfer office that would coordinate and support the activities of the decentralised system of technology transfer offices at universities and research centres.

Recommendation 4.4: Collaboration for Competitiveness

Support contract research and joint applied-research projects between existing companies and scientific institutions to harness synergies - with outside funding and industrial expertise making science stronger, and scientific expertise making industry more competitive.

- Set aside dedicated public funds (possibly managed by GITA), for the support of networking and matchmaking events between universities and applied research centres and the business sector – such as technology days, road shows, Makeathons, Demodays and Hackathons; these events could be organized by the technology transfer offices;
- Introduce competitive calls for innovation and technology-upgrading project grants open to consortia of scientific institutions and businesses; such calls could be jointly operated by GITA and SRNSF;
- Further strengthen support for Georgian scientific institutions and businesses to participate in international calls for proposals;
- Introduce an innovation voucher scheme to support contract research to help the private sector improve productivity and develop new products and services and business models.

Source: UNECE.

4.1 Forms of science-business collaboration

The innovation literature underscores the importance of industry-science linkages as a structural characteristic of a functional innovation system.[1] Most competitive innovation systems feature interlinkages between the science and business sector going far beyond provision of a qualified labour force for business companies and including various forms of knowledge- and technology-transfer. The provision of different knowledge stocks and technologies from publicly-funded research organizations like universities and non-university research institutes to external organizations, mainly private companies, is an important source of competitiveness for specific industries, countries and regions. Public research institutes also benefit from cooperation with external partners on current topics and concrete applications. The UN 2030 Agenda for Sustainable Development has reinforced the need to ensure that publicly-funded research addresses issues such as climate change, energy transformation, health, mobility, sustainable growth, etc. The EU for instance has responded to this by introducing funding earmarked for collaborative research, addressing so-called Grand Societal Challenges.

Various modes of industry-science linkages and collaboration exist in mature innovation systems and are typically known as R&D cooperation with industry and technology transfer. The type, scope, specific organization, financing model, etc. of such linkages depends on the institutional framework (e.g., incentive structures), the "absorptive capacity" of the business sector (e.g., the existence of a well-functioning market for contract research), and the characteristics of the innovation ecosystem. Various forms of industry-science linkages exist, accompanied by specific supportive policy instruments (see also Figure 4.1):[2]

- Contract research and R&D services;
- Collaborative research/joint research;
- Joint publications or co-patents as a result of cooperative research;
- Practical studies and bachelor/master theses in cooperation with companies;
- Spinoffs and support (infrastructure and consultancy), universities as shareholders of spinoff companies;
- Staff exchange (mainly professors to industry, occasionally professionals from industry or the public sector joining public research institutes);
- Advanced training for companies, teaching assignments for companies;
- Informal contacts and networks from former employees/researchers in the business sector or vice-versa;
- Involvement of research institutes or individual professors in business-related committees, boards or networks and business representatives on university boards (e.g. supervisory boards, juries for evaluating research proposals, clusters, regional conferences, etc.);
- More sophisticated, integrated models like public-private-partnerships in research (e.g. industry-on-campus models).

Figure 4.1 · Forms of science-business cooperation and support mechanisms

Source: Schmoch, U.; Licht, G.; Reinhard, M., "Wissens-und Technologietransfer in Deutschland". Fraunhofer IRB Verlag. Stuttgart, 2000 and Koschatzky, K., op.cit.

Contract research (including R&D services) for business is a contractually-agreed R&D project in response to a specific problem. Scientific institutions, especially those with a more practical/applied orientation, increasingly act as contractors for companies, often in close spatial proximity. Contract research can be understood as a target-oriented form of interaction with contractually agreed time and content specifications. Key enabling factors include awareness in the business community on scientific priorities and technologies, the know how of professors engaged in certain topics, and administrative and scientific resources in the research institute/university (organization, staff and infrastructure). This type of industry-science collaboration has untapped potential for Georgia that could be developed with the support of targeted policy interventions.

Cooperative and joint research refers to horizontal R&D partnerships, either among research institutes/centres or between research entities and businesses companies.[3] Joint research is a specific mode of interaction through which the partners pursue a common goal by sharing resources. Typically, the transfer channel is contractually agreed and may include the transfer/exchange of material and non-material resources such as personnel, laboratory facilities, know-how and information on markets. In contrast to contract research, joint research may not have concrete objectives and may be oriented towards the medium to long-term interests of the partners.

Joint publications and co-patents are the result of joint research between science institutions and business companies, particularly in pre-competitive research projects. Publications are typically submitted to scientific journals rather than journals for

practitioners and so are theoretical, scientific or conceptual in nature. For the scientists involved, publications are usually of high importance as these are considered as main scientific outputs and are relevant for evaluations of scientific qualities. However, co-patents are more relevant as innovation indicators (at least as through-put indicators), for the concrete application of scientific research.

Practical studies and **bachelor/master theses** in cooperation with companies are considered significant transfer channels for universities of applied sciences.[4] The property rights of the participating companies related to the associated knowledge transfer are covered by confidentiality agreements. Students often conduct research supervised by professors and company R&D professionals in specific technical disciplines. Companies benefit directly from such cooperation and often use it for strategic recruitment. An important success factor for teaching universities is involvement of individual professors and the university rector/president in regional business networks and industry boards. These approaches could be of interest for Georgia, as incentives for engaging in science-business cooperation require small budgets and often create durable networks with companies.

Support for spin-off companies and start-ups has increased in universities worldwide over the last 15-20 years. Support is primarily conducted at the centres of technology transfer. Concrete measures include consultancy services, involvement of intermediary institutions (like business networks, start-up centres, financing institutions, etc.), patent attorneys and possible cooperation partners. Creating a culture of entrepreneurship within academic administration and among professors, scientists, graduates and students is one of the most important success factors. Support measures should motivate professors and students to start a venture based on technological solutions or scientific results. The autonomy and flexibility of universities are essential pre-conditions to establish vibrant start-up ecosystems. Georgia has made considerable progress in creating an entrepreneurship culture, but there is room to further promote university spinoffs.

Mutual exchange of research staff between scienctific institutions and businesses is currently of limited importance in Georgia but is likely to become more important. Institutional barriers related to compensation and employment contracts are key barriers. Periodic sabbaticals for professors are possible at most Western European universities and are usually spent in industry. Industry professionals are encouraged by their companies to teach and to conduct research projects on a full- or part-time basis or as lecturers or external professors under contract.

Advanced training for companies conducted by university staff are another transfer channel of scientific knowledge to the business sector, often carried out in the framework of specific university business models (e.g., via their own training departments). The main focus is usually on revenue generation rather than institutionalizing industry-science linkages.

Informal contacts and networks from former employees/researchers in the business sector or vice-versa are particularly important for technical universities with priorities in engineering and natural sciences. Along with the allocation of practical studies and master theses, this mode represents the second most important transfer and interaction channel institutionalized at universities. Thus, technical universities consider a former career in the business sector as a major and decisive factor when awarding professorships.

Research institutes and individual professors are increasingly involved in **business-related committees, boards or networks**, including supervisory boards, juries for evaluating research proposals, clusters or regional conferences. These engagements are linked to the "third mission" of scientific institutes and are thus an element of strategic development plans of leading institutions. In terms of regional innovation systems, scientific institutes increasingly recognize the importance of their role in spatial proximity to innovation actors and to help solve regional challenges.

More sophisticated, **integrated models** like public-private-partnerships (PPPs) in innovation and research are a relatively new phenomenon and have been implemented in only a few countries yet (including the U.S., Austria, Sweden, Finland, Germany).[5] Such models are defined as a research and innovation activity, based on a research agenda and jointly financed by the public and private sectors and operated based on a contractual agreement. In contrast to a joint research project, PPPs are usually established as a joint laboratory ("research under one roof") where both scientists and industry researchers work on the same projects while still employed by the delegating partner (university, company). Industry-on-campus models could be regarded as a research-oriented PPP. There have been important steps to implement public-private dialogue, e.g. a USAID-supported "Governing for Growth" (G4G) project in Georgia.[6]

Given the general importance of industry-science linkages for the competitiveness of national innovation systems, many countries have designed and implemented specific policies and support instruments. Important pre-conditions include a culture of cooperation and openness between science and business, business demand for innovative solutions, compatibility between the two sectors in terms of available and needed technologies or innovation input, appropriate incentives in both academia and businesses, a shared innovation culture, and the existence of conducive framework conditions in the area of IPR and exploitation rights.

4.2 Industry-science linkages in Georgia

Policy support to science-business collaboration

As discussed in Chapter 2, in a comparative perspective, industry-science linkages and collaboration in Georgia are in an embryonic form, due to both a lack of tradition in this area and insufficient policy attention to this pillar of innovative development (Chapter 3). The Georgia 2020 strategy mentions the importance of strengthening science-industry linkages by pointing out: "In order to commercialize research and development, connections between the private sector and the educational system, science and technologies systems will also be deepened with a view to introducing applied R&D in practice and improving the efficiency of its commercialization."

The Strategy for Education and Science 2017-2021 highlights that cooperation between the business sector (industry, small and medium entrepreneurs), and research universities with their research institutes and independent research centres remains limited. There is a need to develop professional management systems of scientific research in research universities and centres, including:

- improvement of relevant institutional structures, policies, regulations and training systems;
- institutional promotion of so-called translational/applied research development;
- encouragement of international cooperation;
- attracting research funds and diversification of sources of finance;
- development of a culture of cooperation with industry at universities.

The action plan of the Ministry of Education, Science, Culture and Sports of Georgia for 2019[7] lists some planned amendments to existing legislation and regulations aimed at facilitating IPR and technology transfer (university-industry cooperation) and starting dialogue between stakeholders interested in the system of science, development and innovations. This includes possible engagement of governmental, academic, public and private sectors in core activities to strengthen industry-science linkages.

The Innovation Strategy for Georgia, elaborated with the support of USAID, points to a need for action to develop and integrate regular, innovation-focused entrepreneurship into public education, filtering and prioritizing funding areas in applied sciences to support target industries (aligned with the EU's Horizon 2020 focus areas), and develop partnerships between Georgian target industries and research centres around the world.

Policy implementation for industry-science linkages and collaboration

As discussed in Chapter 3, the main actors responsible for ST&I policy implementation are Georgia's Innovation and Technology Agency (GITA) and the Shota Rustaveli National Science Foundation (SRNSF). These institutions are complementary, with SRNSF primarily responsible for development of the scientific sector (like the U.S. National Science Foundation), while GITA focuses on ST&I activities in the business sector, including specific instruments for start-ups. A third actor, Enterprise Georgia, while not targeting innovation directly, has a key enabling role in supporting private sector readiness to adopt new innovations. Its activities are discussed in greater detail in the previous chapter, but include: support to entrepreneurs to create new enterprises, and to expand and refurbish existing enterprises; promoting the export potential of Georgia by increasing the competitiveness of local products; and promotion of FDI. There would be scope for Enterprise Georgia programmes to increase this impact further by including innovation-related criteria (in particular, on business-science collaboration). Support is currently provided to many companies that are in well established sectors and markets, such as hospitality on the Black Sea coast.

GITA supports parts of the innovation ecosystem facilitating business-science linkages and cooperation. Techparks and Innovation Centres support technological development and innovation, facilitating the establishment and growth of high-tech businesses by offering office space, technological, educational and professional resources. However, organizationally and in terms of staff, scientific institutions are currently not linked to Techparks and Innovation Centres.

FabLabs and ILabs initiated by GITA are complementary to Techparks. FabLabs or "Fabrication Laboratories" offer technological equipment (e.g., 3D printers, CNC rubbers, laser cutters,

PCB equipment), to local start-ups and young innovators to develop prototypes, test and start individualized, customized or digitalized production. FabLabs are implemented as a smaller version of industrial laboratories, accessible for all to design individual products or functions with the goal of developing a business model or start-up company.

The idea of ILabs is to establish a network of ICT laboratories at universities across Georgia. There are currently ILabs operating at three universities. The target groups include young scientists and potential entrepreneurs who will be supported by specialists to further develop their inventions as a basis for technology-based start-ups. ILabs are equipped with modern technologies and represent a working space for inventors and start-ups. The staff support young inventors and researchers with management competencies, training courses and also organizes – together with GITA – Hackathons, Makeathons and Olympiads. The private sector supports the start-up process via management skills and own investments (equity). The three existing ILabs focus particularly on mobile platform programming for computer games and competency development for graphics and visual effects.

Among existing SRNSF funding schemes, the applied research grant scheme in principle targets industry-science cooperation. According to the conceptual design of the scheme, project proposals should have their origin primarily in the business sector. However, until the end of 2019, no specific funding programme addressing joint research at the interface of science and business had been implemented.

In November 2019 a new call within the World Bank's GENIE Project was announced by GITA, organized in partnership with SRNSF. The call targets the scientific community and aims to promote innovation in collaboration with the private, public and academic sectors. Collaborative research should involve young scientists or research groups. The aim is to strengthen their research and technology transfer skills. The focus is on applied research projects, commercialization and technological transfer to address socio-economic challenges. This is a promising first step towards enhanced horizontal collaboration on innovation policy, and the results should be carefully evaluated for further policy development.

4.3 Potential for industry-science collaboration

Georgia can rely on quite a broad science and research sector, comprising public and private universities, research institutes and the Georgian National Academy of Sciences (GNAS). R&D is conducted by 56 institutions, including 47 higher education institutions (status: 2018). In addition, some private institutes focus on applied or project-based activities. As discussed in Chapter 3, the research institutes (most of which were integrated into the structure of the main universities) receive limited baseline funding and the main sources for research proper are private donations and competitive funding from SRNSF. Georgian universities have a high degree of autonomy and freedom to define their own priorities while the National Center for Educational Quality Enhancement monitors educational quality.

According to Geostat, research institutions' total expenditure on R&D was GEL128.3 million in 2018 (the available budget of the research universities and research institutes broadly corresponds, with a few notable exceptions such as Eliava Institute, to the total state allocation to R&D). The number of R&D personnel in the Georgian science sector amounted to 15,522 in 2018, of which 11,174 were researchers (tables 4.1 and 4.2). World Bank research[8] found a large share of researchers at Tbilisi universities and institutes with specializations in research fields such as bacteriophages, microbiology and virology, diagnostics, applied physics and chemistry, and secondary products from waste.

Georgia does not currently realize the full potential a highly educated population. According to Geostat data,[9] in 2018 around 40 per cent of unemployed women were highly educated (compared to 35 per cent of unemployed men), indicating an important education and labour market mismatch.[10] The share of female STEM graduates (43.7 per cent) also suggests that available human resources remain under-employed[11]. This could be explained partly by remuneration levels for women, which stand at only 65 per cent of average male remuneration for professional, scientific and technical activities.[12]

Table 4.1 Persons working on R&D in the science sector, 2018 (Persons)

	Total	Women	Men
R&D personnel, total	*15 522*	*8 239*	*7 283*
Of which:			
Researchers	11 174	5 925	5 249
Technicians and equivalent staff	1 841	1 005	836
Other supporting staff	2 491	1 300	1 191
Not specified	16	9	7

Source: Geostat 2019.

Table 4.2 Researchers in the science sector by education, 2018 (Persons)

	Total	Women	Men
Researchers, total	*11 174*	*5 925*	*5 249*
Of which:			
Doctoral or equivalent (ISCED 8)	7 330	3 855	3 475
Master's or equivalent (ISCED 7)	3 358	1 804	1 554
Bachelor's or equivalent (ISCED 6)	470	250	220
Short-cycle tertiary (ISCED 5)	16	16	0

Source: Geostat 2019.

Despite the existing challenges outlined in the next section, several universities - both public and private - have initiated their own forms of science-business cooperation.

Several public universities have set up FabLabs and ILabs with GITA support. The Georgian Technical University established a small-scale lab for students (with a 3D printer and laser cutter) to support innovations and very early stage start-ups, and there is a student incubator at the Georgian Technical University. A University Research and Entrepreneurial Skills Program is implemented by Ilia State University and the Tbilisi Regional Development Agency in cooperation with Cleveland State University. Ilia State University won grants to found the Laboratory of Future Innovation geared towards engineering and the ILab for innovation in computer and mobile device gaming (GameLab Iliauni). The lab is also accessible to students from Ilia State's partner universities and other commercial partners and seeks to generate ideas, new inventions, and educational platforms. Ilia State University also established a FabLab to fabricate digital technology-enabled products and create smart devices for educational purposes, integrating innovation and entrepreneurship into the curriculum. The overall objective is to train a new generation of designers, engineers, and entrepreneurs.

The Georgian Institute of Public Affairs (GIPA) is currently establishing the ILab CG Multilab as a training centre on computer graphics, animation, visual effects and architectural imaging. Students will create their own portfolio with professional support and undertake an internship with local companies. The University of Georgia established a FutureLab, which is a Start-Up Centre and co-working space for 50 people and plans to create a start-up fund. The Business and Technology University has set up structures to support inventions and foster linkages with private companies. A project called "Silicon Valley Tbilisi" aims to integrate the Business and Technology University, employment platforms, business incubator and accelerator, IT academy, media centre, research centre, virtual reality lab, training centre, and sports facilities in one space. Special emphasis is placed on supporting start-ups and demo days for companies.

The new Kutaisi University Complex (KUC) is an ambitious project, which will be established as an entrepreneurial and applied university in the model of the Technical University of Munich. KUC will include the following elements to build ties with national and international firms:

- Innovation centre;
- Start-up incubator;
- Workshop for prototypes;
- Business park for SMEs;
- Centre for Advancing Innovation.

Other examples of initiatives for business-science cooperation are implemented by the Free University, Agrarian University, Aviation University and Eliava Institute, the latter offering shared infrastructure for electron microscopy that can be used by private firms.

Only two universities have established technology transfer offices (TTO). The Georgian Technical University has both a TTO and a commercialization office (mainly a database of key knowledge and patents). Ilia State University founded a grant-based TTO and implemented an IP strategy in 2014. A memorandum of understanding with GITA was

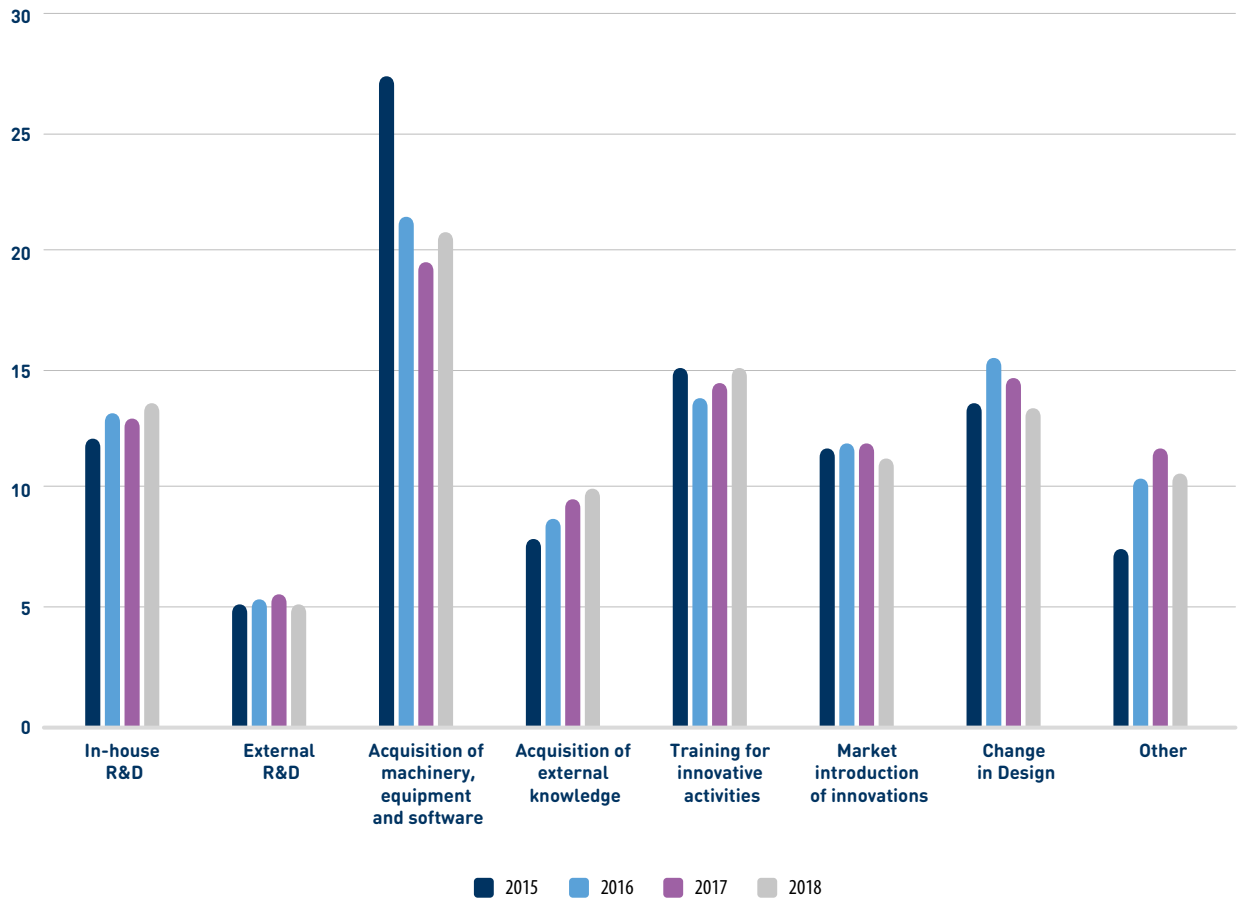
recently signed to develop the TTO further as a central and nationwide technology-transfer and commercialization office. Researchers from other universities already make use of the services offered by the Ilia State University's TTO.

To increase Georgia's commercialization capacity, GITA with the World Bank's technical support is implementing a three-year, EU financed Technology Transfer Pilot Programme. With a budget of €2.7 million, it aims to commercialize the most promising Georgian research results based on market needs.[13]

As regards the potential of the business sector, the Georgian business sector's contribution to research and innovation has been quite low and focused on the acquisition of machinery, equipment and software (see Figure 4.2), although the training of staff for innovative activities increased in the surveyed enterprises.

The "Innovative activity of enterprises" survey (described in Box 4.1) revealed very limited external R&D (around five per cent) at surveyed enterprises. This includes enterprises and subsidiaries within a group as well as public or private research organizations.

Figure 4.2 · Enterprise engagement in innovation activities
(Per cent)



Source: Geostat.
Note: Includes portable computers or other devices like smartphones.
Sampling Methodolgical changes in 2018.

Box 4.1 Innovation-related statistics in Georgia

The Geostat Business Statistics department has published business-related statistics since 1995, collected through the Business Register hosted by the same department. An "Innovative Activity of Enterprises" survey has been undertaken every year since 2012. In 2018, the sampling methodology was updated to 4,000 firms with more than one hired staff (the sample was previously 4,000 enterprises with more than 10 employees). The innovation activities of micro-business ("sole traders" without hired labour and those with annual revenues below GEL30,000) are not surveyed. The number of registered entrepreneurs was at 430,347 in 2018.[i]

This increase in sample scope without increasing sample size may reduce comparability through time. To avoid such a "structural break" in the statistics, one solution may be to continue sampling 4,000 firms with more than 10 employees and to supplement these with an additional number of firms with 1-10 employees, adding coverage of micro-firms without impacting existing data series. The additional sample should be allocated and stratified by innovation activities (NAICS), which would allow selection of a representative sample since their number is limited.

Geostat compiles additional innovation indicators that provide an overview of innovation capabilities. These include, among others, admission and number of graduates by field of science (since 2006), the number of national and foreign applications for inventions and utility models (since 2016), number of institutions conducting R&D and their expenditures (2018), number of persons working on R&D by status and gender (2018).

Geostat could consider indicators such as the share of high-technology, ICT in exports, and technology balance of payments. Aggregated R&D&I expenditures across all government agencies and the private sector published by Geostat may prove useful to capture the entire innovation picture in Georgia.

[i] Business sector in Georgia, 2019 accessed at https://www.geostat.ge/media/28062/Business-sector-2018.pdf
Note: R & D activities defined as "a creative and systematic work aimed at enhancing existing knowledge - including human, cultural and public - and seeking new uses." Three types of activities are covered: fundamental research, applied research and experimental development" (Geostat questionnaire "Innovative Activity of Enterprises").

Most sectors are not particularly innovation-friendly, with imported technologies the main driver of technological upgrading. With the exception of ICT, high-tech sectors are relatively underdeveloped.[14] Among the more promising fields for future innovation and industry-science collaboration are the ICT, medical, pharmaceuticals, biotechnology, automotive and aviation, materials, (alternative) energies and food sectors, although business linkages with scientific institutions are currently limited. This is seen when comparing the percentage of in-house R&D (average 13 per cent) and external R&D efforts (average five per cent) in the private sector.

Despite Geostat's efforts to monitor private sector innovation activities, science-business links are not well reflected in national statistics. Additional indicators could be included in the Innovation Survey (Box 4.1) and used to monitor and evaluate cooperative innovation between science and business. The current Innovation Survey already includes a few items concerning cooperation "with other institutions" and more explicitly "by public and private research organizations" in the case of external R&D performance. No integrated monitoring system currently exists for research activities in tertiary education, scientific-research establishments and results-based funding models.

4.4 Policy messages

Despite broad awareness of the importance of industry-science linkages, there is only limited concrete activity and output in this area. Weaknesses include private sector innovation activities and technological capabilities as well as a science sector mainly focused on basic research. There is a mismatch between the commercial and scientific sectors, with very limited synergies - for instance, regarding joint research, innovation support by universities or the suitability of qualifications for the private sector.

At the instrumental level, GITA has implemented various funding schemes focused on the business sector. In addition, GITA and SRNSF recently published a call, with World Bank and EU support, aimed at funding joint research projects between the science and business sectors, and this could be a model for further development. SRNSF has experience with specific applied funding schemes including business companies in the framework of joint research projects.

Georgian universities (both public and private), and most non-university research centres are fully autonomous institutions. The main focus of the universities is on teaching, with research mainly carried out in affiliated research centres focused on basic research. Given limited financial resources, additional activities like business cooperation/networking, joint research, commercialization, technology exploitation, start-up support etc. are problematic or only basically implemented (if at all). Only two Georgian universities have their own technology transfer offices with limited personnel and capacity, and there is a key need for at least one strong player. Private universities have greater financial flexibility, and some have initiated entrepreneurial approaches (e.g. start-up support). However, the impact in terms of innovation cooperation with the business sector remains quite limited.

Despite the high degree of autonomy of Georgian universities and their research institutes, the key challenges for cooperation with the business sector in applied research and industrial applications are:

- Limited long term financial support for R&D in general and for applied research in particular, and fragmentation of existing funding schemes;
- limited funding schemes targeting research-business cooperation;
- unclear national science, technology and innovation (ST&I) priorities;
- no or limited incentives for scientists to include private companies in internal or collaborative research projects;
- ageing scientific faculty staff and a lack of qualified, mid-level faculty;
- researchers' lack of experience in developing technological applications;
- outdated technical equipment;
- institutional/legislative barriers, including IPRs;
- a weak institutional framework for research cooperation among legal entities;
- limited scope for internal measures and instruments to transfer knowledge and technologies to the business sector;
- deficiencies in universities' internal organizational structures, regulations and competencies for innovation cooperation and partnership.

Technical equipment and technological infrastructure is often outdated. This applies to universities and their research centres and the non-university research institutes, and relates both to laboratories and the technical infrastructure for students, including access to international (research) databases. However, more recently some entities have established innovation-related research infrastructure in the form of new organizational models to support start-ups and integrate science and business companies (FabLabs, ILabs, Techparks and Innovation Centres). Universities like the Georgian Technical University or Ilia University are currently operating FabLabs and ILabs to support technology transfer and commercialization.

More specific barriers to business-science collaboration include a division between universities focused on teaching and research institutes on basic research, and a business sector with limited technical readiness for deeper cooperation - at least from the perspective of universities. There are currently no formal practices in organizing such cooperation and, given the relative novelty of the topic, none, or only limited links with the business community. University/research-based entrepreneurial activities (e.g., start-ups), are also a recent phenomenon with limited innovation output so far.

The Georgian business sector has limited financial resources for risky R&D and innovation projects, while awareness and willingness to invest in long-term research collaboration is low. Innovation policy has to improve the framework conditions for businesses to engage in R&D and innovation activities and to promote knowledge exchange and the mobility between academia and industry.

The SRNSF's applied research grant programme that aims, among other things, to stimulate industry-science collaboration, is still in an embryonic form with limited financial resources, and uptake by target groups not yet known. A crucial aspect will be whether business companies can provide the necessary co-funding (which has been the main bottleneck in similar past attempts), and whether the submitted projects will focus on applied research as a basis for commercialization. The joint definition of project ideas by research institutions and business companies would be one of the main success factors of the programme.

Cluster policy in Georgia - as an approach to strengthening horizontal and vertical value chains, including science-business linkages - has not yet been explicitly formulated. The study on Georgian ICT Cluster Potential elaborated within the project on SME Development and DCFTA in Georgia (GIZ)[15] underlines a lack of managerial and soft skills in the ICT sector and recommends supporting cluster development, including through expert advisory services, starting with the ICT cluster in Tbilisi but without reference to the scientific sector.

The science sector should take a more active role in the Georgian innovation ecosystem. International experience reveals science-business linkages and concrete measures to support cooperation between the two spheres to be an integral part of successful national (and regional) innovation policies. Science-business linkages are multi-faceted and should not limited to a traditional view of technology transfer from technology provider (university/research institute) to technology-taker (company). It should include aspects such as exchange of researchers, contract research, joint research, provision of infrastructure (laboratories), advisory services, matchmaking between students and companies for relevant bachelor's or master's theses and internships, engaging industry practitioners in teaching, building national and regional business-related networks, engaging in regional clusters, national/regional development strategies, etc.

There is a role for direct public support to research infrastructure to encourage innovation in the business sector, but long-term success will also depend on building a market for knowledge and technologies by incentivizing key target groups in the business and science sectors. Innovation policy and the relevant public authorities and innovation intermediaries will be crucial to the process of shaping the innovation ecosystem in general, and science-business linkages in particular.

There is poor awareness on both sides of the science-business dichotomy of the opportunities by matching latent demand in the business sector for applied R&D with the problem-solving capabilities of universities and research institutes. Policy interventions to support networking and matchmaking require limited financial resources, and innovation vouchers can be of great help in addressing this coordination failure. As already mentioned in Chapter 3, the existing facilities of GNAS could support this type of public intervention.

Key high-level challenges for better industry-science collaboration include:

- no coherent, integrated or horizontally-coordinated national strategy for industry-science linkages;
- a business sector with limited R&D and innovation capacities and low articulated demand for external knowledge;
- institutional and bureaucratic barriers within scientific organizations;
- limited internal resources of scientific institutions to build capacity, infrastructure and business-related networks;
- mismatch between potential demand for external knowledge and its supply, both at the macro-level (due to a lack of ST&I priorities), and at the micro-level (due to limited awareness and lack of coordination between industry and science);
- a market for knowledge and technologies that is underdeveloped;
- weak facilitation of links between academia and businesses (both local and international);
- inadequate financial incentives or other mechanisms to support these links;
- insufficient projects or start-ups identified as role models, although there is now potential to do this, for example, at Eliava and GITA.

Possible starting points to improve framework conditions related to science-business linkages include, among others, the following:

- raising business sector awareness of existing scientific potential for innovation, technological upgrading and wider social benefits;
- experimenting with funding measures to strengthen science-business linkages and commercialization, notably by SRNSF and GITA (and jointly);
- further development of innovative infrastructures such as FabLabs and ILabs to support young scientists and start-ups;
- sharing more widely recent experiences at leading universities/research centres with (still small) innovative models and instruments to support cooperation;
- promoting the general openness of universities and professors/scientists to experiment with new approaches and initiatives.

Notes

1 Koschatzky, K., "Räumliche Aspekte im Innovationsprozess. Ein Beitrag zur neuen Wirtschaftsgeographie aus Sicht der regionalen Innovationsforschung". LIT Verlag: Münster, 2001.

2 See Schmoch, U., G. Licht, M. Reinhard., "Wissens- und Technologietransfer in Deutschland". Fraunhofer IRB Verlag. Stuttgart, 2000 and Koschatzky, K., op.cit.

3 In Germany, for instance, the Fraunhofer Gesellschaft and its institutes focus their research activities on concrete applications and receive funding both from the public sector and through contract research earnings. Joint research at Fraunhofer is carried out primarily with industry partners but also with other research institutes. The Steinbeis Foundation supports interactions between professors of a university and industry - for instance by providing organizational support and networking through so-called Steinbeis Centers.

4 Schmoch, U., G. Licht, M. Reinhard., "Wissens- und Technologietransfer in Deutschland W". Fraunhofer IRB Verlag. Stuttgart, 2000.

5 See Koschatzky, K., T. Stahlecker (Eds.)., Public-Private Partnerships in Research and Innovation: Trends and International Perspectives. Fraunhofer Verlag: Stuttgart, 2016.

6 See http://ppd-network.org/en/public-private-dialogue-in-georgia

7 http://mes.gov.ge/content.php?id=7755&lang=eng.

8 The World Bank Georgia: Increasing Institutional Capacity for Innovation, 2018 accessed at http://documents.worldbank.org/curated/en/131791545202539953/pdf/Project-Information-Document-PID-Georgia-Increasing-Insititutional-Capacity-for-Innovation-P169599.pdf

9 Geostat, Women and Men, 2019 accessed at https://www.geostat.ge/media/27546/W%26M-ENG_2019.pdf

10 Women and Men in Georgia, National Statistics Office of Georgia, Tbilisi 2019.

11 UNESCO Institute for Statistics (http://uis.unesco.org/)

12 Geostat, Women and Men, 2019 accessed at https://www.geostat.ge/media/27546/W%26M-ENG_2019.pdf

13 https://gita.gov.ge/eng/static/155/ttpp

14 European Commission, Specific Support to Georgia: Improving the effectiveness of Georgia's research and innovation system through prioritisation, selectivity of funding and science-business links. Horizon 2020 Policy Support Facility. Brussels, 2018; European Commission, Specific Support to Georgia. Background Report. Horizon 2020 Policy Support Facility. Brussels, 2017.

15 EU4Business, GIZ, Georgian ICT Cluster Potential: Strengths, Weaknesses and Internationalization Opportunities. SME Development and DCFTA in Georgia Project, 2017.

Chapter 5

PUBLIC PROCUREMENT AS A DRIVER OF INNOVATIVE DEVELOPMENT

Summary and recommendations

Challenge	Objective of intervention	High-level recommendations
Limited business investment in R&D and innovation due to a lack of demand for innovative products and services	Use public procurement to generate more demand for innovations	• Strengthen the legal basis for public procurement as a driver of innovation and align public procurement practices and procedures with national innovation and sustainable development priorities • Use traditional procurement to encourage broad-based deployment and diffusion of existing best-in-class solutions and to support sustainable development priorities • Introduce Innovation-enhancing procurement (IEP) to increase market demand for innovation and increase competition • Introduce Pre-commercial procurement (PCP) to facilitate the participation of SMEs in IEP and stimulate R&D

Source: UNECE.

Public procurement is approximately 10 per cent of GDP in Georgia, but, so far, has not been used sufficiently and systematically as a driver of demand for innovation. This chapter explores the procurement system in Georgia and identifies potential near- and longer-term reforms to better use this policy lever - and move towards "innovation-enhancing procurement".

Georgia has a strong, well-established central State Procurement Agency and has become a regional leader in e-procurement, used in 81 per cent of all tenders. However, there are no systematic, cross-cutting mechanisms to stimulate demand for innovation and business investment in R&D. This includes areas where innovation could address the country's national sustainable development challenges; such as combating pollution and overcoming substantial regional disparities.

The new law on public procurement, under development at the time of writing, is an opportunity to develop the legal basis and institutional arrangements to promote innovation on the demand side, and to align public procurement objectives and procedures with strategic national innovation and sustainable development priorities.

This can be done in two ways: by adapting and strengthening existing procurement procedures, and by introducing new policy instruments for so-called Innovation-enhancing procurement.

Tenders for standard products and services typically make up the bulk of procurement. Georgia has substantial potential to use its large purchasing power to encourage the broad-based deployment and diffusion of existing "best-in-class" solutions that perform best over the project life cycle by including safety, environmental and social standards among selection criteria. This also requires ensuring a critical mass of potential suppliers for competition, which, in part given the size of the economy, remains a challenge.

Traditional procurement is not always suited to address newly arising public sector needs or societal challenges. Doing so requires additional instruments for Innovation-enhancing procurement (IEP) to facilitate the development of products and solutions that may not yet exist in Georgia. When properly aligned with broader policy objectives, IEP can catalyse transformative innovation in response to SDG-related challenges by creating new business opportunities where profitability is aligned with progress on sustainable development.

IEP requires specifying the selection criteria in procurement tenders in functional terms, i.e. in terms of what functionalities the purchased good or service is to provide (e.g. percentage reduction in energy costs of a building), rather than in terms of which specific good or service to buy (such as a new central heating unit). With functional specifications, bidders can compete by developing new superior solutions that meet the specifications, rather than competing only by supplying an existing solution at a low price. Prior to tendering, competitive dialogue with industry should be held to understand technological possibilities and formulate sound functional specifications.

Given the demands placed by IEP on both procurement officials and potential bidders, including the selection of winning bids in a transparent way, it is advisable to start with pilot demonstration projects and to build up the capacity of procurement agencies and the private sector over time.

While public procurement tenders in Georgia are open to all bidders, including foreign ones, in practice there seems to be little competition, and most tenders have attracted few bidders. SMEs often struggle to compete for public tenders, and many do not participate at all. Because it specifies functions rather than the technical characteristics of products and services, IEP can create market entry points for new competitors. So-called Pre-commercial procurement (PCP) calls are those that fund SME R&D projects that may lead to bids in subsequent IEP tenders. As such, PCP is an additional policy tool that can make IEP more successful by supporting SMEs participation in tenders and creating more competition for large companies.

Recommendations in detail

Chapter 5: Public procurement as a driver of innovation

Recommendation 5.1: Public Procurement as a Policy Lever

Strengthen the legal basis for public procurement as a driver of innovation and align public procurement practices and procedures with strategic national innovation and sustainable development priorities.

- Create a policy framework that fully integrates IEP;
- Coordinate and bundle existing demand among procuring entities;
- Define support of national innovation and sustainable development priorities as one of the strategic objectives of the country's procurement policy, and integrate IEP as a cross-cutting policy instrument in the proposed national innovation strategy;
- Define criteria for when to use functional and when to use traditional procurement specifications, and when to use centralized versus de-centralized procurement;
- Create the legal basis for pre-commercial procurement;
- Support IEP rules through a comprehensive programme of awareness raising, capacity building and training for practitioners through the training centres of the State Procurement Agency and Ministry of Justice, as well as universities and research centres;
- Introduce a systematic process of monitoring, evaluation and policy learning on IEP, led by a central government agency or a centre of excellence on IEP, and drawing on data from the existing e-procurement platform and other sources.

Recommendation 5.2: Making the Best of Traditional Procurement

Use traditional procurement to encourage broad-based deployment and diffusion of existing best-in-class solutions and support sustainable development priorities.

- Expand the use of most economically advantageous tender (MEAT) and lifecycle cost criteria to evaluate bids, where appropriate;
- In all tenders, ensure that winning bids comply with relevant quality, safety, environmental and social standards;
- Do comprehensive risk and impact assessments as part of the design of tenders, identifying not only financial risks, but also expected environmental and social impacts, defining measures for mitigating negative impacts, and setting forth plans for monitoring implementation of these mitigation measures;
- Draw lessons learned from best practices such as the environmental and social management framework for the GENIE project and consider which may be applied to regular procurement to support environmental and social outcomes.

Recommendation 5.3: Innovation-enhancing procurement as a Change Maker

Introduce Innovation-enhancing procurement to increase market demand for innovation and increase competition.

- Develop the required capabilities to effectively manage IEP among the staff of procuring organizations;
- Use innovation foresight exercises (as recommended in Chapter 3) to identify needs, potential, opportunities, and constraints for IEP in Georgia;
- Use IEP as a targeted instrument to advance broader sustainable development objectives (catalytic procurement), including through pilot and demonstration projects; linking IEP to the Green Growth Strategy 2030 would be one potential place to start;
- Introduce functional performance specifications in areas where feasible and where there is potential for innovation and spillover effects, piloting this approach at first in selected areas and then gradually expanding;
- Ensure that selection criteria and the evaluation process for procurement in general, and IEP in particular, are transparent;
- Simplify, where possible, administrative procedures, especially in the pilot phase of IEP;

Recommendations in detail | **Chapter 5: Public procurement as a driver of innovation (Concluded)**

- Pilot and gradually expand a systematic process of competitive dialogue with potential suppliers in order to clarify technological possibilities as a basis for developing functional specifications; the national intellectual property office Sakpatenti could support the State Procurement Agency with information on the state-of-the-art;
- Ensure that IEP tenders are open to foreign bidders and align it with policies promoting foreign direct investment, and in particular policies and rules enabling and promoting technology and other spillovers from such investments.

Recommendation 5.4: Pre-Commercial Procurement to Connect with SMEs

Introduce Pre-Commercial Procurement to facilitate the participation of SMEs in Innovation-enhancing procurement and to stimulate R&D.

- Publish Pre-commercial Procurement calls in preparation for planned innovation-enhancing procurement calls in order to support SMEs in doing the R&D necessary to participate in IEP calls;
- Use the proposed innovation foresight exercises and competitive dialogues to identify possible topics for pre-commercial procurement calls;
- Develop a phased approach where PCP calls can be issued for different stages of the process from research to prototyping, and decisions on which projects to take to the next stage can be made along the way;
- Ensure that additional bidders can enter at different stages, and that the knowledge created at prior stages can be shared with new entrants;
- Align pre-commercial procurement tools with complementary policies supporting R&D, technology transfer and commercialization, including those currently managed by SRNSF and GITA, as well as SME support policies through Enterprise Georgia.

Source: UNECE.

5.1 Introduction

Societal "grand challenges" are driving the need for mission-oriented innovation policies.[1] Traditionally, such policies have been approached from a top-down perspective, taking specific societal challenges and mobilizing existing socio-technical systems to seek solutions.[2] Transformative innovation policy is a recent term expressing the need to transform how we live through innovation policies based on the grand challenges identified by the SDGs.[3]

Grand societal challenges such as the SDGs define the goals of mission-oriented policies. But these goals are "wicked" and unstructured,[4] and must be translated into concrete policy interventions.[5] Public procurement is an essential and under-used policy instrument to tackle such goals, while supporting innovation. Public procurement impacts far beyond innovation development and can have transformative effects on both society and environment.

Grand societal challenges involve searching for unknown solutions to often unknown or undefined problems. Innovation is not an end but a means to mitigate (or even solve) these societal challenges, which must therefore be defined clearly.[6] Mission-oriented innovation policies require a public sector with the "intelligence"[7] to define,

articulate, implement, monitor and evaluate these goals. Saari et al. (2015)[8] found "about half of all innovations originate from middle managers or front-line workers, and the other half from agency heads, politicians, interest groups and individual citizens", that is, at all levels. Policy makers should not define *how* problems should be fixed, but rather *what* problems must be solved, that is, the directionality of innovation policies. Innovation-enhancing procurement (IEP) emerges as a policy instrument that can support innovative development with clear policy directionality.[9]

IEP involves a public agency tendering for a good, service or technology that does not yet exist, providing solutions to an unmet policy need or challenge. IEP must result in some form of innovation before delivery to the public agency of a solution that outperforms existing solutions. IEP requires a shift from defining parameters in detail to specifying objectives and leaving bidders (that is, economic operators) substantial scope for proposing solutions. Unlike traditional, supply-oriented R&D and innovation instruments, IEP implies a proactive prioritization according to strategic goals.

IEP can be a game changer (a transformative instrument) by creating the conditions for creativity and innovation.[10] Putting governments as "lead customers" leads to several benefits, including economies of scale with early purchases, unit cost reductions and quality improvements due to learning effects. IEP encourages innovation by articulating demand, signalling to innovation producers the existence of unmet needs, and facilitating interaction between users and producers. IEP can have a "transformational role",[11] and influence the evolution of an existing market by changing its structure, capturing spillovers not included in traditional value for money (VFM) investment appraisals. Other rationales for using public procurement to promote innovation include:[12]

- Creating markets to fulfil (agency) missions and/or needs;
- Public sector modernization: improved public services;
- Promoting and diffusing innovations to private agents;
- Signalling demand for certain technologies and products;
- Demonstrating the value of innovations to other users and producers;
- Strengthening knowledge and capabilities of key suppliers, and internationalization of local firms;
- Avoiding supplier lock-in situations;
- Economic diversification;
- Cost reduction;
- Creating growth and jobs by bringing R&D to the market.

This chapter considers the legal framework and policy instruments for public procurement, and the degree to which this supports innovation and sustainable development in Georgia. Against international best practice and following consultation with local stakeholders, it suggests a series of possible pilot projects and makes practical policy recommendations.

5.2 Potential of innovation-enhancing public procurement

Demand-side interventions, including IEP, improve conditions for the uptake of innovations and the articulation of demand.[13] Demand subsidies, demand tax incentives, awareness measures, labels, information campaigns, demonstration projects, support of user-producer interaction, support of user-driven innovation, regulations and standards, public procurement (that is, R&D procurement and innovation procurement), and systemic policies (for example, cluster policies), are some examples of demand-side innovation policy instruments (see Figure 1). However, effective IEP requires complementary demand- or supply-side policy instruments. **Supply-side** policy instruments include fiscal measures, support for training and mobility, grants for industrial R&D, information and brokerage support, and networking measures.

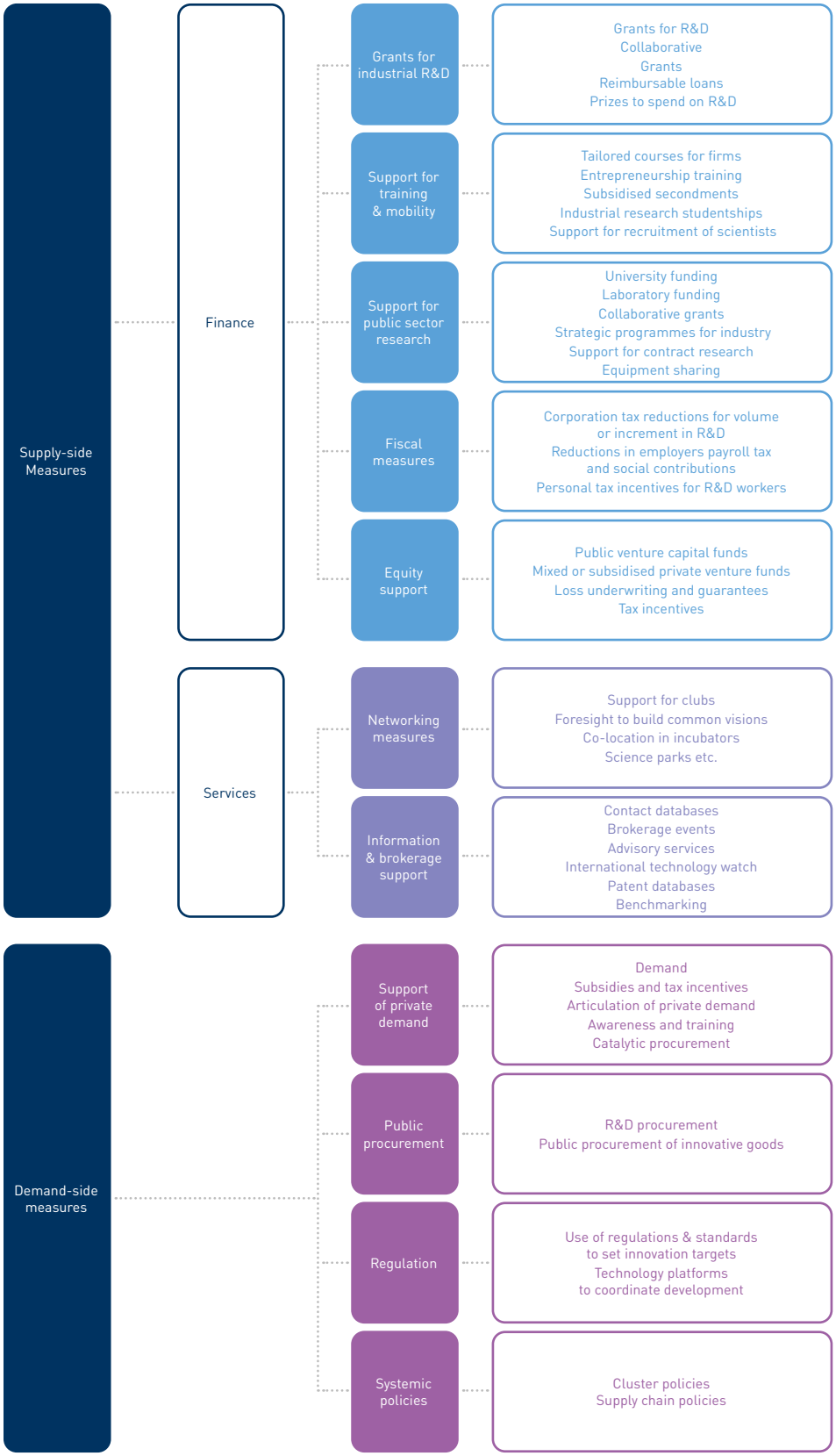
Public procurement may provide a "lead customer" or "lead market" for an innovative product, service or process[14,15] through early stage, large purchases. Such "lead customers" can make substantial economic gains as early adopters of these innovations.[16] Procurement contracts also act as an incentive for developers of new technologies, not all of whom may receive support from traditional R&D funding subsidies. Procurement may "legitimize" product standards, offering the potential to expand to related markets.

There are two European directives which set the regulatory framework for public procurement (Directive 2014/24/EU of 26 February 2014 on public procurement, and Directive 2014/25/EU of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors); however, they do not provide specific regulations for IEP. These two directives state how public procurement regulations adhere to the World Trade Organisation's (WTO) Agreement on Government Procurement (GPA), which "establish a multilateral framework of balanced rights and obligations relating to public contracts with a view to achieving the liberalization and expansion of world trade" (point 17 of the Directive 2014/24/EU, and point 27 of the Directive 2014/25/EU). These two directives also set the threshold amounts of public contracting, which need to be revised every two years according to the thresholds established in the WTO's GPA (see Article 6 of the Directive 2014/24/EU, and article 17 of the Directive 2014/25/EU).

IEP creates an interactive learning space where interactions between procurers and suppliers lessen information asymmetries and create the conditions for further innovation.[17] Both users and producers need interaction to overcome the challenges, risks and uncertainties of innovation. User uncertainties include technological characteristics, performance and potential impact of the products or systems to be procured, specifications and granting of contracts, financial risks, as well as organizational and societal risks.[18]

Producer challenges relate to capability to meet the needs of procuring agencies, and the technological challenges related to the performance requirements. Communication of these needs is an essential feature of procurement processes to signal the nature and sophistication of the demand. Engaging suppliers at an early stage in procurement helps reduce risks.[19] Early supplier involvement improves supplier solutions and generates user benefits.

Figure 5.1 · Taxonomy of innovation policy instruments



Source: Edler and Georghiou (2007: 953).

The most effective and innovative solutions often emerge from stakeholder collaboration and joint partnerships,[20] since public organizations do not hold all the technical knowledge for solutions to new problems. Policymakers must therefore shift towards a cooperative governance model, with innovation policy as a facilitator creating conditions for the emergence of solutions and experimentation.

Edquist (2017) suggested a typology of IEP with four types of intervention.[21]

- **Direct public innovation procurement:** "classic case" with the procuring organization as end user of the product, e.g. public electricity authority or hospital, and using its own requirements to trigger innovation, including the needs ("missions") of the public agency. The resulting product is often diffused to other users, benefitting wider society.
- **Catalytic public innovation procurement:** the procuring agency is a catalyst, coordinator and technical resource for end users. The needs are located "outside" the public agency; it acts as the "buyer" but is not the end user. The public agency procures new products on behalf of other public or private actors. The procuring agency acts to catalyse the development of innovations for broader public use than its own mission.
- **Functional procurement:** an agency describes a function or problem to be solved (functional specification or requirement), instead of the solution itself. The public agency specifies *what* is to be achieved rather than *how*. Problems are identified, translated into functions and presented as requirements for suppliers to respond to.
- **Pre-commercial Procurement** (PCP): the procurement of (expected) research results involving direct public R&D investments, but no actual product development. It does not involve the purchase of a (non-existing) product, and so no "buyer" is involved. PCP could also be labelled "contract" research.[22]

These instruments should not be confused with regular public procurement. Regular procurement occurs when public agencies buy ready-made products such as pens and paper "off-the-shelf", with no innovation required. Only the price and quality of the (existing) product are taken into consideration. IEP must thus not be confused with this regular "off-the-shelf" procurement, which accounts for the very large majority of public procurement in Georgia. Given the fact that public procurement is approximately 19 per cent of GDP in the EU, and about 10 per cent in Georgia,[23] increasing the share of IEP in overall public procurement would have significant benefits to the national economy.

Pre-Commercial Procurement (PCP)

Direct and catalytic innovation procurement is often confused with PCP. PCP concerns the R&D phase before commercialization.[24] PCP refers to the acquisition of expected research results and entails direct public R&D investments. It is regarded as an approach to procuring R&D services in a targeted way, since the funding organizations identify the area in which R&D-based solutions are needed.[25] PCP supports R&D and the prototyping or demonstration of new technological solutions by providing funding to a company, usually an SME. It follows the same logic as R&D funds, but in PCP calls a problem that requires a solution is already identified (for example, develop a solution to identify when dams may break, and hence avoid the risk of flooding), whilst regular R&D projects do not provide such

directionality. However, it does not provide financial support for further commercialization by enterprises investing in manufacturing capability, scaling up, or for marketing and product promotion.[26] In PCP, the public authority is not obliged to purchase the good, service or system that may (or may not) result from the R&D. Public authorities and industry thus share the risks and benefits (that is, public authorities provide the funding for the development of R&D solutions, and the companies can develop a technology or solution, for which however, the public authorities do not commit to purchase). These R&D results may (or may not) lead to product innovations that outperform existing solutions on the market. These R&D outputs may later reach the market through a mix of post-PCP funding from sources such as venture capital, foreign investment, regular procurement, etc.

The PCP process is illustrated in Figure 5.2, where the procurement process is divided into different phases, from curiosity-driven research through to commercialization. The strength of PCP is the clear division of resources between exploration and exploitation during the innovation process. Not all firms can allocate sufficient resources to both processes, and some may be better at generating ideas, while others specialize in implementation and diffusion. Figure 5.2 illustrates how a particular firm can participate in one or more phases without being active in the entire process. This means that handovers (that is, technology and knowledge transfer) need to occur[27] and allows for entry at any stage, regardless of prior involvement.

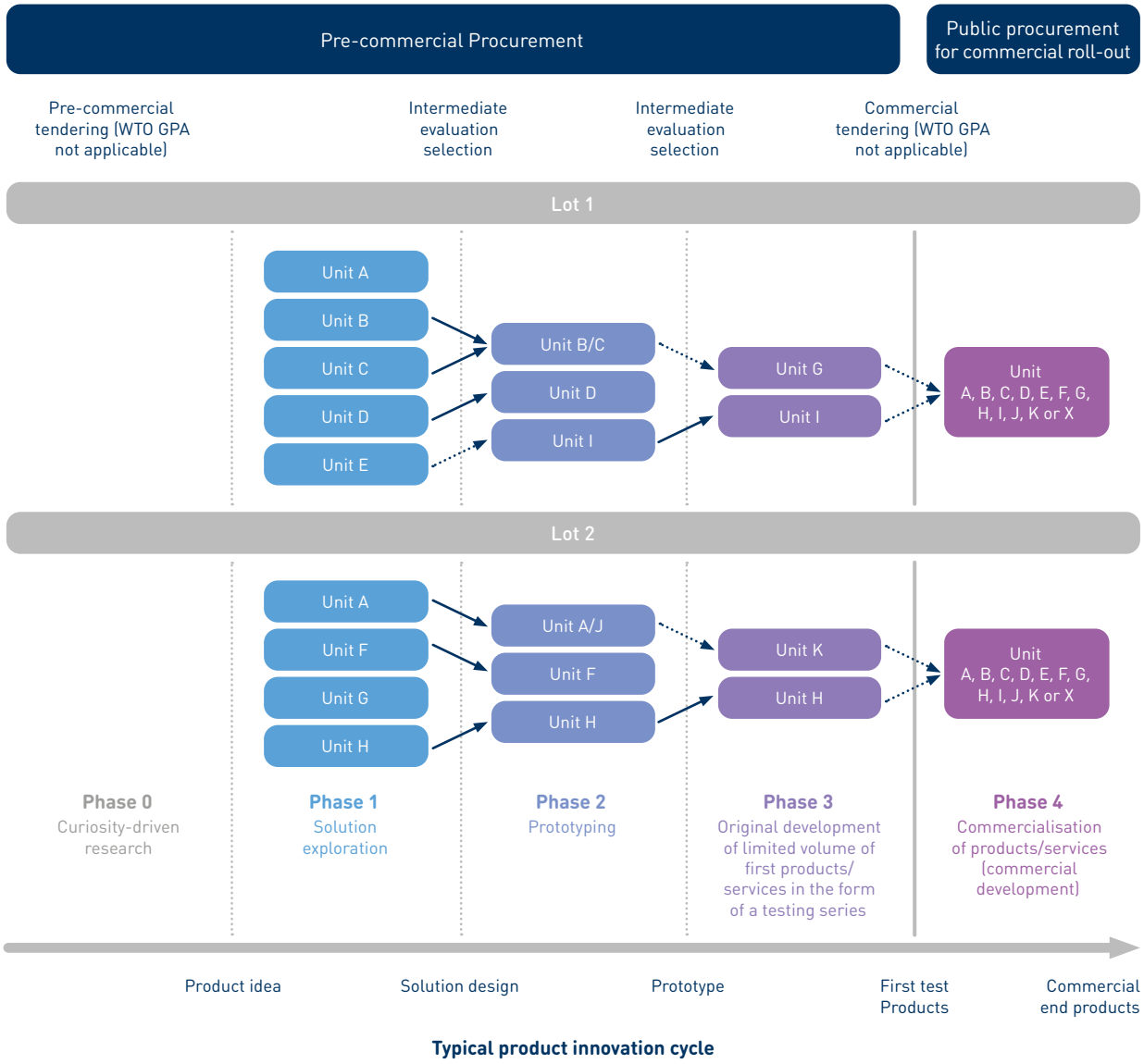
Beyond the PCP programme implemented by DG CONNECT in Europe,[28] examples can be found in the US Small Business Innovation Research (SBIR) programme, established in 1982[29] and aiming to: stimulate technological innovation; use small business to meet federal research and development needs; foster and encourage participation by minority and disadvantaged persons in technological innovation; and increase private sector commercialization of innovations derived from federal R&D. Another example is the UK Small Business Research Initiative (SBRI), introduced in 2011, earmarking a share of the Government's procurement budget for SMEs through competitive R&D contracts.

EU public procurement directives do not apply to PCP schemes. Instead, PCP relies on using the R&D exemption in the EU procurement directives to adhere to the principles in the EU treaty and EU State Aid rules (see Directive 2014/24/EU and Directive 2014/25/EU). PCP can be integrated into a broader policy instrument mix, shortening time to market, facilitating industry-science linkages, and encouraging market acceptance of new solutions.[30] PCP lacks incentives for commercialization, and must be complemented with other instruments such as grants, tax incentives, access to finance, joint technology initiatives, venture capital investments, demand-based foresight, regular procurement, development or modification of regulations and norms, standard setting, innovation vouchers, etc.[31]

General context of IEP in Europe

Early OECD research on innovation activities under procurement contracts suggests strong variation between countries. For example, 9.8 per cent of firms in the Netherlands and 9.2 per cent in Italy participated in procurement contracts requiring the development of an innovation, with lower shares in Austria (3.8 per cent) and Poland (3.6 per cent).[32] The OECD Observatory of Public Sector Innovation (OPSI)[33] is another useful source of information on IEP.

Figure 5.2 · Pre-commercial procurement and regular procurement



Source: Timmermans, B., J.M Zabala-Iturriagagoitia (2013). Coordinated unbundling: A way to stimulate entrepreneurship through public procurement for innovation. Science and Public Policy 40(5), 674-685.).
Note: GPA=WTO plurilateral Agreement on Government Procurement.

The Eurobarometer provides information on public procurement and innovation,[34] including the proportion of companies involved in public procurement and innovative goods or services developed as a result of public procurement. Over 2012-2015, 19 per cent of firms reported winning at least one public procurement contract while 15 per cent reported submitting at least one tender without success. But most companies (62 per cent) neither submitted a tender nor investigated opportunities to bid. Firms that introduced innovative goods or services were more likely to have won at least one public procurement contract, with 38 per cent of companies that won a public procurement

contract reported it including innovation. Most firms, however, reported no innovation in their bids (59 per cent). The results also showed companies with 50-249 employees as most likely to include innovations in a winning public procurement contract (53 per cent of these firms).[35] These results are consistent with OECD findings, and suggest around 15-19 per cent of firms winning a public procurement contract including innovation.

While most countries support IEP, either by developing action plans or broader strategies, very few have systems in place to monitor and evaluate IEP policies.[36, 37] Those countries with IEP related targets mostly prescribe a share of public procurement value to be conducted as IEP. According to the OECD (2016: 47), some countries stated there was no measurement "policy" because IEP initiatives were merely conducted in one-off projects. Countries with explicit IEP policies stated that it was too "new" to be monitored in a meaningful way.

Examples of innovation enhancing procurement

This section provides some previously documented examples of IEP[38, 39] that show its potential to stimulate innovation in multiple sectors and develop solutions to various challenges.

The X2000 high-speed train in Sweden constituted a case of direct procurement targeting mobility. The X2000 procurement was notable for the length of time required, with limited capacity on the procurer's side a key constraint. Technical requirements for the procurement documentation took some years and were finally defined in 1985. The X2000 resulted in significant infrastructure improvements supporting economic growth, commercial surpluses for the Swedish State Railway Company, reduced road infrastructure costs, energy savings, shorter travel times and reduced road accidents and pollution.

The second case is the AXE telephone switch - a computerized switching telephone network for improved telecommunications. The Swedish Telecommunications Administration (nowadays Telia Inc.) acted as the procuring organization. AXE was developed by the semi-public company Ellemtel, jointly owned by Televerket and Ericsson. The first stage focused on the functional specifications of the required system, which were agreed upon by the three parties in 1972. The next stage was development and production of the new switching technology, requiring employee mobility among the three partners to facilitate knowledge transfer. The first trial of the AXE technology was carried out in 1976 in a switching station with 3,000 subscribers. Next steps involved scaling up and selling the AXE system abroad. Orders were subsequently received for ten new AXE stations in Sweden (up to 240,000 subscriber lines), making Sweden the first country with national digital coverage and leading to lower telephone fees. Requests were received for new stations in Finland, France, Denmark, Mexico, Brazil, Australia and Saudi Arabia, leading to a 40 per cent global market share in 1992.

In 1988 the Swedish Government decided to establish a new energy efficiency programme including a subprogramme for technology procurement, managed by the Department of Energy Efficiency at NUTEK (Swedish National Board for Industrial and Technical Development). Programme objectives included development and demonstration of energy-efficient products, systems and processes, market penetration and commercialization in the construction sector and in industry.

This included a light corridor project, initiated jointly by NUTEK and the Swedish Council for Building Research, an example of catalytic procurement with the procuring body acting on behalf of final users. A reference group included representatives from the authorities, users, consumers, real estate owners and managers, energy utilities, lighting manufacturers, scientists and lighting consultants that developed functional specifications for lighting systems to guide bids. Agreements were signed with 13 of Sweden's largest real estate management companies and owners of public and commercial buildings based on these specifications. The purchasers' group had guaranteed 20,000 and 6,000 ballasts intended for 36W and 58W fluorescent tubes, respectively, which represented one third of annual sales in Sweden, and was around five times the previous annual sales of high frequency ballasts. Two years later, the winning bidder produced more than 400,000 ballasts for the Swedish market alone, or 80 per cent of the domestic market, with exports to several European countries following.

In 1988, the Swedish Government launched the Swedish Technology Procurement Programme (STPP) to exploit Sweden's potential for energy efficiency and reduce growth in electricity use. The STPP aimed to reduce national demand for electricity by 10 TWh by 2000, or around 15 per cent of 60-70 TWh nuclear capacity. Several energy-efficient technologies were supported, and we focus here on energy-efficient refrigerators, with refrigerators and freezers accounting for around 30 per cent residential appliance consumption. The public sector facilitated the development of procurement processes, not as a buyer but as a catalyser. STPP experts, together with organizations included in a purchaser group, targeted a product 40-50 per cent more energy efficient than existing products. A request for proposals was circulated internationally, followed by a declaration from the purchaser group guaranteeing the acquisition of 500 units for rental properties and a commitment to continued purchases. In December 1990, a prototype called the TR 1060-LE was tested and by September 1991 was available on the market. The prototype used conventional technology and was 33 per cent more efficient than the most efficient model available, 44 per cent more efficient than the most popular model, and 60 per cent more efficient than the average model in use. The market share for efficient refrigerator/freezers increased from less than one per cent to five per cent, and the winning bidder began exporting to Germany. Cumulative savings through 1994 for the purchased model alone were more than 1 GWh, and NUTEK estimated total annual savings across its market transformation initiatives of 1 TWh by 2010, at a cost to NUTEK of significantly less than half a million dollars.

The fourth case concerns procurement of a shared digital mobile radio system (safety network) for emergency and alert situations in Norway, based on the need for a digital radio network coordinating independent analogue mobile radio communication networks of fire departments, health services, police and other emergency services. The procurement process itself began in November 2004, when the Norwegian Government presented a NOK3.6 billion project to establish a nationwide digital radio network for the fire, police and health services. The specification was technologically neutral, describing only how the radio network should function from an end-user perspective (that is, functional requirements). However, the functional requirements of the agencies were too detailed, with over 4,000 demands as to how the system should operate, leaving limited interpretation space for potential suppliers. The project aspired to sell this publicly-owned safety radio concept to other European countries and yielded other positive impacts for Norway in the areas of employment, efficiency and public safety.

Following a PCP approach, the Dutch Government implemented its Small Business Innovation Research (SBIR) in 2004, a programme seeking quick win, innovative solutions to societal issues. The SBIR begins with a public authority identifying a specific challenge or societal issue and making a budget available with an open competition and specific tender period. All competitions are expressed as a desired outcome or challenge to be solved rather than a detailed set of specifications. An independent committee appraises proposals according to: societal impact, economic prospects, ecological and societal aspects, contribution to the solution of public demand and entrepreneurship, (technological) quality and degree of innovation, budgeted costs and societal added value. One example of PCP in the Netherlands was real time observation and inspection of dykes, which are crucial elements to keep low-lying regions from flooding. The Directorate-General of Public Works and Water Management (Ministry of Transport) saw PCP as a way to find new solutions for monitoring dykes. "DigiDijk", a real time dyke observation and inspection project, was started in 2007. The invitation for bids was simple and reflected a broad challenge: "Is it possible to apply new technologies for conducting permanent, real-time dyke monitoring and early detection of weak spots?" The involvement of water boards from the start did not guarantee that solutions would be purchased, and it took great commercialization efforts for the two winning companies to find their first customers.[40]

The UK also started implementing a PCP scheme in 2011 through the Small Business Research Initiative (SBRI). One example was the "Making Waves: Gesture-based communication system" initiative, a PCP competition launched in January 2011 to develop location and gesture-based communication systems for learners with disability or communication difficulties to interact with mobile technologies. Three candidates were funded for phase 1, and after rigorous review two companies progressed to phase 2. These two projects on gesture recognition allowed the user (with either hearing or motor disabilities), to "talk" to a device in sign language. The gestures were then captured, stored and software-processed to recognise sequences of user gestures through a locally stored library of core concepts or words. These were then assembled into sentences and text output in real time. As in the Dutch case, the PCP scheme did not guarantee purchase, covering only R&D funding.

In 2008, Spain was at the beginning of an almost decade long financial crisis - a context requiring innovation and creativity. The organization responsible for delivering healthcare services in Galicia is the Servizo Galego de Saúde - Galician Health Service - (SERGAS). The 2009 strategic plan of the SERGAS indicated that the financial crisis would have direct performance impacts, and innovation was required to respond to the needs of Galicia's ageing society. The SERGAS adopted a mission-oriented policy aiming to develop a healthy lifestyle model based on active ageing. Galicia defined two large IEP projects in health, InnovaSaúde and Hospital 2050, with a budget of about €90 million from 2011 and constituting the most ambitious IEP initiatives ever in Spain. SERGAS aimed to respond to the global challenge of elderly care and health by strengthening the local and regional supply chains to target needs associated with international markets.

The learning by doing that took place between 2008 and 2015 in the SERGAS led to the institutionalization of IEP in Galician innovation policy-making, with the regional government shifting to make strategic, deliberate use of IEP to foster innovation,

entrepreneurship and growth. The Civil Unmanned Aerial Vehicles (UAV) initiative aimed to improve public services through UAVs in partnership with strategic technological and industrial partners. The Civil UAV initiative is based on a horizontal technology with potential to boost economic diversification in Galicia. The programme, launched in 2015, will last until 2026, and has a total budget of €149 million, with 50/50 public/private funding. A technology park at the Rozas airfield (located in Castro de Rei, Lugo) will be the nerve centre of the initiative and reference centre for the UAV industry, as well as a test centre with the necessary safety testing infrastructure for aircraft and aerospace systems. The Civil UAV initiative boosts sophistication of local beneficiary firms, one example being a local, family-owned welding firm traditionally involved in welding pipes and construction elements. After involvement in the Civil UAV initiative, the company was able to make the transition into specialized welding components for drones, and now benefits from large international demand.

Table 5.1 Examples of innovation-enhancing procurement (IEP)

	Challenge/Need	Results	Who was the Procurer	Specifications	Who was the Supplier
1. X2000	Human mobility as a challenge Faster and reliable passenger transport on existing tracks	High Speed Train (rapid passenger traffic)	SJ, Swedish State Railway Company	Functional and technical requirements	ASEA (now wholly owned by Daimler-Chrysler)
2. AXE Telephone Switch	Communication as a challenge Introduce new services for subscribers Improvements in efficiency, capacity and maintenance costs	Construction and development of equipment for electronic switching	Swedish Telecommunications Administration - Televerket	Functional	Ellemtel (jointly owned by STA and LM Ericsson)
3. Light corridor	Energy efficiency as a challenge Stimulate the development of energy-efficient products Make the results marketable	Stimulate the market Improve the efficiency of lighting	NUTEK Swedish Council for Building Research	Functional Technical	Thirteen large Swedish real estate management companies and owners of public and commercial buildings Helvar Oy (Finland)
4. Swedish refrigerator	Energy efficiency as a challenge Produce market transformations toward more energy-efficient technologies	Reduce energy consumption and environmental impact of refrigerators/ Freezers	Purchaser group: HBV, NUTEK, etc.	Functional 40-50% more efficient than existing products on the market 1.0-0.9 kWh/litre	Electrolux AB
5. NødNett Norge	Security as a challenge but also mission-oriented Coordinate independent analogue mobile radio networks Enable interdepartmental communication	Development of a digital mobile radio system	Norwegian Ministry of Justice and the Police (in cooperation with other national organizations)	Functional	Siemens Norway
6. DigiDijk	Keep the low-lying regions of the Netherlands from flooding	Develop R&D-based knowledge for permanent, real-time dyke monitoring	Dutch Directorate-General of Public Works and Water Management (Ministry of Transport)	Functional (expressed as a desired outcome)	Alert Solutions Hansje Brinker

Table 5.1 Examples of innovation-enhancing procurement (IEP) (Concluded)

	Challenge/Need	Results	Who was the Procurer	Specifications	Who was the Supplier
7. Making Waves	Develop technologies enabling learners with communication difficulties to function effectively and independently	Develop communication systems that enable people with disability or communication difficulties to interact with others	Technology Strategy Board Department for Business, Innovation and Skills	Functional	Technabling Gamelab
8. SERGAS	Respond to elderly care and health by strengthening local and regional supply in order to target needs associated with international markets	InnovaSaúde, Hospital 2050, and Código100	Galician Health Service	Technical and functional	Multiple beneficiaries
9. Unmanned Aerial Vehicles	Diversify the regional economy based on existing manufacturing strengths	Attract foreign direct investment to the region and link the local supply base with multinational firms	Galician Government	Functional	Multiple beneficiaries

Source: author analysis.

5.3 Innovation-enhancing procurement in Georgia: state of play

Policymakers are strongly committed to supporting innovation and creating a fruitful innovation and entrepreneurship-based ecosystem, with a range of strategies adopted (see Chapter 3 in this review) to strengthen innovation governance. Nonetheless, data concerning the overall IEP situation are lacking, as in most European countries.

General context of IEP in Georgia[41]

Over GEL4 billion was spent by contracting authorities in 2018 for the procurement of goods, services and infrastructure construction works.[42] The State Procurement Agency is a key institution, acting as a centralized purchasing body on behalf of all other (ministerial) authorities. There were major reforms in 2018 to centralize procurement. While the State Procurement Agency centralizes public procurement in Georgia, it can still be executed by different contracting authorities (e.g., schools). The draft new law on public procurement indicates (Article 29) that centralized procurement should be adopted, but fieldwork suggested the procurement of common goods and services in many cases remains decentralized, with consequent efficiency losses. Coordinating and "bundling" this scattered demand could especially increase the effectiveness of regular procurements (that is, off-the-shelf) through economies of scale and a reduced share of unsuccessful tenders and corrupt transactions. This coordination and bundling are particularly relevant in the case of Georgia, due to the current lack of joint action and collaboration among procuring entities.

Private R&D and innovation investments in Georgia are very marginal, while non-bank financial institutions like venture capital funds and angel investors are absent. Poor access to finance for innovative activities is a major challenge and a key motivation for IEP. The Sustainable Development Strategy 2020 seeks to improve private sector competitiveness and improve access to finance. IEP may stimulate private investments in R&D and innovation.

Field interviews revealed that ministries define procurement tenders based on budgetary constraints (for example, goods needed, timing, etc.), but it is unclear to what extent this procedure allows for the procurement of innovations (for example, to buy something that does not exist), since the good/service/technology is defined ex-ante. Products described in procurement documents exist, and so cannot be regarded as innovations.

Georgia is a leading country in its region for e-procurement,[43] with 81 per cent of all public procurement conducted through electronic procedures[44] as a central principle. The e-procurement platform provides transparency, with a central role for the State Procurement Agency (SPA) and public access to information.[45] The SPA facilitates the automatization of many stages in the procurement processes and reduces bureaucracy. Additional benefits include zero paper, remote participation by bidders, and reduced risk of collusion. The e-procurement platform generates machine-readable tender information for all procurement contracts, reducing the time required for analytical work.[46] The e-procurement platform could thus play a central role in the proposed "bundling" of demand.

One element hindering IEP is limited availability of suppliers able to offer and supply innovative solutions, due to a limited domestic supplier base that may also restrict competition and reduce incentives to innovate. Georgia has an opportunity to institutionalize public procurement by relying not only on national suppliers, but also by opening calls to international suppliers. The e-procurement platform may act as a facilitator, by reaching a larger international audience of potential suppliers.[47] This is confirmed by the large number of registered suppliers and international firms, although this has not yet translated into increased competition among bidders, with the average number of bidders for tenders only 2.1 in 2018. Building completion works had on average 3.48 bidders, and telecommunication and transportation services only 1.3 bidders. IEP may contribute to increasing the size and sophistication of both demand and supply bases. To engage international suppliers, the Georgian Government could consider potential mechanisms to anchor international companies in the country, and to help increase the innovative capabilities of local firms. One approach could be to require the winning international supplier to involve local suppliers in the implementation of the awarded contract, transferring knowledge and expertise to local suppliers. The interest of international firms in Georgian public procurement is not yet significant, with a key constraint being the short time from tender announcements to the closing of the application process. This calls for additional efforts or obligations to announce the contents of calls earlier (for instance, competitive dialogues with potential suppliers).

The legal framework

A new draft law on public procurement was planned for adoption in autumn 2019 but has yet to be considered by Parliament at the time of writing. The draft new law includes a list of procurement procedures (Article 20): open procedure, restricted procedure, competitive dialogue, innovation partnership, design contest, and negotiated procedure.

During such procedures, it is important to define calls in functional terms to ease the definition of evaluation criteria. Functional procurement emphasizes the functions that the good or service should satisfy (that is, *the whats*), not how these needs are satisfied (that is, *the hows*). Defining evaluation criteria in terms of technical requirements can hinder innovation in more complex procurement cases, as the call defines requirements for a good or service that does not exist (see examples included in Section 1.2). Article 55 of the new draft law on public procurement indicates that, to prove the abilities of economic operators, they should provide "samples, descriptions and photographs" of the goods to be supplied, "the authenticity of which shall be attested if it is requested by the contracting authority". Proving the authenticity of a prospective innovation will be problematic before it has been developed. An explicit innovation policy should be developed with a corresponding action plan with policy instruments identified, funded, articulated, and coordinated. Making this institutional arrangement explicit is necessary to ensure coordinated innovation policy[48]. As discussed below (see Section 2.2), fieldwork established the absence of a legal framework supporting IEP in Georgia.

In relation to the extent to which functional requirements (that is, functional procurement) can be used, Directive 2014/24/EU of the EU states:

> *"The technical specifications drawn up by public purchasers need to allow public procurement to be* ***open to competition*** *as well as to achieve objectives of sustainability. To that end, it should be possible to submit tenders that reflect the* ***diversity of*** *technical* ***solutions*** *standards and technical specifications in the market place, including those drawn up* ***on the basis of performance*** *criteria linked to the life cycle and the sustainability of the production process of the works, supplies and services. Consequently, technical specifications should be drafted in such a way as to avoid artificially narrowing down competition through requirements that favour a specific economic operator by mirroring key characteristics of the supplies, services or works habitually offered by the economic operator.* ***Drawing up the technical specifications in terms of functional and performance requirements*** *generally allows that objective to be achieved in the best way possible.* ***Functional and performance-related requirements are also appropriate means to favour innovation*** *in public procurement* ***and should be used as widely as possible****"*
>
> (European Union, 2014: Recital 74 – bold type added by the author).[49]

It is interesting that the EU Directives stress functional requirements, and remarkable that they emphasize that they "should be used as widely as possible," to favour innovation in public procurement. The emphasis on functional specifications is intended not only to promote innovation but also serves as a powerful competition policy tool. Functional descriptions lead to increased competition between different products (and producers) to satisfy the same needs or problem.

With functional requirements included in the national legislation there are no legal obstacles, and functional demands can be used in tender specifications without legal reform. Therefore, functional procurement can and should be widely used. Technical specifications should avoid restricting competition through requirements favouring specific economic operators, that is, avoid *reflecting* important characteristics of goods and services a supplier usually offers or *describing requirements too precisely*.

This is best achieved through technical specifications designed as functional and performance requirements. For ***competition reasons***, describing goods and services is avoided, with required functions defined instead. The procurer typically uses functional descriptions rather than product descriptions (that is, technical requirements) in the procurement documents.

First steps towards IEP

IEP could start with procurement of innovations developed elsewhere for which there is no national capacity,[50] thus improving public services. The state would minimize its risks with innovations tested elsewhere. The state could also "matchmake" between Georgian firms and potential international suppliers, so domestic firms could benefit from knowledge and technology exchange. Universities and research institutions could also be involved in such partnerships to increase the domestic absorptive capacity and knowledge base.

Georgian higher education institutions have not been able to effectively and systematically commercialize research outputs. The National Academy of Sciences seeks to promote research commercialization in close cooperation with innovation stakeholders like GITA, and has a Commission for Innovative Technologies to support research commercialization. However, it mainly supports mature technologies ready for commercialization, rather than facilitating further development of new technologies. This presents a clear opportunity for the development of PCP initiatives to leverage the commercial capabilities of research institutions.

When required solutions are not available elsewhere, the innovation partnership procedure[51] has potential to develop innovative solutions. Through innovation partnerships, PCP initiatives can be developed, either through direct, catalytic or regular procurements. However, the required innovation-related capabilities have not yet been comprehensively developed, and additional competences are needed for both contracting authorities and potential suppliers. This requires a progressive roll-out of innovation partnerships with training on best practices.

The State Procurement Agency has a Training Centre to provide specialized training to state procurement entities, and provided training to 315 participants from all Georgian regions in 2018. It is unclear the extent to which this training centre provides capacity building on IEP, which is needed so the national authorities with innovation-related competencies can transition from regular public procurement to IEP. A network of public agencies could also exchange experiences to foster mutual policy learning.

Georgia has adopted different policies to stimulate entrepreneurship and technological development (for example, TechnoPark, Fablabs, Start-up Georgia, a Business Incubator programme, and a small grant scheme).[52] However, start-ups often struggle to survive due to a lack of demand for their products, services and technologies. Early conversations and preliminary market consultations could help entrepreneurs adapt their technologies to emerging public needs. These could take the form of matchmaking events so contracting authorities get to know what technologies are available to them, and economic operators understand public sector needs and the extent to which their technologies provide effective solutions.

The new draft law on innovation procurement (Article 17) indicates that "if an economic operator, its employee or the person indicated in the tender of the economic operator has participated in any previous stage of the relevant procurement project or in the development of the procurement documents, the economic operator is not entitled to participate in the next stages of the same project or in the relevant procurement procedure if the referred conditions provide the economic operator an advantage over other economic operators, thus restricting the competition". Article 35 of this draft law indicates that "for preparation of procurement documents contracting authorities are entitled to conduct market consultations. For this purpose, contracting authorities may seek advice from independent experts or authorities or from economic operators. Contracting authority must ensure that advice received in a process of market consultations does not distort or limit competition and does not violate the principles of non-discrimination and transparency". With the extant evidence proving early market consultations one of the most effective mechanisms for successful IEP,[53] it will be essential to clarify the circumstances that would block an economic operator from bidding in procurement calls.

Results from stakeholder interviews

To complement the previous findings, a series of interviews were conducted with civil servants from the State Procurement Agency, Georgia's Innovation and Technology Agency (GITA), the Eliava Institute, and the Tbilisi State Conservatoire. These organizations were approached due to their expertise in relation to procurement and relevance of their mandates to IEP. The interviews evidenced limited awareness of IEP, and strongly divergent views between the organizations involved in purchasing innovative products, and those responsible for the governance of public procurement.

IEP remains underdeveloped in Georgia. Despite IEP being expected to play a role in the new draft innovation strategy for economic and industrial diversification (that is, use of IEP for strategic purposes), there is no explicit mention of IEP in the strategy. Interviews with GITA indicated that this strategy focuses mainly on reform of procurement standards and processes to encourage innovation, especially by updating old standards that encourage procurement of dated technologies and creating incentives for solutions that offer the best results, rather than rewarding risk mitigation only. The strategy also foresees institutional incentives to encourage outsourcing rather than in-house production by default, and to help local industry develop and use scarce technical talent. At the time of writing, this strategy is not adopted by the Government.

Interviews also revealed there is no legal framework to support IEP. There is no practice of using public procurement as a driver of innovative development, and according to the interviews the draft law does not consider innovation or sustainability as award criteria. While some stakeholders saw current legislation as rigid and hampering innovation and the State Procurement Agency acknowledged that IEP is more demanding than off-the-shelf procurement, it is still considered feasible within existing legislation. The State Procurement Agency considered the greatest constraint to IEP as still being a low level of awareness among purchasing organizations.[54] This reflects a lack of capacity to properly prepare terms of references, and insufficient ability to learn from other countries.[55] In this regard, Georgia could follow the guidelines provided by

the OECD on IEP[56], and those by the European Union on green public procurement[57], and which identify some good practices and strategies followed by a set of European countries when promoting innovation and environmental support through public procurement.

In this regard, a twinning project[58] has been implemented with BBG Austria (Bundesbeschaffung, Austrian Federal Procurement Agency) to help develop a transparent, non-discriminatory, competitive public procurement system in line with EU and international best standards and let Georgia join the EU public procurement market, leading to greater opportunities for EU companies in Georgia and vice versa. This joint work is expected to provide the State Procurement Agency with the capacity to approximate Georgian public procurement legislation to European standards and introduce EU best practices.

The cooperation with Austria will increase mutual learning (that is, exchange of best practices) and develop the State Procurement Agency by sharing experiences with one of the most advanced European countries in this area. It could also be interesting for the State Procurement Agency to extend such cooperation to the PPPI Service Centre of Austria.[59] The Austrian PPPI Service Centre, or national competence centre for innovation procurement, has long experience in IEP, especially functional procurement. The cooperation with Austria could also help the Georgian Government in general and the State Procurement Agency to create a policy framework that fully integrates IEP. This is central for IEP to become an effective policy instrument supporting innovation and entrepreneurship in Georgia. This implies outlining a clear legal background for IEP, linking IEP to other policy instruments in a holistic policy mix (see Section 1), defining its governance aspects, and setting criteria to support local innovators, including SMEs and start-ups.

Interviews revealed that respondents did not have a conceptual understanding of IEP. Interviewees could not identify either policy priorities (that is, missions, grand challenges) that have been tackled by IEP, nor good practice related to it (that is, policies, financial instruments, programmes, standalone cases, etc.). It was not possible to identify any example of IEP being used jointly with other policy instruments (for example, R&D funding, tax subsidies, etc.).[60]

While procurer organizations have the legal capacity to support innovation through procurement, they are not aware of how to do it, or simply find it too challenging to undertake. There is neither monitoring of IEP implementation, nor a quantitative target for IEP (that is, as a share of GDP). According to the State Procurement Agency the innovation partnership procedure will be a strong step in favour of innovation, and while the current law on procurement already enables similar outcomes to the new innovation partnership procedure, interviewees felt that procedural simplification would enable more procurers to use the practice. Both GITA and the State Procurement Agency considered this procedure would enable start-ups to participate and bid in IEP calls. The procedure may also help increase the complementarity of PCP initiatives with regular procurements, and foster knowledge transfer among bidders.

Representatives of the State Procurement Agency viewed the purchase of innovative solutions as possible under the current draft law. The "two-stage procurement" procedure enables the procurer to purchase a product which is not yet created. They shared the example of the purchase of solar panels for villages lacking access to electricity.

This procurement call was an example of functional procurement. It requested the provider to ensure the permanent access of those villages to electricity. However, no further (technical) specifications were added.

While interviewees at the State Procurement Agency claimed the procurement law enables innovation purchases, other consulted organizations noted the time required to purchase an innovative product is significantly longer than in off-the-shelf procurements and constitutes a significant shortcoming. This highlights the need to establish foresight activities to anticipate demand, so calls can take place when needs are still latent, and solutions developed by potential suppliers are market-ready once the need becomes evident. This view was shared by GITA, where interviewees felt the communication of future needs was barely used in the context of public procurement (4 points out of 10). Given the identification of future needs is the starting point for IEP, relevant ministries and agencies should consider incorporating public scrutiny and participation into the regular policy cycle to identify emerging societal needs and demands.

Centralized procurement by the State Procurement Agency is used when large purchases are needed, so the procurement can be as efficient as possible (that is, bundling of demand). This approach makes it possible to benefit from economies of scale. The State Procurement Agency collects requests from other procuring organizations that lack information on each other's needs. This centralized procurement is used for more than 300 products that procuring organizations have no liberty to buy independently. It is unclear what mechanisms are used by the State Procurement Agency to decide which procurements are centralized, and which are more efficient to conduct in an unbundled way. Representatives of GITA stated that the new legislative framework currently under development (that is, the new draft law on public procurement) will stimulate the development of IEP at the local and regional level.

GITA viewed contracting authorities as reluctant to purchase products where there is a single provider, although other respondents had different views. Representatives from the State Procurement Agency noted there is no legal requirement to obtain more than one price quotation, while representatives from the Eliava Institute accepted that although there is no strict requirement for competition, it is always seen as poor practice to purchase a product through a tender with only one supplier, due to corruption concerns. This highlights the need to engage in preliminary market consultations to raise awareness about the needs of the Government, and to get familiar with the state-of-the-art technologies that could be developed to respond to particular challenges.

Engaging in early market dialogues with potential suppliers was also perceived differently by the consulted stakeholders. Some avoid it; due to fear of potential consequences, despite the current regulations and EU directives permitting it, while others encourage it to better understand supplier capabilities and market conditions. Contracting authorities tend to act cautiously, since public procurement has always been controversial, and minor infringements can be perceived as corruption. Public procurement tenders are actively monitored by governmental and non-governmental organizations, and the state audit office.[61] When GITA were asked to what extent early interaction with potential suppliers has been applied during the past three years, they indicated that it has been used "always". They also considered that functional specifications were used "always" in public procurement documentations. These representatives indicated the main benefits of early

market dialogues as: (i) knowledge of suppliers' offers, (ii) improved product or service requirement specifications, (iii) improved understanding of supplier capability to develop innovative solutions, and to a lower extent, (iv) improved development of innovative solutions by suppliers.

Government authorities were also asked whether innovation policies and IEP initiatives are evaluated regularly. Representatives from GITA indicated they were unaware if this is done, and no civil servant could share results of previous innovation policy or IEP evaluations. To make the most of public procurement as a driver of innovation, it is necessary that an evaluation process is defined in the relevant organizations and/or ministries. This includes the definition of performance indicators, and the development of capabilities to extract relevant conclusions from evaluation exercises for policymaking.

Finally, roll-out of the procedures foreseen by EU directives requires the necessary capabilities, and providing flexibility to contracting authorities to roll-out procurement processes (see Table 5.2).

Table 5.2 Main capabilities required for the definition and implementation of IEP

Capabilities	Rationale
Political will and mandate	IEP must be regarded as a key stage of innovation policy definition and implementation, particularly given risk aversion in line ministries and agencies
Awareness	IEP is a complex policy concept and awareness remains low
Qualified staff	Specific training on IEP, including clear terminology, conceptual and legal understanding (e.g. procedures), with clear definitions to capture all prerequisites Specific training on management of intellectual property
Regularity	Possibility to conduct IEP initiatives on a regular and systematic basis Monitoring and evaluation need to be systemically related to policy design
Information systems	Acquisition, validation, management, use and analysis of data (e.g. e-procurement platform) for policy learning
Evaluation and policy learning	How to derive corrective actions based on evaluation exercises
Knowledge networks	Create networks of innovation stakeholders to continue mutual learning and improve IEP policies and processes

Source: UNECE based on Zabala-Iturriagagoitia (2018).

The previous list of capabilities required for the definition and implementation of IEP is relevant because the interviews revealed a lack of training of public employees in procuring authorities. This current lack of skills and the shortage of personnel with experience in IEP are likely to hinder the effective use of IEP to drive innovation. It is thus important that procurement staff at the State Procurement Agency is provided with the necessary skills and expertise. However, quite paradoxically, when asked to assess their capabilities for successful implementation of IEP, interviewees at GITA self-evaluated with a score of 8 on a scale of 0-10 and considered the training centre of the State Procurement Agency as fostering the development of these capabilities to a large extent (also 8 out of 10 points).

A lack of perceived need to develop new capabilities to support IEP, together with the absence of IEP, suggests a need to strengthen the demand-side in Georgian innovation policy making. Knowing the extent to which the relevant capabilities in Table 5.2 are available or missing would help identify actions to improve the innovation capabilities of Georgian contracting authorities and policy makers.

Finally, we note that the most widely used public procurement practices in Georgia include the following (from most frequently used to least):

I. Communication of future needs,
II. Submission of tenders by electronic means,
III. Definition of the terms and conditions relating to intellectual property,
IV. Early communication with potential suppliers,
V. Definition of functional specifications,
VI. Emphasis on sustainability criteria (ecological or social),
VII. Use of most economically advantageous tender & lifecycle cost to evaluate bids.

In relation to these procurement practices, effective IEP risk management will require the identification of needs and their translation into functional requirements, early market dialogues to communicate the need to potential suppliers, the use of functional requirements including in the evaluation of tenders, a widening of award criteria beyond cost, and monitoring of the projects funded to avoid deviations from targets and reduce the risk of IEP. This will require allowing for an increase in tendering time to ensure adequate interaction between contracting authorities and economic operators.

5.4 Policy messages

Besides direct purchasing power, public procurement has huge potential to become one of the most important mission-oriented policy instruments for SDGs. An ERAC consultation[62] found annual public procurement of works, goods and services of close to €2.3 trillion in the EU, or 19.4 per cent of GDP,[63] showing the enormous potential for the state to create new or shape existing markets.

IEP policy goals and requirements

The goal of Innovation-Enhancing Procurement (IEP) is to provide market demand to foster the emergence, development and diffusion of innovations. According to the OECD,[64] an argument for IEP is that an innovative solution often yields better results. IEP can also help to:

- Reduce public sector risk aversion;
- Increase innovation-related capabilities in the public and private sectors;
- Create incentives for public entities to promote experimentation;
- Promote training to civil servants in other disciplines to improve their capabilities;
- Create innovation-friendly institutional practices, particularly in the public side;
- Modernize the public sector;
- Improve coordination across governmental units;
- Decentralize the innovation policy ecosystem to other regions.

Naturally, the use of public procurement as an instrument of innovation policy also entails challenges for policy makers. Hence, to benefit from the previous results, changes in the way public administrations are governed are required. Georgia lacks a coordinated strategic framework agreed upon among the various institutions related to innovation in the country (such as, GITA, Enterprise Georgia, Georgian National Academy of Sciences, SRNSF, the competent ministries and Georgian National Investment Agency). For example, the Law on Science, Technology and their Development (Law of Georgia № 672 of 30 April 1997) does not mention public procurement as a driver of innovation. Similarly, the Law on the Georgian National Academy of Sciences mentions neither innovation nor public procurement, despite NAS potential to be one of the key actors linking procurement with innovation. Hence, it is central for Georgia to create a policy framework for innovation policy that fully integrates IEP. Nonetheless, most European countries have yet to develop such a strategic framework. Despite the benefit of making such frameworks explicit,[65] Sweden is so far the only country with such a framework. Georgia could learn from the Swedish experience, and the role played by the National Innovation Council of Sweden in creating the definition.[66]

It will also be important to develop policy evaluation processes to provide learning for policymakers and avoid repeating the same mistakes. It is not a separate function to be performed at the end of a policy intervention, but rather a continuous process with its foundations laid at the programme planning stage. Three phases of evaluation can be distinguished: *ex-ante* (prospective), interim (intermediate) and *ex-post* (retrospective), which may produce information to be used in the assessment of past policies, the monitoring of ongoing initiatives or the forward planning of innovation and technology policies.

If we are to monitor, evaluate and assess the impact of innovation policies including IEP policies, measurement is essential for meaningful monitoring, evaluation or impact assessment. Georgia should develop sound measurement systems that provide data to evaluate IEP and enhance return on investment and social benefits (OECD, 2016: 14).

A set of capabilities and levers should be developed to articulate IEP. Training of procurement officials should be prioritised so officials clearly understand procurement procedures and processes and know when to ask for external expertise or technical support. A mix of capabilities is needed, that is, a team of people with diverse skills. Life-long learning should be promoted, for example, by bringing vocational training centres closer to the needs of universities, firms, research organizations and the public sector. The training centres of the State Procurement Agency and Ministry of Justice, as well as universities and research centres, could be instrumental in providing such services.

Sharing international best practices

There are also some specific learning experiences from other countries on concrete dimensions of IEP:

- **Digitalization of public procurement** (e-procurement platform in Estonia). In **Estonia**, approximately 10,000 public procurement procedures take place annually. The Ministry of Economic Affairs and Communications monitors innovative procurement through an e-procurement register of the Ministry of Finance.[67]

- Use of **IEP for strategic purposes** (Sweden). The National Innovation Council of Sweden has been the first to implement functional procurement and define a national strategy of innovation procurement.
- Use of **IEP for environmental concerns** (that is, green public procurement, and the use of public procurement to promote a circular economy) in the Netherlands. The Dutch Directorate-General of Public Works and Water Management at the Ministry of Transport has long experience in the implementation of its Small Business Innovation Research (SBIR) programme, which aims to find innovative solutions to societal issues, particularly related to the environment. The recent guidance on public procurement for a circular economy of the European Union could also be instrumental in this regard.[68]
- **Co-funding schemes and funding-mix related to IEP** in Spain and Lithuania. Some countries such as Spain or Lithuania use the European Structural and Investment Funds combined with national funds. In Spain there are multiple avenues for innovation-related procurement financing, from both national and EU structural funds.
- **Evaluation and monitoring of IEP** (Austria and Germany). In Austria, the two ministries responsible for IEP follow a holistic approach, aimed at evaluating the system of activities that aim to promote IEP. In Germany, the Centre of Excellence for Innovative Procurement (KOINNO), advises public procurement officers on how to streamline public procurement processes and buy more innovative products.[69]
- **Articulation of IEP at sub-national and city levels** (Denmark and Finland).

A powerful tool for sustainable development

Regular procurement occurs when public agencies buy ready-made products "off-the-shelf", with no innovation required. Only the price and quality of the (existing) product are taken into consideration. IEP must thus not be confused with this regular "off-the-shelf" procurement, which is the largest part of all public procurement, accounting for approximately 19 per cent of GDP in the EU, and approximately 10 per cent in Georgia. This share of overall demand makes regular, "off-the-shelf" procurement a key potential driver of sustainable development.

IEP can provide directionality to innovation policy making, identifying broad areas, not limited to high tech, where Georgia has potential for relative comparative advantage (for example, food industry, agriculture and bacteriology). Small demonstration projects in fields where the Government can have a direct impact would raise awareness among societal actors of the policy commitment and resulting opportunities and could unlock export opportunities. This would help lessen the risk aversion that often limits public policy outcomes and overcome inertia. Starting with large scale procurement projects may hamper IEP due to the risk of such projects failing because of lack of public and private sector organizational capabilities.

There is a lack of targeting of public procurement to drive innovative development. Potential areas where IEP could be used as a strategic policy instrument include:

- Modelling of agricultural pests and infestations based on existing excellence in science and maths, to support Ministry of Agriculture response.

- Simulation models to optimize traffic lights based on traffic density.
- Emissions control and surveillance to reduce mortality from air pollution.
- Invest in transport infrastructure to act as a logistics hub, for example, road access, silent asphalt, environmentally friendly and efficient ports, environmental technologies in urban mobility, and rural/urban connections.
- Public sector digitalization to improve institutional memory and strengthen institutional capacity.
- Waste management and reduced industrial emissions.
- Improved reliability of water supply.
- Investment in the energy sector to reduce dependence on third countries.
- Broadband access.
- Foresight processes should identify and anticipate areas of future demand, so procurement calls can target areas of emerging need.

Functional procurement should be used to the largest extent possible. Success factors identified in the design and implementation of World Bank matching grant schemes[70] could be applied to IEP:

- Early presentation and explanation of IEP to stakeholders,
- Technical assistance tailored to potential beneficiaries,
- Mitigation measures to avoid political capture,
- Transparent selection criteria,
- Light administrative procedures,
- Effective marketing and promotion,
- Real-time monitoring and evaluation for continuous improvement, impact assessment and fraud reduction.

Some countries have already introduced environmental standards in procurement calls and evaluation criteria. Like IEP, green public procurement can signal a major policy shift.[71] IEP roll-out could go hand in hand with incorporating environmentally related sustainability criteria. The recent approval of the European Green Deal by the European Commission[72] creates opportunities for green public procurement that may be relevant for Georgia. Climate neutrality across Europe by 2050 will require huge innovation, thereby the link with IEP. The Ministry of Economy and Sustainable Development of Georgia has drafted a Green Growth Strategy 2030 and including IEP as a key policy instrument seems not only necessary but also a potential opportunity to export the innovations developed to other countries.

Building capacity for IEP

Interviews revealed both public and private sides to be far from ready to implement IEP. Since the PCP scheme is based on an exemption to the EU regulations on public procurement, and its logic is closer to that of R&D programmes, a first step towards IEP in Georgia could be linking PCP with regular procurement. PCP should be central, not only to SMEs and start-ups, but also to support research institutes (such as, Eliava Institute, Shota Rustaveli National Science Foundation), to develop commercial - or at least testable -

products from research. If the prototype works, then regular procurement can be used for scaling up (Figure 5.2). The innovation partnership procedure in EU procurement directives and the new Georgian draft law on public procurement could be used to boost such relationships. This progressive incorporation of PCP in regular procurement would also facilitate the transition to IEP and include innovation criteria in procurement calls, helping new technological solutions to reach the market.

Given existing Georgian mechanisms for R&D support, the PCP scheme could be co-funded and coordinated with other policies and programmes (such as, those from the Ministry of Education, Science, Culture and Sports, Ministry of Economy and Sustainable Development, SRNSF, GITA, etc.).[73] An example of the considerable potential to combine existing R&D support with PCP is the call for applied research of the Shota Rustaveli National Science Foundation. R&D results could reach the market through regular procurement and technology transfer support programmes. An example of policies to promote technology transfer from research to market is the technology transfer policy projects, which is a pilot initiative already running under the GENIE project (Georgia National Innovation Ecosystem).

IEP programmes need several pre-existing capacities to be in place. Besides supporting diffusion and commercialization of innovations, IEP can help develop capabilities in public sector and private firms (that is, research capabilities). R&D funding is almost entirely focused on HEIs, with nearly 90 per cent of researchers, and almost no private sector researchers. IEP has strong potential to change this situation, as it requires the development of R&D activities by firms, both in-house and in cooperation with other research infrastructures. PCP can support the development, consolidation and market reach of SMEs and start-ups (for example, SBIR and SBRI programmes). Under PCP schemes, scientists can cooperate with start-ups and SMEs to develop prototypes and solutions with scope to reach society.

- Expertise is needed to make a correct diagnosis of the state-of-the-art of technologies with potential to address the relevant societal need. This requires continuous market dialogue with potential suppliers to identify needs and translate them into functional requirements. Experience shows that dialogue as early as possible in policy design improves outcome. The national intellectual property office Sakpatent could support the State Procurement Agency in early-stage dialogues with potential suppliers and share information on the state-of-the-art behind the need to be addressed by the procurement call, helping avoid possible legal issues and identifying whether IEP can provide something new. Incorporating functional requirements in procurement calls both supports innovation and increases competition among potential suppliers.

Notes

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27 PCP is a policy instrument that can become particularly relevant for Georgia, as it also facilitates the transfer of knowledge and technology, which is one of the main failures that need to be addressed by Georgian innovation policy (see conclusions from Chapter 4 on industry-science linkages ".)

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[40] A similar PCP example, also from the Netherlands, is the noise reduction along secondary roads programme.

[41] The information in this section is based on a field visit made to Tbilisi in November 2019, and from the interviews conducted with a set of relevant stakeholders in February 2020.

[42] State Procurement Agency (2019) Annual Report 2018. Tbilisi.

[43] See https://blogs.worldbank.org/europeandcentralasia/improving-public-procurement-georgia-what-s-magic-recipe.

[44] Out of these, 49 per cent of contracts were related to the procurement of goods, 28 per cent to the procurement of services, and 23 per cent to the procurement of construction works.

[45] See https://www.worldbank.org/en/news/feature/2015/02/18/georgia-an-e-procurement-success.

[46] See https://blogs.worldbank.org/europeandcentralasia/improving-public-procurement-georgia-what-s-magic-recipe.

[47] This e-procurement platform has also been set up to advertise private procurement calls, and hence, facilitate B2B relationships (Order N8, 30 July 2018 on approval of the Procedure of Holding e-tenders).

[48] Edquist, C. (2019) Towards a holistic innovation policy: Can the Swedish National Innovation Council (NIC) be a role model? Research Policy 48(4), 869-879.

[49] A performance requirement is the same as a functional requirement. This means that the procurement documents can specify a certain energy reduction compared to the best available technology, without specifying how this reduction will be achieved.

[50] This is related to the recommendation raised in Chapter 3 as to the potential to develop new-to-the-country innovations through their diffusion from other territories where those technologies/products/services are already available and their absorption into Georgia, rather than trying to develop new-to-the-world innovations.

[51] According to this draft law, the Innovation Partnership procedure is described in the following way: "Innovation Partnership is a procurement procedure in which any economic operator may request to participate and where only those economic operators invited by the contracting authority may submit a tender. On the basis of submitted tenders, the contracting authority may enter into partnership with one or several economic operators in order to develop an innovative product, service or works that are not already available on the market"

[52] See Chapters 3 and 4 in this review for additional details.

[53] Edquist, C., N.S. Vonortas, J.M Zabala-Iturriagagoitia. Edler (Eds.) (2015). Public procurement for innovation. Edward Elgar, Cheltenham.

[54] World Bank (2014) Georgia 2020 Innovation Strategy. Comments and Recommendations. Prepared by the World Bank under Competitive Industries and Innovation Project (P146270).

[55] To further develop its IEP strategy, Georgia could use the information provided by the European Commission in its recent benchmarking exercise of national innovation procurement across Europe, which discusses the policy frameworks conditions in which IEP policies are defined and articulated in 28 European Countries. See https://ec.europa.eu/digital-single-market/en/news/benchmarking-national-innovation-procurement-policy-frameworks-across-europe.

[56] OECD (2016) Public Procurement for Innovation: Good Practices and Strategies. Paris: OECD.

[57] European Union (2017) Public procurement for a circular economy. Good practice and guidance. Available: https://ec.europa.eu/environment/gpp/pdf/CP_European_Commission_Brochure_webversion_small.pdf

[58] The name of the twinning project is "Strengthening Public Procurement Practices in Georgia".

[59] The Austrian PPPI Service Centre was established within the Federal Procurement Agency (BBG) in 2013. Financed by the Austrian Ministry of Digital and Economic Affairs, and the Ministry for Transport, Innovation and Technology, the PPPI Service Centre acts as the single point of contact for PCP and innovation procurement issues in Austria. It also initiates and conducts pilot projects and offers services in the fields of further education and training. See https://www.ioeb-innovationsplattform.at/.

[60] One of the representatives of GITA referred to a case, named, TechnoBus – Educational service, which consists of bus journeys across the country to provide training to secondary school students.

[61] As discussed in this chapter, regular public procurement should not be mixed with IEP, which as already indicated, is neither evaluated, nor monitored or followed up.

[62] European Union (2015a) ERAC Opinion on Innovation Procurement. ERAC 1209/15. Brussels, 23 June 2015.

[63] Kahlenborn, W., C. Moser, J. Frijdal, M. Essig (2010). Strategic use of public procurement in Europe. Final Report to the European Commission, MA RKT / 2010/02 / C. Berlin: Adelphi.

[64] OECD (2016) Public Procurement for Innovation. Good Practices and Strategies. OECD, Paris.

[65] See Edquist, C. (2017) Developing strategic frameworks for innovation related public procurement. Thematic Report Topic A. Horizon 2020 Policy Support Facility. Mutual Learning Exercise on Innovation Related Procurement.

[66] See Edquist, C. (2019) Towards a holistic innovation policy: Can the Swedish National Innovation Council (NIC) be a role model? Research Policy 48(4), 869-879.

[67] See: https://www.rahandusministeerium.ee/et/riigihangete-poliitika

[68] European Union (2017) Public procurement for a circular economy. Good practice and guidance. Available: https://ec.europa.eu/environment/gpp/pdf/CP_European_Commission_Brochure_webversion_small.pdf

[69] See https://www.koinno-bmwi.de/en/koinno/.

[70] Hristova, D., A. Coste (2016). How to make grants a better match for private sector development (English). Washington, D.C., World Bank Group.

[71] World Economic Forum (2019) The Global Competitiveness Report 2019.

[72] See https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

[73] See also the discussion in Chapters 3 and 4 in this review on innovation ecosystem and its governance, and industry-science linkages.

Chapter 6

INNOVATION AND GROWTH DYNAMICS IN GEORGIAN ENTERPRISES

Summary and recommendations

Challenge	Objective of intervention	High-level recommendations
Many enterprises struggle to achieve increased specialization in technology-intensive, high value-added products.	Strengthen the capacity of enterprises to adopt and adapt productivity -enhancing growth innovations	• Remove specific obstacles that potentially innovative companies face across all sectors • Establish sector-oriented strategies to promote intra-industry collaboration and bolster flexible specialization • Develop a national system for generating the required data to track technology diffusion and different kinds of innovation at the enterprise level

Source: UNECE.

This chapter delves into growth and innovation dynamics at the micro-level of enterprises, in particular the main factors underpinning the ability of the enterprise to improve its productive capacity and achieve increased specialization in technology-intensive production activities. Case studies from face-to-face interviews with a select group of 13 innovative companies from strategic sectors, as well as insights from the UNECE Study on Regulatory and Procedural Barriers to Trade (RPBT),[1] form the basis of the analysis and recommendations.

Although Georgian enterprises are eager to expand their activities and innovate, the leading constraint they face is the lack of technological capabilities to identify, appraise, use and improve on technologies, production processes, and business models needed to increase efficiency and diversify production.[2]

Market-support institutions could play an important role in helping Georgian enterprises overcome this constraint and bridge the gap between policy and implementation. While support services are insufficiently adapted to the enterprises' development needs, they do provide up-to-date information on regulatory requirements; local and international demand and growth opportunities in regional and global markets; networking opportunities with national and regional partners; and, to a limited extent, funding opportunities. Insufficient support for enterprises to adhere to environmental, quality and safety standards is another constraint that undermines private sector ability to benefit further from trade reforms associated with the Deep and Comprehensive Free Trade Area (DCFTA) with the EU and investment reforms.

Standards implementation requires significant investments in machinery, skills, and production processes - which in turn require different types of financial support. The limited scope and focus of concessional finance available, holds back innovation and global value chain integration, especially for start-up companies with insufficient

collateral for debt finance. Further, public support for training and R&D would also be important - there is both a clear demand among enterprises and a solid justification due to the positive spinoff benefits.

Similarly, limited access to skilled labour at reasonable cost poses a major constraint to Georgian firms, particularly during the expansion phase - suggesting the need to align the education and vocational training system towards the needs of the enterprise as part and parcel of the on-going reforms.

Market-support institutions need to play a stronger role in promoting linkages and relations. Enterprises cited networking opportunities - or lack of - with national, regional and global enterprises and transnational corporations (TNCs), as a key growth dynamic during both start-up and expansion activities.

Enterprise growth dynamics are also influenced by access to basic infrastructure (e.g., transport, electricity etc.). At issue are not only the costs but also the quality of these services, which undermine enterprises' ability to expand and engage in technology-intensive production processes.

Bridging the gap between policy and implementation is also required, to increase the outreach efforts of companies with sector-focused interventions, enabling them to experiment with new ideas, technologies, products, services, and business models. This exploration process is the driving force for positive structural transformation towards increased specialization in activities with high value-added and, ultimately, the prospects for Georgia to attain its ambitious SDG objectives.

The recommendations suggest a consolidated and coherent system of incentives across the macro-level of policy, the industry-level and the meso-level of institutions.[3] The recommendations could be sequenced within the context of sector-focused initiatives, which complement the national SME Development Strategy of Georgia 2016-2020; the Social-economic Development Strategy of Georgia - Georgia 2020 - and, the Georgia Rural Development Strategy (2017-2020). The aim is to support the Government in enabling enterprises to reap benefits from emerging growth opportunities; particularly those generated by access to a broad range of export markets, in particular the EU.

Recommendations in detail

Chapter 6: Enterprise Growth Dynamics

Recommendation 6.1: Going Beyond Targeting Macro-economic Disequilibria

Address constraints that are undermining the consolidation of a coherent system of incentives at the macro-level to enable and promote enterprise innovation.

Recommendation 6.2: Setting Industries on a High Road Growth Path

Establish sector-oriented strategies for enabling and promoting inter- and intra-industry collaboration to enhance flexible specialization and collective efficiency. These strategies could be incorporated as annexes to the SME Development Strategy, and include a combination of several connecting, meso-level measures including the following:

- Consider establishing credit schemes that involve microfinance institutions and non-bank financial institutions (NBFIs) to further facilitate the enterprises' access to finance;
- Develop training programmes on standards implementation and industry-focused R&D activities, potentially in co-operation with HEI and TVET institutions;
- Encourage a new generation of networking programmes by industry and business associations as well as by the Chamber of Commerce and Industry;
- Establish a dedicated programme for linking Georgian enterprises with transnational corporations;
- In parallel to networking efforts, support business and industrial associations to promote inter- and intra-industrial networking among Georgian enterprises so as to enable the emergence of voluntary clusters of enterprises that can collaborate and work jointly to achieve flexible specialization and gradually move towards technology-intensive activities with high value-added;
- Build partnerships with specialised training and R&D institutions and disseminate information on opportunities and best practices to bridge the gap between R&D and enterprises;
- Strengthen conformity assessment through involving the private sector within the context of public-private partnerships, in establishing the much-needed conformity assessment bodies, especially in the area of product testing, drawing on international best practices and recommendations, including those of the UNECE;
- Assist line Ministries responsible for the authorization and licensing of the manufacture and sale of food and beverages, cosmetics, pharmaceutical products, dietary supplements and medical devices to establish the required guidelines, systems and expertise knowledge for issuing Good Manufacturing Practice (GMP) certificates.

Recommendation 6.3: A Coherent System for Monitoring Private Sector Innovation

Develop a national system for generating the required data to track technology diffusion and different kinds of innovation at the enterprise level. This could be achieved by developing a new generation of surveys for collecting data against a clear set of indicators that capture growth dynamics at the macro-, meso- and micro-levels including the following measures:

- Support GeoStat, Enterprise Georgia and GITA in expanding the scope and coverage of the enterprise survey according to international standards and good practices, repeated regularly and allowing for panel data to track enterprise performance across time. The survey results can be used for establishing clear benchmarks and indicators for measuring progress;
- In addition, the Government could consider using big data techniques to consolidate information from different sources.

Source: UNECE.

6.1 Introduction

This chapter takes the analysis a step further by ascertaining the Georgian economy's growth dynamics at the enterprise level, with growth dynamics understood as the main factors underpinning the ability of the enterprise to improve productivity and achieve increased specialization in technology-intensive production activities with high value-added. The focus will be on identifying such factors and highlighting the manner in which they influence market entry and the enterprises' ability to expand and engage in innovative activities.

To do this, the chapter uses the case study method. This method involved face-to-face interviews with a select group of 13 enterprises engaged in innovative activities and belonging to strategic sectors with major contribution to total value-added, employment and exports. The interviews were conducted in 2019 using a questionnaire that was developed by the UNECE, drawing on insights gained from the UNECE Study on Regulatory and Procedural Barriers to Trade (RPBT),[4] (see Box 6.1) carried out in 2018 upon the request of the Government to bring forward the interplay between non-tariff measures (NTMs) and structural transformation.

Box 6.1 UNECE Study on Regulatory and Procedural Barriers to Trade

As evidenced by the UNECE Study on Regulatory and Procedural Barriers to Trade of Georgia, the country is one of the top reformers in the UNECE region. The study, which involved face-to-face interviews with 65 traders belonging to manufacturing activities in strategic sectors, showed the Government as effectively consolidating a conducive trading environment. It has delivered impressive achievements in implementing international recommendations and best practices in the areas of trade facilitation, standardization and quality assurance, with significant benefits to the enterprises in the form of reduced trade costs. The study also provides evidence of the necessity of complementing the trade reforms with targeted efforts to improve the productive capacity of enterprises.

Source: UNECE, Regulatory and Procedural Barriers to Trade in Georgia: Needs Assessment, United Nations, New York and Geneva, 2018.

As evidenced by the RPBT study, Georgia's trade cost achievements were undermined by value added tax (VAT), which, at 18 per cent, increased the traders' financial burden along with transport costs. Transport costs, particularly when shipping by sea and air, constituted over 20 per cent of the monthly expenses of around 16 per cent of the interviewed enterprises. Another 22 per cent reported allocating between 10 to 20 per cent of their monthly expenditures for covering trade costs.

Yet, contrary to the widely held view, these high costs did not carry adverse consequences for expansion activities. Indeed, 98 per cent of the traders had well established expansion plans for 2018-2019. These plans involved hiring additional staff (36 per cent of respondents); purchasing new machinery (29 per cent); and establishing branches in Georgia (20 per cent) and, to a limited extent abroad (5 per cent).

These plans were meant for venturing into new markets, particularly the EU (81 per cent of interviewed traders) and launching new products (58 per cent).

The enterprises were eager to capitalize on the growth opportunities generated by the Association Agreement (AA) with the European Union (EU)[5], which constitutes a new addition to the Government's efforts to create a growth-enabling environment for enterprise. (Annex). The AA also comprises a Deep and Comprehensive Free Trade Area (DCFTA) with the European Union (EU), which provides a new impetus for increasing the contribution of trade to structural transformation, as envisaged in the national SME Development Strategy of Georgia 2016-2020[6]; Social-economic Development Strategy of Georgia - GEORGIA 2020[7]; and, the Georgia Rural Development Strategy (2017-2020).[8]

However, most of the traders remained awkwardly placed to implement their expansion plans, owing to their inability to carry out technology-intensive and knowledge-based innovative activities. This is so because they lacked the required level of technological capability; understood as the accumulated knowledge and skills to identify, appraise, utilise and improve on existing technologies and production techniques or develop new ones to modernize production processes and venture into new innovative production activities.[9]

The study showed that developing the technological capabilities of an enterprise is a function of several factors, including, among others, access to finance. The interviews carried out as part of this review sought to establish whether there are other factors at play and targeted, in addition to manufacturing enterprises, those involved in the information and communication technology (ICT) sector. Moreover, special emphasis was accorded to distinguishing between growth dynamics influencing start-up activities and those influencing the ability of the enterprise to expand by scaling up existing activities; venturing into new production lines/services; diversifying its export mix; and/or expanding export partners.

This chapter is divided into five sections. The introduction is followed in section two by the profile of the interviewed enterprises. Section three discusses their growth dynamics in Georgia drawing on the 13 interviews. Section four establishes the extent to which these dynamics are adequately addressed by market-support institutions, leading to action-oriented recommendations for the Government's consideration in section five.

6.2 Enterprise profiles

Mirroring the national trend, the interviewed enterprises were predominantly small- and medium-sized.[10] Small enterprises, employing between 10 and 49 people, constituting the largest segment with a 54 per cent share, followed by large enterprises employing 250 people and above (31 per cent), with the remaining balance equally split between micro (employing fewer than 10) and medium enterprises (employing between 50 and 249). The enterprises represented industrial branches with significant contribution to employment and exports as well as the information and communication technology (ICT) sector, and operated from major industrial hubs (Figures 6.1 and 6.2).

Figure 6.1 · Surveyed Enterprises by sector (Shares, per cent)

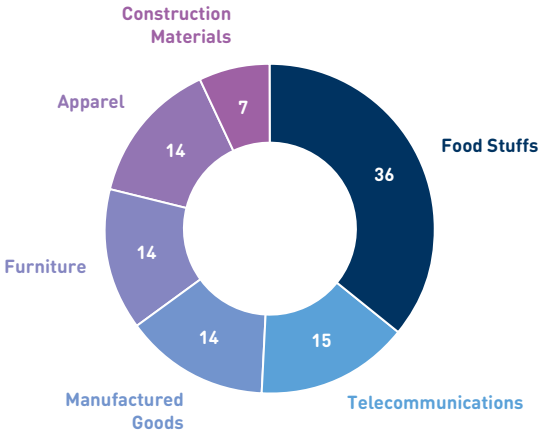
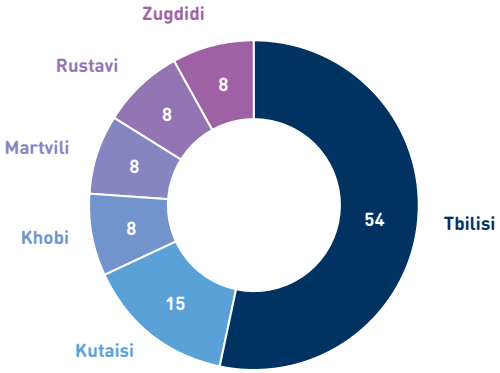


Figure 6.2 · Surveyed enterprises by city (Shares, per cent)



Source: UNECE interviews with Georgian enterprises, 2019.

Only one of the interviewed enterprises was created out of necessity to make up for lost livelihood sources. Pushed out of the labour market overnight, the founder saw in the business sector a means to survive and, with luck and persistence, establish a sustainable livelihood. The remaining enterprises were created by opportunity-driven entrepreneurs, who, as shown in Table 6.1, ventured into the business sector to offer practical solutions to the problems facing their communities; reap benefits from emerging growth opportunities; and, fulfil a life-long passion.[11] They were "search[ing] for change, respond[ing] to it and exploit[ing] it as an opportunity."[12]

Table 6.1 Visions that willed the enterprises into existence

Sector	Date of establishment	Reasons for establishment	Prior working experience
Construction	2014	Unemployment (loss of job). Venturing into manufacturing was the only means to secure a livelihood, given the lack of job opportunities in Georgia.	No prior working experience or formal training in the field. Learnt on the job.
Food manufacturing	2011	Established the company to provide solutions to pertinent problems: food waste. Food manufacturing practices begged the need for rational (efficient) production processes. After the harvest, fruits are sorted into three categories. Third class fruit is the worst in terms of appeal and does not meet agricultural commercial standards, and most likely will end up thrown away or in the best case scenario used for juice. The founder decided to improve efficiency by using the third class fruits (for example, fruits that do not comply with commercial agricultural standards), as inputs for the production of fruit chips.	No prior working experience or formal training in the field of food production. Learnt on the job by overcoming challenges. The enterprise disseminates information on quality and health requirements to its suppliers (farmers) and helps them meet these requirements. The enterprise also owns land used as plantations of kiwi, tea and nuts. The main reason to own plantations was to ensure high quality of raw materials. The first-hand experience in overcoming challenges helped the enterprise accumulate knowledge and further experience.

Table 6.1 Visions that willed the enterprises into existence (Concluded)

Sector	Date of establishment	Reasons for establishment	Prior working experience
Manufacture of beverages (Wine production)	2013	Keen interest in the sector. Founders established the enterprise to pursue their passion for wine-making and used their personal savings for financing start-up capital, and one of the founders transformed part of own premises into a production facility. The founders have permanent jobs and are pursuing wine-making as a hobby.	No prior working experience or formal training in the field. Accumulated knowledge in modern technology-intensive production.
ICT	1999	Saw an opportunity in the ICT sector, particularly web hosting, promising growth opportunities.	No prior experience in the field, but formal training in ICT. Founders were interested in ICT and learnt on the job.
Manufacture of basic metals	2015	The enterprise relocated back to Georgia from Ukraine, where it was based since 1998.	Founder had prior working experience.
Manufacture of clothing apparel	2017	Encouraged by partners in Bulgaria to capitalize on improved market access conditions to the EU following the entry of the DCFTA into effect.	No prior working experience or formal training in the field.
Manufacture of rubber and plastic products	1985	Established by the State.	
ICT	2006	To spearhead digitalization by providing modern technology solutions to households and enterprises	Relevant education in the field. No prior working experience
Manufacture of furniture	2004	Prompted by the idea of using recycled materials (from demolished buildings), and raw materials purchased locally, including used Georgian timber that has a luxurious, vintage look	Founder had extensive experience in furniture manufacturing
Manufacture of tea	2016	Prompted by a desire to restore the tea industry in the Martvili region. Benefited from the Government's "Georgian Tea Plantation Rehabilitation Programme» during the start-up phase. Currently company is producing organic tea, enjoying growing demand and is engaged in exports	Prior working experience in the field
Laurel	2019	Experience of working with the laurel plant was the major reason for starting the enterprise. Facing competition from Turkish laurel and currently considering shifting to bio-production, as the bio product is more valuable and higher in demand on the international market. However, this transition requires equipment and machinery which will ensure the quality of the product	Prior working experience
Manufacture of clothing apparel	2016	To use accumulated working experience in establishing a sustainable income source, meet domestic demand and export	Prior working experience
Manufacturing of pet furniture and animal feed	2014	Main impulse for starting the business was the DCFTA	No previous experience or formal training in the area

Source: UNECE interviews with Georgian enterprises, 2019.

The founders drew on their entrepreneurial spirit, in the sense that they were eager to capitalise on emerging opportunities, even though the majority lacked prior working experiences and in some cases had no previous knowledge in their chosen field of activities. They had to learn by doing because their formal training, while up to university level, was not pertinent to their areas of activities. Moreover, the majority did not have prior working experience in their fields (Table 6.1). They were persistent and their efforts bore fruit. As shown in Table 6.2, all of the manufacturing enterprises produced final goods and the majority sold their products abroad, particularly in EU markets. Several were also creating jobs for national enterprises through backward links that involved the sourcing of raw materials. ICT enterprises were also involved in exports and boasted established clients in regional and global markets.

Table 6.2 Surveyed enterprises' supply sources and target markets by product

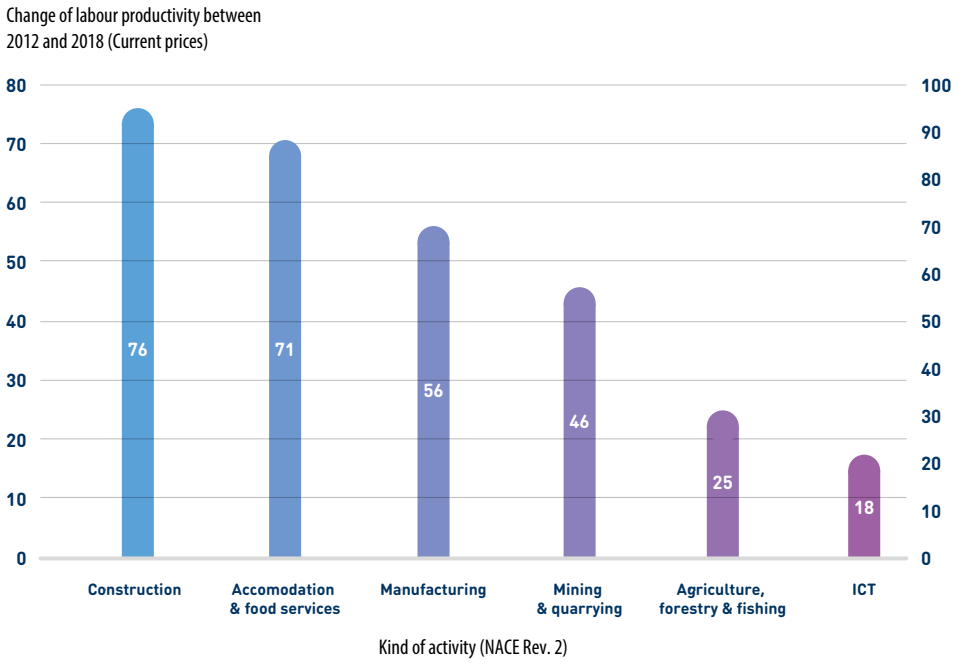
Products	Main supply sources	Main target markets
Buildings, other construction work	Azerbaijan (Workforce)	Domestic markets
Fruit chips, food supplements, fresh fruits and vegetables	Domestic markets	EU and Russia
Bottled wine	Domestic markets	Austria and US
Web hosting, servers, cloud storage, websites	IT Software and hardware. Mainly from China	Webhosting and iCloud servers. Main clients: Russia, Panama, Brazil, Hong Kong
Rebar; Rebar mash; chopped fibre; Geogrid; laminate strips; matting; dowels	China and Germany	UK and China, EU countries such as Germany, Austria, and Netherlands
Blouses, dresses, trousers, shorts, T-shirts, shirts, overalls, coats, jackets	Turkey and Bulgaria.	EU, Turkey
Drinking water pipes and gas pipes, also sewer pipes and fittings	Saudi Arabia, South Korea, U.S. and Iran	Domestic markets
Bio tea	Raw material from domestic markets. Machinery from China and Japan	Poland and China
Laurel, laurel oil	Domestic markets	Poland, China and Ukraine
Pet furniture	Machines imported from Europe (Italy, Spain). Raw material from Belarus, Finland and the Baltic States. Screwing bolts and knitted parts imported from Turkey and China	EU and USA
Animal feed	Machines imported from Europe	EU

Source: UNECE interviews with Georgian enterprises, 2019.

6.3 Enterprise growth dynamics

The experience of the 13 interviewed entrepreneurs is not common to the broader population of enterprises. Available statistics show enterprises registering significant improvements in labour productivity across the industrial, tourism and ICT sectors (Figure 6.3). Moreover, in a testament to the Government's successful reforms, the number of active enterprises assuming an increasing trend following the entry into force of the Deep and Comprehensive Free Trade Area (DCFTA) with the European Union (Figure 6.4).[13] An essential element of the Association Agreement (AA) of Georgia with the EU,[14] the DCFTA, set in motion comprehensive reforms in the areas of trade facilitation, standardization and quality assurance as part of the Government's broader effort to align the national legislative and institutional set-up with the European Union (EU) *Acquis Communautaire*.[15]

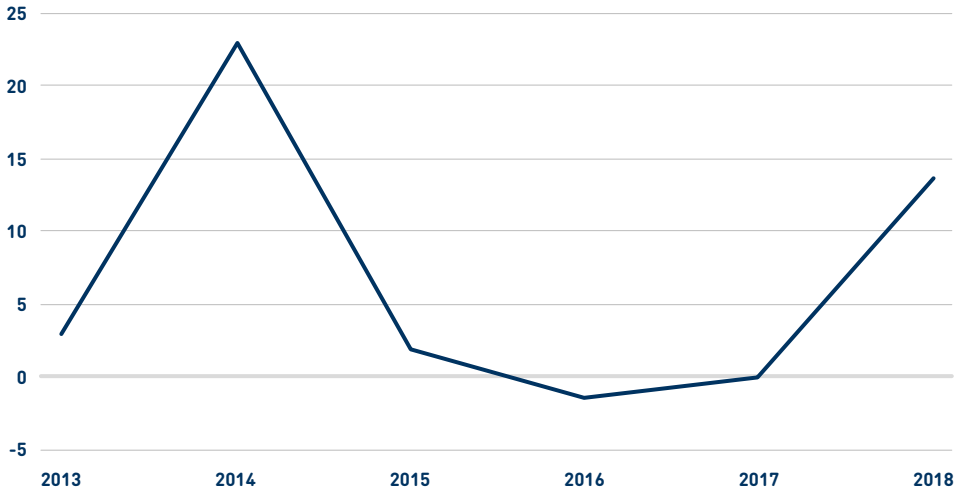
Figure 6.3 · SME labour productivity growth
(2018 compared to 2012, per cent)



Source: UNECE based on data provided by GeoStat.

However, it remains difficult to establish the reasons behind such productivity gains. To begin with, the data on enterprise productivity is not disaggregated by type of ownership, making it impossible to differentiate structural variations between public and privately-owned enterprises. There is also a dearth of statistics on gross fixed capital formation at the enterprise level (in other words data collected through enterprise surveys); so that it is difficult to ascertain the extent to which productivity growth was a result of capital deepening and whether such deepening involved high levels of investments per employee.[16]

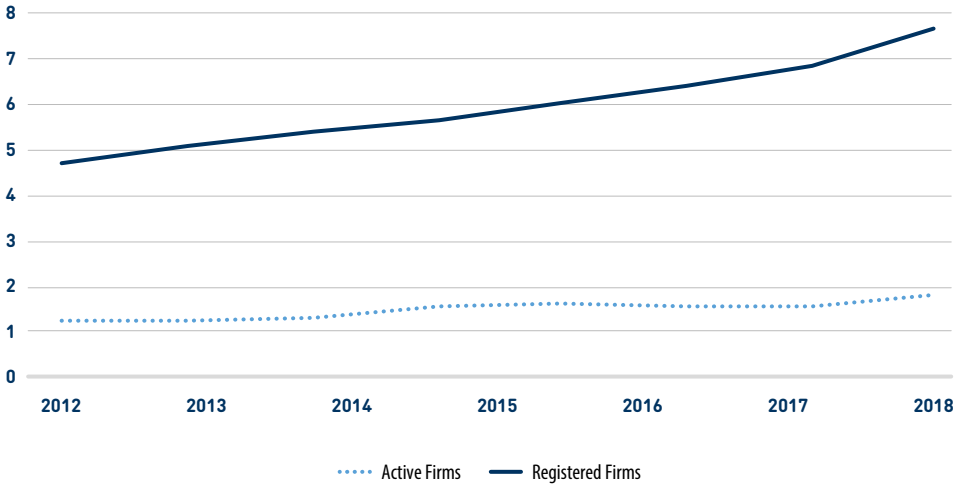
Figure 6.4 · Growth rate of active enterprises in Georgia (Per cent)



Source: UNECE based on Geostat data.
Note: UNECE analysis based on Geostat data. Annual growth rate in number of active firms.

At the same time, a closer examination of Georgian enterprise statistics reveals that the above improvements mask deep-seated vulnerabilities. In particular, the significant number of entrepreneurs who remain inactive and do not forge ahead with business plans following registration. As shown in Figure 6.5, this has been a consistent trend. Entrepreneurs who bring their plans to fruition are often met with limited success and exhibit anaemic operations, so much so that they are excluded from official business statistics.[17]

Figure 6.5 · Registered versus active enterprises
(Hundreds of thousands)



Source: UNECE based on data provided by Geostat.

Evidence also shows that export-oriented enterprises do not necessarily enjoy strong comparative advantage in targeted destination countries. Only 50 per cent of Georgia's top 20 exports carry a Revealed Comparative Advantage (RCA)[18] index above the threshold level of one. These exports are dominated by agricultural products, particularly meat and wine, destined to non-EU countries, and involve limited overlap with Georgia's top 20 exports to the EU and to the rest of the world.[19]

This suggests that there remains room for improvement, and the starting point would be to support the efforts of enterprises to develop their technological capability; which is a prerequisite for achieving structural transformation towards increased specialization in innovative activities. As shown in Table 6.3, engaging in innovative activities requires mastering complex core skills and functions. Start-ups that commence activities with advanced technological capacities built into their enterprises are the exception rather than the rule; so that at issue is how best to enable enterprises to gradually master complex core skills and functions.

The implication is that capital deepening is to be seen as one element for improving technological capability and does not necessarily denote a move towards innovative activities. The quality of investments and indigenous technological progress are of equal importance, particularly for achieving increased specialization in innovative, high value added activities. The experience of the 13 interviewed enterprises offers valuable insights into the factors influencing technological capability development in Georgia.

Table 6.3 Surveyed enterprises' supply sources and target markets by product

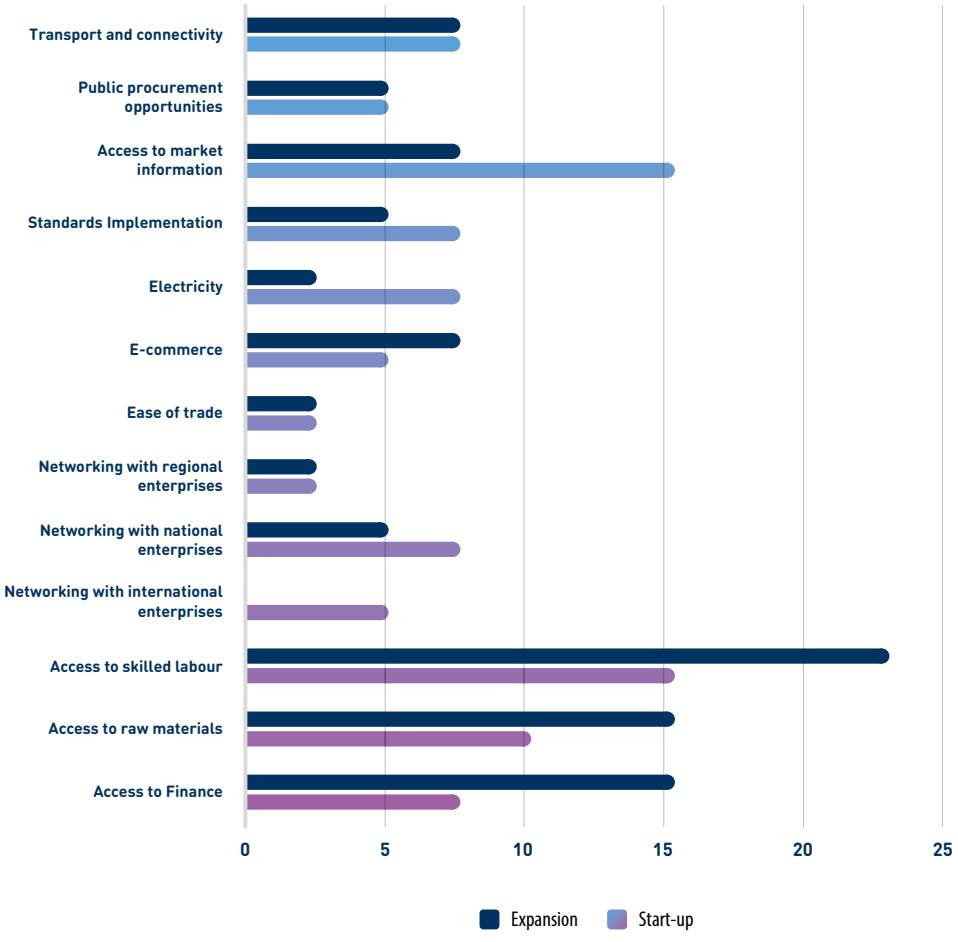
	Functional					
	Investment			Production		
Degree of complexity	**Pre-investment**	**Project execution**	**Process engineering**	**Product engineering**	**Industrial engineering**	**Linkages within economy**
Basic Simple, routine (experience- based)	Pre-feasibility. Feasibility studies, site selection, scheduling of investment	Civil sonstruction. Ancillary services, equipment erection, commissioning	Debugging. Balancing, quality control, preventive maintenance, assimilation of process technology	Assimilation. Product design, minor adaptation to market needs	Workflow scheduling. Time-motion studies, inventory control	Local procurement of goods and services. Information exchange with suppliers
Intermediate Adaptive/ duplicative (search-based)	Search for technology source, negotiation of contracts, bargaining suitable terms, info systems	Equipment procurement, detailed engineering, training and recruitment of skilled personnel	Equipment stretching, process adaptation and cost saving, licensing new technology	Product quality improvement, licensing and assimilating new imported product technology	Monitoring productivity, improved coordination	Technology transfer of local suppliers, coordinated design, S&T links
Advanced Innovative/risky (research-based)		Basic process design, equipment design and supply	In-house process innovation, basic research	In-house product innovation, basic research		Turnkey capability, cooperative R&D, licensing own technology to others

Source: Lall, S. (1992) Technological Capabilities and Industrialization, World Development, Vol. 20, p. 167 [155] .

The results of the interviews show enterprises that tangible improvements were made possible by significant investments in standards implementation; unfettered access to finance; and, collaborative networking with national, regional and global partners (Figure 6.6). These factors were at the centre of the enterprises' growth dynamics, with access to finance and networking enabling them to forge ahead with start-up activities, and standards implementation constituting an effective prerequisite for expansion activities, all the way enabling necessity entrepreneurs to graduate into opportunity entrepreneurs.

Expansion endeavours involved the creation of new branches in Georgia and, to a limited extent, abroad, to bolster market shares as well as increased engagement in exports, encouraged by the new opportunities generated by trade agreements, particularly the DCFTA. However, the enterprises were still challenged, with their efforts to capitalize on achievements gained, complicated by the lack of adequate infrastructure and market support services. The upshot was that the majority remained unable to advance beyond basic skills and functions. They are yet to harness their entrepreneurial drive to graduate into drivers of creative destruction in the Schumpeterian sense.

Figure 6.6 · Factors undermining the growth dynamics of interviewed enterprises (Per cent)



Source: UNECE interviews with Georgian enterprises, 2019. Results expressed as per cent of interviewed enterprises.

Access to market information

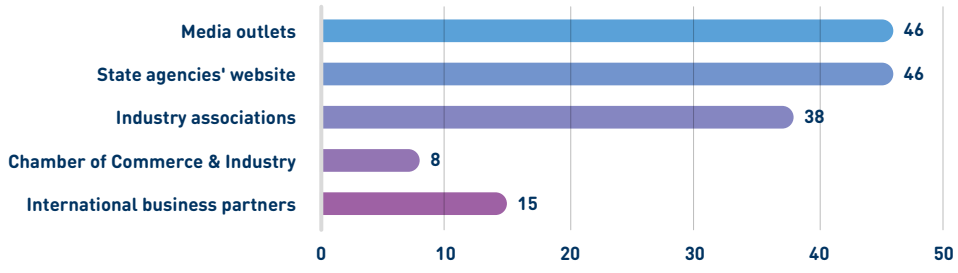
Access to up-to-date information on applied laws and associated regulatory and procedural requirements represented a major element in determining the enterprises' growth options. Starting with the search for suppliers and potential buyers and ending with the effort to ensure compliance with applied safety, health and environmental regulatory requirements in domestic and targeted export markets, enterprises invest considerable exploratory costs. Some spend months piecing together a clear understanding from different sources, while others source this task to specialized marketing agencies.

However, their efforts do not always yield the expected results, and this also applies to those calling upon the service of marketing agencies. It is often the case that enterprises fail to find raw materials at reasonable prices; are forced (out of desperation) to accept taxing terms of sales dictated by their newly-found suppliers and buyers; and/or feel unable to grasp the implications of the new/revised laws and associated procedures on their production and trade activities. These are some of the challenges that enterprises, particularly SMEs, face.[21]

In the case of the interviewed enterprises, the State agencies' institutional website ranked high on their list of information choices along with media outlets. As shown in Figure 6.7, these two sources seem to be used in tandem by 46 per cent of the enterprises for keeping abreast of new/revised laws and broader reforms, with media outlets providing live updates on new/revised legislation that are published on the State agencies' websites, which also feature a portal on DCFTA reforms and associated regulatory requirements and procedures.[22] Industry associations ranked as the second information source, followed by international business partners.

The enterprises also obtain first-hand information during public-private consultative meetings, which are organized within the context of well-established institutional mechanisms. Supported by line Ministries, these meetings are geared towards engaging the business community in decision-making and ensuring continuous feedback on implementation challenges facing this community as well as its emerging needs (Table 6.4).[23]

Figure 6.7 · Interviewed enterprises' information sources
(Per cent)



Source: UNECE interviews with Georgian enterprises, 2019.

Table 6.4 Enterprises' involvement in public-private consultations

Organizing State agency	Frequency	Issues discussed
Ministry of Foreign Affairs; Ministry of Agriculture; Ministry of Economy and Sustainable Development; Ministry of Environmental Protection and Agriculture.	Every three months	New regulation; export regulation; standards of production; state strategies and vision; international practices
Georgian Wine Agency	Generally, on ad hoc basis	New legislative changes on wine parameters and standards
Business Associations	Every six months	Public procurement, support for export, maintenance of the logistical infrastructure, development of the city Rustavi (location where they are based), taxation regulations and bureaucracy, innovation support
Ministry of Economy and Sustainable Development; Ministry of Environmental Protection and Agriculture	Every three months	Brain drain, low productivity, shortage of education providers.
Ministry of Economy and Sustainable Development; Ministry of Environmental Protection and Agriculture.	Every six months	Public procurement, import of the final goods (counter parts), laboratories
Georgian National Communication Commission – sector regulatory agency	At least once per month	Regulation related to the sector, law ratifications, sector-related specific discussions, legislative initiatives and recommendations to improve general climate in the sector.
Ministry of Foreign Affairs; Ministry of Finance; Ministry of Agriculture; Ministry of Economy and Sustainable Development; Ministry of Environment and Natural Resources Protection of Georgia	Every six months	Export and import regulations; production standards; State strategies and vision of the ministries; international practices; labour security; new regulations
Ministry of Foreign Affairs; Ministry of Finance; Ministry of Agriculture; Ministry of Economy and Sustainable Development; Ministry of Environment and Natural Resources Protection of Georgia	Every six months	Export and import regulations; production standards; State strategies and vision of the ministries; international practices; labour security; new regulations
Ministry of Finance; Ministry of Agriculture; Ministry of Economy and Sustainable Development	Every six months	Export and import regulations; production standards; international best practices
Ministry of Economy, Enterprise Georgia	Every three months	Export, trade policies, hastening the DCFTA processes.

Source: UNECE interviews with Georgian enterprises, 2019.

Around 85 per cent of the interviewed enterprises reported participating in such meetings and were quick to register their satisfaction with the discussions. They noted that in addition to receiving information on applicable rules and practical advice on export activities, the meetings enabled them to register tangible influence on revised/new legislation. Several described the public sector as highly open to suggestions and noted the officials' willingness to hold follow-up discussions with the concerned enterprises to address the challenges at hand.

However, the above sources seem to fall short of meeting the enterprises' information needs, particularly during the start-up phase (Figure 6.7). Start-up activities seem to be undermined by the lack of information on applied laws and associated regulatory and procedural requirements, local demand and growth opportunities in regional and global markets; networking opportunities with national, regional and global partners;

and, to a limited extent, information on funding possibilities. Expansion activities are undermined by the lack of clarity over applied regulations, owing to the quick pace of legislative reforms. Enterprises explained that regulations are subject to constant updates, making it difficult to keep pace, let alone form a comprehensive understanding of potential impacts on current and future activities. Others complained about the lack of information on safety, health and environmental regulatory requirements in export markets; relevant international standards; labelling requirements; potential export markets and global demand for their products in general; global prices; and, networking opportunities with regional and global partners; and potential supply sources.

The need to further develop the country's information dissemination function is obvious. The emphasis should be on consolidating a coherent system of information on the implications of ongoing and planned reforms, including the DCFTA associated reforms and legislative approximation, for the enterprises as well as the broader mega-trends (for example, digitalization and circular production models), that entrepreneurs have to take into account when planning and executing start-up and expansion plans. This is an area where market-support institutions have a major role to play (Section 4)

Standards implementation

The successful implementation of international quality, safety and health standards as well as private quality standards constituted a major determinant to the interviewed enterprises' development trajectory, and this was also the case of those interviewed as part of the RPBT study.[24] This is only to be expected since standards provide blueprints for technological learning and upgrading of production facilities, involving detailed guidelines for informing decisions on, among others, machinery and equipment, production methods, management systems and the organization of factory floors.

All the interviewed enterprises reported implementing international standards as part of a broader effort to engage in export activities and noted reaping immediate benefits in the form of improved market access. Decisions on standards implementation during the start-up phase seem to be taken following a balance sheet approach, with enterprises preoccupied by the costs. Standards implementation is seen as posing unnecessary additional costs as opposed to a strategic investment for improving production capacity. As explained by one of the enterprises interviewed as part of this review, avoiding standards implementation was helpful because it allowed for reduced start-up costs.

The enterprises' tendency to defer standards implementation must also be measured against their troubled access to finance (see below). Standards implementation often involves significant investments in facilities, machinery, equipment and human resources development.[25] In the absence of such resources, global markets will remain inaccessible to the enterprises. This was particularly the case of food producers, who lacked the resources to implement the Hazard Analysis Critical Control Points (HACCP) system as well as furniture producers who reported lacking the resources and capacity to implement internationally-recognized standards for green products.

However, the implementation of standards did not figure as an important growth dynamic for start-up activities. Several enterprises reported that implementing standards is not necessarily a critical requirement for competing in domestic markets, suggesting the low emphasis that consumers accord to product quality attributes.

The low demand for standards among inward-looking enterprises was also established in the study on RPBT. Traders lamented that the dominant view among enterprises is that implementing standards brings limited advantages, if any, especially since adherence to such standards is not required by law.[26] This puts standards implementing enterprises at a disadvantage in that they are faced with fierce competition from cheaper, low-quality and counterfeit products. The fact that such products also find their way into the markets through imports creates additional pressures, thereof, fuelling erosive price-based competition that blunts investments in product quality.

The above concerns were echoed by the 13 interviewed entrepreneurs, who also lamented the weak intellectual property rights (IPR) enforcement. They noted the significant number of unregistered products (trademarks) on the markets, which are difficult to trace and recall, posing risks to consumers and putting enterprises that invest in standards implementation and innovative activities at a disadvantage.

Thus, while standards implementation constituted an essential requirement for venturing into export activities, its influence on start-up decisions seemed to be detrimental. Standards implementation is seen as a financial burden, and this cannot be understood in isolation of the enterprises' troubled access to external finance. Their preference is to survive the first years and flourish before taking on the significant investments that standard implementation requires.

The interviewed enterprises' pragmatic approach is not common to the entire population of SMEs. A significant segment of the enterprises remains inward-looking, begging the need for increasing the enterprises' demand for standards. This is important not only for ensuring a level playing field, but also for the protection of human, animal and environmental public health and safety. Outward looking enterprises also need to be supported in their efforts to implement standards. Otherwise, they will remain unable to access international markets, particularly the EU, where Technical Barriers to Trade (TBT) and Sanitary and Phytosanitary (SPS) measures are most demanding to ensure consumer safety and environmental protection. TBT measures, covering labelling, quality standards and associated regulatory requirements constitute the largest segment of the EU's applied NTMs, accounting for 55 per cent of total measures, while SPS measures constitute the second largest segment, with a 41 per cent share.[27]

Linked to standards implementation is the additional costs enterprises assume to prove compliance with regulatory requirements in global markets. Conformity certificates issued by conformity assessment bodies (CAB) are not recognized outside the EU,[28] since the Georgian Accreditation Centre (GAC)[29] is yet to join the International Laboratory Accreditation Cooperation (ILAC) mutual recognition agreement (MRA).

Moreover, while Georgian conformity certificates are recognized in the EU, there is a shortage in accredited CABs in product certification (particularly food). Interviewed enterprises noted that this shortfall increases their financial burden, as they have to call upon the services of the expensive international CABs. On their part, ICT enterprises pointed to the lack of data centres offering visualization, iCloud and other modern ICT networking certifications. Such centres are too limited in number to cater for the market.

Access to finance

Facilitating the enterprises' access to finance ranks high on the Government's priority list, with active involvement in promoting alternative sources of finance resulting in tangible benefits to the interviewed enterprises. Around 69 per cent reported benefiting from non-bank funding schemes for financing start-up activities and subsequent standards implementation efforts. As shown in Table 6.5, these schemes were offered by the Government as well as by international organizations within the context of donor-funded initiatives.

Access to finance was a significant impediment to start-up activities for only eight per cent of the interviewed entrepreneurs, who reported failing to fulfil the banks' collateral requirements. Others experienced difficulties in completing the banks' cumbersome lending procedures. Still others, particularly those involved in the ICT sector, noted that at issue was the lack of investors willing to partner with Georgian enterprises. Yet others, emphasized that the difficulties were mainly due to the lack of information on available financing opportunities.

Entrepreneurs who managed to obtain start-up bank loans lamented the additional financial burden that the loans have created, given the prohibitive interest rates and demanding collateral requirements. The above-mentioned constraints also undermined the development activities of around 15 per cent of the interviewed enterprises, who reported lacking the necessary resources for further developing their production facilities and/or intensifying exports, particularly to the EU.

Table 6.5 Financial support initiatives cited by enterprises

Sector	Initiative	Support
Food	USAID grant	Financial support GEL100,000
Food	APMA	Financial support GEL250,000
	EBRD co-financing creation of webpages	EBRD co-finances the creation of webpages; this initiative has been working since the very beginning of the business and it helped us to attract more clients.
ITC	EBRD	10% co-financing of the purchased technology.
Metal manufacturing	GITA Innovation Funding	Financial support for innovative businesses. The understanding of the interviewed enterprises that this is mainly for the ICT sector.
Apparel	Enterprise Georgia	Co-financing of the loan, which was very helpful at the entry stage.
Plastic/rubber manufacturing	Enterprise Georgia	Co-financing the loan for expanding the enterprise.
Furniture	USAID grant	Financial support of GEL100, 000
Furniture	Enterprise Georgia	Co-financing the loan (cheaper loan) of GEL150, 000
Food	USAID grant	Financial support of GEL100, 000
Food	Enterprise Georgia	Co-financing the loan (cheaper loan) of GEL150, 000
Food	Enterprise Georgia	Co-financing the loan (cheaper loan) of GEL150, 000
Furniture	Enterprise Georgia	Co-financing the loan (cheaper loan) of GEL150, 000
Furniture	EBRD	10% cash-back on technology purchase.

Source: UNECE interviews with Georgian enterprises, 2019.

The challenges raised by the enterprises are common to SMEs across the globe. Their limited asset base and low volume operations render them uncreditworthy to commercial banks, which are inherently risk averse. At issue, therefore, is how best to expand the pool of sustainable funding schemes that can maintain activities beyond the international funding cycle? At issue is also the limited focus of available funding schemes. Enterprises approached as part of this review highlighted the lack of financing possibilities for endeavours outside of investments/reinvestments in facilities, machinery and equipment. Most notable is human resource development. As shown below, several reported lacking the necessary resources to invest in training their staff; an imperative that is all the more pertinent given the skills shortages in the domestic labour force.

Yet another area is research and development (R&D). Around 77 per cent of the enterprises reported that investing in R&D would be at the expense of production activities and staff training. Enterprises with funds to spare for R&D could benefit from further developing their departments or from establishing dedicated units to move beyond the current practice of outsourcing research to foreign companies; all of which remain out of reach in the absence of external funding. The interviews also suggest the need for increasing the support for standards implementation. Several manufacturing and ICT enterprises reported experiencing difficulties in obtaining external funds for investing in standards implementation.

Access to skilled labour

Access to skilled labour at reasonable costs posed a major constraint to the interviewed enterprises, particularly during the expansion phase. Enterprises drew attention to skills shortages in the Georgian labour market, noting that it was "hard to find skilled workers" and professional experts in such areas as ICT engineering and marketing. Several reported lacking in-house ICT capacities to venture into e-commerce; a platform that was emphasized by several enterprises as playing an essential role in increasing exports.

To develop their human capital, some entrepreneurs reported hiring foreign experts to provide on the job training to staff at a high cost. Otherwise, the majority (70 per cent) relied on the training services provided by market support institutions and international organizations within the context of donor-funded projects. These services took the form of workshops covering topical issues, including: product certification (cited by food producers); marketing; ICT standards (cited by ICT providers); workplace safety (cited by apparel manufacturers); and digitalization; taxation; financial accounting standards; and, new/revised trade and business legislation. The enterprises found the workshops useful in keeping abreast of new developments in their fields. However, several lamented that the workshops' short duration meant that they were unable to gain in-depth understanding of the issues covered. Others noted that by virtue of being donor-funded, training workshops are often organized on an *ad hoc* basis and are not sustained beyond the international funding cycle. Still others noted that training is often complicated by staff resistance to re-education.

While external funds can help the enterprises develop their human capital, this option comes with significant burdens in the form of loan payments. Networking with regional and global partners and transnational corporations offers a more viable option, but, as shown below, tends to be a challenging undertaking. Hence, the need for re-purposing the national education system as well as vocational training

possibilities to ensure increased emphasis on areas with direct bearing on innovation such as, among others, R&D, standards implementation, industrial organization, supply chain management and ICT engineering.

Networking

Networking with national, regional and global enterprises and transnational corporations (TNCs) was cited as a key growth dynamic during both start-up and expansion activities. For several enterprises, networking with international enterprises and TNCs was vital during the start-up phase. The TNCs constituted the main source of high-quality raw material and/or accounting for the bulk of their sales, thereby, paving the way for access into other markets. Cooperation with TNCs was also described as vital in obtaining guidance on standards implementation and keeping abreast of emerging opportunities.

Several noted that cooperation with TNCs enabled them to identify and forge relations of cooperation with accredited testing laboratories, which, as shown below, is an important advantage given the lack of accredited testing laboratories in Georgia. Still others described a snowballing effect, with their initial partners rendering them better placed to establish cooperation with new partners.

Cooperation and networking with international enterprises and TNCs were difficult to establish, however. The enterprises said that it took them time to earn their partners' trust, especially since they were new entrants and lacking in experience. Once established, these relations were carried over to the expansion phase. Several enterprises described a snowballing effect, with their initial partners rendering them well placed to establish cooperation arrangements with new partners.

Cooperation with regional enterprises, while considered as important, seems to be elusive in the absence of broader bilateral and/or regional cooperation agreements. For example, apparel manufacturers noted that Georgia's free trade agreement with Turkey[30] played a crucial role in stimulating cooperation and networking with Turkish enterprises, since it reduced the cost of raw materials. Similarly, enterprises noted that cooperation with the EU entered a new phase following the DCFTA's entry into force, since the agreement also involved the harmonization of non-tariff measures (NTMs).

Some regional partners went beyond the call of duty in supporting Georgian enterprises. A case in point is the management of a leading European producer that took it upon itself to nurture a Georgian start-up. The management encouraged an aspiring entrepreneur to establish a production facility in Georgia, provided guidance and took care of marketing the products in the EU markets. However, cooperation with regional enterprises was not deemed essential for several enterprises. These seemed keener on increasing sales through establishing commercial presence in regional markets, and noted that following this path is more effective than networking and cooperation arrangements with TNCs.

In contrast, cooperation with national enterprises, an important element in strengthening backward and forward linkages within the economy, figured as an important growth dynamic for driving both start-up and expansion activities and involved sourcing raw material and supplies and distributing/selling final products domestically. Once established, these relations evolved to feature the exchange of information and experience sharing as well as pooling efforts through joint orders and combined transport.

However, enterprises noted experiencing difficulties in identifying potential partners during the start-up phase, owing to lack of experience and first-hand knowledge of the sector. Others lamented that some networks are inherently difficult to access. This was particularly the case of the wine sector, which involves a "closed" network of wine makers, with well-established relations of trust. Joining this network was only possible after accumulating working experience and registering an impressive performance record in terms of product quality. Then there were those whose efforts to network with their counterparts were met with limited success. These enterprises pointed to the prevalence of cut-throat competition that stifles cooperation, lamenting that most counterparts tend to only focus on their own wellbeing and financial stability, therefore do not consider networking possibilities.

The need to support cooperation and networking at all levels and across sectors cannot be over-emphasized. Such efforts should also extend to link enterprises with TNCs. Successful development experiences show industries isolated from international value chains as more likely to be locked in low value-added activities, or what the literature dubbed as a "low road growth path".[31] In so doing, special emphasis should be given to link national SMEs to TNCs with established presence in Georgia, which, judging from the size of FDI inflows, are sizeable. Even though these have assumed a declining trend over the past few years, at over 20 per cent share of GDP since 2010, FDI inflows remain significant.[32]

Availability of basic infrastructure

The importance of basic infrastructure in the form of transport, electricity and other basic services in determining the enterprises' growth potential is self-evident and finds the strongest expression in the choice of location. Mirroring the overall national trend, the interviewed enterprises are clustered in and around Tbilisi to shorten geographic distances and, thereof, travel time, to major highway intersections, ports and container terminals.

However, these benefits are undermined by shortfalls in electricity power.[33] Several noted experiencing electricity outages, which create additional costs in the form of waste and higher repair and maintenance costs. To minimize such costs, the enterprises reported sourcing expensive generators. Needless to say, for enterprises that rely on external resources for financing investments, such expenditures could have only come at the expense of advancing indigenous technological progress.

Further undermining location benefits are the high transport costs, especially by sea and air. The enterprises' heavy dependence on sourcing machinery equipment along with the bulk of raw materials from abroad means that this constraint carries negative consequences for both outward-oriented enterprises as well as those dedicated to catering for the domestic demand. These consequences are not limited to costs and extend to dampen technology-intensive imports, which furnish the enterprises with practical means for acquiring the tacit knowledge needed for mastering core skills and functions. High transport costs also eat into the cost savings generated from the trade facilitation and regulatory harmonization efforts, which the Government has been undertaking to reduce trade costs.

6.4 The role of market-support institutions

Market-support institutions are effectively the glue that bridges the gap between policy and implementation. They bring about the intended trickle-down reform benefits through addressing instances of market failure and ensure policy responsiveness by transmitting reform impacts and emerging needs to decision makers. In the case of Georgia, the system of market-support institutions brings together an assortment of business and industry associations, which work alongside the Chambers of Commerce. The system also features two specialized State agencies with an explicit mandate to support enterprise development. The first is Georgia's Innovation and Technology Agency (GITA), which is responsible for coordination of national development efforts in the field of innovation. The second institution is Enterprise Georgia, which is responsible for coordinating and implementing SME policies and programmes. In designing their services, the two agencies are guided by the "SME Development Strategy of Georgia 2016-2020". This strategy involves action-oriented interventions, geared towards ensuring the successful achievement of the following five strategic directions/objectives[34]:

1. Further improvement of legislative, institutional framework and operational environment for SMEs.
2. Improvement of access to finance.
3. SME skills development and promotion of entrepreneurial culture.
4. Export promotion and SMEs internationalization.
5. Facilitation of innovation and R&D in SMEs.

Around 62 per cent of the interviewed enterprises belonged to market-support institutions, with several holding several memberships. As shown in Table 6.6, these memberships enabled the enterprises to benefit from: training services;[35] opportunities to participate in regional and international exhibitions; advisory support in the areas of marketing and production; and, up-to-date information on applied legislation and regulatory requirements. Most of the enterprises were satisfied with the services provided. The majority also noted the additional benefit of expanding their network with national, regional and international suppliers and buyers.

However, the previous sections suggest that these services remain insufficient for consolidating the enterprises' technological capabilities. There is a need to increase the outreach of market-support institutions, so that they could increase the number of beneficiaries and launch sector-focused programmes. Both points were raised by the enterprises that do not hold memberships in market support institutions (38 per cent). Several lamented the lack of adequate information on available enterprise support services, noting that they have no means to access such information. Enterprises involved in the ICT sector, construction services and the clothing and apparel industry lamented the lack of sector-focused programmes that could help them develop their products and services, noting that the existing market-support institutions do not cater for their specific needs. The point was also made regarding sector-focused programmes which are often

donor-funded so that they are short lived. Under such conditions, some of the enterprises acquired a preference to rely on international partners. A case in point is the clothing and apparel manufacturers, who reported working with EU partners to develop an industry association.

Both GITA and Enterprise Georgia, as well as two of the leading market-support institutions (Chamber of Commerce and Industry and Agricultural and Rural Development), reported plans to expand their services. However, as shown in Table 6.7, apart from Enterprise Georgia, the institutions seem to be challenged by the lack of finance and/or human capital. The point was also made by GITA that more needs to be done to raise the enterprises' awareness on the links between advances in innovation and enterprise development.

Table 6.6 Support services received by interviewed enterprises

Institutions	Services received	Average satisfaction (scale 1-5; 1= least satisfied)	Reason for satisfaction
• Georgian Farmers' Association • Export Development Association • Georgia Chamber of Commerce and Industry • Georgian Tea Producers Association • European Tea Producers Association • Georgian Laurel Producers Association	• Production and quality control of raw materials. • Trade consultation • Networking • PPP opportunities • Working meetings to keep members abreast of reforms • Exhibitions	4.75	• Regional/international exhibitions are organized frequently, with immediate benefits in the form of increased visibility and networking • Up-to-date information on applied legislation • Product recommendationsare useful • Market-access information • Sector-specific networking • Advice and information received helps enterprises get things right and avoid losses.
• Infrastructure Construction Companies Association • European Business Association • Business Association of Georgia	• Networking • Training • Meetings with international/ public officials • Business forums and exhibitions	3	• Difficult to meet the needs of all members • Business forums assist with customer outreach
• Business Association of Georgia	• Networking • Legislative updates from government officials	3	• Inability of members to elicit change without association's authority
• Georgian Chamber of Commerce and Industry • Georgian Association for Wood Processors and Furniture Manufacturers • European Business Association	• PPP opportunities • International forums • Networking • Training • Workshops	4.67	• Up-to-date business information • Regional/international exhibitions are helpful for increasing visibility and for networking • Networking with local enterprises helps expand production • Sector-specific cooperation leading to more effective problem solving

Source: UNECE interviews with Georgian enterprises, 2019.

Table 6.7 Support services and expansion plans of major market support institutions

Market support institution	No. of members	Current services	Planned services	Challenges to expanding services
The Office of the Business Ombudsman of Georgia	100	• Supervises the protection of rights for entrepreneurs • Reveals violations to entrepreneurial rights and resolves discrepancies • Responds to individual/joint applications • Assists in reviewing and correcting errors in Georgian legislation • Requests relevant information. Documents from administrative/entrepreneurial bodies • Collaborates with specialists, scientists and academics for business-related analysis • Creates working groups to address issues • Acts as court consultant for firms • Recommends legal counsel for business disputes		Lack of human and financial resources
Georgian Chamber of Commerce and Industry	960	• Provides information on planned events by GCCI and local/international businesses including seminars, exhibitions, workshops, etc. • Coordinates partnerships with Enterprise Europe Network • Participates/organizes business to business and state agency meetings • Assists in compliance/integrations with international standards • Consults on free trade agreements (especially DCFTA), state grant programmes, and donor grant initiatives • Provides guidance on alternative dispute resolution mechanisms • Engages in legal consultation for various subjects especially bar code issuance for international registration • Registration with GCCI allows use of GCCI logo, GCCI membership certificates, and networking events • Assists in obtaining certificates of origin, thematic trainings and document verifications	New webpage including: • Coordination with foreign business • Personnel management • Vocational education and training (VET) consultations	Insufficient: • Qualified staff • Specialised trainings • Awareness of GCCI services
Enterprise Georgia	Industrial component includes 495; micro and small 6,012; Film in Georgia 31	• Assists in co-financing for firm development through credit schemes and investment attraction • Provides trainings and executive development programmes • Consults firms on various subjects • Engages in trade-related networking with foreign firms by promoting trade missions, international exhibits of Georgian goods, and other events • Provides trading platform for domestic and international firms that disseminates relevant information on export procedures and markets for goods	Expanded into: • Hotels • Tourist attractions	Has no challenges to expand into specific projects which have been met with enthusiasm

Table 6.7 Support services and expansion plans of major market support institutions (Concluded)

Market support institution	No. of members	Current services	Planned services	Challenges to expanding services
Agricultural and Rural Development Agency (Previously Agricultural Project Management Agency)	Agri support 600; berries 200; agri insurance 100,000; storage 100; young entrepreneur 200; loan 40,000.	• Engages in firm-specific services • Assists in firm development through the dissemination of best agricultural practices • Coordinates rural development programmes aimed at strengthening and maintaining rural infrastructure • Provides financial assistance through co-financing, low interest loans and insurance coordination • Coordinates networking opportunities between firms with complementary needs and services	The agency is funding vocational education to promote greater employment in the fields of: • IT • STEM	In the process of implementing expansion plans, but insufficient: • Decision-making power due to subservience to their supervisory ministry • Funding • Qualified staff • Resources to address other/new topics
Georgia's Innovation and Technology Agency (GITA)	100	• Provides coordination among R&D scientists and firms • Supports start-ups through developmental guidance • Facilitates cooperation among administrative officials and firms • Promotes skill development of firms especially in digital literacy and capacity building • Engages in SME development through innovation guidance and technological solutions • Assists firms in the financing of knowledge-based initiatives • Implements programmes for stimulation of R&D initiatives and firms	The agency is funding vocational education to promote greater employment in the fields of: • IT • STEM	Have had issues with: • Regulation development/ implementation for start-ups to promote public procurement • Awareness creation for science-related linkages to industries • Promoting the necessity of R&D at firms

Source: UNECE interviews with Georgian enterprises, 2019.

6.5 Policy messages

Just like its counterparts across the globe, the Georgian Government is faced with the challenge of ensuring that reform benefits trickle down to the enterprise sector. This challenge is complicated by the predominance of small enterprises. Making development work for these enterprises requires targeted support, since they are inherently ill-equipped to capitalize on emerging growth opportunities.

As shown throughout this chapter, the Georgian Government has registered significant achievements in addressing this challenge. The next step would be to capitalize on these achievements through sector-focused interventions for enabling enterprises to graduate into more complex core skills and functions and, thereof, drive structural transformation towards increased specialization in activities which are high value-added.

Successful experiences suggest that such interventions should be grounded in a bottom-up approach, with a focus on supporting indigenous technological progress at the enterprise level, in addition to addressing macro-economic disequilibria. The focus should be on consolidating a coherent system of incentives across the macro-level of policy, the industry-level and the connecting, meso-level of institutions.

The above requires a developed system of education along with an advanced quality infrastructure system (standardization, conformity assessment and metrology),[36] and would be impossible to maintain in the absence of strong market support institutions. The Government has registered an impressive record in bringing the national quality infrastructure up to international standards and best practices, and the interviews suggest that priority needs to be accorded to consolidating the conformity assessment function. The Government is also according priority to improving the education system and has been stepping in to address instances where there is lack in market support services.

While its continued involvement remains crucial, the sheer size of demand for these services means that the Government cannot be a substitute for market support institutions. Below are a number of proposed recommendations for the Government's consideration as it proceeds to update its SME development strategy.

Macro-level incentives

The all-important imperative of ensuring macroeconomic stability aside, [37] the assessment suggests the need for mitigating the financial burden associated with VAT payment. One option would be to consider extending the payment period from five days to one month.[38]

Yet another area that could benefit from further improvement is IPR enforcement and efforts to ensure protection of registered trademarks. Otherwise, it would be difficult to achieve greater networking with TNCs. TNCs and foreign investors would be reluctant to make their technology and trademarks available to local partners. The absence of proper enforcement would also act as a disincentive to domestic investments, causing entrepreneurs to consider innovative activities as a risky venture rather than a growth opportunity.

Georgia has a well-established legal basis for IPR protection.[39] The Government could consider strengthening the capacity of the institutions involved and consolidate the body of secondary laws and associated procedures related to the identification of infringements as well as the confiscation and destruction of infringing goods.

Industry-level incentives

Industry-level incentives should focus on promoting inter- and intra-industry collaboration through networking and bolstering enterprise clustering. These could be combined or sequenced with networking paving the way for clustering in situations where there is a lack of trust among the enterprises. Once established, relations of trust could be leveraged through clustering initiatives aimed at promoting flexible specialization and collective efficiency.[40]

Flexible specialization relates to supporting a decentralization of production in a manner that would allow network members to specialize in specific activities through subcontracting arrangements. This would enable members to focus on product characteristics instead of an exclusive preoccupation with price, thereof improving the quality of their products and achieving economies of scale and scope in a gradual manner through adaptive machinery and broader participation in multi-skilled innovative activities.

Flexible specialization could be further supported through collective efficiency, to be understood as purposeful joint action involving cooperation between companies operating at the same level of the production chain (horizontal cooperation) or between final producers and their suppliers (vertical cooperation). Several interviewed enterprises reported instances of joint action in the areas of transport and information sharing.

Combined, networking, flexible specialization and collective efficiency dynamics set the context for structural transformation, ensuring greater dependence on knowledge, information and expertise skills. They provide the impetus for innovation and have inspired incubators, industrial districts, science and technology parks as well as innovation districts across the globe and, most recently, urban-centred approaches for transitioning to circular economies.

Georgia already has a well-established incubation programme[41] along with free industrial zones (FIZ) in Kutaisi, Poti and Tbilisi to attract FDI.[42] Georgia already has important clustering initiatives.[43] The next step would be to consider complementing these clustering initiatives with targeted efforts to promote flexible specialization and collective efficiency, and business associations can play an important role in spearheading these clustering and networking efforts. Such efforts should be complemented by a dedicated focus on further developing the national system of quality infrastructure (standardization, conformity assessment and metrology).[44] While Georgia has gone a long way in developing this system, the results of the interviews with the select group of enterprises as well as the study on RPBT show that there remains room for improvement. The next section proposes options for harnessing the national system of market-support institutions towards bolstering the economy's technological capability development at the enterprise level.

Meso-level incentives

Facilitating greater access to finance

The Government could consider promoting greater involvement of microfinance institutions and non-bank financial institutions (NBFIs) in meeting the financial needs of micro, small and medium enterprises. Such institutions could assume the role of intermediaries between potential borrowers and the banks within the context of credit guarantee schemes, which allows them to tap into the banking system's deposit base to finance their credit lines. These institutions could be assisted to assume this role by equipping them with the required expertise skills to, among others, screen borrowers, monitor their performance and assume responsibility vis-à-vis the banks in case of default and required payment proposals.

In developing such schemes, priority needs to be accorded to involving business and industry associations as well as the Chambers of Commerce. These actors have a good command of the enterprises' needs and could provide applicants with assistance in the preparation and implementation of business plans. Needless to say, the associations need to be equipped with the required expertise skills in such areas as business plan development and appraisal as well as follow-up monitoring of enterprise loan repayments. The Government could also consider establishing a credit rating agency to ensure proper cooperation between the assortment of institutions involved in facilitating the enterprises' access to finance.

Skill sets for indigenous technological progress

Addressing the skills shortages is accorded priority treatment by GITA, Enterprise Georgia, the Agricultural and Rural Development Agency and, among others, the Chamber of Commerce and Industry, with efforts ranging from the organization of training workshops to developing the national system of vocational training. These efforts need to be complemented with greater involvement of universities, particularly through specialized courses on standards implementation,[45] indigenous technological learning and industry-focused R&D activities.

As vocational training institutions and universities proceed to develop their training courses, the emphasis should be on tailoring the content and approaches to the different stages of technological learning. As shown in Table 6.3, technological capabilities are to be understood in the broadest sense to involve launching technology-intensive products that are new, not only to the enterprise, but also the world. Achieving such advanced stages requires fostering entrepreneurs' skills in three specific areas. The first relates to investment decisions. In particular, their ability to identify and obtain the required technology, equipment and human resources, as this is essential for determining the costs, the appropriateness of the scale, product mix, technology and equipment, and the technological learning curve. The second area concerns production processes and ranges from basic skills such as quality control, operation and maintenance to more advanced ones such as adaptation, improvement or equipment stretching, and further to the most demanding ones of research, design and innovation. The third area involves the enterprise's ability to transmit skills and technology to, and receive them from, component or raw material suppliers, subcontractors, service firms and technology institutions.

Each skill set requires specific courses, which are predominantly industry-specific and require a deep understanding of standards implementation.

Networking and clustering

Networking can be easily assumed by existing industry and business associations along with the Chamber of Commerce and Industry, as they collectively have first-hand knowledge of the growth bottlenecks holding back the enterprises and first-hand experience in providing enterprise support services. These market support institutions could be called upon and enabled to undertake, then assume, the role of network brokers and deliver such tasks as:[46]

- Identifying potential networks in response to an initiative by a group of enterprises or proactively – involving a diagnostic exercise to identify common problems and explore areas of mutual benefit to participating enterprises;
- Overcoming the scepticism of participating enterprises by providing such immediate benefits as pooling resources for the purchase of raw materials, helping enterprises apply for a joint loan and, facilitating the sharing of equipment;
- Ensuring commitment to addressing common challenges and servicing common interests.

Business and industrial associations can also spearhead the creation of flexible specialization and collective efficiency dynamics within the context of inter- and intra-industry clusters. Priority should be accorded to supporting existing networking, or pockets of excellence, and transforming them into clusters of enterprises working in close collaboration rather than creating new clusters from scratch. Successful experiences point to a suite of options for consolidating industrial clusters based on the salient features of member enterprises and inter-firm cooperation. These include[47]:

- Marshallian clusters, comprising local SMEs and featuring substantial inter-firm trade and collaboration, as well as strong institutional support;
- Hub and spoke clusters, dominated by one or several large enterprises with numerous small suppliers servicing the large firms;
- Satellite platforms, dominated by externally-based TNCs and their affiliates with minimum inter-firm trade and networking; and
- State-anchored, dominated by public entities, such as universities, government agencies and suppliers of services to public entities.

The above efforts could be complemented by link programmes to: connect Georgian SMEs with TNCs, including those operating in the FIZs; build partnerships with specialized training and R&D institutions; and disseminate information on opportunities and best practices as a way of bridging the gap between R&D and the different sectors. Business associations can assume a lead role in initiating and supporting such programmes.

Conformity assessment

The GAC has established competence in seven areas, drawing on a pool of 130 experts, who are kept abreast of international best practices through training and email notifications,[48] and 130 external technical assessors (Table 6.8) The country's pool of accredited conformity assessment bodies (CABs) [49] is dominated by inspection bodies

(including vehicle testing centres and verification bodies), and testing laboratories, which accounted for over 80 per cent of total accredited CABs in 2018. Medical laboratories, product certification and personal certification bodies represented the remaining balance, and comprised six product certification bodies, six personal certification bodies, and three medical laboratories.

Georgia also lacks accredited bodies for performing audit and certification of management systems; a shortfall that the GAC has been according priority with plans to accredit 70 CABs, including the first management system audit and certification body (Table 6.9), amidst preparations to implement the updated ISO/IEC 17025 "General requirements for the competence of testing and calibration laboratories".

The system of CABs is therefore evolving. However, efforts are undermined by the lack of financial resources. Officials interviewed as part of the study on RPBT emphasized the need to involve the private sector in addressing the existing supply shortages. One way to achieve this would be to establish public private partnership (PPP) arrangements, drawing on international best practices and recommendations, including those developed by the UNECE.

Linked to conformity assessment is market surveillance. As pointed out in the study by RPBT, there is a need to assist the line Ministries responsible for the authorization and licensing of the manufacture and sale of food and beverages, cosmetics, pharmaceutical products, dietary supplements and medical devices to establish the required guidelines, systems and expertise knowledge for issuing Good Manufacturing Practice (GMP) certificates.

Table 6.8 Georgian Accreditation Centre (GAC) areas of competence

Area	International standard	Staff	External assessors
Testing laboratories	ISO/IEC 17025 (recognized by the EA)	65	LA (Lead Assessor): 8 TA (Technical Assessor): 38 Expert: 19
Calibration laboratories	ISO/IEC 17025 (recognized by the EA)	17	LA: 6 TA: 9 Expert: 2
Medical laboratories	ISO 15189	17	LA: 2 TA:14 Expert: 1
Inspection bodies	ISO/IEC 17020 (recognized by the EA)	45	LA: 6 TA: 33 Expert: 6
Product certification bodies	ISO/IEC 17065 (recognized by the EA)	15	LA: 3 TA: 10 Expert: 1
Management system certification bodies	ISO/IEC 17021	3	LA: 1 TA:2
Personnel certification bodies	ISO/IEC 17024 (recognized by the EA)	8	LA: 2 TA:4 Expert: 2

Source: Georgian Accreditation Centre (GAC), June 2018.

Table 6.9 Conformity assessment bodies (CABs) undergoing accreditation in Georgia

Field	No. of CABs	Location	Ownership
Inspection body	67	Tbilisi, Batumi, Kutaisi, Sagarejo, Akhaltsikhe, Gori, Rustavi, Zestafoni, Marneuli, Chokhatauri	Privately-owned
Management system - Audit and Certification body	0	Tbilisi	Privately-owned
Personnel Certification body	6	Tbilisi	State-owned 1 Privately-owned
Product Certification body	6	Tbilisi, Poti, Batumi	Privately-owned
Testing Laboratory	104	Tbilisi, Borjomi, Kutaisi, Gori, Batumi	State-owned 1 Privately-owned 19
Calibration Laboratory	9	Tbilisi, Kutaisi	Privately-owned
Medical Laboratory	3	Tbilisi	Privately-owned

Source: Georgian Accreditation Centre (GAC), 2018.

Measuring and monitoring technological capability development

Developing the enterprises' technological capability is a lengthy process and often involves significant setbacks, which need to be taken into account in order to expand the pool of innovative enterprises. This begs the need for establishing a coherent system for monitoring and measuring indigenous technological progress at the enterprise level. This could be achieved by developing a new generation of surveys for collecting data against a clear set of indicators that capture growth dynamics at the macro-, meso- and micro-levels. Technical assistance may be of value to GeoStat in designing and piloting such surveys.

Annex Main elements of Georgia's enterprise growth-enabling legislative framework

- Law of Georgia on JSC Partnership Fund, 2011
- Law of Georgia, On Deposits Insurance System, 17 May 2017, No 852-II
- Law of Georgia, Tax Code, 2010
- Law on Free Industrial Zones, 2007
- Law of Georgia on the Business Ombudsman of Georgia, 28 May 2015, No 3612-IIS
- Law of Georgia On State Support for Investments, 30 June 2006, No 3424-ES
- Law of Georgia On Promotion and Guarantees of Investment Activity, 12 November 1996
- Law of Georgia on the Georgian National Investment Agency, 2015, No 473-I
- Law of Georgia On Innovations, 2016
- Law of Georgia On Entrepreneurs, 1994

- On Information Technology Zones, 15 December 2010 No4064-RS
- Law of Georgia On Supporting the Development of Free Tourism Zones, 26 October 2010, No 3754–IIS
- Law of Georgia, On State Support for Investments, 30 June 2006, No 3424-ES
- Law of Georgia On Collective Investment Undertakings, 2013
- Law of Georgia On Commercial Bank Activities,1996
- Law on Grants, 1996
- Law of Georgia on the Unified State Registry of Information, 2011
- Law of Georgia On Trademarks, 1999
- Law of Georgia On Border Measures Related to Intellectual Property, 2017
- Law of Georgia On Competition, 8 May 2012, No 6148-IS
- Law of Georgia On Deposits Insurance System 17 May 2017, No 852-II
- Government of Georgia, Ordinance No 35, 17 January 2020, Tbilisi. On the Approval of Regulatory Impact Assessment (RIA) Methodology

Notes

1 The study is available at: https://www.unece.org/fileadmin/DAM/trade/Publications/ECE_TRADE_443E_Georgia.pdf

2 For a concise description of this concept, see, for example, Lall, S. (1992). "Technological Capabilities and Industrialization", *World Development*, Vol. 20, No. 2: 165-186

3 The emphasis on approaching policies as tools for consolidating a coherent system of macro-, intra/inter- industry and meso-level incentives was advanced by Lall, S, (1992). This approach is all the more pertinent since innovation is the culmination of years of learning and indigenous technological progress that cannot be brought to fruition in the absence of targeted support for addressing innovation and growth bottlenecks throughout the commercial and production networks underpinning end-to-end value chains.

4 The study is available at: https://www.unece.org/fileadmin/DAM/trade/Publications/ECE_TRADE_443E_Georgia.pdf

5 "The Association Agreement between the European Union and the European Atomic Energy Community and their Member States, of the one part, and Georgia, of the other part" was provisionally implemented in September 2014 and entered into full force on 1 July 2016

6 http://www.economy.ge/uploads/files/2017/ek___politika/sme_strategy_2016_2020_eng.pdf

7 https://www.adb.org/sites/default/files/linked-documents/cps-geo-2014-2018-sd-01.pdf

8 http://enpard.ge/en/wp-content/uploads/2015/05/Rural-Development-Strategy-of-Georgia-2017-2020.pdf

9 For a concise description of this concept, see, for example, Lall, S. (1992) "Technological Capabilities and Industrialization", World Development, Vol. 20, No. 2: 165-186

10 According to most recent statistics by GeoStat, SMEs represented 99.7 per cent of total registered enterprises, with small enterprises accounting for the largest segment (98.5 per cent of SMEs). As of 2017, Georgian classification of SMEs follows the EU Commission Recommendation 2003/361/EC "Concerning the Definition of Micro-, Small- and Medium-sized Enterprises".

11 For an informative discussion of opportunity and necessity entrepreneurs, see, for example, Robert W. F., and M. F. Fossen. (2018). "Opportunity versus Necessity Entrepreneurship: Two Components of Business Creation", IZA – Institute of Labour Economics Discussion Paper No. 11258

12 This definition was coined by Peter Drucker, who argued that "entrepreneurs see change as the norm and as healthy. Usually, they do not bring about the change themselves. But - and this defines entrepreneur and entrepreneurship - the entrepreneur always searches for change, responds to it, and exploits it as an opportunity". Drucker, P. (1985) Innovation and Entrepreneurship: Practice and Principles. New York: Harper & Row, p. 28. The concept of entrepreneurship has taken on several meanings under the weight of the various definitions, with each bringing forward certain attributes and traits that characterize successful entrepreneurs. Drucker's definition stresses management skills, foresight, discipline and hard work, and considers entrepreneurship as the bedrock of innovation. These traits were also highlighted by Joseph Schumpeter who attached more importance to the role of entrepreneurs as driving the "creative-destructive" process of modernity through venturing into innovative activities. The literature on entrepreneurship points to learning by doing, with entrepreneurs evolving through successes. This is the view taken in the review, which, following Lall, S. (1992), sees entrepreneurs as graduating into entrepreneurs in the Schumpeterian sense and transforming their enterprises into centres of innovation. For further details on Schumpeter's views on entrepreneurship, see, for example, Becker, C.M., K. Thorbjørn and S. Richard. (Eds.) (2011). The Entrepreneur: Classic Texts by Joseph A. Schumpeter. Stanford, California: Stanford University Press.

13 The DCFTA was provisionally applied on 1 September 2014.

14 "The Association Agreement between the European Union and the European Atomic Energy Community and their Member States, of the one part, and Georgia, of the other part" was provisionally implemented in September 2014 and entered into full force on 1 July 2016

15 As shown in the UNECE study on RPBT, in each area, the Government sought to adapt international best practices to the national context and, in so doing, enabled traders to achieve significant savings (time-wise and financial.). Updates on the Government's reforms to fulfil its commitments under the DCFTA are available at: http://www.dcfta.gov.ge/en/home.

16 For example, the lack of disaggregated data on fixed capital formation at the enterprise level means that it is impossible to calculate total factor productivity, which is an indicator of the level of investments in machinery and equipment and, as such, provides a window into assessing the extent of specialization in technology-intensive products. These technology-intensive production activities involve not only increased emphasis on ICT but also increased use of modern machinery.

[17] The National Statistics Office of Georgia (GeoStat) business register sampling frame excludes enterprises with low turnover as well as enterprises belonging to financial and insurance (activities K, using NACE rev. 2); public administration, defense and compulsory social security (O); Households as Employers, undifferentiated Goods and Services-producing Activities of Households for own use (T); extraterritorial organizations and bodies (U); and; retail sale via stalls and markets (47.8). It is difficult to establish a clear idea about enterprise death rate from a long-term perspective. Comparison is difficult for the period before 2017; the date marking GeoStat's adoption of the EU's classification of SMEs as established in EU Commission Recommendation 2003/361/EC "Concerning the Definition of Micro-, Small- and Medium-sized Enterprises".

[18] The RCA index is based on the idea that if a country exports more than the global average exports of a specific product, then the country has a comparative advantage in that product. If the RCA is higher than 1, then the producer is said to have an RCA in producing a certain good.

[19] For a detailed list of these products, see the UNECE study on RPBT, Chapter 5, Tables 5.1 and 5.2

[20] Lall's approach provides a coherent reference framework for approaching the challenge of enterprise development, irrespective of the sector. It invites us to link macro-level interventions with inter-intra industry and meso-level interventions and gear these towards supporting the enterprises' technological capability. For, irrespective of the sectors, enterprises have to acquire the knowledge, machinery equipment and sophistication to graduate into activities with high value-added.

[21] This is a main theme running through the UNECE Studies on RPBT

[22] http://www.dcfta.gov.ge/en/home

[23] A brief overview of trade-related public-private consultative mechanisms is provided in the Study on RPBT (Chapter 3, Section 3.1)

[24] A Standard refers to a technical specification approved by a recognized national, regional or international standardization body and made available to the public for repeated or continuous application.

[25] This was emphasized by the standards-implementing enterprises approached as part of this review as well as by those approached as part of the study on RPBT. Traders provided an account of both the one-time investments and annual expenditures associated with standards implementation. See Study on RPBT, Annex 6.

[26] Enterprises are better off implementing standards referenced in technical regulations to ensure compliance with regulatory requirements applicable to their activities. Otherwise, following the EU directives and approaches, standard implementation in Georgia is voluntary.

[27] See study on RPBT, Annex 5

[28] GAC is a signatory to the European Cooperation for Accreditation (EA) Multilateral Recognition Arrangement (MLA). The agreement, which was signed on 23 May 2017, is available at: http://gac.gov.ge/files/bla_1_1.png. Moreover, Georgia has unilaterally recognized the technical regulations and conformity assessment procedures of EU and OECD member countries. For an analysis of Georgia's CABs, see, UNECE Study on RPBT in Georgia.

[29] GAC is guided by the Code on Safety and Free Movement of Products and its own Statute and operates in accordance with ISO/IEC 17011 on "conformity assessment- requirements for accreditation bodies accrediting conformity assessment bodies"

[30] Georgia's free trade agreement with Turkey entered into force on 1 Nov 2008

[31] Pyke. F. (1992). Industrial Development through Small-firm Cooperation: Theory and Practice. Geneva, International Labour Organization

[32] World Bank Database.

[33] For an overview of the main structural weaknesses in Georgia's electricity sector, see Business Association of Georgia (2016) Electricity Sector Overview, available at: https://bag.ge/file.helix?i=427e322d-a7ea-48fc-a283-d27ee04ac0a2&r=P

34 The strategy is available at: http://www.moesd.gov.ge/uploads/files/2017/ek___politika/eng_sme_development_strategy.pdf

[35] See sub-section 3.4.

[36] For a discussion of Georgia's quality infrastructure, see UNECE study on RPBT, Chapter 4.

[37] Macroeconomic incentives relating to interest rates, exchange rates, debt management, and international terms of trade fall beyond the scope of this chapter.

[38] Suggested by the traders interviewed as part of the study on RPBT.

[39] The legislative basis of IP protection in Georgia comprises: Law of Georgia on the investment activity promotion and guarantees; Law of Georgia on Patents; Trademark Law of Georgia; Law of Georgia on Design; Law of Georgia on Copyright and Neighbouring Rights; Law of Georgia for the Protection of New Breeds of Animals and Varieties of Plants; Law of Georgia on Border Measures Related to Intellectual Property; Law of Georgia on Permission for Distribution of Agricultural Crop Varieties, Seeds and Planting Materials; Law of Georgia on Topographies of Integrated Circuits; and, Law of Georgia on Protection of Selected Achievements.

[40] For an informative discussion of these dynamics, see, for example, Schmitz, H. (1997). "Collective efficiency and increasing returns", Working Paper No. 50, Institute of Development Studies: Brighton; and, Liedholm, C. (2001) Small Firm Dynamics: Evidence from Africa and Latin America, Washington: World Bank Institute.

41 Details on Georgia's incubation programme are available at: https://gita.gov.ge/eng/static/139free

42 The FIZs are regulated by the Law of Georgia on Free Industrial Zones. A detailed summary of the range of incentives offered to investors is available at: https://www.investingeorgia.org/en/ajax/downloadFile/569/Free_Industrial_Zones_in_Georgia

43 https://open.unido.org/projects/GE/projects/180316

44 For an analysis of the Georgian system of quality infrastructure, see the study on RPBT.

45 This is an area that is ranking high on the agenda of European universities and their experience would be of much benefit to Georgia.

46 The recommendations draw on successful experiences highlighted by Humphrey, J. and H. Schmitz. (1996). "The triple c approach to local industrial policy", World Development, 24 (12): 1859-77.

47 Based on Markusen's typology of industrial clusters, which he sketched, having drawn on successful experiences. Markusen, A.R. (1994) "Sticky places in slippery space: the political economy of post-war fast-growth regions", Working Paper No. 79, Centre for Urban Policy Research: New Brunswick

48 Staff receives notifications on new decisions by EA, ILAC and the International Accreditation Forum.

49 The list of accredited laboratories is available at: http://gac.gov.ge/index.php?lang_id=ENG&sec_id=10.