

## Assessment and recommendations

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*Panama is a small and fast-growing economy specialised in services. The country is well integrated into global trade, but production of goods and services with high knowledge content remains an exception.*

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Panama's gross domestic product (GDP) grew on average by 6.57% a year between 1990 and 2012, twice the average growth of Latin America during the same period. The country has recovered relatively well from the financial and economic crisis of 2008, helped by the expansion of the Panama Canal and other investments in infrastructure development. In parallel, since 1990 real per capita incomes in Panama have more than doubled. Despite the progress, however, poverty and inequality persist in the country, mostly in rural areas, and unemployment is still high, especially among the young (15.6% in 2011).

The service sector accounts for the largest share of Panama's economy – around 80% of GDP in 2011 – and employs 60% of the workforce. These shares are higher than in other small economies such as Singapore and Costa Rica, where the shares of services in GDP are 73% and 68% respectively, and higher than the average in OECD countries, where the service sector accounts for an average of 70% of GDP. Most economic activities in the country are related to the operations of the Panama Canal and the Colón Free Trade Zone. In 2012 the canal's revenues amounted to 7% of GDP. Manufacturing accounts for a small share of GDP (around 6% in 2011). Within manufacturing, low-tech sectors account for about 75% of total value added, a share which is higher than in other Latin American countries, including Colombia, Costa Rica and Uruguay. Agriculture produces between 3% and 4% of GDP, and employs 18% of the total workforce, being an important source of income, especially in rural areas.

Panama is well integrated into global trade. In 2011, total exports accounted for 81% of GDP, while total imports amounted to 84%. The average in Latin America and the Caribbean was 39% of GDP for total exports and 35% for total imports. Services dominate the export portfolio and contribute 75% of total exports. The country also exports a number of agricultural products, mostly in unprocessed form, including bananas, sugar, fish and pineapples. Sophisticated manufactured exports, including chemicals, electronic equipment and pharmaceuticals, are mostly re-exports of multinational companies situated in the Colón Free Trade Zone. Panama has recently started to give priority to attracting multinational companies (MNCs). As a result, a number have recently opened regional headquarters in the country or offshored knowledge-intensive business activities such as research and development (R&D), design or training facilities, which have created new jobs. However, by comparison with other countries of similar size in the region, such as Costa Rica, knowledge-intensive foreign direct investment (FDI) is still limited.

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*Despite recent efforts in the promotion of innovation, Panama still lags behind most other countries in the region in terms of scientific and technological capabilities, R&D investment and private sector innovation. The country has, however, improved its performances in scientific production and diffusion of information and communications technology (ICT).*

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Panama is investing in improving its human resources for innovation, but major bottlenecks in terms of quality and critical mass remain. The quality of secondary education is low on the basis of an international comparison. The 2009 OECD Programme for International Student Assessment (PISA) on the performance of secondary students (aged 15 and above) ranked Panama 62<sup>nd</sup> out of a total of 65 countries. The country scored below the OECD average in each assessed category. University students show a strong preference for the social sciences and humanities and few are enrolled in applied sciences curricula. As far as doctoral training is concerned, Panama's number of PhD students is low, totalling 14 in the period 2000-09, against 2 252 PhDs in Chile, 571 in Costa Rica and 219 in Uruguay.

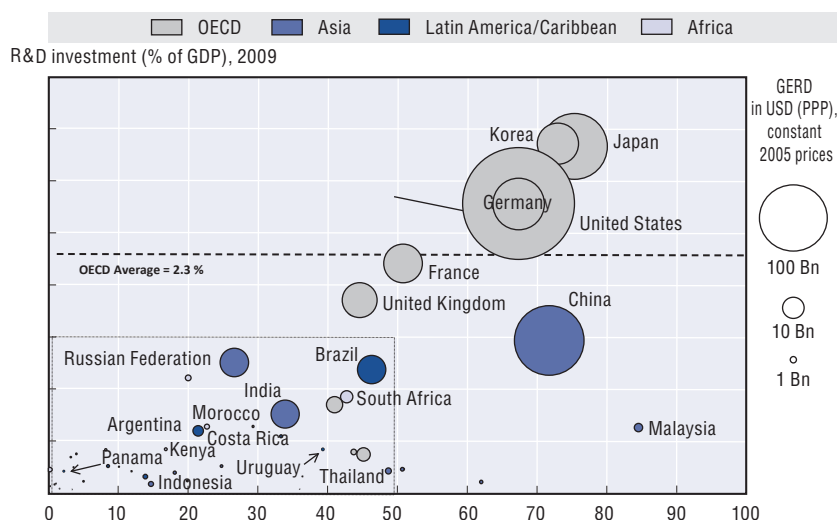
Recently, as a result of efforts to promote research in the country, Panama's scientific production has increased. In 2007, Panama instituted the National Research System (SNI) to recognise and regulate the profession of "researcher" in the country. The SNI helps in identifying the set of potential beneficiaries of National Secretariat for Science, Technology and Innovation

(SENACYT) research grants and in creating the conditions to perform research for professionals, such as professors, attached to bodies where their contract also requires them to perform other activities (such as teaching). In 2010, the country hosted a total of 410 researchers, that is 0.28 researchers per 1 000 labour force, and 553 R&D staff. This number is low when compared with international and regional peers. The average ratio of researchers per 1 000 members of the labour force in Latin America was 1.09 in 2010. Costa Rica, which has roughly the same population as Panama, in 2009 hosted 1 535 researchers and Uruguay 1 745. In addition, foreign researchers represent a significant proportion in Panama. Nevertheless, Panama has recently increased its research output. The number of scientific publications in the Science Citation Index (SCI) increased from only 162 in 2000 to 424 in 2011. This ratio of 84.6 articles per 100 researchers was the highest in Latin America in 2011.

Panama has improved access to and use of ICT. Nowadays around 43% of Panamanians use the Internet on a regular basis, a share which is on a par with the figures registered in the other countries of the region. While in 2010 the number of broadband subscriptions was only 3.4 per 100 inhabitants, today Panama has one of the highest and fastest-growing mobile broadband penetration rates in Latin America. It also scores relatively well in terms of e-government indicators. However, in 2011 only 29% of all Panamanian households owned a computer and of these only 21% were connected to the Internet. In the same year, the rate was 62% in Uruguay and 45% in Costa Rica.

Business R&D expenditure and private sector innovative activities are still underdeveloped in Panama. In 2010, the public sector accounted for about 47% of total R&D expenditure and the private sector financed only about 2% of total R&D. This is a low proportion compared with similar-sized Latin American countries where private companies spend significantly more on R&D. In Costa Rica, for instance, the private sector contributes 29% of all R&D expenditures, and in Uruguay the figure is as high as 39%. In OECD economies, where private companies are the main source of R&D financing, the private sector's share is usually between 40% and 70% (Figure 0.1).

Figure 0.1. **Research and development investment and private sector commitment in selected countries, 2009**



Note: 2009 or latest available year. No reliable data available for Dominican Republic. Estimates for R&D expenditure (as % of GDP) are 0.25% (see UNCTAD, 2012).

Sources: Authors' calculations based on OECD MSTI Database for OECD countries, [www.oecd.org/sti/msti.htm](http://www.oecd.org/sti/msti.htm); RICYT for Latin America and the Caribbean, [www.ricyt.org/](http://www.ricyt.org/); UNESCO for other countries.

*Panama has a National Secretariat for Science, Technology and Innovation (SENACYT), in charge of policy design, implementation and monitoring. The main policy guidelines are set by a five-year plan (PENCIYT), but resources are allocated on an annual basis, through a long and highly bureaucratic process.*

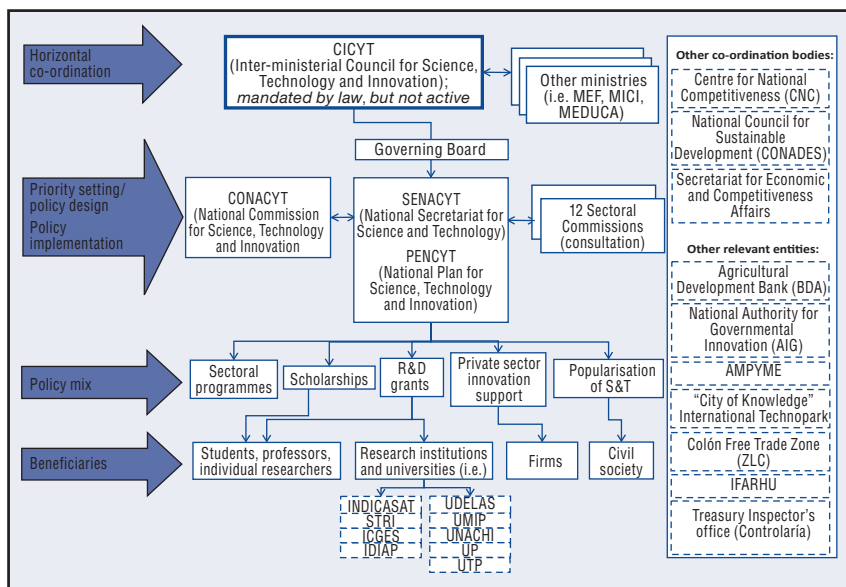
Panama's experience in science, technology and innovation policy is quite recent and dates back to the end of the 1990s when the National Secretariat Science, Technology and Innovation (SENACYT) was instituted by law as an autonomous agency in charge of the elaboration and implementation of science and innovation policy in the country. SENACYT is responsible for defining the strategy (as set by the five-year National Strategic Plan for Science, Technology and Innovation, PENCIYT) and for implementing that policy. While countries in general tend to assign this function to separate entities, Panama lacks an implementation agency/body for innovation policy (Figure 0.2). In Uruguay for

example, the National Strategic Plan for Science, Technology and Innovation is designed by the Interministerial Innovation Cabinet, and implemented by the National Research and Innovation Agency (ANII) which has been given a special status to allow flexibility and agility in operations.

SENACYT was instituted to support domestic scientific development and it is a highly respected institution among the national scientific community. Since the 2000s, in line with a general trend in the region, SENACYT has been engaging in efforts to promote innovation in the private sector, by setting up specific policy tools. In this area, however, results have been poorer than expected, because the resources allocated are not sufficient to excite attention from the private sector and the disbursement procedures are very long. Furthermore, the promotion instruments are designed in such a way that resources are allocated through public tenders to firms which have to complete specific government documents and in the local context the awareness and capacity of firms, especially small and medium-sized enterprises (SMEs), in respect of how to deal with government procedures are low.

The PENCYT 2010-2014 was elaborated following a participatory approach and is not perceived as a “government document”, but rather as a set of reference guidelines for science-related activities enjoying legitimacy in the eyes of the scientific community. Sectoral and horizontal commissions composed of members of research centres, academia, relevant governmental institutions and the private sector were established to identify the needs and priorities of the different knowledge and scientific areas. But the plan is extremely detailed, with a multiplicity of objectives and lines of actions and little capacity to consolidate investment around a limited number of priorities. The level of detail of operational conditions included in the plan hinders the possibility of fine-tuning according to evolving conditions.

Figure 0.2. Institutional framework for innovation policy, Panama, 2013



Note: AMPYME=Authority for Micro, Small and Medium Enterprises; ICGES=Gorgas Commemorative Institute of Health Studies; IDIAP=Agricultural Research Institute of Panama; IFARHU=Institute for Training and Development of Human Resources; INDICASAT=Institute of Advanced Scientific Investigations and High Technology Services; S&T=Science and Technology; MEDUCA=Ministry for Education; MEF=Ministry of the Economy and Finance; MICI=Ministry of Commerce and Industry; STRI= Smithsonian Tropical Research Institute; UDELAS=Panama Specialised University of the Americas; UMIP=Panama International Maritime University; UNACHI=Autonomous University of Chiriquí; UP=University of Panama; UTP=Technological University of Panama.

Source: Authors' elaboration based on PENCYT 2010-2014 and information provided by SENACYT, 2013.

*The innovation policy mix in Panama is conducted on a “project-based” approach. In spite of the existence of a variety of tools, most of them are implemented on an ad hoc basis, reducing the capacity of the policy mix to help achieve the strategic objectives of the plan.*

## Panama's innovation policy mix has four main dimensions:

*i) Popularisation of science and technology.* This pillar gathers together initiatives that address the need to raise awareness about the relevance of science, technology and innovation for Panamanian society. In this area the country is performing well and it has managed to achieve good results. For example, the network of Internet points (*Infoplazas*) disseminated all over the country has helped not only to favour Internet access even in remote areas, but also to create a government presence and to support community building in poor rural areas.

*ii) Education grants.* SENACYT offers grants to undergraduate, graduate and PhD students, teachers and professors. Out of the 641 grants in place in 2013, almost half (46%) targeted undergraduates, 37% professional programmes, and only 16% doctoral or post-doctoral careers. A very small fraction (1%) of the grants is devoted to vocational training. Of the 641 grants, only 20% were used for educational programmes within the country, while most of them went to Panamanian students who had chosen to pursue their studies in the United States (38%), Europe (24%), or other countries in Latin America and the Caribbean (16%). SENACYT grants include conditions for repatriation, but deeper co-ordination with industrial and production development policies is needed to ease the absorption of these highly skilled people into the domestic economy.

*iii) Promotion of scientific R&D.* SENACYT manages competitive R&D grants which target individual researchers or groups and special sectoral programmes in priority areas. These funds are allocated on the basis of ad hoc project proposals. In parallel, SENACYT also finances the development of research infrastructure. In 2002, the Institute of Scientific Research and High Technology Services (INDICASAT) was established to carry out frontier research in chemistry and biology.

*iv) Incentives to promote innovation in the private sector.* SENACYT offers incentives and grants to promote innovation in firms. New Entrepreneurs started in 2009 and offers grants covering up to 100% of total project costs to graduate students who want to set up a company within the two years following their graduation. SENACYT also manages a fund to promote innovation in existing firms (*FIE, Fomento a la Innovación Empresarial*). However, this line of financing has been discontinued, leaving an empty space for promoting modernisation and entrepreneurial networks in the country. These incentives are oriented towards demand (meaning that potential beneficiaries need to respond to tender calls by completing official government documents). These schemes function better in highly dynamic and innovative contexts where companies know how to access government resources and/or in the presence of awareness campaigns.

Even though the innovation plan in Panama covers a five-year period, the budget for implementation is assigned on an annual basis, diminishing the capacity to implement pluri-annual actions. The SENACYT budget for scientific and technological activities increased from USD 80.6 million for the period 2005-09 to USD 122 million for 2010-13. In spite of the increase in the amount allocated, the volatility of the annual budget has increased since 2011, calling into question the implementation of pluri-annual actions (such as grants). SENACYT also suffers from long delays in resource allocation. A major bottleneck derives from the legal requirement to obtain an authorisation from the national audit office for each financial disbursement.

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*A major challenge ahead for Panama is to co-ordinate the innovation policy with other government policies, such as education, attraction of FDI and support to the development of SMEs, among others. A variety of institutional spaces for policy co-ordination in fact exist, but they have seldom been utilised.*

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The innovation agenda in Panama, as in other countries, cuts across several ministries and agencies. A major challenge for SENACYT is the co-ordination with other government bodies with STI-related responsibilities. Panama is endowed with a multiplicity of institutions and spaces in charge of policy co-ordination. It has had, since 1997, a cross-sectoral body with advisory functions to contribute to the definition of the national innovation strategy (the National Commission of Science, Technology and Innovation, CONACYT) and an Interministerial Council for Science and Technology (CICYT) instituted in 2005, composed of six ministries with responsibilities in competitiveness and scientific subjects. The governing board of SENACYT, composed of seven members drawn from the ministry of the presidency, the ministry of education, the National Banking Association, the National Council of Private Enterprise (CONEP), the Panama Rectors' Council and two representatives from public and non-governmental research centres, is an additional space for policy co-ordination. However, even though these mechanisms have been established by law, they have barely been used, especially in the last few years.

New institutions have been created, which are opening new opportunities for co-ordination, for example the Centre for National Competitiveness (CNC). Created in 2005 as a private-public partnership, it brings together the private sector, representatives of the labour force and the government. The CNC has a significant convening power. It has managed to convert itself into an effective space for public-private dialogue where ministries in charge of the economy, finance, infrastructure, education and trade meet to talk about achievements and



future challenges in an open dialogue with the private sector and civil society. It could be a powerful ally in SENACYT's effort to strengthen the linkages with the business community.

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*Panama monitors the implementation of innovation policy, but needs to strengthen its evaluation capacities.*

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As innovation policies increase in relevance in governments' strategies, the demand for the establishment of accountability systems grows, to trace how public resources are spent and to assess to what extent these public investments are effective and capable of delivering the expected results. Innovation policies are still often perceived as "luxury" policies, whose impact on development and poverty alleviation is too indirect to be considered relevant. It is therefore important to strengthen evaluation capacities to increase the effectiveness of policy action and to support the generation of consensus on the impact that science and innovation could have on the well-being of citizens.

Panama has introduced an innovation survey to monitor innovation trends in the domestic economy, but few resources are invested in monitoring and evaluation in comparison with countries of similar size. SENACYT has developed a matrix to monitor progress in the achievement of targets. The matrix reveals that for the period 2010-14 Panama has: *i*) shifted the focus from supporting tertiary to secondary education; and *ii*) faced difficulties in meeting the targets of the support for STI in the private sector. Mid-term and *ex post* evaluation of the PENCYT have been introduced, since 2004, as a legally required step in policy planning. However, Panama needs to strengthen its institutional capacities for evaluation. While monitoring can be assigned to the unit in charge of implementation because of ease in accessing and processing information, evaluation functions tend to be assigned to different units to ensure independence between assessment and implementation. For example, the ANII in Uruguay has a unit in charge of evaluation, employing eight people with diverse backgrounds, out of a total of 53 employees. SENACYT assigns evaluation to the planning unit, which operates with 2 employees out of 245.

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*To establish innovation policy at the heart of the national development agenda and make innovation a reality, Panama needs to strengthen its institutional capacities. In particular, it would be beneficial to shift the focus from planning to implementation. The country can achieve this based on its own experience and by drawing lessons from other countries.*

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## Shift the attention from planning to implementation

Government plans do not guarantee effective implementation. They are a relevant starting point, but they are effective only when matched with capacities for execution and the availability of budgets to implement the relevant actions. The fact that Panama has a pluri-annual innovation plan represents a step forward for the country, as it contributes to raising awareness about the relevance of innovation, and it provides a framework for the implementation of specific actions. However, the existence of the plan and the willingness to put it into practice have revealed the presence of bottlenecks that jeopardise the implementation capacity.

- **The PENCYT could be shortened**, and focused on setting the strategic orientation of the policy over the five-year period, with targets and associated planned budget. Fewer priorities could be identified and it would be beneficial to shift from seeing the plan as a micro-management guide to a logic in which the plan sets strategic orientation and facilitates the implementation of actions in co-ordination with other bodies.
- Within SENACYT, proposals could be made about how to **separate planning and evaluation functions** without necessarily increasing the number of employees in the organisation; a number which is already high in comparison with peer countries.
- SENACYT could **draw on its good experience in the participatory approach** to planning and enlarge it to the private sector in order to increase the effectiveness of the activities of promotion of innovation in firms.
- **Remove barriers to effective implementation by simplifying procedures.** Panama lacks an implementation agency for innovation policy. The country could consider the creation of an institutional arrangement that allows it to have an implementing body/agency to facilitate action. In addition, it would be important to modify the existing procedures and facilitate disbursement mechanisms to reduce operating costs and time delays in implementation by allowing SENACYT to operate in a more flexible way. In Uruguay, for example, the ANII has simplified the procedure of authorisation of resource allocation by substituting *ex ante* controls with *ex post* monitoring. An annual plan, which includes a budget, is prepared each year by the ANII, and approved by the governing board. Any expenditure not envisaged in the annual plan needs instead to be specifically authorised by the executive secretary (or the governing board,

if the amount is greater than a given threshold). Moreover, deadlines of up to ten days have been established for the execution of the payments. This increase in the capacity to implement policies and in the ability to allocate resources has been achieved by assigning to the ANII a special status of “non-state public entity”.

- **Look for new, pluri-annual financing mechanisms.** The budget for innovation policy in Panama is low when compared with those of other countries. The effectiveness of the pluri-annual plan for innovation is hindered by the mechanism of yearly budget allocation and by the fact that each disbursement from SENACYT is subject to approval by the national audit office, making the process of allocation of resources slow and bureaucratic. The creation of innovation funds in priority areas, jointly managed by the public and the private sectors, with simplified operational rules could help in raising the budget for innovation and in overcoming the current implementation barriers.

## Put innovation policy at the heart of the national development strategy

Panama is a small economy and faces barriers in respect of the scale and scope of public interventions. The challenges, however, are not only linked to the critical mass of resources that the country could eventually channel to promote innovation, but to the lack of consensus about the relevance of innovation for development. If an adequate consensus were built around the role of science and technology in the country, Panama could have an adequate cash flow to increase the amount of resources mobilised for investment in innovation, which is today one of the lowest in the region. The innovation agenda cuts across several institutions and bodies. Despite the efforts made, innovation policy in Panama has suffered from a low level of co-ordination with other government policies and from a low capacity for dialogue with the business community. In order to advance, it is important to:

- Continue to **raise awareness** at the decision-making level of the importance of innovation as a fundamental element of the national economic strategy, with the aim of mobilising a larger amount of resources in the future.
- Keep **investing in the** popularisation of science and technology to increase citizens’ awareness on the importance and potential contribution of science and innovation to the development of the country and its insertion in global markets.

- **Increase co-ordination** across government bodies and levels of government. This can be done by reactivating the SENACYT governing board and the CYCIT as spaces for strategy-setting to align actions managed by different government bodies.
- **Increase public-private dialogue** and partnership for innovation. The CNC offers the private-public linkage dimension that SENACYT is missing and it could be a powerful ally in promoting science, technology and innovation policy in Panama by making the domestic private sector more aware of the innovation agenda.

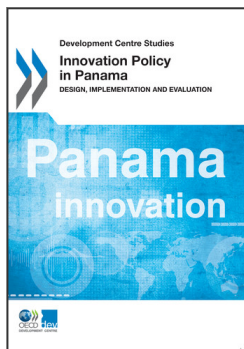
### Strengthen monitoring and evaluation capacities for innovation policy

Monitoring and evaluation systems are essential to allow learning in the making and execution of policy and to increase the effectiveness of actions. While monitoring systems are often carried out by the implementing agency, evaluations need to be carried out by external bodies and the time, scope and objective of the evaluation need to be clarified up front. In Panama, it would be important to:

- **Strengthen monitoring capacities** within SENACYT, by increasing the number and variety of backgrounds of the people in charge.
- Plan in advance **evaluations of specific programmes** and tools with a view to improving future policy design, clarifying data requirements and costs.
- **Increase domestic evaluation capacities** and, given the limited size of the country, set up a network of external evaluators to rely upon as a complement to internal evaluation capacities.
- **Define clear mechanisms for feedback** from monitoring and evaluation into current and future policies.

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