

Executive summary

In the 2000s, the government of Kazakhstan made a concerted effort to increase research and development (R&D) activity. To narrow the persistent productivity gap and, in the longer term, move towards a growth model that is less dependent on commodity exports, it launched major legal reforms, strategies and programmes aimed at boosting science and technology. These initiatives helped to improve scientific output and have resulted in some successes in technology commercialisation. However, despite these achievements, the goal of greater innovation and value creation has not been fully realised, and new economic activities have not yet emerged. In addressing these challenges, Kazakhstan can draw upon its rich endowment of natural resources, its unique geographic position, bridging Europe and Asia, and a diverse population. Further reforms will be necessary, however, within organisations as well as at the level of the governance of the system of research and innovation, to make the most of these advantages in an uncertain economic environment due to the volatility of commodity prices

Enhance research capabilities in line with the national development needs

Independent Kazakhstan inherited a well-developed but dual science and education system, in which research was performed almost exclusively in public research institutes (PRIs) whereas the universities were in charge of higher education. As funding was sharply cut back during the 1990s, the country's research capacity and performance, as well as the educational standards in schools and universities, declined.

The gradual increase of the national R&D effort and the major reforms of the early 2000s resulted in profound structural and qualitative changes in the higher education and research system. Nazarbayev University, which was established in 2011, was endowed with unprecedented financial and human resources and granted a high degree of autonomy, with the expectation that it acts as a model for other higher education institutions (HEIs) aiming at research excellence and high innovation performance. The recent mergers between HEIs also have the potential for strengthening some of these institutions. A lack of information makes an assessment of the activities and performance of PRIs very difficult, although these institutes receive a substantial part of public R&D funding.

The absence of institutional funding for research activities at universities and their lack of autonomy have held back their transformation into research institutions. The bulk of university research is therefore financed through competitive schemes, which do not provide the level of financial stability needed for longer-term planning and more strategic research projects. Reinforcing domestic research capacity calls for an increase of non-competitive, pluri-annual resources dedicated to university research. In addition, adequate monitoring, as well as *ex post* evaluation mechanisms at institutional and individual levels, will be required to allocate these resources efficiently.

Moreover, the competitive grant schemes currently in place are beset by the small size of the funded projects and their insufficient orientation toward national priorities. The Technology Commercialisation Project was launched in 2011 to serve as a real-scale demonstrator for developing a competitive, efficient and problem-oriented model for research funding. Its next programme phase, announced in 2015, should provide further opportunities to help solve some of the problems faced by competitive grant schemes.

Broaden the support for knowledge transfer in the innovation system

The legacy of the Soviet university system still has considerable bearing in terms of the mixed quality of universities' outputs and their limited ability to create value from them. The relationships between science and industry have increased and improved, but the model of knowledge transfer is still linear, with little consideration for the demand side of innovation, especially the capabilities of business firms and the market needs they convey ("technology pull"). In attempting to commercialise their projects, research organisations still face challenges related to excessive bureaucracy, a continued lack of autonomy, as well as researchers' limited managerial and entrepreneurial skills. Several promising initiatives for knowledge transfer have been set up in some universities, but their impact is low so far, because of a lack of visibility and adequate funding, and the absence of systematic relationships and interactions between them.

Since 2010, the government has launched several public support initiatives to enhance knowledge transfer, for example by setting up technology transfer offices at universities. However, even the most elaborate of these endeavours are facing tight resource constraints and an uncertain future due to unrealistic expectations regarding their financial self-sustainability. Further capacity building is needed to increase their staff's experience in innovation. Last but not least, knowledge transfer must be encouraged through a variety of channels, in addition to patenting and licensing.

Invest in and deliver on education and skills

During the transition period following independence, Kazakhstan's relatively well-developed education system deteriorated. While educational performance in schools has improved in recent years, Kazakhstan still lags behind not only the OECD average, but also Europe and Central Asia average for some key indicators such as reading. Tertiary education performance, in terms both of its attractiveness and the quality of educational programmes, is affected by low remuneration of teachers and the imbalance between students' research work and other university occupations. Further decentralisation of the governance of HEIs, with greater financial, academic and organisational flexibility is a key condition for their ability to cope with these problems. In recent years, the number of students enrolling in technical and vocational education and training (TVET) has also fallen. The government should take actions to improve the quality and relevance to industry needs of TVET and reinforce its attractiveness.

Since independence, Kazakhstan has made much progress in internationalisation, especially thanks to the Bolashak scholarship programme. However, quality gaps and language barriers have discouraged foreign institutions from building partnerships or joint programmes with Kazakhstani universities. Limits to academic autonomy are also a major barrier for internationalisation and, more generally, for enhancing the research and educational performance of higher education institutions (HEIs).

Strengthen business innovation

Kazakhstan’s economy is in need of upgrading and diversification. Its industry depends heavily on primary products, especially oil, gas and minerals, as well as agricultural commodities. Meanwhile, its industrial base is largely composed of very small private firms and large state-owned enterprises. These structural factors explain why, although it is growing slowly, the share of innovative firms is low by international standards. Important innovation obstacles pertain to the low influence of private demand, a weak flow of potential projects and the scarcity of funds to finance research and innovation, especially in early stages.

The government has introduced a number of regulations and incentives to boost business R&D, such as the R&D tax credit and tax exemption. In particular, the 2012 amendment to the “Law on Subsoil and Subsoil Use” requires subsoil users to invest 1% of their annual income in R&D. While this initiative could, in principle, help Kazakhstan’s effort to diversify, its effectiveness has been reduced by the lack of adequate bylaws, unclear eligibility rules and weak enforcement principles. The authorities have also expanded the portfolio of financial and qualitative instruments to support innovative small and young firms (innovation grants, loan guarantees, venture funds, training programmes, extension centres, etc.) but each of these instruments remain limited in scale and scope.

Improve the governance of science, technology and innovation

Greater investment of resources is needed to achieve the ambitious goals for research and innovation set at the highest political level. However, the effectiveness of these additional resources will be limited if not tied to further reforms. In particular, bold actions should be taken to improve horizontal and vertical policy co-ordination, solve the numerous implementation hurdles of the initiatives in place and enhance their monitoring and evaluation.

Subnational authorities could complement the central government’s effort to support innovation actors and their networks, and in particular, innovative business firms and intermediary organisations.

Main recommendations

- Gradually increase the level of institutional funding for research at universities and PRIs.
- Evaluate the PRIs’ missions, activities, results and governance.
- Intensify and broaden the support to knowledge transfer in research-performing organisations.
- Focus on developing the basic skills, knowledge and competencies of students which prepare them to integrate in rapidly changing and global markets.
- Ensure that the Subsoil User R&D requirement is functioning properly, channeling the expected amounts of funds towards R&D generating high returns to society, including outside the extractive sector.
- Improve communication, information exchange and co-operation between the main actors of the innovations system – Ministry of Education and Science, Ministry for Investments and Development, Ministry of National Economy, and sectoral ministries.



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