

## Executive summary

### Colombia has a strong imperative to innovate

- Colombia has made much progress in its economic and social development, underpinned by prudent macroeconomic management and an improved business environment, and a progressive opening of the economy. It has achieved high economic growth over the past decade and shown resilience during the crisis.
- Further efforts are needed to make growth sustainable and ensure that future international competitiveness is based not only on commodities, but also on agriculture, manufacturing and tradable services.
- Innovation is essential to tackling the challenges Colombia faces. It can help develop new economic activities, boost productivity to sustain income and employment growth for the rising urban population, foster agricultural diversification to improve rural livelihoods, and raise the environmental sustainability of growth.
- Colombia's innovation system is still small, and lacks a strong business core. R&D expenditure is only 0.2% of GDP, compared to 1.2% in Brazil and 2.4% in the OECD area. Other measures of innovation such as patent registrations and scientific publications per capita place Colombia below neighbours such as Argentina, Brazil, and Chile. Much can be learned from other emerging economies that are important actors in global innovation.

### There is a window of opportunity for effective action

- The internal conflicts, governance weaknesses and difficulties for shifting to a more formal economy that have hindered Colombia's development are being overcome. Although inequality persists, poverty has been reduced significantly.
- Framework conditions for innovation have improved significantly, though there remains scope for improvement. This entails continuing the regulatory reform process, increasing public-sector efficiency, further stimulating competition, including in the telecommunications sector, and strengthening the intellectual property system's contribution to innovation. Stronger competition provides a powerful incentive for businesses to innovate; firms will need to strengthen their innovation capabilities to succeed in a more competitive environment.
- Colombia has also become more open internationally, including through a number of free trade agreements. New opportunities arise from Colombia's integration in global value chains, knowledge and innovation networks.
- Colombia has stepped up its efforts in education and innovation in the past decade, as reflected in the prominence of science, technology and innovation (STI) in the National Development Plan 2010-14 and in policies such as the ICT strategy "*Vive Digital*".

- The new system for distributing royalties allocates 10% of non-renewable resource revenues to an STI fund. This implies a significant increase in the resources available for STI. If well managed, this can significantly strengthen the innovation system and address imbalances between public and private innovation and between the regions.

### **Put business at the heart of the innovation system**

- Business is the principal source of dynamism in all high-performing innovation systems, and helps leverage the activities of universities and research institutes. Colombia needs to make a concerted effort to develop a business-centred innovation system – as successful emerging economies have done.
- Colombian firms engage only little in innovation. During the past decade, just a third of manufacturing firms introduced innovations. Only 30% of total R&D is performed by the business sector, compared with 65-75% in leading OECD countries and China.
- Tackling the low levels of innovation in industry and services is the key task for STI policy, and can have large impacts on productivity. Policy has thus far emphasised support for science and research-driven enterprises and university-industry linkages. This is important, but the potential for innovation is not limited to such firms.
- To strengthen innovation across the business sector, support for business innovation needs to be a priority and aimed at building the in-house innovation capabilities of firms, notably through investment in human resources.

### **Invest in human resources for innovation**

- Human resources are the key to innovation. The access to and quality of secondary level education has improved and tertiary level education has expanded. Nevertheless, Colombia still lags the regional average in tertiary education, especially in doctoral degrees. Inequalities in the access to education mean that Colombia's talent pool is not being fully utilised.
- In addition to a focus on doctoral graduates and other high-level skills, more attention should be devoted to professional technical degrees, e.g. in areas such as design, logistics and management. This will require changes in funding priorities within tertiary education.
- Raising the level of business innovation will require further investment in human capital and in embedding skilled people within those knowledge-intensive business activities (e.g. engineering, design, management and IT) that require innovative solutions. Policy should encourage mobility between firms and public research organisations, facilitate student placements in industry and foster increased business investment in human resources.
- As highlighted in the OECD Skills Strategy, governments can influence the demand for high-level skills by encouraging economic diversification, facilitating inward investment, rewarding employer ambitions and occupational standards. Support for inter-firm networks centred on large firms (e.g. in the petrochemical sector) has also been useful in other emerging economies.

## Strengthen the role of universities and public research institutes

- Strengthening the contribution of Colombian universities to the innovation system requires that they be supported in their transition from a primary focus on teaching to more research-based education institutions. This involves capacity building, including doctoral training for faculty, creating and funding “centres of excellence” to build critical mass in research and teaching, and encouragement for universities to develop their own strategies.
- Policy can nurture durable academic-industry links through information platforms, by giving priority to collaborative projects, and by funding longer-term “competence centres” that bring industry and academia together to work on areas of mutual importance. Regulatory and other impediments to collaboration with industry and to the creation of spin-offs should also be investigated and addressed.
- The public research institute sector needs to be modernised. Much of it has a narrow stakeholder focus and is not well suited to the task of facilitating diversification into new economic activities. Reform and consolidation can facilitate a reorientation towards technologies rather than branches of industry and enlarge the range of stakeholders and funding.

## Adapt governance and the policy mix

- Increased STI funding from the new royalties system offers an opportunity to rebalance, expand and address regional disparities in the innovation system. However, it also raises new governance challenges which may jeopardise effective absorption. It will be important to strengthen the capabilities of sub-national authorities so that they can define and implement suitable projects, whilst ensuring coherence at national level. Moreover to maintain coherence in the system, royalty funding must not crowd out existing funding streams for R&D and innovation.
- Effective innovation policy will require better co-ordination across the various parts of government and between the central government and the regions. This can also help deal with “horizontal” challenges, such as environmental issues, that affect many ministries and parts of society.
- While the National Development Plan (NDP) highlights the demand for social innovation, the precise demands, e.g. from socially disadvantaged urban and excluded rural communities, can be better articulated. Policy initiatives should be clearly defined and their development gradual and contingent on evaluation.
- A strong knowledge base for policy making is crucial and requires internationally comparable STI indicators. To strengthen accountability and enable learning about policies, better monitoring and evaluation are necessary.



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