New Innovation Policy for transition economies in the SPECA subregion
New Innovation Policy for transition economies in the SPECA subregion
UNECE Policy Handbook
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Innovation – or the systematic experimentation with new ideas – is essential for the sustained economic growth and enhanced competitiveness of the seven countries of the United Nations Special Programme for the Economies of Central Asia (SPECA), i.e., Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, to achieve sustainable development in line with the UN 2030 Agenda.

In recent decades, the SPECA countries have increasingly prioritised innovation to drive their transition to a knowledge-based economy and as a tool to meet national economic and societal challenges, including poverty alleviation and access to basic infrastructure and services, as well as the transition to circular economy principles. There is also a growing awareness of the need to tackle the triple planetary crisis in order to achieve the UN Sustainable Development Goals (SDGs).

Policymakers of the SPECA countries have worked to develop and strengthen their respective national innovation ecosystems, reforming policies, institutions and processes in the areas of research, education and entrepreneurship while more generally strengthening public sector governance and the framework conditions within which innovation takes place.

New innovation policy for transition economies refers to a set of policies and strategies aimed at promoting innovation and technological advancement in countries with economies in transition. These transition economies typically face a number of challenges, including outdated technologies, limited access to finance, and weak institutional capacity, which can make it difficult for them to compete in global markets.

Scant resources available for “pure” innovation policy means that policymakers need to leverage complementary policies in other domains, including through effective public-private dialogue and horizontal coordination across policy areas based on a broad view of what innovation entails. Policy approaches include, but are not limited to:

- Encouraging private sector investment in research and development (R&D) through tax incentives and other financial incentives.
- Building innovation networks and clusters to facilitate collaboration between businesses, universities, and research institutions.
- Strengthening technology transfer mechanisms to encourage innovation and investment.
- Supporting entrepreneurship and a start-up culture by providing training, mentorship, and access to funding.
- Investing in soft infrastructure, education and workforce development to ensure that workers have the skills and knowledge needed to succeed in the global economy.

This Handbook aims to support policymakers in the SPECA countries to get the right policy mix as they move towards a new innovation policy approach to drive economic transition. The Handbook draws upon evidence of existing best practices in the SPECA countries, and highlights areas requiring further policy attention.
The Handbook forms part of the support of the United Nations Economic Commission for Europe (UNECE) to the SPECA countries to improve their innovation policies and achieve sustainable development in the framework of the United Nations Development Account project “Strengthening innovation policies for SPECA countries in support of the 2030 Agenda for Sustainable Development”, carried out jointly with the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).

Ms. Tatiana Molcean

United Nations Under-Secretary-General
Executive Secretary
United Nations Economic Commission for Europe
The findings in this publication draw upon UNECE work in the SPECA subregion on technology upgrading (Radosevic, 2021) and technological transformation (Dobrinsky, Towards Technological Transformation of the SPECA Countries: The Innovation Imperative for Sustainable Development, 2021) that has been overseen by the SPECA Working Group on Innovation for Sustainable Development (WG on ITSD). This work has also been informed by a Science, technology and innovation (STI) gap assessment of the SPECA countries (Dobrinsky, STI gap assessment of the SPECA countries, 2020) that was carried out in support of the SPECA Innovation Strategy for Sustainable Development (SPECA, 2019).

The recommendations and tools in this Handbook target national and local governments, universities, and other stakeholders in the national innovation system, including private partners.

The introduction to this Handbook covers the background to this work, including the role of UNECE and the UN Special Programme for the Economies of Central Asia, overall sustainable development challenges for the SPECA countries, and specific STI policy challenges facing these countries.

Part one of this Handbook presents seven key principles for successful new innovation policy for economic transition in the SPECA countries.

Part two presents nine key challenges to effective new innovation policy for economic transition in the SPECA countries. For each issue, there is an assessment of the current policy environment in the SPECA countries followed by policy recommendations and examples of international good practice.
ACKNOWLEDGEMENTS

This Handbook was developed within the framework of the UN Special Programme for the Economies of Central Asia. The programme was launched in 1998 to strengthen subregional cooperation among Central Asian countries and their integration into the world economy. The SPECA countries are Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

This publication was produced under the overall supervision of Anders Jönsson, Chief of the UNECE Innovative Policies Development Section. The main authors of the publication were Kris Boschmans, Senior Researcher, and Alasdair Reid, Policy Director, both at the European Future Innovation Systems Centre in Belgium. The publication benefited from the guidance and contributions of Christopher Athey as project manager, as well as Elif Kizildeli and Lyudmyla Tautiyeva in the UNECE Innovative Policies Development Section. Lyudmyla Tautiyeva supported the coordination of the project while Mijidgombo Oyunjargal provided administrative assistance. Marie Christine De Sa created the graphic designs for this publication. Trang Tran provided valuable research assistance.

The engagement of national partners in the SPECA countries, in particular the delegates to the SPECA Working Group on Innovation and Technology for Sustainable Development, has been essential throughout the project.
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LIST OF ABBREVIATIONS

Covid-19  Coronavirus disease 2019
DAMU  Entrepreneurship Development Fund Joint Stock Company, Kazakhstan
ESCAP  United Nations Economic and Social Commission for Asia and the Pacific
ECA  Transition economies of Europe and Central Asia
e-Government  Electronic Government
ETIN  UN-ECE Transformative Innovation Network
Eurostat  European Statistical Office, European Union
FDI  Foreign direct investment
G20  Group of 20
GBP  British Pound, United Kingdom
GDP  Gross domestic product
GITA  Georgia’s Innovation and Technology Agency
GVC  Global value chain
ICT  Information and communications technology
IHGE  Innovative high-growth enterprise
ISO  International Organization for Standardization
JRC  Joint Research Centre of the European Commission
KOSGEB  SME Development Agency, Türkiye
LEO  Local enterprise office
LPI  World Bank Logistics Performance Index
MIC  Middle-income country
MoID  Ministry of Innovative Development, Uzbekistan
NGO  Non-governmental organization
NIP  New innovation policy
NPSTI  National Policy on Science, Technology and Innovation, Malaysia
NSC  National Science Council, Malaysia or National Skills Council, Ireland
OECD  Organisation for Economic Co-operation and Development
PPP  Public-private partnership
R&D  Research and development
RIA  Regulatory impact assessment
RMA  Research Management Agency
<table>
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<td>SDG</td>
<td>Sustainable Development Goal</td>
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<td>SMEs</td>
<td>Small and medium-sized enterprises</td>
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<tr>
<td>SOLAS</td>
<td>State Agency for Further Education and Training, Ireland</td>
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<tr>
<td>SPECA</td>
<td>United Nations Special Programme for the Economies of Central Asia</td>
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<td>STI</td>
<td>Science, Technology and Innovation</td>
</tr>
<tr>
<td>STRATA</td>
<td>Government Strategic Analysis Centre, Lithuania</td>
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<tr>
<td>UN/CEFACT</td>
<td>United Nations Centre for Trade Facilitation and Electronic Business</td>
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<td>UNDP</td>
<td>United Nations Development Programme</td>
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<td>UNECE</td>
<td>United Nations Economic Commission for Europe</td>
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<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<tr>
<td>USD</td>
<td>United States Dollar, United States of America</td>
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Within the participating countries of the UN Special Programme for the Economies of Central Asia (SPECA), a relatively strong recovery in Gross Domestic Product (GDP) from the Covid-19 crisis relative to other regions is tempered by risks of global financial instability that add to pre-existing challenges in achieving the Sustainable Development Goals (SDGs). Against this background, the transition economies of the subregion increasingly recognize an urgent need to diversify and become more innovative. Science, technology and innovation (STI) has therefore become a development priority. Innovation is also key to achieving, among others, the digital transformation, SDG 12 on sustainable consumption and production, SDG 13 on climate action, and the transition to a green and circular economy. The latter, alongside diversification, is particularly important for the resource-dependent economies of the subregion.

Innovation systems in the SPECA countries face manifold challenges, as reflected by an overall poor score in international rankings of innovation performance (e.g., the Global Innovation Index). Commonalities include a high share of low-tech industries, and low intensity of research and development (R&D). The average level of R&D expenditures has declined steadily since the 1990s. At significantly less than one per cent of GDP, this level is very low and lags considerably behind comparator countries. Consequently, the SPECA countries lack sufficient capacity to produce breakthrough innovations and operate on the knowledge frontier. The countries also face significant challenges in absorbing and adapting innovations from abroad, as evidenced by data on patenting and the use of international standards and trademarks.

There have been efforts to expand STI policy support in recent years, e.g. through business incubators, science and technology parks, etc. Results, however, have been mixed. This publication makes the case that STI policies in the subregion will be more successful if the underlying weaknesses common to transition economies are addressed more systematically by policymakers. These weaknesses include a lack of public and private capacity to implement reforms, underdeveloped business environments and innovation systems, marginal private sector investment in innovation, underdeveloped innovation infrastructure and a nascent entrepreneurship and start up culture. In addition, due to a reliance on resource-based industries for growth, innovation policies that facilitate technology upgrading across the economy are essential.

Based on all these factors, this publication recommends a new approach to innovation policy for the subregion. (Box 1).

The first part of this publication sets out the need for a new innovation policy and provides a conceptual framework. The second part provides guidance for policymakers to put these principles into practice, with nine key recommendations. In each instance, information is provided on the importance of the issue, why the countries of the subregion lag behind and good practices from other countries to inspire potential solutions.

The first five recommendations relate to governance and institutional capability failures that hinder effective innovation policy implementation in the SPECA subregion. A first
Box 1 New innovation policy: main principles

1. Develop innovation policy as a means to an end, not an end in itself.
The main goal of innovation policy should be not only to embed innovation across the economy, but to promote sustainable development. The number of innovative businesses created or technology transfer projects completed is often used as a performance indicator to assess innovation policies. Success should also be defined based on the contribution of policies to solving economic, societal and environmental challenges (e.g., poverty reduction, reduced inequalities, green and digital transitions, among others).

2. Create ample space for policy experimentation through pilots.
Small-scale pilots are often more cost-effective and beneficial to support innovation than expensive, large-scale projects. They are relatively straightforward to set up, monitor and evaluate. They can be scaled up if successful, and scrapped or modified if not. They offer a more sustainable approach to finding long-term solutions. With this approach, policymakers can progressively improve the landscape of support, and tailor the policy toolkit to reflect national specificities.

3. Foster close interaction with innovation stakeholders in the design and implementation of STI policies.
Crucial stakeholders that should be involved in the design and implementation of STI policies include public and private research organizations, the private sector, higher educational institutions, and civil society. Clear and transparent mechanisms for systematic stakeholder engagement, such as public-private dialogue platforms, are crucial to ensure that innovation policy responds to needs on the ground. This approach contrasts with the current top-down culture of policymaking in the subregion, whereby central government takes the strategic, and often operational, decisions.

4. Ensure effective coordination across public bodies, including at the subnational level.
Innovation policy in the subregion is often fragmented. It involves many ministries and public bodies, operating independently with little contact. This lack of coordination leads to unaddressed gaps, duplication of efforts, wasted funds, and poor targeting. Formal coordination mechanisms (e.g. national innovation councils) could address these issues, increase the involvement of subnational authorities in policy design and implementation, and broaden understanding of the potential for innovation to promote sustainable growth.

5. Adopt a broader view of innovation with a focus on technology upgrading.
Innovation should be viewed in a broader manner than the mere invention of new technologies. The SPECA countries are not currently developing groundbreaking innovation – that is, they are not at the technological frontier. There is therefore merit in focusing on the adoption of innovative products, services, and processes that have proven successful elsewhere. This requires building the capabilities of research organizations and the private sector to absorb and adapt innovation, and upscale existing or emerging bottom-up initiatives that could potentially support sustainable growth and technology upgrading.

6. Identify the most promising STI policies based on a rigorous assessment of implementation capabilities.
The approach should take into account the economic and institutional reality of the subregion (e.g., relatively weak economic governance, difficulty of doing business, nascent national innovation systems, and a lack of private sector capacity to absorb innovation). Implementation capabilities should be assessed and strengthened, including at the subnational level, in a strategic manner (e.g., training of staff, targeting innovative high-growth enterprises, broader public administration reform efforts).

7. Match investment in the hard infrastructure of STI support with improvements in soft infrastructure.
The "hard" infrastructure for innovation (e.g., business incubators, accelerators, science and technology parks) must be complemented by efforts to improve the "soft" infrastructure (e.g., legislative and regulatory frameworks, public and private sector capabilities). A balanced, strategic and coordinated development of both is critical to catalyse experimentation across all sectors of the economy and address sustainable development challenges.

Source: UNECE, based on Radosevic, 2021.

observation in this respect is that there is a lack of coordination in terms of policy design and implementation of STI policies and insufficient linkages among relevant actors. Even in relatively advanced countries that enacted reforms in recent years (e.g., Kazakhstan), there is ample room for improvement. The relative success of Malaysia provides inspiration that a dedicated effort to simplify the innovation governance structure and remove unnecessary layers pays off. Recent reforms in Malaysia also aimed to embed a clear separation of strategic and operational functions, clarified the mandates of public actors, and made efforts to align resources with these mandates, while enhancing strategic autonomy and information flows.

Another feature across the SPECA subregion is a weak monitoring and evaluation culture. Lithuania may be a model to follow in this respect. Among other things, the
country recently established a dedicated unit charged with monitoring and evaluation, the Government Strategic Analysis Centre of Lithuania (STRATA). Such an institution helps to concentrate expertise and capacity in one place to reach a critical mass. This is helpful to disseminate good practices to other public bodies, and to provide training to officials across different levels of government.

Conducting a mapping exercise of STI activities, as Serbia has recently done, is another recommendation to help design better policies, as it can shed light on regional and sectoral strengths to build on.

The private sector could also be more closely involved in the identification of policy priorities and the design and implementation of public initiatives, drawing on a transparent engagement mechanism. Moldova, among other countries, has set up formal consultation platforms to engage with the private sector on policies and draft legislation. This could serve as an inspiration for the SPECA sub-region, where support from international donors and organizations could be drawn upon to ensure sufficient outreach and impact.

A final recommendation is to continue efforts to improve the overall business environment, especially by improving accountability and transparency in the public sector. Experiences from other countries, especially from Central Europe, suggest that initiatives in this area have a greater chance of impact on the ground when backed by strong political commitment and with support from international organizations and donors with established expertise in this area.

A related set of recommendations zooms in on the considerable untapped potential to improve STI support programmes in the SPECA subregion. As a notable case in point, access to finance, especially equity-type sources, represents a major impediment for new innovative companies to scale up and for established firms to innovate. At the same time, policy support for equity finance remains limited in most countries of the SPECA subregion. This contrasts with many other emerging economies such as Türkiye, which has developed a large number of instruments to foster development of the equity-investor ecosystem. Countries in the SPECA region could introduce similar instruments, initially as pilots, which could then be scaled up where successful.

In addition, there is space to exploit global value chains for innovation and knowledge imports. The countries of the SPECA subregion are not well integrated into global value chains, in part due to poor logistics and infrastructure, but also due to deficiencies in the soft infrastructure such as conformity assessment and metrology, non-trade barriers, among others. Georgia may be a model to follow in this respect, as well as in how to run a high-performance export promotion agency to foster closer ties between multinational companies and domestic enterprises.

Countries in the SPECA subregion could also do more to strengthen the managerial capacities of business owners, especially of innovative ventures, and to promote adult learning among the workforce. Ireland may point the way ahead, with its manifold initiatives, often grassroots, to develop both. A key feature of the Irish framework is the National Skills Council (NSC) which, among other things, keeps track of the current and future skills required in the labour market and the way these needs are being met. Similar diagnostic tools, at present largely absent in the SPECA subregion, would go a long way towards bridging the gap in skills in high demand among innovative enterprises.
Finally, this report highlights a lack of commercialization of research as problematic in the SPECA subregion. In general, formal traditional cooperation mechanisms and linkages between the business community and research and higher education institutions are few. Most existing cooperation, much as in other transition economies, comes from “problem solving” dynamics, whereby companies work with research institutions to find solutions to a specific production or technological problem (UNECE, 2022). Facilitating the expansion and upscaling of these initiatives through dedicated policy tools can significantly contribute to fostering innovative activity across the economy. Innovation vouchers, a common tool to promote industry-science cooperation, if implemented wisely, could also be an important tool for the SPECA countries. One take-away from the policy experience in Scotland is that innovation voucher schemes are most effective when they are embedded within a broader support structure for industry-science collaboration and complement match-making services and guidance provided to companies and research organizations on specific issues (e.g., on intellectual property).

1 Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.
Background

Within the countries participating in the United Nations Special Programme for the Economies of Central Asia (SPECA), overall progress towards the SDGs is stagnating and, in some instances, regressing. Productivity growth has declined, and new challenges include the ongoing energy and cost of living crisis, as well as the impacts of the war in Ukraine. In the face of global technological transformation, the economies of the subregion, which are largely dependent on commodities and manufacturing, risk a loss of competitiveness, with limited integration into global value chains (GVCs).

Reversing these trends calls for innovative approaches to policymaking, as well as wide-ranging innovation in the broad sense. Technological transformation for sustainable development thus features prominently in the medium- and long-term policy goals of the SPECA countries. Private firms, especially innovative high-growth enterprises, are crucial actors in this regard.

Many of the long-term challenges faced by these countries, including the need to diversify and integrate better into GVCs, are transboundary in nature. This calls for both national and cross-border efforts. The countries of the subregion need to work together for cooperative solutions to drive technological transformation and sustainable development.

The SPECA countries need to work together to find mutually beneficial solutions to drive technological transformation and sustainable development.

Against this background, in 2019 the SPECA Governing Council approved the SPECA Innovation Strategy for Sustainable Development and encouraged the SPECA countries, donors and partner organizations to support its implementation.

As reflected in this Strategy, the ambition of the SPECA countries is to develop and consolidate their national capacities to design and implement innovation policies for sustainable development, and collaborate to tackle challenges that transcend national borders. They aim to work together to strengthen institutional frameworks for subregional cooperation.

The ambition of the SPECA countries is to develop and consolidate their national capacities to design and implement innovation policies for sustainable development.

Development challenges in the SPECA participating countries

Countries in the subregion have varying natural endowments and development levels. According to World Bank classifications, Afghanistan and Tajikistan are classified as low-income economies, Kyrgyzstan and Uzbekistan as lower-middle income economies, while Azerbaijan, Kazakhstan and Turkmenistan are classified as upper-middle income economies.
economies. Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan are rich in resources, with hydrocarbons constituting the largest share of export revenues. This contributes to a low productivity in non-resource sectors, coupled with insufficient private sector development for sustained growth of a market economy (UNECE, 2021).

The economies of the SPECA countries are relatively de-industrialised, and largely outside global value chains. They exhibit a low share of manufacturing in GDP and exports. In 2021, in the countries where data were available, manufacturing as a share of GDP was in general lower than the average of 21.5 per cent for middle income countries (Figure 1).³

Another major issue is that the SPECA economies are largely outside GVCs, again with the notable exception of resource-based activities. This helps explain why industries and firms have relatively low production sophistication and management quality. A low number of quality certificates signifies isolation from GVCs and indicates the enormous scope for improvement in managing production capabilities. The situation is compounded by overall poor connectivity in the SPECA subregion, with below average quality of logistical and information and communications technology (ICT) infrastructure (Radosevic, 2021).

Finally, the rapid pace of the global digital transformation calls for SPECA countries to step up their efforts in this field. This will be crucial if the SPECA countries are to reap the benefits of digitalisation to accelerate structural economic transformation for sustainable development. Such transition is crucial if the SPECA countries are to reap the benefits of technology and to use digital technologies to accelerate structural economic transformation and to address common sustainable development challenges (Box 2).
The role of the United Nations Economic Commission for Europe

UNECE has a mandate to support its member States, including those in the SPECA subregion, in their efforts to enable and promote innovation for sustainable development and develop vibrant innovation systems. UNECE contributes analytical support to intergovernmental discussions among the SPECA participating countries, including through the SPECA Working Group on Innovation and Technology for Sustainable Development and in line with the SPECA Innovation Strategy for Sustainable Development and its Action Plan.
UNECE member States chose the following themes for the high-level segments of the Commission session in 2021 and 2023, respectively: “Promoting circular economy and sustainable use of natural resources in the UNECE region” and “Digital and green transformations for sustainable development in the UNECE region”. One goal of this document is to provide a practical tool for SPECA policymakers to upgrade their national innovation systems and strengthen regional cooperation on these two topics.

At UNECE, innovation policy is understood to be a systemic process that takes place in a complex national innovation system. The various elements that underpin experimentation with ideas, including the framework conditions for innovation, markets for innovative products and services, enterprises, public research organizations, research and development (R&D) institutions, universities and innovation intermediaries are all part of this system (UNECE, 2021). From this perspective, innovation is not the activity of a sole inventor, but an inherently collaborative activity, involving multiple actors whose interactions influence overall system performance. Therefore, when assessing the role of innovation for technology-driven transformation, it is necessary to consider all types of innovation, as defined in the so-called OECD/Eurostat Oslo Manual (Table 1).

Given this systemic view, innovation policy should seek to address limited coordination between disparate innovation actors, insufficient capacity in the private sector to absorb innovation, and insufficient capacity in the public sector to drive and accompany policy transformations.

The “new innovation policy (NIP) approach” aims to do just that. Based on the extensive work of UNECE on STI policymaking in the subregion, as well as good practices and experiences from other countries, NIP puts forward principles that can significantly contribute to sustainable economic and technological transformation.

### Table 1: Types of innovation

<table>
<thead>
<tr>
<th>Type of innovation</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product innovation</td>
<td>A good or service that is new or significantly improved. This includes significant improvements in technical specifications, components and materials, software associated with the product, user-friendliness, or other functional characteristics.</td>
</tr>
<tr>
<td>Process innovation</td>
<td>A new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.</td>
</tr>
<tr>
<td>Marketing innovation</td>
<td>A new marketing method involving significant changes in product design and packaging, product placement and promotion, and/or pricing of goods and services.</td>
</tr>
<tr>
<td>Organizational innovation</td>
<td>A new organizational method involving changes in business practices, workplace organization or external relations.</td>
</tr>
</tbody>
</table>

Source: UNECE, based on (OECD/Eurostat, 2018).
Achieving the Sustainable Development Goals will require truly transformative innovation to address the triple planetary crisis and reshape economic and social systems. A new UNECE initiative, the (UN)-ECE Transformative Innovation Network (ETIN) (Box 3) seeks to share best practice in this regard to support the UNECE member States to achieve the ambitious goals under the UN Agenda 2030.

The STI policy environment in the SPECA subregion

A recent assessment of STI governance and policymaking in the SPECA countries (Dobrinsky, STI gap assessment of the SPECA countries, 2020) based on a survey of local stakeholders revealed a number of gaps in the STI environment and policy that hinder effective innovative development in the SPECA subregion.
The SPECA countries have established a broad range of support measures, as illustrated in Table 2. Nonetheless, the national innovation systems in most SPECA countries remain underdeveloped, with many of the building blocks of mature innovation systems either missing or at an early stage. In addition, many policy initiatives are not well aligned with the key principles of new innovation policy discussed above.

While most of these instruments are on the supply side, much of the potential to foster innovation lies on the demand side. Innovation-enhancing public procurement is one of the tools that can boost demand for innovation while helping to address the most pressing sustainable development challenges and meet national policy objectives. Representing on average 10-15 per cent of GDP, public procurement can be used to buy innovative goods and services that do not yet exist in the market by providing functional specifications of those desired goods and services, rather than their specific characteristics, thereby creating space for experimentation. The SPECA countries should consider using the potential of public procurement to stimulate demand for innovation, which is quite low given the overall weak capabilities of firms in the subregion. This could help to address priority social, economic and environmental challenges.

When it comes to obstacles to innovative development, and the adoption of innovation policy in line with new industrial policy, local innovation stakeholders highlight several key areas, including low STI capability in the country, corruption and administrative hurdles, poor access to finance for start-ups, etc. (Table 3).

While the SPECA countries differ in many respects, including on STI performance and policies, the key challenges and issues are shared, to varying degrees, across the subregion. It is crucial to understand that innovation policies in the SPECA subregion will not reach their full potential unless these underlying weaknesses are tackled, both in terms of governance and institutional failures as well as in the overall mix of relevant policies and how they are implemented. The remainder of this report highlights the key issues, together with recommendations for improvement based on a learning from across the UNECE region.
## Table 2  STI policy instruments applied in the SPECA countries

<table>
<thead>
<tr>
<th>Policy instruments</th>
<th>Afghanistan</th>
<th>Azerbaijan</th>
<th>Kazakhstan</th>
<th>Kyrgyzstan</th>
<th>Tajikistan</th>
<th>Turkmenistan</th>
<th>Uzbekistan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grants for fundamental research</td>
<td>x</td>
<td>x&lt;sup&gt;2&lt;/sup&gt;</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Grants for applied research</td>
<td>x</td>
<td>x&lt;sup&gt;3&lt;/sup&gt;</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Grants for innovative startups</td>
<td>x&lt;sup&gt;1&lt;/sup&gt;</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x&lt;sup&gt;5&lt;/sup&gt;</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Innovation vouchers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x&lt;sup&gt;3&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Coaching programmes for innovative startups</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Competitions for innovative startups</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Incubation and acceleration programmes for innovative startups</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Entrepreneurship support programmes</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Credit guarantees for innovative SMEs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Equity investment in innovative SMEs (venture financing)</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grants for the commercialization of R&amp;D results</td>
<td>x</td>
<td>x&lt;sup&gt;4&lt;/sup&gt;</td>
<td>x&lt;sup&gt;6&lt;/sup&gt;</td>
<td>x&lt;sup&gt;5&lt;/sup&gt;</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tax incentives for R&amp;D and/or technological development in the business sector</td>
<td>x</td>
<td>x&lt;sup&gt;2&lt;/sup&gt;</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Budget subsidies for R&amp;D and/or technological development in the business sector</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Subsidized credit for R&amp;D and/or technological development in the business sector</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Grants for full-cycle STI projects (from R&amp;D to market)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Grants for industry-science cooperation in STI projects</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Support for industrial clusters</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>STI grants from international donors (World Bank, Asian Development Bank, etc.)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Source: (Dobrinsky, STI gap assessment of the SPECA countries, 2020)
1 Exists as a policy option but is temporarily suspended.
2 Has been adopted in legislation but implementation is still pending.
3 Exists as a policy option but has not been applied yet.
4 Has not been applied since 2018.
5 Not regular and largely from private sources.
Introduction

Challenges related to the STI system in the SPECA countries

According to the Global Innovation Index of the World Intellectual Property Organization, countries in the subregion tend to score poorly when it comes to business sophistication (as shown by low scores on innovation linkages, knowledge absorption and knowledge workers), knowledge diffusion, and creative output (as shown by low scores on intangible assets, creative goods and services and online creativity). These results show ample room for improvement among the SPECA countries, with Azerbaijan and Kazakhstan performing somewhat better (Figure 2).

Table 3: Stakeholder opinions on key obstacles to innovative development in the SPECA countries

<table>
<thead>
<tr>
<th>No.</th>
<th>Main problems, obstacles and bottlenecks that hinder innovative development</th>
<th>Countries that indicated it as a top problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low STI capability in the country</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Corruption and administrative hurdles</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Poor access to finance for startups</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Low level of government support</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Generally low level of skills in the country</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Low competence of government officials</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Poor policy coordination</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>Unsatisfactory framework conditions</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Poor industry-science collaboration</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Poor business competence</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>Weaknesses in the education system</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>Small domestic market</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: Contains problems that were identified by more than one SPECA country in the framework of a subregional analysis; answers gathered through surveys.
Manufacturing in the SPECA countries is characterized by a meagre share of medium- and high-tech industries as reflected by data on high-tech exports and trade in ICT (Figure 3) and a high share of low-tech industries of low research and development (R&D) intensity. These structural features further explain the limited knowledge intensity and meagre business and public sector R&D. The SPECA economies have a similar share of firms with active R&D to their respective income groups but these firms are intermittently and marginally active. Given that ICT is an essential factor in the modernization and technology upgrading of all sectors, a low share of ICT imports indicates significant weaknesses in the diffusion and adoption of new technologies in both the economy and wider society.

The average level of R&D expenditures in the SPECA countries is very low by any standard and lags considerably behind comparator countries (Figure 4). Furthermore, it is far below the levels that would be needed to support robust STI development, with some high-income countries spending more than 2% of GDP on R&D. Moreover, the general trend observable in the past decade is that of further relative decline in R&D expenditures, even in the better performing SPECA countries such as Azerbaijan and Kazakhstan. The stated objective of prioritising STI in the SPECA countries is thus not typically matched by a corresponding increase in public resources in key areas of policy making.

R&D in the SPECA countries primarily seeks to facilitate foreign knowledge absorption. This is often supported by research contracted by firms from university or academic institutes in a range of downstream services like consulting, metrology, testing and problem solving. Business linkages with higher education are informal but relatively frequent and compensate for a weak market for local knowledge-intensive services.
Figure 3 · High-tech exports and ICT trade in SPECA and middle-income countries (MIC), 2021

Source: Radosevic based on World Bank Development Indicators (2021).
Note: High-technology exports data for Kazakhstan is from 2020. There is no such data for Afghanistan. ICT goods exports data for Afghanistan and Kazakhstan is from 2019, and for Azerbaijan, Kyrgyzstan, Uzbekistan and Middle Income Countries is from 2020. ICT goods imports data for Afghanistan and Kazakhstan is from 2019, and for Middle Income Countries, Azerbaijan, Kyrgyzstan and Uzbekistan is from 2020. Data for Tajikistan and Turkmenistan were unavailable.

Figure 4 · R&D expenditure in the SPECA countries, % of GDP, 2010-2018.

Source: Dobrinsky (2020) on the basis of World Development Indicators Database.
A final and important observation is that the SPECA countries are not engaged in technological activities at the knowledge frontier, but are active innovators and engaged in domestic patenting activities. These are mostly activities that are imitative in nature, although a share are technical novelties but not of international significance. There are several indicators that point to a widening gap between the region and high-income countries in this respect.

The SPECA countries’ future innovation potential lies in the adaptation of innovation from abroad based on investment in the absorptive capacities of businesses and public research organizations.

First, resident patent applications expressed relative to national GDP is a proxy for the intensity of inventive activity. Data indicate that the relative intensity of patenting activity is not only marginal, but also that it has been on a sharply declining path over recent decades. This reflects the increasing technological openness of economies and the availability of cheaper and more effective technological solutions abroad.

Second, quality certificates are a proxy for production capabilities and specifically for operations management. Quality certificates also indicate the degree of integration with global value chains by signaling conformity with best practice standards. Industry standards expressed in per capita terms are exceptionally low in the SPECA countries.

Third, trademarks are an alternative proxy of technological learning that indicate firms’ product differentiation activities and thus reflect how firms are engaged in related innovation activities. A comparison of trademark intensity to GDP shows that firms in the SPECA countries are very weakly engaged in product differentiation activities (Radosevic, 2021). As an illustration, the 2020 number of trademarks per 100 billion of USD GDP in 2017 purchasing-power parity ranges from 1,393 in Tajikistan to 3,421 in Uzbekistan in the SPECA countries, comparing unfavourably with a global average of 5,656.

Notes

1. Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.
2. As one example, the Government of Uzbekistan adopted the “Strategy for Innovative Development Of the Republic of Uzbekistan for 2019–2021” in 2018, with a road map for its implementation (Kurbanbaeva, 2020).
7. In Uzbekistan, for instance, the number of patent applications per 100 billion USD GDP plummeted from more than 1 000 in the early 2000s to fewer than 200 in 2019. In Kazakhstan, the development is broadly similar with applications declining from around 900 to fewer than 50 over the same period.
8. In the smaller economies of the subregion, Kyrgyzstan, Tajikistan and Turkmenistan, fewer than 10 companies had an official quality certificate.
Part 1

NEW INNOVATION POLICY
While there is merit in learning from foreign experiences, transferring successful policies into significantly different economic and institutional settings often leads to suboptimal outcomes. Therefore, in their efforts to improve their innovation systems, countries in the SPECA region should not merely mimic approaches from high-income countries. Innovation policies in emerging economies need to be adapted to local circumstances, with due consideration of public and private sector capabilities. A rigorous assessment of human and financial resources, as well implementation capacity, should guide policymaking (Cicera, Frías, Hill, & Li, 2020).

This publication suggests a new innovation paradigm for the SPECA countries, taking into account their specific institutional and economic contexts. An important aspect of this is what has come to be known as “new industrial policies”, as opposed to traditional or “old” industrial policies (Radosovic, 2021). The term “new industrial policies” refers to a wide class of contemporary policy approaches focused on technology upgrading, summarised in Box 4.

Box 4 New industrial policy approach: key features

- **New industrial policies are focused on innovation and technology upgrading in an intersectoral context.** Industry boundaries are not defined through products, but rather by activities that transcend typical classifications. The selectivity of new industrial policies is based not on industries defined through sectoral or product classification, and thus does not favour subsidies or other direct intervention to keep inefficient producers or certain goods or services afloat. Rather, it is focused on **how to apply new technologies in any “sector” or in a cross-sectoral settings** (e.g., drones in agriculture).

- **New industrial policies calls for cooperative public and private sector efforts to work jointly on technology upgrading.** Unlike the old-style industrial policies, new industrial policies recognize that the government does not possess the necessary information for the right decision. Equally important, however, firms also do not have perfect foresight of the long-term opportunities and constraints they face. As all views are partial, and no single actor possesses a bird’s eye view of an industry, **industrial policies recognise the inability of policy and market actors to have perfect foresight**. The limits to economic growth therefore need to be discovered in tandem.

- **New industrial policies are inherently market-friendly.** New industrial policies are designed to work with the market rather than against it. **Reliance on the market as an allocation mechanism** at the various stages of development and **recognition of the facilitating role of the State in industrial upgrading** are central to new industrial policy approaches. This means that policy should enhance latent comparative advantages and use “soft” policies to embed FDI and GVCs to build linkages and act as levers for domestic technology upgrading.

- **New industrial policies address not only market failures, but also coordination failures.** In the context of new industrial policy, the distinction between market and system (coordination) failure is important. What may seem like market failure may be coordination failures among different stakeholders in the economic process. However, the government’s role in such cases is not to replace the market but to **enhance private sector coordination** by establishing missing intermediary organizations. The **government’s role is to facilitate the development of private sector institutions**: that can overcome these failures rather than solve the coordination problem by itself.

- **New industrial policies are centred around the private sector and actors in the innovation ecosystem with a focus on collective actions.** New industrial policies aim to bolster private sector capabilities to cooperate in new technological areas, as opposed to many “old” industrial policy mechanisms that aim to preserve existing industries, such as subsidies to individual enterprises. Policies to keep inefficient companies afloat through government intervention will ultimately prevent the formation of new microsystems of innovation, e.g. clusters and value chains. The scope for government action will largely depend on **the degree to which the private sector has technological capabilities and effective intermediaries to facilitate collective activities in search of new technologies or new markets**. A case in point is the “entrepreneurial discovery process” under smart specialisation efforts in the EU, which aims to enhance the collective action and capabilities of firms.

- **New industrial policies assume either explicit or implicitly some elements of experimentalist governance.** New industrial policies require “coordinated decentralisation”, whereby initiatives are left to a variety of actors involved in implementation at national and local levels and across different economic activities. **The actors’ freedom to experiment with different ways to solve technological problems** is at the core of new industrial policies. Another central idea of such policies is to **forge flexible forms of strategic collaboration** between the public and private sectors, sharing risks and responsibilities.

Source (Radosovic, 2021).
While the above framework offers guidance to policymakers on the “new industrial policy” approach, it is less clear how to put these concepts into practice and how they can shape STI policymaking in different economic and institutional contexts. The application of new industrial policy features in the SPECA innovation context leads to several broad implementation principles for innovation policy are elaborated and discussed in Part I.

Part II then outlines how policy practices in the SPECA subregion adhere to these principles, and what governments could do in practical terms to align more with the new innovation policy approach.

**Figure 5 - Implementation principles for innovation policy**

| Principle 1 | Develop innovation policy as a means to an end |
| Principle 2 | Create ample space for policy experimentation through pilots |
| Principle 3 | Foster close interaction with innovation stakeholders in the design and implementation of STI policies |
| Principle 4 | Ensure effective coordination across public bodies, including at the subnational level |
| Principle 5 | Adopt a broader view of innovation with a focus on technology upgrading |
| Principle 6 | Identify the most promising STI policies based on a rigorous assessment of implementation capabilities |
| Principle 7 | Match investment in the hard infrastructure of STI support with improvements in soft infrastructure |

Source: UNECE, based on (Radosevic, 2021).

**Principle 1: Develop innovation policy as a means to an end**

A key notion of new innovation policy is that innovation is not a goal in itself. Rather, it is a tool to realise economic and societal ambitions, such as achieving the SDGs and a more resilient, diversified and greener economy. Policymakers should therefore consider STI outcomes as intermediary outputs, and investigate how they impact technology accumulation, employment, exports, and broader sustainability objectives.

At present, innovation policy in the SPECA subregion often exhibits a strong focus on research, and lacks a mandate for sustainable development and a broader strategic vision for societal change.
Principle 2: Create ample space for policy experimentation through pilots

Governments are not omniscient. Mistakes are inevitable, and even necessary, when designing and implementing ambitious STI policies. This is even more true in the absence of a strong monitoring and evaluation culture, as is the case in the SPECA subregion. Mechanisms need to be put in place to identify these mistakes and learn from them.

For these reasons, small-scale pilots that focus on improving policy aspects are likely to yield significant benefits in the SPECA subregion. Small pilots can be adapted to specific regional and industrial contexts, including at the level of the subregion. Successful pilots can be reconfigured to scale up, while those that prove unsuccessful can be modified or cancelled. Such flexible or “agile” approaches are easier to achieve where programmes have limited scope and outreach at their initial phase compared to major, flagship programmes of high political profile.

Such a policy approach would primarily target the upscaling of existing or emerging bottom-up initiatives with potential to boost sustainable growth and technology upgrading. Policies should be created and implemented in coordination and co-production with the affected parties. Policy approaches should ideally be provisional in nature by design, with objectives continually revised in light of outcomes.

This in turn relies on solid monitoring and evaluation mechanisms. The performance of STI programmes and projects should ideally be subject to a system of “diagnostic monitoring” to discover unforeseen events in the project portfolio and seek to correct them or use them as new opportunities. In addition, the goals, metrics and decision-making procedures should be reviewed in light of new challenges and opportunities.

**Goals, metrics and decision making procedures should be reviewed in the light of new challenges and opportunities.**

The government’s role in contributing to and facilitating collective action on innovation remains essential but takes into account the limitations of existing capacities. Existing policymaking capacities vary across the SPECA countries but on average do not appear to be at the required level for effective implementation of innovation policy. This further suggests the use of pilot projects and regulatory sandboxes where risks and failures are accepted and where technical risks are clearly differentiated from strategic risks, and “diagnostic monitoring” or early warning systems are used to detect where desired results seem unlikely to be achieved.

Principle 3. Foster close interaction with innovation stakeholders in the design and implementation of STI policies

An experimental approach to policymaking also entails policy goals being established in interaction with the affected stakeholders, and that they have a significant degree of autonomy in pursuing different programmes or projects - ideally through a portfolio of projects or programmes. This is linked with the well-established notion of a quadruple helix framework, whereby STI policies are shaped not just by public actors, but by close and repeated interactions between government, industry, academia and civil society (Figure 6).
The central notion of the new innovation policy conceptual framework that no single stakeholder of the quadruple helix has perfect knowledge to take the most appropriate decision applies very well to STI policies, given the complex and uncertain nature of interactions that lead to the creation and diffusion of knowledge in society.

This contrasts with “old industrial-style” policymaking, where decisions are typically made in an exclusively top-down fashion by central government. While an element of top-down policymaking is useful to steer the broad policy direction and set high-level targets, for example through strategic plans, this needs to be complemented with scope for bottom-up initiatives and innovation.

**Top-down policymaking should be complemented with scope for bottom-up initiatives.**

STI policy goals should therefore strike a balance. One the one hand, they should be sufficiently tangible and specified so that they can be tracked and monitored. On the other hand, they should be sufficiently broad and not overly prescriptive in how these ambitions will be achieved so as to allow the various actors in the innovation ecosystem space for manoeuvre (Terzi, Singh, & Sherwood, 2022).

**Principle 4: Ensure effective coordination across public bodies, including at the subnational level**

Coordination failures are a central concept in the new innovation policy framework, as highlighted in the previous principle. In order to improve cooperation across different stakeholders in the broad ecosystem, however, public authorities should get their governance right with various ministries, agencies and implementation bodies exchanging information and coordinating their policy approach, ideally through formal mechanisms.

Often, innovation policy in developing economies is entrusted to a dedicated ministry which, due to the limited resources at its disposal, has only limited political weight, and therefore adopts a linear, research-driven approach to innovation in relative isolation from other policies and other public bodies that have an impact on innovation ecosystems.

**Effective governance and policy coordination should ensure that ministries, agencies and implementation bodies exchange information and coordinate their policy approaches.**

This crucially includes public initiatives at the regional and local levels of government. Governments at the subnational level often have a better understanding of the local business community and innovation ecosystem, which may have idiosyncratic characteristics. As a result, they may be better able to interact with innovation partners and address needs that are specific to the region. As one example, they may be better able to identify firms with growth potential, and well placed to set up experimental schemes that, in case of success, could be scaled up across the country and even beyond. This
again calls for a measure of flexibility in STI policies so as to tailor the support landscape to regional and circumstances and ecosystems. This approach contrasts with top-down policymaking with decisions taken solely at the level of central government.

**Principle 5: Adopt a broader view of innovation with a focus on technology upgrading**

*Innovation is not limited to cutting edge technological breakthroughs, but includes novel ideas to bring products and services to market.*

The main take-away here is that innovation is not limited to cutting edge technological breakthroughs, but includes novel ideas to bring products and services to market, the adoption of new processes and organizational practices and so forth (Table 1). In other words, innovation is not necessarily an R&D intensive activity generating inventions and new technologies, especially not for emerging economies grappling with scarcer resources and limited capabilities and catching up mostly through incremental innovation (i.e., adaptation to local contexts the innovation that worked in developed economies). As previously mentioned, countries in the region are not at the technological frontier, with the gap with high-income countries widening over recent decades. While it may be worthwhile to reverse this trend, this is not the sole or even most important metric to measure the success of STI policies.

In fact, the SPECA countries would benefit disproportionately from measures that raise productivity across a broad segment of the enterprise population. While innovation activities in high-income economies are R&D focused, they are much more concentrated in downstream activities in low- and middle-income economies. R&D plays a significant role in isolated segments of industry, primarily to improve firms’ absorptive capacities. This is the case in the SPECA countries and has important policy implications, calling for a much more significant role of industrial policy than conventional horizontal and R&D-based innovation policy. In other words, it calls for a technology upgrading approach going beyond support to R&D alone. In particular, governments in the SPECA countries should facilitate the upscaling of existing or emerging bottom-up initiatives involving successful industry-science cooperation across sectors, including natural resource-based industries, which would contribute to enhanced production and technological capabilities and consequently technology upgrading (Radosevic, 2021).

Innovation policies should therefore reflect the reality that innovation does not take place exclusively in high-technology start-ups or through commercialization of the results of cutting edge scientific research.

**Innovation policies should reflect the reality that innovation does not take place only in high-technology start-ups.**

This holds true for businesses in general, and even for innovative high-growth enterprises (IHGEs) (Box 5). Here, the question of high growth in not associated in the first place with age and sector but rather with the innovative nature of the products and services offered or under development. Even though ICT or biotech start-ups could be considered as the most typical representatives of innovative high-growth enterprises, established enterprises and firms operating in more traditional sectors, such as food manufacturers or equipment suppliers, may also become innovative high-growth enterprises.
Part 1
New innovation policy

Principle 6: Identify the most promising STI policies based on a rigorous assessment of implementation capabilities

Decisions about specific policy instruments are more successful when they are based on a careful assessment of institutional capacities for their design, implementation, monitoring and evaluation. It is important to ensure that only those actions with a good match between policy intention and policy implementation capacity are promoted. In particular, there is a risk of policy overreach when adopting policies from high-income countries, whose performance may crucially depend on advanced implementation capabilities, including human and financial resources. The SPECA subregion is not characterized by strong implementation capacities as reflected, for example, in the government effectiveness index and the regulatory quality index (Figure 7). As a case in point, countries in the subregion have established business incubators, accelerators and science and technology parks in recent years to promote innovative businesses, but these institutions have not seen the same success as their peers in Europe and the United States.

Decisions about specific policy instruments are more successful when they are based on a careful assessment of institutional capacities for their design, implementation, monitoring and evaluation.

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Box 5
IHGEs and their role in driving sustainable development

A small group of enterprises, typically comprising up to 6 per cent of the business sector, innovative high growth enterprises have played a disproportionate role in job and value creation around the world and hold significant potential for driving innovation-led sustainable development in the SPECA subregion, while also contributing to a circular and green economic transition. IHGEs help systematize the processes of experimentation with ideas by responding to emerging opportunities in the market and economic, societal and environmental challenges.

Given ongoing economic uncertainty due to higher global inflation and interest rates, shrinking fiscal resources coupled with rapid technological change open the door to targeted, cost-effective measures to support the development of IHGEs with significant positive spillovers for the economies and societies of the SPECA countries. Such a targeted approach to IHGE support should build on a nuanced understanding of the needs, dynamics and characteristics of IHGEs – especially as they can differ substantially from that of the business population as a whole.

Central to the policies on IHGEs is broad experimentation, since it is hard to identify, ex ante, which firms will grow fast and which firms will not. Experimentation with ideas may lead to innovation in sectors that are often perceived as not particularly innovative, such as childcare, construction and light industry, echoing the fact that innovation can and should happen anywhere in the economy.

Currently, the SPECA countries lack dedicated policies to support IHGEs, with support largely in the form of acceleration/scaling initiatives, often biased towards high-tech start-ups while failing to target much of the potential for innovation and growth of established manufacturing or service firms. Other more limited efforts that contribute to IHGE support include initiatives to foster spill-overs from large enterprises, including multinationals towards smaller companies and the attraction of ambitious entrepreneurs and/or scalable companies from abroad to establish locally and grow globally.

Source: UNECE based on the policy handbook on "Supporting Innovative High-Growth Enterprises in the SPECA subregion", 2023
Enhancing these implementation capabilities would require, among other things, increasing the competences of civil servants, including through training, competitive salaries, and conducting broader public administration reform for improved governance. The SPECA countries would also benefit from cooperation with international donors, non-governmental organizations (NGOs), and private sector organizations to complement their own technical and governance capabilities.

In addition to that and in line with the “new industrial policies” approach, government should play the role of facilitator of collective action on innovation policy issues. This is firstly because governments do not have perfect information for decision making and therefore need to create meaningful linkages with other innovation policy stakeholders to inform policy making. Secondly, the facilitator role saves scarce public resources by allowing room for grass-roots initiatives that direct further policy action.

**Principle 7: Match investment in the hard infrastructure of STI support with improvements in soft infrastructure**

Governments in the SPECA subregion are advised to follow a two-pronged approach to STI policymaking. On the one hand, they can improve their targeted policies based on a gap analysis and following good practices from other countries, adapted to their

![Figure 7 · Government effectiveness and regulatory quality in SPECA and comparator countries, 2021](image)
needs and context, which could be labelled as “hard” infrastructure. On the other hand, these policies should ideally be matched with efforts to improve their economic governance, public and private capabilities and framework conditions in which businesses operate, the so-called “soft” infrastructure that improves performance of the hard infrastructure (Figure 8).

**Figure 8 • Innovation support infrastructure: directing policy efforts**

- **Hard infrastructure**
  - Innovative entrepreneurship support institutions: business incubators, accelerators, science and technology parks;
  - Public research and technology transfer organizations;
  - Innovation broker and intermediary organizations;

- **Soft infrastructure**
  - Economic governance;
  - Public and private sector implementation capabilities;
  - Regulatory and legislative frameworks for innovation;
  - Framework conditions in which businesses, research organizations and other innovation actors operate;

Source: Authors’ compilation

Business incubators, accelerators and science and technology parks are among the most important tools to support the initial stages of the life cycle of innovative ventures – pre-seed, seed, start-up, and scale-up. In emerging economies such as the SPECA countries, the potential of business incubators (box 6) to increase economic competitiveness and tackle various social challenges such as unemployment and poverty is huge.

While these innovative entrepreneurship support institutions are key to a high-performing innovation ecosystem, their potential in the SPECA subregion is limited by a number of challenges associated with poor infrastructure development, including ICT, limited private sector R&D, a lack of incentives to start a business, gaps in accessing finance, and gaps in human capital development. In addition, to operate effectively, these structures need knowledgeable and adequately skilled staff to perform the assigned tasks and draw on international good practices. For policymakers, it is crucial to ensure that business incubators are meaningfully aligned with and complement other support measures to be effective.

*The potential of innovative entrepreneurship support organizations in the SPECA countries is limited by a number of challenges, including poor infrastructure and issues in human capital development.*

In other words, significant gaps remain for this infrastructure to play a systematic, catalytic role in enabling policy experimentation and driving a high-performance innovation ecosystem. In particular, the private sector’s absorptive capacities are typically insufficient to allow these institutions to realise their full potential.
The principal objective of business incubators is to help and support innovative entrepreneurs at the very early stages to shape their innovative ideas in a way that would enable its advance forward in the innovation process. Accelerators focus on companies that are somewhat more mature and have a more developed business model with tougher selection procedures and a more condensed and intensive period of support provision. Science and technology parks are typically affiliated with a higher education institution, and aim to promote innovation and its commercialisation, in large part by linking different innovation actors and providing incubation and acceleration services to their tenant firms. The transfer of technology is part of their core function and they often focus on specific economic sectors where the university or similar higher education institution has a competitive advantage.

While the use of business incubators has proliferated in recent years, there is considerable variation across countries, as has also been highlighted by the UNECE handbook on this topic. Some countries, such as Afghanistan, have until recently been considering the establishment of institutions such as technology parks, business incubators and technology transfer offices. In contrast, both Kazakhstan and Azerbaijan have established extensive networks of innovation support institutions with the latter having an operational high-technology park along with five industrial parks for large conglomerates and four industrial estates focused on small and medium-sized enterprises (SMEs). Kazakhstan also has an extensive network of innovation support institutions and activities that focus their efforts on different phases of the innovation process. These include incubation and acceleration programmes that are administered by innovation support institutions such as the International Technology Park for IT startups “Astana Hub”, QazTech Ventures, Astana Business Campus under the Nazarbayev University along with a number of others. Several further initiatives are underway, such as university-based technoparks and business incubators in Kyrgyzstan and Tajikistan, an Academy of Science-based technopark in Turkmenistan and several private sector run business incubators.

Source: (UNECE, 2021).

Notes

1 Government effectiveness index assesses the quality of public services, civil service, policy formulation, policy implementation and credibility of a government’s commitment to raise these qualities or keeping them high.
Part 2

GOVERNANCE AND INSTITUTIONAL CAPACITY FAILURES HOLDING UP PROGRESS ON NEW INNOVATION POLICY
Introduction

This section addresses issues related to the institutional capacity of policymakers in the subregion, followed by areas of innovation policymaking that could be further aligned with new innovation policy principles.

**Public sector implementation capacities represent an additional challenge in transition economies.**

The presence of knowledgeable, capable and efficient public administrations mandated with policy design and implementation represents a key factor for the success of any policy. Given the cross-sectoral and complex nature of innovation (see Principle 5), it is of crucial importance to have well-trained and competent civil servants in all public bodies mandated to deliver on innovation. In transition economies, these capacities are often lacking and are among the major barriers to the reform process.

**The cross-sectoral nature of innovation policy requires engagement with the private sector, academia and coordination across various public bodies.**

Governance is another critical element for innovation policy delivery, and refers to the decision-making rules and interactions between innovation stakeholders involved in policy design and implementation. Innovation governance includes both public sector bodies engaged in innovation policy (including ministries and agencies tasked with innovation policy design, implementation and monitoring and evaluation), private sector innovation stakeholders (such as businesses, financial institutions, innovation intermediaries, etc.), as well as academia and civil society representatives (e.g., research organizations, higher educational institutions, etc.) (Dobrinsky, Towards Technological Transformation of the SPECA Countries: The Innovation Imperative for Sustainable Development, 2021). The cross-sectoral nature of innovation policy requires engagement with the private sector and academia, as well as coordination across various public bodies and ensuring continuity of policies whose effects are usually felt beyond the electoral cycle.

International evidence indicates that there are considerable governance issues in the SPECA countries. As data from the Worldwide Governance Indicators in Figure 9 illustrate, countries in the SPECA subregion perform below the global average almost consistently on various governance indicators, and especially in the areas of “voice and accountability”, “rule of law” and “control of corruption”.

One manifestation of the weak institutional and technical implementation capabilities for innovation policy is competitive STI funding, which should cover all phases of the implementation process, including the design of the competitive calls, the organization of bidding processes, the screening and evaluation of bids, the selection of winners and the monitoring of implementation of funded STI projects. These elements are not being regularly followed through in those of the SPECA countries that have competitive funding in place.

While a comprehensive analysis of governance issues of transition economies in the SPECA subregion is beyond the scope of this report, the following governance and institutional capacity issues that hold back effective innovation policymaking in line with the new innovation policy principles are highlighted in the analysis that follows.
Challenge 1. A lack of coordination of STI policy design and implementation

1.1. What is the issue?

As innovation depends on the interactions between numerous innovation stakeholders, good connectivity and efficient linkages are essential for a vibrant national innovation system. While many of the institutional elements of the innovation systems can be established with government support, their effectiveness will be limited in the absence of interactions in the system. In most countries, especially those with economies in transition, innovation systems are fragmented with the various actors largely operating in silos. It is of particular importance to make connections between the main entity or entities responsible for science and innovation policy and their counterparts responsible for industry, entrepreneurship and SMEs and competitiveness given the different incentives they may face (Cicera, Frias, Hill, & Li, 2020).

Innovation systems in transition economies are often fragmented, with different actors operating in silos.

This is especially important because, for transition economies such as the SPECA countries, innovation and technological transformation are largely associated with their capability to
adopt, absorb and adapt existing knowledge and technologies into their existing socio-economic structures and processes, which in turn relies on innovation and knowledge spreading through different actors and sectors of the economy. For such countries, the opening up of their economies and international cooperation (both regional and global) will be important to advance in science, technology and innovation (STI).

The internationalization of the SPECA economies will be key to advancing in science, technology and innovation (STI).

One specific public sector governance function is the coordination of policy design and implementation. The need for this arises from the largely horizontal nature of STI policy, which is shaped by many actors and ministries at a similar level in the government hierarchy. In addition, subnational authorities have become more important in designing and implementing STI policies in many countries around the world, recognising the need to tailor policies to local strengths and institutional capacity. In addition, this shared responsibility for policymaking between national and subnational levels of government creates "multi-level governance issues" (OECD, 2015). For instance, some instruments such as loan guarantees or incubators may exist both at the national and subnational level, creating the potential for wasteful duplication. As another example, there may be a need to tailor policies to specific conditions at the regional level, e.g. to take into account different framework conditions in rural, peripheral regions compared to in the capital, but regional governments may lack the financial means or technical skills to operate support schemes adequately (Cicera, Frias, Hill, & Li, 2020).

Innovation policy must also manage tensions and conflicts between different parts of the national innovation system to create the conditions necessary for long-term sustainable development. Policy coordination and information exchange between the institutions mandated with innovation management are therefore essential.

1.2. The policy environment in the SPECA subregion

There is a clear role for innovation intermediaries and support institutions to facilitate market uptake of innovative ideas and entrepreneurial projects, which is essential for the successful completion of innovative projects. However, such institutions are virtually absent in some SPECA countries and only exist only in rudimentary form in others. The building of such infrastructure is in itself a long-term process that will require continued policy support efforts from the various governments. In addition, even when such intermediate structures exist, they still suffer from poor connectivity and linkages between innovation stakeholders which is a major barrier to the completion and commercialization of science, technology and innovation (STI) activities.

Innovation intermediaries and support institutions play a clear role in facilitating market uptake of innovative ideas and entrepreneurial projects.

The UNECE STI Gap Assessments and Innovation for Sustainable Development Reviews of the SPECA countries provide evidence of frequent failures in this process due to a lack of information sharing and consultation among institutions. In practical terms, this results in the fragmentation of innovation governance at the operational level. The inadequate coordination capacity of innovation stakeholders also limits their ability to respond swiftly
to both emerging challenges and opportunities. For instance, interviewed stakeholders from Kazakhstan have highlighted persistent obstacles in STI policy implementation related to weak coordination across public actors, an unclear division of responsibilities between the public bodies tasked with STI governance and problems with the management and guidance of the R&D system (Shevchenko, 2021).

At the same time, there is substantial variation across the region with many countries taking quite divergent initiatives. In Kyrgyzstan, for instance, there remains insufficient leadership and coordination across different levels of government in designing and implementing innovation policy, despite the efforts of the State Agency of Intellectual Property and Innovation “Kyrgyzpatent” to the contrary. In addition, mismatches between formal mandates and the budgetary and human resources that implementing agencies such as Kyrgyzpatent have at their disposal are commonplace (UNECE, 2019). As another example, Uzbekistan (Box 7) created the Ministry of Innovative Development (MoID) to coordinate STI policies across the various public institutions, a milestone achievement to address the fragmented nature of policymaking (UNECE, 2022). MoID also aims to address the issue that entities responsible for STI policy have traditionally had other, diverse mandates in their portfolio, which in the past led to further fragmentation and diversion of (already limited) public resources for STI policymaking. It remains early, however, to assess the impact on the ground of this revision of the STI governance structure.

To find out more about the Ministry of Innovative Development of Uzbekistan, please follow this link [link]

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Box 7

Main recommendations on innovation policy governance from the UNECE Innovation for Sustainable Development Review of Uzbekistan

In 2022, UNECE published the Innovation for Sustainable Development Review of Uzbekistan, providing an in-depth analysis of the country’s national innovation system, including policy governance, industry-science linkages, innovation and technology transfer infrastructure. The main policy recommendations on governance and policy instruments include the following:

1. Recommendation 1: Improve coordination of innovation policy initiatives across national and regional government authorities and strengthen public capacities for effective policy design and implementation.

2. Recommendation 2: Strengthen the participation of all ministries relevant to innovation, the private sector and civil society in designing, implementing and monitoring innovation policy initiatives.

3. Recommendation 3: Expand policy support for enhancing the absorptive capacity of the private sector to equip firms with managerial and organizational skills.

4. Recommendation 4: Promote start-up creation by ensuring sufficient coordination and awareness of innovation policy initiatives to exploit the entrepreneurial capacity of the general population, including targeted support for female entrepreneurs.

5. Recommendation 5: Enable the functional and structural transformation of the national statistical system to provide policymakers, business and civil society with sufficient data on innovation.

6. Recommendation 6: Foster an evidence-based culture of innovation policymaking through a systematic approach to design and to monitoring, assessment and evaluation.

Source: Based on (UNECE, 2022).
As another frontrunner in this area, Azerbaijan has taken steps to improve innovation policy implementation by setting up the Innovation Agency in 2019. This agency aims to improve coordination and coherence across public entities involved in STI policy and also runs incubation programmes and residency programmes. Nonetheless, there remain overlapping mandates between the agency and other governmental authorities, as well as a need to avoid potential crowding out of the private sector in incubation and residency services provision. Returning to Principle 6 on identifying the most promising STI policies based on a rigorous assessment of implementation capacities, it is important for the government to facilitate experimentation among the various innovation stakeholders in the area of innovation support.

1.3. Policy recommendations and international good practice

Malaysia formulated its National Policy on Science, Technology and Innovation (NPSTI) in 2013 with the overarching aim to adopt an integrated and holistic approach to policymaking in these areas. The idea to harmonise and better coordinate policy efforts took centre stage in the development and design of this strategy with a clear recognition of the role of various stakeholders such as civil servants, industry, academia and the business community.

As is the case in the SPECA countries, STI policies involved different ministries, agencies and other bodies, each with their own strategic agenda, funding and policy instruments. Over the years, the number of advisory councils, policy instruments, frameworks and organizations has increased. Part of the NPSTI entailed designing a simpler and more efficient architecture of innovation governance. The National Science Council (NSC) was created to orient policy and better coordinate efforts. In addition, the Research Management Agency (RMA) manages the allocation of research funding according to clearly set criteria.

Countries in the SPECA subregion could follow Malaysia’s example and assess areas where different responsibilities overlap and, to the extent possible, the governance structure could be simplified and rationalized. Many of the issues that Malaysia faces, such as weak monitoring and evaluation, excessive bureaucracy, and a lack of middle-management implementation skills (OECD, 2016) are prevalent in the SPECA subregion as well, as is the tendency to create more structures and governance layers as time goes by. Both phenomena favour a critical assessment of the overall structure and a dedicated effort to remove unnecessary complexity. As a notable policy initiative to reverse this weakness, Malaysia created the National Science and Industry Council in 2013, replacing the myriad science and industry councils that were in place, and whose recommendations did not always find the ear of policymakers. This would represent an important step for the SPECA countries as illustrated in Box 8.

This Malaysian approach also aims to embed a clear separation of strategic and operational functions, with the NSC responsible for the former and the RMA the latter. Countries in the SPECA region should follow suit and clarify responsibility for both strategic and operational functions.

Finally, the NPSTI made significant efforts to ensure that the key actors delivering STI policies have clear mandates matched by sufficient resources, the necessary autonomy to act, and
the required information from the various stakeholders. While the SPECA countries have, to varying degrees, made improvements to their governance structure, there remains in many cases a need to clarify the mandate of the key actors, their resources, autonomy and mechanisms to share information.

**Challenge 2. The culture of monitoring and evaluation is weak**

2.1. What is the issue?

*The quality of innovation and industrial policy is significantly determined by the effectiveness of monitoring and evaluation.*

The quality of innovation and industrial policy is significantly determined by how well monitoring and subsequent evaluation are organized. This is the only way to embed experimental learning into STI policies. In this respect, monitoring and evaluation are essential aspects of new innovation policy’s institutional setup and implementation capacity. A solid evidence base, as well as monitoring and evaluation activities, allow
policymakers to distinguish between pilot programmes that should be scrapped, and those that could be expanded and/or revised.

The principles of how to monitor and evaluate public policies are well understood and summarized in table 4. The three first steps refer to the monitoring dimension. Policymakers need to keep track of the take-up of public programmes, ideally broken down by firm characteristics such as size, age, sector, geographical location, the gender of the principal owner, etc. Second, the opinion of the beneficiaries about the programme and how and when it is delivered, offers information on how to improve programmes. As one example, if the procedure to obtain support is considered cumbersome and time-consuming by a majority of beneficiaries, this may suggest scope for simplification. Third, an initial idea of the impact of public support programmes can be derived by asking beneficiaries, even if they have only an imperfect idea of the difference that public intervention makes to their business performance.

In emerging economies, monitoring and evaluation activities are generally under-developed and under-staffed, lacking technical capabilities, and have a relatively low status in policymaking.

The three last steps are related to evaluation, whereby, as a first stage, the performance of companies who receive support is compared with the “average firm”. This comparison may be misleading as the firms that benefit from public interventions are not randomly selected and differ ex ante in crucial respects from other firms. By designing a database of firms with similar characteristics (the so-called counterfactual), a more appropriate comparison is made possible (step 5). Finally, statistical techniques should be applied to take into account various selection biases when data is analysed.

2.2. The policy environment in the SPECA subregion

In emerging economies, monitoring and evaluation are not developed and even when such units exist, they are often understaffed, lacking technical capabilities, and have a relatively low status in the innovation policy machinery. Very often, monitoring and evaluation are adequately performed only when supported by international donors.

### Table 4 Monitoring and evaluation policies

<table>
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<tr>
<th>Monitoring</th>
<th>Evaluation</th>
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<td>STEP III</td>
<td>STEP VI</td>
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<tr>
<td>• Take up of schemes</td>
<td>• Comparison of the Performance of “Assisted” with “Typical” firms</td>
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<tr>
<td>• Recipients Opinions</td>
<td>• Comparison with “Match” firms</td>
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<tr>
<td>• Recipients views of the difference made by the Assistance</td>
<td>• Taking account of selection bias</td>
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</table>

Source: (Storey, 2017)
The situation is no different for countries in the SPECA subregion, where there is an absence of an evaluation culture in public policy more generally. Even relatively basic steps in the process outlined in the above table 4, such as monitoring the take-up of public schemes (also broken down by firm size, sector, age and other characteristics) or surveying beneficiaries on the impact of the support and their general opinion, appear uncommon.

In similar spirit, the SPECA countries could make significant progress by performing regulatory impact assessments (RIAs), in accordance with best practice. In particular, the "innovation principle", which means that whenever a policy is developed, its impact on innovation is fully assessed, could be more widely applied. In addition, when the legislative process does not match the pace of innovation then the existing rules risk slowing down and disrupting innovation (the so-called pacing problem). Finally, regulatory issues, including taxation, may provide a disincentive to scale-up or encourage growing firms to create subsidiaries rather than consolidating (e.g. more complex reporting obligations or higher taxation rates above a certain threshold) (UNECE, 2022).

Finally, these exercises should also feed into policymaking. In some instances, there is only a tenuous link between the results of evaluation exercises and the design of future public programmes.

### 2.3. Policy recommendations and international good practice

Since 2020, the Lithuanian Government has embarked on a reform to strengthen the monitoring and evaluation capacity across public bodies, including on innovation policy, and move decisively towards evidence-based policymaking. The reform implementation consisted of several phases. The first phase represented a stock-taking exercise of existing capacities for coordination, promotion and commissioning evaluation, as well as quality assurance and the use of evaluation in decision-making. The second phase consisted of support through capacity-building workshops, based on the above analysis, and with the support of international experts. In phase three, additional technical support was envisaged, an implementation roadmap designed and key deliverables identified.

The Government Strategic Analysis Centre (“STRATA” by its acronym in Lithuanian) plays a key role these efforts, as it carries out, among others, foresight activities, monitoring and evaluation (including on 10 strategic government goals against 50 established performance indicators), conducts thematic studies in science, innovation and education, and promotes the quality of both ex ante RIAs and ex post assessments.

Governments in the SPECA subregion can learn from this approach in Lithuania by, among other things, establishing a dedicated unit within government charged with monitoring and evaluation exercises and, possibly, strategic foresight where expertise and capacity can be concentrated. STRATA acts as a “centre of excellence” whereby such practices can be disseminated throughout the public sector. STRATA is well placed in this regard as it is well respected for its technical skills, but with sufficient independence and autonomy to make critical assessments if necessary. Institutions like this in the SPECA subregion, especially if operating at arm’s length from government, make it more likely that monitoring and evaluation exercises will shape public policy on the ground.
The establishment of such a unit would contribute to building capacities within the public sector to gather an evidence base and conduct evaluation exercises.

*Governments in the SPECA subregion might benefit from establishing dedicated units within government charged with monitoring and evaluation functions.*

Similar to Lithuania’s State Progress Strategy, many countries in the SPECA subregion adopted a long-term economic development plans. These plans will likely be more successful and impactful if progress on key performance indicators can be monitored repeatedly, representing an added rationale for the creation of such an organization.

*Boosting capacities within the public sector and building the evidence base for policy evaluation would be necessary.*

A second key take-away is the importance of conducting RIAs on a regular basis and following international guidelines. UNECE analysis shows that the regulatory framework in countries in the SPECA subregion is often not conducive for innovation and the creation and development of high-growth firms. RIAs are an indispensable tool to drive improvement in this area.

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**Challenge 3. Insufficient private sector involvement in the identification of policy priorities, and the design and implementation of public initiatives**

**3.1. What is the issue?**

As outlined at greater length in the previous section, institutional capacities for innovation policy are not confined to the administrative capabilities of governments. The state cannot be useful in STI policy as an autonomous entity without being enmeshed in rich knowledge networks with academia and the private sector through which it can enter a dialogue about growth challenges (Principle 3). Hence, in-house government capacities should be complemented by private sector engagement to ensure successful policy outcomes.

*Institutional capacities for innovation policy are found not only in government but in wider knowledge networks.*

The issue is twofold. One the one hand, the private sector is often well placed to identify possible opportunities or challenges in science, technology and innovation before civil servants do. In other words, engagement with business and other partners can make policymakers more responsive in light of the fast-changing nature of innovation and its potential to address societal and economic issues. On the other hand, there is increasing recognition that private sector involvement often enhances the implementation of relevant policies, as witnessed by the growing interest in public-private partnerships (PPPs). As one example, financial support schemes should adopt a risk sharing mechanisms between the private and public sector, to ensure private initiatives are
not crowded out by public interventions, support is allocated efficiently on the basis of merit rather than political connections and excessive risk-taking is avoided (G20/OECD, 2015). At the same time, closer private sector engagement in policymaking is associated with higher potential corruption risks, especially in a transition context, which should be addressed through transparent engagement mechanism and adequate controls.

**Financial support schemes should adopt risk sharing mechanisms between the private and public sectors, to ensure private initiatives are not crowded out by public interventions.**

### 3.2. The policy environment in the SPECA subregion

Engagement with the private sector is uncommon among transition economies in the SPECA subregion, leading to a disconnect between policymakers and the private sector. More regular and institutionalized engagement with business sector representatives would lead to a better understanding of their needs and thus to better policy design and implementation. This holds especially true in the fast-moving environment of innovative firms with high-growth potential and start-ups, for which the wheels of bureaucracy often turn too slow.

**Engagements with the private sector are uncommon among transition economies in the SPECA subregion, leading to a disconnect between policymakers and the private sector.**

Such a state of play partly reflects the legacy of a planned economy and the persistent large role of State-owned enterprises (SOEs) and the government in economic development. As one example, close to two-thirds of GDP in Turkmenistan is in the public sector, with the most important economic sectors firmly under government control. In addition, extensive legislation ensures that the government has a relatively tight grip on private businesses (Aronskyi, 2020). Partly as a result, the policy agenda to diversify its economy and raise innovation activities is driven from top to bottom, with relatively little involvement of the private sector and other stakeholders in its design or implementation. A positive development in that respect is the expansion in recent years of PPPs to facilitate economic activities (Aronskyi, 2020). The same issue, to a lesser but still a considerable degree, is present in other SPECA countries with, for example, the oil and gas sectors dominated by SOEs in Azerbaijan and Kazakhstan.

### 3.3. Policy recommendations and international good practice

The SPECA countries could follow the example of Moldova which has made significant progress in recent years to establish public-private dialogue mechanisms. The most prominent among these is the 118 member Economic Council under the Prime Minister, which serves as an advisory platform for dialogue among business associations, donors and policymakers to improve the environment for entrepreneurship and investment.

In addition, Particip.gov.md is an online platform, funded by United States Agency for International Development USAID, provides feedback on various draft laws and the formulation of STI policies from civil society and innovation stakeholders more broadly. (UNECE, 2022a).

The SPECA countries could experiment with setting up online platforms or other mechanisms to facilitate exchange between the public and private sectors. This should include efforts to
increase outreach and awareness of the online consultation process, in particular among the business community, which is arguably most affected by legislation on innovation policy. Ideally, there should be outreach to both large enterprises as well as SMEs, established companies and start-ups, foreign and local firms.

Finally, the experience of Moldova underlines the potential for international donors and international collaboration to strengthen intermediary structures and organizations such as chambers of commerce and business associations that allow the business community and other stakeholders to voice their concerns and become more active in advocacy. A key feature of new innovation policy is an acknowledgement of the technical weaknesses in the public sector of the SPECA countries, which necessitate collaboration with external public and private organizations to complement these capabilities, thereby raising the quality of public programmes (Radosevic, 2021).

*The experience of Moldova underlines the potential for international donors and international collaboration to strengthen intermediary structures and organizations.*

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**Challenge 4. A lack of data to underpin robust, evidence-based innovation policies tailored to regional strengths**

**4.1. What is the issue?**

The success of a systemic approach towards innovation hinges on the existence and use of data and empirical analysis. More generally, this is an essential requirement to perform STI policies based on objective facts, which is in turn fundamental to sound governance. As one example, evaluation exercises crucially depend on reliable data. It is impossible to assess the impact of a given policy, and in particular to construct a reliable counterfactual, without such data.

*At present, reliable data is often lacking in the subregion.*

**4.2. The policy environment in the SPECA subregion**

While governments in the region have put forward development plans, in some cases with a central role for innovation, such strategies need to be grounded on a more solid empirical basis. These should allow not only the identification of key opportunities and the general direction for policy action, but also to track progress and revise policies accordingly.

Currently, reliable data is often lacking in the region, with data collection practices varying significantly and lacking international comparability. For example, the State Statistics Committee of Uzbekistan initiated reforms to harmonize national statistics with international standards to reinforce evidence-based policymaking and improve the quality and comprehensiveness of statistical data. Nonetheless, data collection practices are fragmented, leading to inconsistent or incompatible databases, insufficient data
collection and availability, while also falling short of international standards (UNECE, 2022). Data collection at the subnational level is similarly scant, making it hard to assess the strengths and weaknesses or regional economies.

*In the SPECA subregion, data collection practices and statistics often do not comply with international standards, leading to inconsistent or incompatible databases.*

### 4.3. Policy recommendations and international good practice

Conducting a data collection exercise would help guide evidence-based policy decisions at different levels of government. Serbia may serve as a useful learning model in this regard. In partnership with the Joint Research Centre (JRC) of the European Commission, Serbia conducted a mapping exercise to identify priority domains in different regions of the country in terms of their economic, innovation and scientific potential. Data collection for this exercise was a critical element and presented significant challenges. For instance, data collection bodies, including but not limited to the national statistical office, did not always collaborate on a formal basis, with databases typically not linked, and information often insufficiently granular. To address this, a dedicated Analytical Team, including scientists from local research institutes and international experts, was established. The Analytical Team worked together to design a more disaggregated, reliable and interconnected evidence base (Radovanovic, Matusiak, & Kleibrink, 2021).

A similar exercise to improve the collection of data would be welcome in the SPECA countries. One promising example, although relatively limited in scope, is the case of Uzbekistan, where the Ministry of Innovative Development (MoID) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) with financial support from the Islamic Development Bank (UNESCO, 2020) conducted analysis of research and innovation activities in Uzbekistan in 2020.

*An exercise in the form of a mapping conducted through a dedicated task force including national and international experts could be an important step towards better policy design and evaluation.*

The collaboration of national experts in a task force, complemented by international expertise, would constitute a good model to take stock of data collection practices and challenges and propose tailored solutions to existing shortcomings. The methodology employed by Serbia has proven useful in other European countries, and is sufficiently flexible to be applied elsewhere. Even if, in contrast to Serbia, data prove to be too poor to allow a formal mapping exercise, this exercise would likely raise statistical standards and identify future areas for improvement.

In addition, besides the data collection benefits, such a mapping exercise could point to priority areas for development at the subnational level – a concept referred to as “Smart Specialisation” and a widely used policy in the European Union. “Smart Specialisation” involves a process of interaction between different innovation stakeholders, in particular the private sector, to identify emerging market opportunities at the subnational level. This interactive process empowers the best placed actors to tap into undiscovered potential, with government acting largely as a facilitator of such initiatives that are developed based on the evidence gathered (Principle 6).
**Challenge 5. The business environment requires improvement, especially in terms of public sector transparency and accountability**

5.1. **What is the issue?**

Innovation requires firms and other stakeholders to collaborate, exchange ideas and knowledge and establish decentralized management arrangements. This is facilitated where public institutions, such as ministries, but also regulatory bodies such as competition authorities, innovation and SME agencies, development banks, and courts are regarded as trustworthy, and create a more reliable and predictable business environment.

Bureaucracy and corruption at different levels of government represent significant barriers to innovation, especially for smaller firms. It saps confidence in public initiatives and support measures and creates considerable difficulties for the successful implementation of STI policies. More generally, it has an adverse affects on investment in R&D activities, among others, competitiveness and entrepreneurial activities. Making the operation of public institutions more transparent and accountable, for example through the establishment of clear and objective criteria regarding the award of STI support, goes a long way to mitigate the impact of an otherwise unfavourable business environment (Paulov, 2016).

At the same time, ICT solutions have developed in recent years, making it easier to share information and interact with stakeholders at the technical level.

*Bureaucracy and multi-layer corruption is often highlighted as one of the most important barriers to innovative development in the SPECA countries.*

While all businesses benefit from improvements in the business environment, innovative firms with high-growth potential benefit disproportionately given their specific vulnerabilities. These firms typically challenge incumbents (including State-owned enterprises and other companies with political connections), have unproven and risky business models, and typically face greater difficulty in accessing the skills and financial resources they require for growth. For all these reasons, they operate best in a transparent regulatory environment that guarantees a fair and level playing field across all businesses, allows for some room for experimentation and does not hinder the reallocation of labour, financial and other scarce resources.

*Innovative firms operate best in a transparent regulatory environment that guarantees fair conditions for doing business.*

5.2. **The policy environment in the SPECA subregion**

It should be noted that the SPECA countries have made progress in recent years in creating a favourable business environment, albeit with considerable cross-country variation. The SPECA countries, including the frontrunners among them, could make improvements in various areas that would particularly benefit innovative firms and those
with high-growth potential. For example, bureaucracy and multi-layer corruption was most commonly referred to by interviewed stakeholders as the key issues hindering innovative development in Kazakhstan (Shevchenko, 2021). This is all a concern for the overall SPECA subregion given that Kazakhstan scores better than other SPECA countries in the areas of "control of corruption" and "rule of law".

This perception is also echoed in the Corruption Perception Index 2022 of Transparency International (Transparency International, 2022). In 2022, Kazakhstan ranked 101st - the best performance among the SPECA countries, with Kyrgyzstan ranking 140th, Azerbaijan 157th, Uzbekistan 126th, Tajikistan 150th, Turkmenistan 167th, and Afghanistan 150th, all showing significant levels of corruption.

Other negative features of the business environment relate to business regulation, where rules often overlap or contradict one another. Regulations are also subject to frequent change with inadequate consultations with private sector stakeholders. Customs regulations and border procedures remain expensive and complicated in most countries in the region, with tax compliance often a bottleneck to effective business operations. As one example, it is hard to comply with tax regulations in Uzbekistan given their complex nature. At the same time, there can be severe penalties for relatively minor infringements (Ernst & Young, 2020).

Business regulation in the SPECA subregion is often complicated, and rules frequently contradict each other.

Dispute settlements are also not always perceived as fair, transparent and of high quality in the context of a reported lack of public accountability. There is reluctance, for instance, to legally challenge State bodies and State-owned enterprises in court (OECD, 2021). Finally, the SPECA countries have made progress on public procurement processes, again with considerable variation across the subregion, and with scope to do more, in particular with regard to innovation-enhancing public procurement (see Part 1 on the STI policy environment in the SPECA subregion). In Kyrgyzstan, for example, many procurement officers lack both skills and support from central government (e.g., standardized templates) to adhere to the rules (Orazymbet, Nurgaliev, & Akhmetova, 2021).

The SPECA countries have made progress with public procurement procedures, but standards are still not applied uniformly.

The aforementioned issues are compounded by a lack of accountability and transparency at many public sector agencies, and could be addressed, at least to some extent, by raising procurement standards. This would result in a more predictable environment where rules are applied evenly to both incumbents and new bidders in public procurement processes.

5.3. Policy recommendations and international good practice

Addressing the abovementioned challenges would be possible by ensuring a transparent system of public administration and governance. Slovenia scores very well in terms of access to government information. According to public administration and governance rankings from the European Commission, it is among the best performers in the EU27 on this metric, with significant improvement in recent years. This can be partly attributed to the establishment and implementation of the Public Administration Development
Strategy 2015-2020 in 2015, which aimed to improve the internal operation of public bodies. The government set forth objectives and key performance indicators and appointed an agency to track progress in annual reports and, while its record in other areas is mixed, the strategy was assessed as having a positive impact on public sector transparency (European Commission, 2020).

Similar strategies could be deployed among the SPECA economies, with Kyrgyzstan providing an illustrative example. Taza Koom - roughly translated as honest nation - was adopted in 2017 and is a long-term strategy to harness the potential of digitalisation and build an open and transparent State. This strategy includes aspirations to follow good practices in electronic Government (e-Government). This could potentially make public bodies more transparent, but also more effective and collaborative through the use of digital tools and solutions. The United Nations Development Programme (UNDP) is also providing support to develop the institutional capacity of key agencies involved in ICT-enabled public sector transformation (UNDP, 2020). Kazakhstan is one of several countries in the region that has embraced e-Government as a key feature of its comprehensive Digital Kazakhstan initiative.

Many e-Government initiatives in transition economies have failed to meet expectations.

It is, however, noteworthy that many e-Government initiatives either fully or partially fail in implementation, with only a minority successful, especially among emerging economies (Amanbek, Balgayev, Batyrkhanov, & Tan, 2020). Experience from the EU suggests that, where there is a lack of political buy-in, implementation is likely to be patchy (European Commission, 2020).

In short, the SPECA countries are advised to make public institutions more transparent and accountable through efforts on e-Government, but success is far from guaranteed. In this sense, it may be preferable to aim for modest, realistic goals rather than overly ambitious targets. Experience from other countries also highlights political commitment at the highest level of government as a key factor for success. Finally, as in the case of Kyrgyzstan, it is recommended to seek support from international organizations in the design, and in particular implementation, of such strategies.

Ensuring expert support and overall assistance from international organizations for the design and implementation stages of e-Government strategies is critical for their success.
Challenge 6. Access to finance, especially to equity-type finance, is a major barrier to the set-up and scale up of innovative firms, and to innovation in established firms

6.1. What is the issue?

Innovative activity across the SPECA subregion could benefit from the introduction of new funding instruments, especially of the equity type, with greater private sector involvement and the expansion of the coverage of existing ones. In addition, some non-financial support instruments, which are critical for enhancing the capabilities of institutions and actors involved in innovation policy, are underused in the subregion. This includes the provision of coaching and business services, supporting both local and international networking, facilitating the integration of innovative SMEs into global and regional supply and value-added chains as well as innovation vouchers or other instruments to support the commercialisation of research. While the next sections provide more detail on the recommended approach in these different areas, it is important to note that these instruments should not be limited to high-tech start-ups only and should a broader definition of innovation, meaning that it can happen in any sector of the economy (Principle 5 on adopting a broader view of innovation with a focus on technology upgrading).

Innovative activity across the SPECA subregion could benefit from the introduction of new funding instruments, especially of the equity type.

Deep and diversified financial intermediation is essential to promote and sustain vibrant innovation activity. The absence of financial markets, especially those that provide equity, represents a serious impediment not only to innovative development but also to economic growth in general and to the ability to attract FDI, which is an important channel for technology and knowledge transfer from abroad.

The financial systems of all the SPECA countries are underdeveloped and dominated by the commercial banking sector.

When it comes to financing mechanisms, access to seed and early-stage finance is among the most important factors for the success of innovative startups. The key feature required for such a financing mechanism – and that which distinguishes it from support provided by banking institutions – is that it extends non-debt finance to entrepreneurs in various forms (e.g., grants, equity finance, etc.). Without the support of such a mechanism most, if not all, innovative entrepreneurial ventures are not likely to get off the ground and cross the “valley of death”. Equity financing is also critical at the scale-up stage for innovative companies, as the experience of many advanced economies has shown (e.g., Silicon Valley in the US, the Singapore Scale-Up Initiative, etc.).

It is for this reason that greater access to external finance is empirically associated with greater innovation at the firm level. This relationship has been documented for firms of varying size and for countries at differing levels of development (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2011).
6.2. The policy environment in the SPECA subregion

The available evidence suggests that the financial systems of all SPECA countries are underdeveloped and dominated by the commercial banking sector. Savings rates are generally low, interest rates high and collateral requirements substantial. With some exceptions, the SPECA countries generally perform below the world average on indicators measuring the development of the financial sector (see Table 5).

Based on interviews with key stakeholders in the SPECA subregion, venture capital markets, business angels (or networks) and crowdfunding opportunities are reportedly at an early stage of development, or do not exist at all. Where they exist, they are generally at low levels of activity and tend to rely heavily on public support. This leaves many high-growth ventures relying instead on international organizations for funding (UNECE, 2022). As one example, a clear majority of interviewed stakeholders in Azerbaijan agreed with the statement that there is a notable lack of funding for start-ups, with financing ranking among the most pressing challenges for innovation activities (Aliyeva, 2021).

6.3. Policy recommendations and international good practice

Policy interventions can take various forms, from the establishment of public funds tasked with early stage financing of innovative firms to guarantee schemes in which governments underwrite credit extended by commercial banks to SMEs. Such measures substitute for deficient collateral and/or help compensate high credit risk.

Policymakers in the SPECA countries should place an additional focus on facilitating access to finance for innovative undertakings, such as vouchers and equity-type instruments.

Table 5

<table>
<thead>
<tr>
<th>Country</th>
<th>Per cent of firms with a checking or savings account</th>
<th>Per cent of firms with a bank loan/line of credit</th>
<th>Proportion of loans requiring collateral (per cent)</th>
<th>Value of collateral needed for a loan (per cent of loan amount)</th>
<th>Per cent of firms not needing a loan</th>
<th>Per cent of firms whose recent loan application was rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Countries</td>
<td>87</td>
<td>32</td>
<td>75.7</td>
<td>198.3</td>
<td>49.3</td>
<td>10.4</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>43.7</td>
<td>5.1</td>
<td>70.7</td>
<td></td>
<td>45</td>
<td>35.3</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>94.5</td>
<td>16.8</td>
<td>77.8</td>
<td>198.6</td>
<td>64.5</td>
<td>10.2</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>97.3</td>
<td>17.2</td>
<td>79.3</td>
<td>158.3</td>
<td>63.7</td>
<td>22.5</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>89.2</td>
<td>18</td>
<td>64.2</td>
<td>125.5</td>
<td>68.1</td>
<td>9.5</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>83.8</td>
<td>22.2</td>
<td>96.4</td>
<td>166.1</td>
<td>58.5</td>
<td>15.1</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>97</td>
<td>25.8</td>
<td>93.6</td>
<td>244.3</td>
<td>69.1</td>
<td>7</td>
</tr>
</tbody>
</table>

Note: Turkmenistan was not covered in the database, data for Afghanistan are from 2014.
Public initiatives to increase access to debt finance for enterprises are relatively common across the region. As an example, the Government of Kazakhstan provides various forms of support to firms in need of debt finance through the DAMU Entrepreneurship Development Fund Joint Stock Company of Kazakhstan, including credit guarantees, loan subsidies and a soft lending scheme. Microcredit institutions are also relatively active in the region with, for example, 32 institutions active in Azerbaijan and members of an umbrella sectoral organization. Such traditional approaches to public intervention could be further developed and strengthened in the SPECA countries, with an extra focus of facilitating access to finance for innovative undertakings. Given risks inherent to innovation activity, equity financing has proven a more efficient means of funding innovative ventures than traditional bank loans.

**Additional support measures include those targeting specific groups of enterprises** [e.g., IHGEs, women-run firms] and may include tailored training and financial literacy programmes.

Policymakers in the SPECA countries could also consider supplementary instruments such as targeted credit lines, direct lending schemes and equity guarantees to ease access to finance by entrepreneurs and companies engaged in such ventures. Moreover, the governments of the SPECA countries may consider additional measures catering to the needs of some target groups such as IHGEs, women entrepreneurs and young entrepreneurs and further facilitating their access to finance, including training in financial literacy.

Other instruments used in different countries are underexplored in the SPECA subregion. Vouchers for innovative enterprises and firms with high-growth potential, while common in high-income economies, are not in use in the subregion. Grants or concessional loans to innovative enterprises are uncommon and, where in place, often operate on a small scale. In Azerbaijan, for instance, the National Innovation Agency, established in 2019, has disbursed concessional loans and grants to innovative companies (replacing a previous scheme targeting the ICT sector only); however its overall budget is small, indicating support measures on a small scale (OECD, 2020).

The shortage of early-stage equity finance options is compounded by the very limited public support dedicated to this purpose. As a consequence, even in cases where early-stage financial support instruments exist, the outreach of such instruments is limited and their effect is marginal. Finally, tax instruments for equity investors such as business angels or venture capitalists, are another underexplored policy instrument (UNECE, 2022). Türkiye offers a potential model for the SPECA economies to follow (Box 9).

The SPECA countries are not necessarily recommended to establish equivalent instruments to all those that the Turkish Government has in place, and especially not at one time and at a similar scale (also considering public budget constraints). They could, however, pilot programmes similar to the ones described above based on an assessment of the most acute market failures and, after an evaluation of its impact, revise the programme and/or scale up activities accordingly (in line with Principle 2, as outlined earlier). Another take-away from the Turkish experience is the importance of collaboration between the government and other innovation stakeholders such as chambers of commerce or commercial banks in the implementation of relevant programmes (Principle 3).
Challenge 7. Global value chains are insufficiently exploited to drive innovation and knowledge imports into the SPECA subregion

7.1. What is the issue?

Overall, there are several routes by which knowledge and technology flow into a country. These include: domestic firms’ integration in global value chains (GVCs), activities carried out as a result of foreign direct investments (FDI) and imports of high-technology goods and services, along with qualified human capital.

Integrating into GVCs allows local firms to upgrade their technology and adopt managerial and organizational innovations that have proven their worth elsewhere. Both export promotion activities and the attraction of FDI can contribute to this ambition. Lastly, the
import of advanced machinery and equipment, the licensing of intellectual property from abroad and the attraction of skilled employees and entrepreneurs are all useful tools to boost innovation activity and, in the case of transition economies, a way to catch up with high-income countries.

*The SPECA economies are poorly integrated into the global economy and global value chains. Hence, accessing supply chains and supporting local firms’ technology upgrading is a key challenge.*

### 7.2. The policy environment in the SPECA subregion

The SPECA economies are, with the exception of resource-based sectors (i.e., oil and gas, agriculture), poorly integrated into the global economy and global value chains. This is reflected, for example, by a low number of quality certificates showing conformity with best practice standards (Table 6).

Hence, accessing supply chains and enhancing local firms’ technology upgrading is a key challenge. Almost all SPECA countries have so-called “pockets of excellence”, or areas in the economy where linkages between industry and science work well and result in innovation outputs (e.g., in ICT services), with foreign linkages, but they are marginal in terms of employment and value added.

Partly, this lack of integration is reflected in poor infrastructure, as the World Bank Logistics Performance Index (LPI) shows. The LPI is a composite set of indicators that measures the quality of trade and transport-related infrastructure, efficient customs clearance processes, competent and quality logistics services, the ability to track and trace consignments and the ease of arranging competitively priced shipments. Middle-income countries

<table>
<thead>
<tr>
<th>Table 6</th>
<th>Quality certificates in SPECA economies, 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Afghanistan</td>
</tr>
<tr>
<td>ISO 9001:2015 Quality management systems</td>
<td>10</td>
</tr>
<tr>
<td>ISO14001:2015 Environmental management systems</td>
<td>2</td>
</tr>
<tr>
<td>ISO/IEC 27001:2013 IT – Security Techniques – Information security management systems</td>
<td>343</td>
</tr>
<tr>
<td>ISO50001:2018 Energy management systems</td>
<td>No data</td>
</tr>
</tbody>
</table>

Source: International Organization for Standardization (ISO) database
The MIC score an average of 2.6 on this ranking. The SPECA countries, with the exception of Kazakhstan, score below this MIC average. Countries in the Balkans and the South Caucasus also perform better than the SPECA countries. This is reflected by the score of 3.2 for the transition economies of Europe and Central Asia (ECA) (Figure 10).

With regards to trade, the SPECA countries have manufacturing imports as a share of merchandise imports significantly higher than the manufacturing share of merchandise exports. This makes their economies highly vulnerable to fluctuations in revenues from natural resource exports, FDI net inflows and remittances that are generally used to fund imports of manufactured goods (Figure 11).

FDI flows are generally higher as a share of GDP than in other middle income countries and transition economies of Europe and Central Asia. Apart from Azerbaijan, net FDI inflows are also significantly higher for the SPECA countries than for these middle income and transition economy comparators (figure 12). As in most transition economies, FDI remains under-utilised in the SPECA countries and is often directed into extractive sectors with limited knowledge spillovers into the local economy. FDI into other sectors, including manufacturing, is often constrained by the limited absorptive capacities and production capabilities of domestic firms. In some cases, e.g. in extractive sectors and manufacturing, stronger environmental protection measures could both improve well-being in local communities and develop local supply chains for such technologies. Skills transfer and support to local training initiatives, alongside public support to industry-science linkages, may also help more fully utilise the significant net FDI inflows generally enjoyed by the SPECA countries.

In the SPECA countries, export promotion agencies are often underdeveloped in terms of the range and sophistication of support they provide.

The proportion of SMEs in the SPECA countries that export, either directly or indirectly, is low by international standards, suggesting scope to expand and improve the current

**Figure 10 · Logistics performance index: overall score, 2018**


Note: 1=low, 5=high; MIC=middle-income countries, LIC=low-income countries; ECA=Europe and Central Asia.
activities of export promotion agencies and similar organizations. At present, export promotion agencies do not have the necessary range and sophistication of support services to significantly boost exports (UNECE, 2022). Necessary improvements include, inter alia, expanding advisory services and training capacities for exporters and would-be exporters, providing match-making services between local companies and foreign ones, and supplying export credits, export insurance products and other financial services (OECD, 2018). In addition, when it comes to trade with the Western countries, Japan and Korea, certification is one of the major obstacles, and UNECE and ongoing work of the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) to enhance transparency and traceability for sustainable value chains could be instrumental for the SPECA subregion in this respect.7

In addition, subregional integration among the SPECA countries is largely underutilised in the areas of trade, finance and investments (Lee, 2020). There is considerable potential to boost regional cooperation in these areas, not least because firms with export potential often consider other countries in the subregion as natural markets to expand to beyond the domestic one (UNECE, 2022). In this regard, the SPECA countries are putting efforts to cut the bureaucratic, procedural barriers to trade in order to raise the competitiveness and economic development of the subregion through the implementation of the SPECA Trade Facilitation Strategy4 elaborated with UNECE and ESCAP support. The SPECA Principles of Sustainable Trade,5 adopted in 2021, are of great importance to ensure the SPECA subregion’s sustainable integration into the global economy (Box 10).
**Box 10** The SPECA Principles of Sustainable Trade

The SPECA Principles of Sustainable Trade were adopted at the 14th Session of the SPECA Governing Council in 2019 on the basis that if the right policies and regulations are put in place, international trade has the potential to enable countries to benefit from investment and integration into the regional and global value chains that foster sustainable development.

Central principles for sustainable trade include, among others:

1. Mainstreaming trade into national and sector strategies to achieve the SDGs, and mainstreaming relevant SDGs into trade development strategies.

2. Adopting appropriate regulation, so that trade can facilitate the transition to more sustainable and equitable growth and to a green economy by fostering the exchange of environmentally sound goods and services, by increasing resource and energy efficiency, and by generating economic and employment opportunities for all.

3. Further developing rules for environmentally friendly trade.

4. Reducing inequality by letting poorer countries and people access markets, investments, and new technologies, while allowing the achievement of higher labour and living standards.

5. Identifying and harnessing trade opportunities associated with transition to a green economy.

6. Eliminating trade subsidies that negatively affect the environment and employment.

The SPECA countries are currently considering the application of the Principles of Sustainable Trade within the SPECA framework to serve as a platform to analyse the effects of trade growth in the subregion, and to promote trade policy reform and subregional cooperation in support of the SPECA countries’ implementation of the SDGs.

Source: UNECE paper on “Trade, water management, food security and the circular economy in the SPECA region” (Libert, 2021).
7.3. Policy recommendations and international good practice

Countries in the SPECA subregion stand to benefit greatly from the adoption of knowledge and technologies from abroad through GVCs, FDI, and imports of high-tech goods, services, and skilled human capital.

Georgia can serve as inspiration to the SPECA countries in terms of integration into GVCs. Following the signature of several Free Trade Agreements, including with the European Union and with China, Georgia has conducted a number of reforms to reduce non-tariff barriers and trade restrictions (UNECE, 2020). For example, significant efforts were directed towards standardisation, metrology, accreditation and conformity assessment, sanitary and phytosanitary measures, intellectual property rights, etc. to align practices with the relevant EU frameworks.

As a result of these efforts, growth in trade has significantly outstripped GDP growth in recent years, and Georgia’s trade as a share of GDP is higher than in any country in the SPECA subregion (see Figure 13). FDI levels also jumped from around 55% of GDP in 2007 to more than 100% in 2018 (OECD, 2020).

Enterprise Georgia, the business development agency of Georgia, conducts significant export promotion activities while also acting as Georgia’s official investment promotion agency, complementing the efforts of Georgia’s Innovation and Technology Agency (GITA), and the Georgian Chamber of Commerce and Industry. The Georgian experience shows that solid reform efforts can pay large dividends, including encouraging foreign firms to set up business or to collaborate with domestic firms in other ways. While there remains scope for further catch up in the case of Georgia, it remains a useful example to be considered by policymakers in countries with economies in transition.

Figure 13 · Trade as a per cent of GDP, 2021

Note: No data for Afghanistan, data for Turkmenistan are from 2018, data for Tajikistan are from 2020.
In the SPECA countries, significant structural reform remain necessary to enhance the environment for innovation and entrepreneurship. As one example, essential features of the rule of law, as well as an independent and impartial judiciary, are only partially in place in Kyrgyzstan, while enforcement and implementation of reform efforts in this area often patchy (UNECE, 2019).

The SPECA countries should incentivise foreign companies to involve local suppliers in their value chains or otherwise establish links with the local business community to ensure knowledge and innovation spillovers for the entire economy.

Finally, when carrying out activities to attract FDI, policymakers in the SPECA countries should incentivise foreign companies to involve local suppliers in their value chains, or otherwise establish links with the local business community, for example through local content requirements. In the absence of such incentives or programmes, there is a risk of foreign firms being disconnected from the local business community, and that knowledge and innovation do not generate positive spillovers for the wider economy.

CzechInvest, the Investment and Business Development Agency of Czechia, provides one model from which to draw inspiration. CzechInvest has compiled a database of local enterprises with the capabilities to supply multinationals based in Czechia, classified into ten sectors and further broken down into subcategories. It encourages and facilitates visits of multinational firms to companies in this database, and organizes supplier days with matchmaking events. Part of its supplier development programmes involve raising the capacity of a limited and targeted number of indigenous enterprises that have the potential to become part of the value chains of foreign companies with a presence in the Czechia, but need specific support to meet the criteria, for instance to comply with international quality standards and benchmarking tools.

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**Challenge 8. Managerial capabilities of innovative business owners are weak, with limited policies to enhance adult education and training**

8.1. What is the issue?

The innovative entrepreneur is the central figure in any innovation process, and its main driver. The competencies of business owners, especially of current and potential innovative high-growth enterprises, is therefore of great importance to innovation outcomes. The importance of incorporating entrepreneurial education into educational curricula from the level of primary school upward is now widely acknowledged as an important element of private sector development efforts. Fostering this further and adding more of a “growth mindset” to entrepreneurial education would help support the dynamics of experimentation and innovation more broadly in the SPECA countries.

*SPECA countries show low capacity and competence for innovative entrepreneurship as well as limited STI capabilities among the general workforce.*
Skills shortages are a frequent barrier to the creation and expansion of innovative businesses worldwide, which is in turn affects the absorptive capacity of the private sector. As the Oslo Manual on the Measurement of Scientific, Technological and Innovation Activities notes “people are the most important resource for innovation as they are the source of creativity and new ideas. The design, development and implementation of innovations require a variety of skills and the co-operation of different individuals. Data on the skill levels of a firm’s workforce and on how a firm organises its human resources (including how it attracts and retains talent) are therefore critical for understanding innovation activities and innovation outcomes (OECD/Eurostat, 2018).”

8.2. The policy environment in the SPECA subregion

The evidence available from the national STI gap assessments conducted by UNECE in 2020, as well as other publications, indicates both limited capacity and competence for innovative entrepreneurship as well as limited STI capabilities among the general workforce (including, but not limited to digital skills and expertise in science, technology, engineering and mathematics.

The poor performance of managerial skills (as indicated by interviews with stakeholders in the absence of quantitative data) coincides with a notable absence of public leadership training programmes in the SPECA subregion. Management training programmes are therefore an underutilised policy lever to stimulate high-growth entrepreneurship. In a similar spirit, the region is characterised by longstanding weaknesses in lifelong learning opportunities and technical and vocational education and training in the SPECA subregion.

*In the SPECA countries, management training programmes are underutilised as a policy lever to stimulate innovative and high-growth entrepreneurship.*

While there are pronounced differences in education systems and outcomes across the SPECA subregion, a common feature is the presence of considerable skills mismatches on the labour market, with close to half of employers in the region not finding qualified personnel. The formal education system has a strong emphasis on memorization rather than problem solving and an absence of mechanisms to monitor quality and harmonise qualification standards. This leads to an inability to keep pace with the requirements of private companies, especially of innovative ventures (UNESCO, 2021).

*There is a need to conduct labour market analysis and introduce robust mechanisms for anticipating and assessing skills requirements in the SPECA subregion.*

In addition, vocational training and education activities for adults were often scaled down in the SPECA countries following the collapse of the Soviet Union. In Azerbaijan, for instance, more than 80,000 students were enrolled in vocational training in 1991 with 176 institutions active. In 2020, the figures were 22,000 and 74, respectively, with an adult student population far below levels observed in EU member states (relative to overall population) (Aliyev, 2021). In Kazakhstan, while there has been an increase in the number of training providers since 2015, the participation rate in adult learning remains well below levels observed in high-income countries, as well as countries with a similar
income level for which comparable data are available (OECD, 2021). Furthermore, data on labour market, diagnostic tools and multi-stakeholder platforms on matching skills with the labour market needs are largely absent in the SPECA subregion, as noted in a recent UNESCO study (UNESCO, 2019).

8.3. Policy recommendations and international good practice

Dedicated programmes to foster adult training and education (both vocational and non-vocational) in general and management training in particular would raise the absorptive capacity of the private sector and hence tackle a key impediment to innovation in the SPECA subregion.

*Dedicated programmes to foster adult training and education (both vocational and non-vocational) in general and management training in particular would raise the absorptive capacity of the private sector and address a key impediment to innovation in the SPECA subregion.*

Ireland may provide a suitable learning model in both areas. SOLAS is the Irish State agency tasked with building a world class further education and training system in the country, providing support and guidance to various service providers active in the country from the public, private and non-profit sectors, while ensuring the offerings are aligned with local needs and of adequate quality. The National Training Fund has a mandate to raise the skills of those in employment, to give jobseekers relevant skills and to facilitate lifelong learning. Skillnet Ireland is another important service provider, complementing traditional training programmes with tailored training for groups of firms. Its operations are co-funded on an equal basis from business and public funds. The SPECA countries could benefit from similar institutional arrangements for adult learning and vocational training programmes.

In terms of enhancing future workforce skills in Ireland, the National Skills Council (NSC) plays an important role in monitoring current and future skills required in the labour market and how these are met. The NSC includes high-level representatives from government, academia, providers of educational services and employers. Together with the Skills and Labour Market Research Unit of SOLAS, it formulates an annual National Skills Bulletin. This bulletin guides policymakers in their training and education efforts and influences the direction and provision of courses at vocational training centres and similar organizations. A Network of Regional Skills Fora was also created as part of the Government’s National Skills Strategy to keep a finger on the pulse of skills needs and shortages at the subnational level (OECD, 2019). The development of a Skills Council similar to Ireland could be an important step forward to address the skills gap in the SPECA countries.

*National Skills Councils could be instrumental in keeping track of current and future skills requirements in the labour market and how these needs are being met.*

Other examples seeking to enhance the managerial skills of business owners and entrepreneurs include initiatives by organizations such as Enterprise Ireland, Science Foundation Ireland and local enterprise offices (LEOs). LEOs, with representation in different regions of the country, provide a range of managerial training programmes to a broader segment of the enterprise population (beyond innovative startups). Skillnet Ireland also runs management training programmes for SMEs in various sectors and stages of their life cycle (OECD, 2019).
SPECA governments should run pilot programmes dedicated to improving the managerial skills of existing and would-be entrepreneurs.

There is scope for the SPECA countries to set up similar schemes or, where already in place, to scale up such schemes where successful with the ambition of embedding entrepreneurship training as a policy priority. In addition, the SPECA countries could run pilot programmes dedicated to the managerial skills of existing or would-be entrepreneurs along similar lines as Ireland. Ideally, training programmes should be available not only to innovative start-ups (e.g., alongside other incubation services), but also to companies that are already well established and/or are active in traditional sectors. The differentiation employed by Irish policymakers, whereby Enterprise Ireland caters to the needs of the former, and the LEOs to the latter, could serve as a template for the SPECA countries.

Challenge 9. A disconnect between publicly funded research and the market

9.1. What is the issue?

Globally, there is increased recognition of the importance of transferring, exploiting and commercialising public research as a core part of science, technology and innovation (STI) policy. Indeed, the idea is central to the concept of new innovation policy, which advocates close collaboration among different innovation stakeholders, the academic and business communities in particular, and a continuous process of entrepreneurial discovery and exploration of market opportunities (Principles 2 and 3).

This implies that universities and other (public) research organizations should not only perform research and teaching tasks, but also contribute to economic development by putting research into practice. In this context, for-profit businesses collaborate with educational and research organizations to achieve better innovation outcomes. Establishing these industry-science linkages and bridging the gap between publicly funded research and the market is a policy challenge (Compagnucci & Spigarelli, 2020). This is particularly the case in transition economies, where the capabilities both of firms to absorb innovation and PROs to produce and adapt innovation are generally weak.

Almost none of the SPECA countries have instruments in place that cover both the research phase and the later phases of the innovation cycle, namely the transformation of research results into new products and services that reach the market.

9.2. The policy environment in the SPECA subregion

Almost none of the SPECA countries have instruments in place covering both the research and later phases of the innovation cycle, namely the transformation of research results into new products and services for the market (e.g., encouraging research-based spin-offs emerging from public research institutes or higher education institutions). This is linked to the structural underinvestment in public research systems and the nascent nature of knowledge transfer and commercialisation structures in the SPECA countries.
In the context of commercializing R&D results, a well-functioning and balanced intellectual property rights system is a means of encouraging private sector R&D and innovation activities. This would increase the likelihood of international investors licensing technology to companies in the subregion, in particular technologies such as software that can be easily imitated. This could improve the chance of attracting equity investments. In addition, training for current and potential entrepreneurs to boost skills and awareness of the importance of proportionate protection of intellectual property rights to ensure the commercial success of innovative ideas is also crucial for the development of innovative enterprises. Table 7 illustrates the relatively weak performance in terms of patent applications, with the 2021 rankings of Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan below those of regional peers Russia and Türkiye.

A well-functioning and balanced intellectual property rights system can increase the likelihood of international investors licensing technology to companies in the subregion.

Relatively weak R&D systems and insufficiently developed research commercialization and technology licensing frameworks mean that the SPECA countries must balance investment in innovation infrastructure (prototyping facilities, industrial R&D labs, pilot plants, etc.) with funding for value-added services (including ideation, proof of concept, testing and piloting, living labs, etc.) that support innovative enterprises to develop market-ready products and services.

As one example, the Government of Uzbekistan invested significantly in research and higher educational institutions with a budget of SUM 800 billion (about 65 million euros) over the 2014-18 period for innovation and technology projects. This led to around 700 patented inventions. However, more needs to be done to bring these inventions to market. In addition, the protection of intellectual property rights is relatively weak (Kurbanbaeva, 2020), a problem shared with the other SPECA countries.

Table 7: Number of new patent applications by origin in 2021 versus 2020 in SPECA (per billion dollars of real GDP at 2020 purchasing power parity).

<table>
<thead>
<tr>
<th>Country</th>
<th>2020</th>
<th>2021</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>6</td>
<td>5.7</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>Türkiye</td>
<td>3.4</td>
<td>3.4</td>
<td>30</td>
<td>24</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>6</td>
<td>2.8</td>
<td>16</td>
<td>27</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>1.7</td>
<td>1.9</td>
<td>44</td>
<td>39</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>1.7</td>
<td>1.5</td>
<td>45</td>
<td>47</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>0.1</td>
<td>0.4</td>
<td>118</td>
<td>83</td>
</tr>
</tbody>
</table>

Source: Cornell University, INSEAD and WIPO (2020) and WIPO (2021).
A common problem throughout the region is the lack of formal cooperation and linkages between the business community on the one hand and research and higher education institutions on the other. In Tajikistan, for instance, the government introduced a range of legal and State support options available for private-public partnerships in this area, but in practice few cooperation mechanisms have been used and the scientific and business communities rarely interact (Mengliev, 2020). Even in countries where these linkages are more developed (e.g., Kazakhstan), these are often of an informal nature and appear to have limited success in fostering knowledge transfer and commercialisation activities.

**A common problem in the region is the lack of formal cooperation and linkages between the business community and research and higher education institutions.**

There is evidence that technology transfer offices, formal entities within universities that aim to transfer and commercialise their research, are not as successful in transition economies as they are in high-income countries. Recurrent issues include the lack of trained professionals in transfer offices, insufficient incentives for research organizations to partner with businesses, the dearth of early-stage finance opportunities needed to develop research into a product and general weaknesses in the governance structure of innovation systems.

**9.3. Policy recommendations and international good practice**

Strengthening links between industry and science requires many existing barriers to be addressed. These include weak incentives for the private sector to collaborate with research organizations, insufficient quality of research results of academic organizations and lack of competent technology transfer personnel, weak private sector capacity to absorb innovation, regulatory barriers for such cooperations to work effectively, etc.

Kazakhstan appears to be a leader among its peers in the subregion with some potential to scale up its ongoing activities in this direction and serve an example for other countries. Kazakhstan’s Science Fund provides grants for R&D commercialization, targeting domestic R&D developed by local universities, research institutions or the private sector, and providing commercialisation grants specifically for start-ups.

**Innovation vouchers could narrow the gap between research institutes and universities on the one hand and enterprises on the other, driving industry-science linkages and cooperation.**

While there are a range of policy options at the disposal of policymakers (related to spin-offs, fostering an entrepreneurial culture among students, financial support mechanisms for proof of concept and prototyping, specialised training for staff at transfer offices and so forth), a practical way forward is to propose innovation vouchers as a more widespread tool across the region. These could narrow the gap in linkages between research institutes and universities on the one hand and enterprises on the other, and could be piloted with relative ease.

These vouchers have become a standard tool in the support package to enterprises in many high-income countries, allowing them to purchase different types of innovation services from research organizations, universities and similar organizations, including
innovation audit, training, new business and service development, knowledge transfer projects and many others. Their use would also provide research organizations and higher educational institutes with an additional source of funding, thereby encouraging outreach to the local enterprise community and actively seeking ways to have a positive impact on their business performance. The use of innovation vouchers in Scotland could serve as inspiration for the SPECA countries in this respect (Box 11).

The SPECA countries could develop similar schemes. An important consideration is that the funding itself can be quite limited, with the potential to benefit a large group of enterprises in a context of scarce public resources. Another take-away is that innovation voucher schemes should be complemented by services provision to accompany firms in their collaboration with research organizations. In the Scottish context, voucher schemes are embedded within a broader support structure called Interface with a mandate to facilitate collaboration between industry and business. Interface provides various matchmaking services and information and guidance to companies and research organizations, for example on how to manage issues related to intellectual property.

Establishing a similar structure may constitute a policy ambition for SPECA countries over the longer term. In the shorter term, a pilot scheme could be launched, loosely modelled on the experience of Montenegro, which did so in 2012 with support from the Flemish Government, European Commission and OECD. The scheme was continued and expanded in 2018 with eligibility criteria loosened to allow more Montenegrin companies to benefit.11

Box 11 Innovation vouchers to boost industry-science linkages: experience of Scotland

As one example, the Scottish Government has established several innovation voucher schemes, more specifically:

- Standard Innovation Vouchers, whereby up to GBP 5,000 of funding is provided to encourage first-time partnerships between a company and a university or further education college. The company contributes an equal value in cash or in-kind (such as staff time, materials or equipment), or a combination of both.
- Student Placement Innovation Vouchers, whereby GBP 5,000 of funding is provided for a PhD or Masters student to work within the partner organization on a clearly defined project.
- Advanced Innovation Vouchers, whereby up to GBP 20,000 of funding is provided to either encourage sustained relationships with academia and enable existing partnerships to continue the development of a project or for those companies who are beginning their collaborative journey with an HEI or further education college partner. The company must provide a mix of in-kind and cash contributions.

Source: Author’s compilation based on desk research.

11This information is sourced from: https://interface-online.org.uk/how-we-can-help/funding
Conclusion

The SPECA countries have traditionally relied, to varying degrees, on mining, the export of natural resources and remittances for their economic development. There is increasing recognition, not least in the region itself, that this economic model has run its course and there is a need to find new drivers of growth to achieve the Sustainable Development Goals (SDGs), exploit the development opportunities presented by digitalization, and contribute to the green and circular economy transitions. Innovation has a key role to play in this process as it allows experimentation with new ideas, generates value and creates new market niches, contributing to the productivity and competitiveness of the SPECA economies, but also to people's quality of life across the SPECA countries.

Much of the potential for innovation in the SPECA countries lies in absorbing and adapting existing products, services, business processes, managerial and organizational practices that have proven their worth in other contexts. This represents a huge opportunity for the SPECA subregion to catch up with developed economies.

However, for this transformation to take place, the SPECA countries need to ensure they have sufficient domestic capabilities for absorption of innovation, in particular when it comes to the private sector and (public) research organizations. Significant efforts must be directed to strengthening human capital through investment in training the labour force, closing the skills gap, introducing frameworks for technological diffusion and adaptation, as well as policies promoting demand for innovation at the national level. This is not possible without strong and well-functioning innovation systems with vibrant industry-science linkages and an efficient innovation support infrastructure, in particular for innovative enterprises.

Innovation policies in the SPECA subregion will not reach their full potential unless these underlying weaknesses are tackled, both in terms of governance and institutional failures as well as in terms of the overall mix of relevant policies and their implementation. This policy paper emphasises the importance of a holistic innovation policy approach that combines "new industrial policies" with innovation policy imperatives in a "new innovation policy approach". It outlines several principles that, if put into practice, could substantially improve innovation policymaking in the SPECA subregion. This policy paper also proposes guidance to tackle innovation policy challenges along with policy solutions that are in line with the new innovation policy approach for the transition context of the SPECA subregion and draw on internationally recognised good practices in STI policymaking. The below table summarises the nine policy challenges, potential solutions and links these with the identified new innovation policy principles.

UNECE, through its three core functions – development of norms, standards and legal instruments; hosting of a convening platform to share international best practice; and technical cooperation across a number of relevant sectors – supports countries in their efforts to achieve a sustainable, inclusive and resilient post-pandemic recovery, including digitalization in support of the SDGs and transition to a circular economy.12
### Table 8: Main challenges and policy options for SPECA countries from a new innovation policy perspective

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Policy options</th>
<th>Link to principle(s)</th>
</tr>
</thead>
</table>
| 1 A lack of coordination of STI policy design and implementation          | • Assess areas where different responsibilities overlap to simplify and rationalise innovation governance  
• Consider establishing national innovation councils to strategically coordinate innovation policymaking | 1, 4 and 6           |
| 2 The culture of monitoring and evaluation is weak                        | • Establish a dedicated unit responsible for M&E that would also provide a critical mass of expertise to ensure more evidence-based policymaking  
• Conduct RIAs on a regular basis and following international guidelines  
• Boost capacities for M&E through international donor support | 3 and 5              |
| 3 Insufficient private sector involvement in the identification of policy priorities, and the design and implementation of public initiatives | • Consider setting up online consultation platforms or other mechanisms (e.g. councils, committees) to facilitate exchange between the public and private sectors  
• Engage with international donor initiatives focused on strengthening the capacities of intermediary structures and organizations, such as chambers of commerce and business associations, to better advocate and raise concerns | 3                   |
| 4 A lack of data to underpin robust, evidence-based innovation policies tailored to regional strengths | • Conduct a data collection exercise to gather statistical data at a sufficient level of disaggregation through a task force involving national and international experts, potentially with international donor support  
• Conduct a mapping exercise including an assessment of the potential for economic and innovative development of different subnational entities | 2, 3 and 6           |
| 5 The business environment requires improvement, especially in terms of public sector transparency and accountability | • Ensure a transparent system of public administration and governance through efforts on e-Government and digitalisation  
• Ensure expert support and overall assistance from international organizations for the design and implementation stages of e-Government strategies | 2 and 6              |
### Table 8
Main challenges and policy options for SPECA countries from a new innovation policy perspective (Concluded)

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Policy options</th>
<th>Link to principle(s)</th>
</tr>
</thead>
</table>
| 6 Access to finance, especially to equity-type finance, is a major barrier to the set-up and scale up of innovative firms, and to innovation in established firms | • Design additional measures to facilitate access to finance for innovation, including through introduction of equity-type instruments, innovation vouchers, and tax instruments for equity investors  
• Use pilots to identify what works for potential scale up                                                                                                                             | 2, 3 and 6           |
| 7 Global value chains are insufficiently exploited to drive innovation and knowledge imports into the SPECA subregion | • Continue efforts to align trade practices with international standards, including in the areas of metrology, standardisation, and conformity assessment to allow for better integration into GVCs  
• Enable export promotion agencies to provide sophisticated services to boost exports, including match-making services between local and foreign companies, export credits, export insurance products, etc.  
• Incentivise foreign companies to involve local suppliers in their value chains or otherwise establish links with the local business community to ensure knowledge and innovation spillovers for the entire economy | 2 and 7              |
| 8 Managerial capacities of innovative business owners are weak, with limited policies to enhance adult education and training | • Strengthen programmes to foster adult training and education (both vocational and non-vocational) and monitor skills needs, e.g. through a National Skills Council  
• Provide management training programmes to increase private sector absorptive capacity                                                                                               | 7                   |
| 9 A disconnect between publicly funded research and the market           | • Incentivise industry-science linkages through innovation vouchers  
• Ensure voucher schemes are accompanied by support services, such as match-making, information and guidance to companies and research organizations                                                                                                                                               | 6 and 7              |
Notes

2 This information is sourced from https://www.oecd-ilibrary.org/sites/77389fbc-en/index.html?itemid=/content/component/77389fbc-en
3 See, for example, https://www.oecd.org/gov/regulatory-policy/regulatory-impact-assessment-7a9638cb-en.htm, for principles on how to conduct a RIAs.
4 https://amfa.az/
5 Excluding high income countries. ECA refers to Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Montenegro, North Macedonia, Russia, Serbia, Tajikistan, Turkiye, Turkmenistan, Ukraine and Uzbekistan.
6 This information is largely based on an analysis of a series of reports by UNECE over the 2020-21 period in which a gap analysis of the STI policies in all seven countries of the region was conducted.
7 This work is carried out under the Working Party 7 on Agricultural Quality Standards. More information available here https://unece.org/trade/working-party-agricultural-quality-standards-wp7
10 This is based on (Taylor, Shvarova, & Di Anselmo, 2021), (Shvarova, Di Anselmo, Taylor, & Shuba, 2021), (WIPO, 2012), (Belitski, Aginskaja, & Marozau, 2019), (Di Anselmo, Shuba, & Taylor, 2021).
12 E/ECE/1496 (“Circular economy and the sustainable use of natural resources: Toolbox of instruments of the Economic Commission for Europe”). Available at: https://unece.org/sites/default/files/2021-03/E_ECE_1496-2101396E.pdf
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Notes
UNECE supports closer cooperation among its 56 member States in the pursuit of the UN Sustainable Development Goals (SDGs) and the 2030 Agenda. Its Economic Cooperation and Trade Division (ECTD) assists member States with economic integration and in promoting and enabling a better policy, financial and regulatory environment. To foster sustainable development, including progressing towards an increasingly circular economy and building resilience to events such as the COVID-19 pandemic, experimentation with ideas and technologies must become systematic across UNECE economies and societies.

The Innovative Policies Development Section within ECTD focuses on promoting a supportive environment for innovative development and knowledge-based competitiveness. Activities include policy dialogue, recommendations and good practices, analytical reviews, and capacity-building.

The United Nations Special Programme for the Economies of Central Asia (SPECA) was launched in 1998 to strengthen subregional cooperation in Central Asia and its integration into the world economy. The countries of SPECA are Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. The United Nations Economic Commission for Europe (UNECE) and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) jointly provide overall support to the Programme.

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