Chapter 2

Designing and implementing innovation policy in Panama

Panama's experience in designing and implementing innovation policy is recent. The country has made progress in learning how to elaborate pluri-annual plans and monitor the implementation of innovation policy. Nevertheless, major challenges remain: especially in guaranteeing pluri-annual budgeting for innovation; in improving the co-ordination of the promotion of science, technology and innovation with the national development strategy; and in scaling up initiatives in key priority areas. This chapter focuses on: *i)* the institutional setting and governance for innovation policy; *ii)* the national innovation strategy and policy mix as outlined in Panama's National Strategic Plan for Science, Technology and Innovation (PENCYT) 2010-2014; and *iii)* the main implementation challenges.

Introduction

Panama's experience in designing and implementing innovation policy is recent. Because this is a new commitment, the country is still in a learning phase. A critical analysis of the policies adopted so far, together with a look at the solutions implemented by other countries facing similar challenges, is therefore a helpful exercise in providing hints for the future of innovation policy in Panama.

During the last decade, the high economic growth of the country, mostly led by the expansion project of the Panama Canal and other large infrastructure projects, as well as by the growing revenues from the canal's management, is increasing the scope for government investments. So far the country has put the focus on bridging the infrastructure gaps, by investing in creation of a metro-transport system in the capital and improving the physical, as well as digital, infrastructure for science and technology. Innovation policy has not been at the core of the country's priorities, but several agencies, such as the National Secretariat of Higher Education, Science, Technology and Innovation (SENACYT, Secretaría Nacional de Educación Superior, Ciencia, Tecnología e Innovación) and the National Competitiveness Council (Centro Nacional de Competitividad, CNC) are drawing attention to the importance of science, technology and innovation for sustaining Panama's growth in the future, promoting the diversification of its sources of growth, and contributing to a shift towards a more inclusive growth pattern.

This chapter presents a brief overview of the institutional setting for the design and implementation of innovation policy in Panama. It assesses the current innovation strategy, including priorities and budget, and it reviews the existing policy mix for innovation, comparing it with those of peer countries, including the Dominican Republic and Uruguay. The chapter concludes by identifying some areas of improvement as an introduction to Chapter 3 which focuses on the evaluation of the implementation of innovation policy in Panama.

Institutions and governance for science, technology and innovation policy in Panama

Panama's experience in supporting science, technology and innovation (STI) is quite recent, dating back to the end of the 1990s. In particular, Law 13 of

15 April 1997, later modified by Law 50 of 21 December 2005, is considered the keystone of Panama's support for STI. It establishes the institutional framework and policy tools to promote science, technology and innovation in Panama. The law instituted the National Secretariat of Higher Education, Science, Technology and Innovation (SENACYT) as an autonomous agency with legal autonomy and its own assets. Its president answers directly to the President of the Republic. Together with the creation of SENACYT, the Law 13/1997 also established the National Commission of Science, Technology and Innovation (CONACYT, Comisión Nacional de Ciencia, Tecnología e Innovación), a cross-sectoral body with advisory functions, set up to contribute to the preparation of strategic plans for the development of STI. In parallel, Law 13/1997 created the National Fund for Science, Technology and Innovation (FONACITI, Fondo Nacional para el Desarrollo de la Ciencia, la Tecnología y la Innovación). However, even though the fund exists in practice, the SENACYT needs to administer its budget through the national budget system, thus making more difficult disbursement procedures. The same law also established the Interministerial Council for Science and Technology (CICYT, Consejo Interministerial de Ciencia y Tecnología), which is composed of six ministries with responsibilities in competitiveness and scientific subjects, and has co-ordination functions.

SENACYT is the main institution responsible for innovation policy in Panama. Like other countries in the Latin American and the Caribbean region, Panama does not have an *ad hoc* ministry for innovation. SENACYT was created to provide specific support to domestic scientific development. The institution is therefore highly respected among the national scientific community. However, despite recent efforts to engage in the promotion of innovation capacities in the private sector, increasing its capacity to enter into dialogue and interaction with firms and setting up programmes to promote applied research programmes matching scientific research with business actors remain major challenges ahead. Today, SENACYT is responsible for the elaboration, implementation, evaluation and revision of the five-year National Strategic Plan for Science, Technology and Innovation (PENCYT, *Plan Estratégico Nacional de Ciencia, Tecnología e Innovación*) SENACYT (2010). SENACYT employs 245 people and had an overall budget of USD 42 487 900 for 2013. Table 2.1 shows a comparison of SENACYT with the peer institutions in the Dominican Republic and Uruguay.

Table 2.1. **Comparison of the human and budgetary resources of SENACYT (Panama), the Vice Ministry for Science and Technology (Dominican Republic) and ANII (Uruguay)**

Country	Panama	Dominican Republic	Uruguay
Agency	**SENACYT**	**Vice Ministry for S&T**	**ANII**
Number of employees (2012)	245	16	53
Annual budget (USD million)			
2012	33.1, of which 94% exec.	4.5 of which 100% exec.	33.9 of which 84% exec.
2011	30.9 of which 92% exec.	2.4 of which 100% exec.	31.6 of which 91% exec.
2010	34.4 of which 90% exec.	2.9 of which 100% exec.	27.3 of which 79% exec.

Note: ANII is the National Innovation and Research Agency of Uruguay.

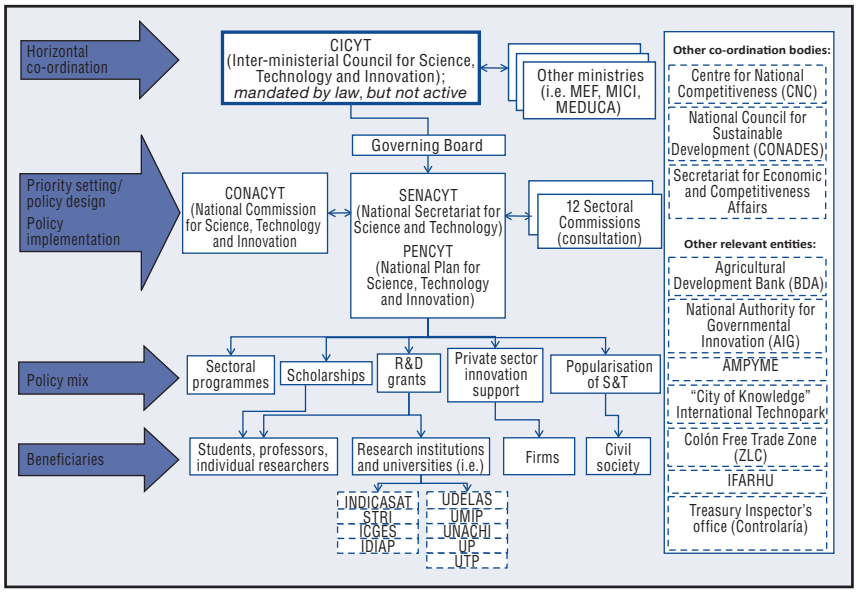
Source: Authors' calculations based on national official sources [SENACYT (2013) for Panama, ANII (2013) for Uruguay and Vice Ministry for S&T of the Dominican Republic, 2013].

In Panama, SENACYT is responsible for both defining strategy and implementing policy (Figure 2.1). In general, countries tend to assign these functions to two separate entities. The separation of functions allows for a smoother operation and favours tailoring the management structure of each institution to the specific functions it has to perform. The institutions in charge of policy implementation are usually independent – although affiliated – agencies, in order to make the implementation function more responsive and adaptable.

The separation of strategy setting from implementation is not only a characteristic of big economies, as in Argentina where the Ministry for Science, Technology and Productive Innovation is in charge of strategy setting, and the National Innovation Agency is responsible for policy implementation. It is also the case for economies that are smaller in terms of country size and population such as Costa Rica and Uruguay (Figures 2.2 and 2.3). In Uruguay, a recent reform following the Law 18.084 in 2006 established that the National Council for Innovation, Science and Technology (CONICYT, Consejo Nacional de Innovación, Ciencia y Tecnología) is formally responsible for planning, as well as for elaborating proposals on specific policies and instruments. The National Innovation and Research Agency (ANII, Agencia Nacional de Investigación e Innovación), created in 2005, is entrusted with implementation functions (Figure 2.2). In Costa Rica, strategy setting and policy implementation are managed by different institutions, working under the co-ordination of the Presidential Council for Competitiveness and Innovation (CPCI, Consejo Presidencial de Competividad e Innovación). Since Costa Rica has a dedicated Ministry for Science and Technology (MICIT, Ministerio de Ciencia y Tecnología),

this ministry is responsible for innovation priority setting, policy design and strategy setting, while the National Council for Scientific and Technological Research (CONICIT) is in charge of implementation (Figure 2.3).

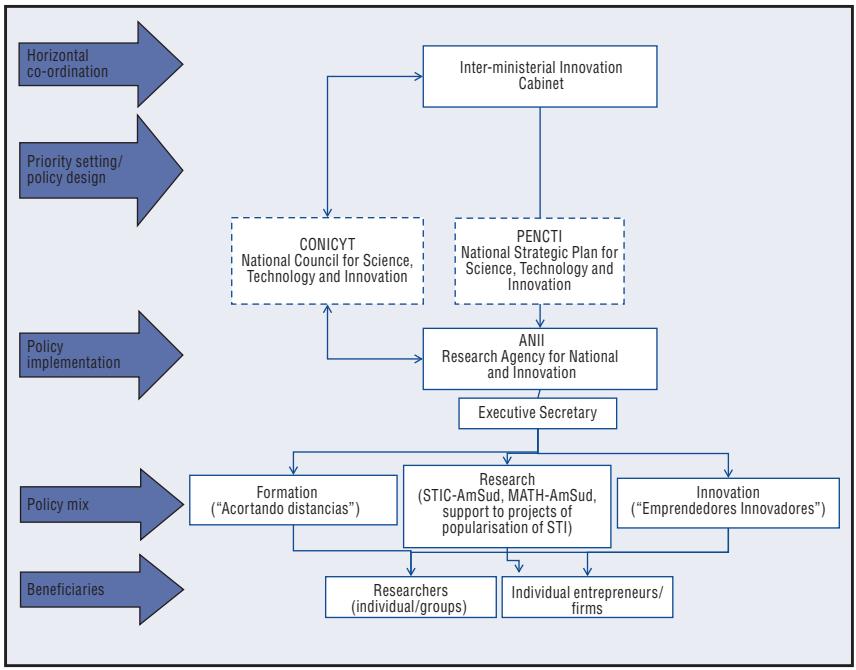
Figure 2.1. **Institutional framework for innovation policy, Panama, 2013**



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 Chiriqui; UP = University of Panama; UTP = Technological University of Panama.

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

Figure 2.2. **Institutional framework for innovation policy, Uruguay, 2013**



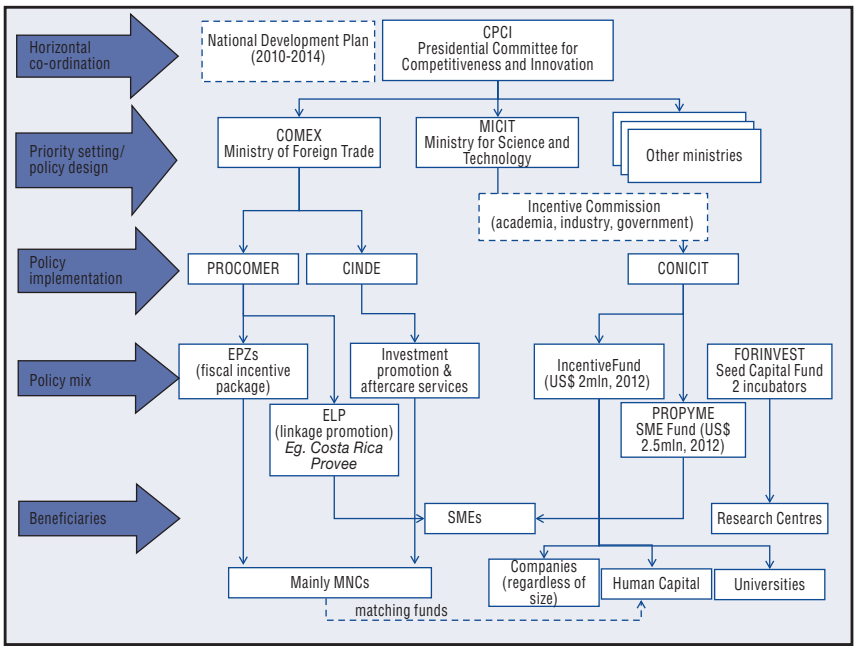
Source: Authors' elaboration based on information provided by ANII (2013).

The innovation agenda in Panama, as well as in other countries, cuts across several ministries and agencies, from those responsible for the introduction of innovation in government management practices – such as the recently instituted Panamanian Authority for Government Innovation – to the ministries responsible for education, industrial development, trade and finance. A major challenge for the institutions in charge of innovation policy is therefore 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. However, even though these co-ordination mechanisms are established by law, in many cases they have been barely used, especially in the last few years. One of those is the Interministerial Council for Science, Technology and Innovation (CICYT, Consejo Interministerial de Ciencia, Tecnología e Innovación). Set up in 2005, it is made up of the ministers with relevant responsibilities with respect to STI, as designated by the president. CICYT is responsible for the approval of overall national expenditure in STI, and contributed to the co-ordination of public budgets for innovation in the

years in which it was called upon to operate. The SENACYT governing board is an additional space for policy co-ordination. It is composed of seven members drawn from the Ministry of the Presidency, the Ministry of Education, the National Banking Association (Asociación Bancaria de Panamá), the National Council of Private Enterprise (CONEP, Consejo Nacional de la Empresa Privada), the Panama Rectors' Council (Consejo de Rectores de Panamá), and two representatives from public and non-governmental research centres (art. 19-B Law 13/1997).

Figure 2.3. **Institutional framework for innovation policy, Costa Rica, 2013**



Source: OECD (2012a).

While the CICYT and the SENACYT governing boards have not been active spaces in recent years, Panama has created new institutions which are making advances in becoming platforms for policy co-ordination in the area of competitiveness. The Secretariat for Economic Affairs and Competitiveness (Secretaría de Asuntos Económicos y Competitividad), is designed to support the President of the Republic and the Ministry of the Presidency in the implementation of the national economic agenda. Its main responsibility is to co-ordinate the different programmes launched by the national government to improve competitiveness. The National Council for Sustainable Development

(CONADES, Consejo Nacional de Desarollo Sostenable) was created in 1996 with the National Decree N° 163, as a tool for the Minister of the Presidency to ensure the systematisation and integration of social and environmental concerns into Panama's economic activities. The activities of the council operate at three levels; local, national and international, following a decentralised structure. This feature could be exploited to engage local and indigenous communities, as well as international actors, in the debate about Panama's development strategy.

The Centre for National Competitiveness (CNC) was created with the support of the National Enterprise Association (APEDE, Asociación Panameña de Ejecutivos de Empresa) in 2005, a private-public partnership aiming at bringing together the private sector, representatives of the labour force and the government. Since its creation, the CNC 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. The objective of the CNC is to promote alliances to improve the competitiveness of the country, concentrating above all on the quality and quantity of industrial production, and on the creation of a business environment which attracts both domestic and foreign investment, while improving the well-being of the citizens of the country.

The CNC has a significant convening power and could help to overcome the co-ordination gap that is currently weakening the national innovation policy. In fact, the co-ordination issue in innovation policy concerns not only the inter-ministerial dimension, but also the capacity to create synergies with the actors of the national innovation system, including the private sector, universities and research centres. SENACYT, as has been stated, has a good reputation in the scientific community, but it is much weaker when it comes to its capacity to enter into dialogue with, and deliver services and incentives to, the private sector. 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 sensitising the domestic private sector to the innovation agenda. To mainstream the role of the CNC as a space for co-ordination in strategy setting, it needs to align and create synergies with CICYT or the SENACYT governing board which already exist in law.

Promoting co-ordination across ministries for S&T and with the private sector is a common challenge for OECD and non-OECD countries (Box 2.1). In Latin America several countries have invested in the last decade in improving the spaces for policy co-ordination. Colombia, for example, created in 2011 the Private Council for Promotion of Competitiveness, to provide a forum for dialogue

between the private and the public sectors. Seventeen companies (both national and foreign) founded the initiative, whose members are required to commit their chief executive officers (CEOs) to participate actively in its activities. The council has a specific agenda and is "action-oriented", co-ordinating initiatives among the private sector, government and academia. The Colombian Private Council on Competitiveness has a staff of six associate researchers and publishes a bi-annual National Competitiveness Report analysing and providing policy recommendations on different topics, such as education, social security, the labour market, science, technology and innovation, infrastructure, information and telecommunications technology, the financial and tax system, competition, justice and corruption, and sustainability (OECD, 2012a).

Box 2.1. **Promoting inter-ministerial co-ordination in innovation policies: The cases of Costa Rica, Dominican Republic and Uruguay**

Promoting innovation requires aligning actions across different fields, including education, infrastructure and trade. As innovation assumes a higher priority in countries' development agendas governments are confronted with the need to foster co-ordination across several ministries and government agencies. The following paragraphs outline examples of recent experiences in three Latin American countries that have put in place reforms to promote co-ordination for innovation policy.

For the last decade Costa Rica has been shifting its policy model towards the attraction of more knowledge-intensive foreign direct investment (FDI) and to stronger promotion of domestic innovation. The Presidential Council for Competitiveness and Innovation (CPCI, Consejo Presidencial de Competividad e Innovación) was established in 2010. It is run by an executive secretary reporting directly to the President of the Republic, who serves as the council's chair. Its members, who include several ministers, meet every month and participation is mandatory at the ministerial level. The council has identified five priority areas in need of better policy co-ordination: *i)* infrastructure; *ii)* permit simplification; *iii)* creation of new financial instruments, especially for start-ups and small and medium-sized enterprises (SMEs); *iv)* FDI and foreign trade; *v)* human resources development. Efforts are being made to upgrade the council, which so far has played an important role in knowledge sharing, to a platform for policy dialogue, enlarging the spaces for co-operation among the different innovation agents in the country. The OECD assessment (OECD, 2012a) suggests that the council needs to have more enforcement powers to elaborate shared guidelines and priorities if it is to foster policy co-ordination among different sectoral ministries. In particular, it should be endowed with the highest political support and empowered as the policy space for creating consensus on objectives and aligning policy actions. In addition, it should be made responsible for ensuring the implementation and follow-up of decisions stemming from its discussions and deliberations, as well as for identifying a proper mechanism to channel the voices of the private sector. Otherwise there is a risk that its role will be confined to mere information sharing.

Box 2.1. **Promoting inter-ministerial co-ordination in innovation policies: The cases of Costa Rica, Dominican Republic and Uruguay** (*contd.*)

The Dominican Republic's Ministry for Higher Education, Science and Technology (MESCYT, Ministerio de Educación Superior, Ciencia y Tecnología) co-ordinates actions with various entities that define policy, such as the National Competitiveness Council. The MESCYT also presides the Council for Innovation and Technological Development (CIDT, Consejo para la Innovación y Desarollo Tecnológico) created by decree to govern the National System for Innovation and Technological Development (SNIDT, *Sistema Nacional de Innovación y Desarrollo Tecnológico)*. The main objective of the SNIDT is to co-ordinate the functioning of the institutions (academic, public, private and foreign) promoting innovation and applied technological development. The council is composed of 15 members including: the Centre for Export and Investment, the National Competitiveness Council, the Dominican Institute of Telecomunications, the Innovation in Industry and Biotechnology Institute, the National Intellectual Property Office, the Dominican Agriculture and Livestock Research Institute, as well as four business associations, and university representatives. In 2007 the CIDT co-ordinated the National Strategy for Science, Technology and Innovation 2008-2018 (PECYT, *Plan Estratégico de Ciencia, Tecnología e Innovación*) of which the main goal is to establish the foundation for a transition to an economy based on knowledge and innovation. This strategic plan is defined as a planning tool for policy and institutional co-ordination of the national science, technology and innovation system in the interest of developing competitive advantages for productive sectors, as well as promoting sustainable development and the improvement of quality of life of the society. The PECYT is in its fifth year of implementation and has been used as the basis for planning for national science and technology institutions, as well as being consulted for national dialogues between industry and government. This strategic plan was also used as input for the National Development Strategy (Law 1-12) co-ordinated by the Ministry of Economy, Planning and Development.

In Uruguay, the task of horizontal co-ordination in STI has been assigned to the Inter-Ministerial Innovation Cabinet created in 2005. The Cabinet consists of the Ministries of Economy and Finance, of Industry, Energy and Mining, of Livestock, Agriculture and Fisheries, and the Director of the Office of Planning and Budgeting, and is chaired by the Ministry of Education and Culture. Acknowledging the horizontal nature of STI, its fundamental role in the development of the country and the fragmentation of responsibilities for innovation-related policies among different institutions, the Cabinet has been positioned at the highest level of the executive of the country. Its main objective is to co-ordinate and articulate governmental actions in support for STI – identified as a fundamental pillar for the development of the country – in fields such as education, research, industrial production and taxation.

Source: OECD (2012a), UNCTAD (2012) and authors' elaboration based on official information from ANII (Uruguay), 2013.

Panama's national innovation strategy: The pluri-annual plan 2010-2014 (PENCYT)

Multi-annual plan and participatory approach in strategy setting

SENACYT is responsible for defining the National Plan for Science and Technology (PENCYT) which sets the main priorities and lines of action for national innovation policy. SENACYT designed and implemented the third PENCYT for the period 2005-09 and, on the basis of the objectives that were envisaged but not fulfilled within that period, it has defined the priorities and lines of action for the PENCYT 2010-14.[1] Panama – SENACYT in particular – is still in a learning phase of how to design, implement and evaluate innovation policies, and so the continuity in terms of objectives and programmes between the previous pluri-annual plan and the current one appears a strategic choice.

The PENCYT has been defined taking into account the innovation challenges of the Panamanian economy and the government's development priorities. SENACYT has put in place efforts to align the PENCYT with the priorities of the government's strategic plan 2010-14, set out by the Ministry of the Economy and Finance (MEF, Ministerio de Economía y Finanzas). The national development plan prioritises the achievements of: *i)* sustainable economic growth and *ii)* the reduction of poverty and income inequality. To achieve the first, the government has prioritised investment in infrastructure, regulatory reforms, institutional strengthening and modernisation of the state in three key sectors: logistics, tourism and agriculture. The social sustainability goal, by contrast, rests on investment in human capital formation and social inclusion, with a prioritisation of educational and social protection programmes in rural areas (MEF, 2010). The co-ordination between the national plan and the plan for innovation rests at the level of strategy setting and implementation of specific projects, as for example the strengthening of university capacities in the field of logistics, which is one of the priorities of the national strategic plan. However, in practice the two plans operate in parallel, target different sectors, and generate low synergies among implemented actions.

SENACYT elaborated the plan following a participatory process. Sectoral and horizontal commissions composed of members of research centres, academia, relevant governmental institutions and the private sector were established to convey the needs and the priorities of the different knowledge and scientific areas. The plan is structured at four levels: *i)* development goals; *ii)* strategic objectives, identifying the purposes to which the tools defined in the plan should

be directed; *iii)* priority lines of action, targeting areas of key interest for the country; and *iv)* specific programmes for each of the lines of action (Table 2.2). The plan is structured in a two-volume document.The first part identifies six lines of action including promoting innovation in the private sector; enhancing knowledge generation and diffusion; strengthening institutional capabilities of public STI institutions; improving human resources and scientific infrastructure; undertaking high-impact project in logistics, tourism and agriculture (i.e. the priority sectors defined in the government's strategic plan); and enhancing public awareness of the relevance of science and technology for development (i.e. popularisation of science). The second volume focuses on the 12 areas that were prioritised in the previous PENCYT (seven sectoral: bio and health sciences; agriculture, forestry, and fisheries; basic sciences; social sciences; education; industry and energy; logistics and transport;) and five horizontal: information and communications technologies (ICT) development; STI and the environment; gender equality in STI; STI and ethics; strategic alliances for STI). When compared with the national plans and policies for innovation in other countries of the region, the PENCYT looks extremely detailed, with a multiplicity of objectives and lines of action and with little capacity to consolidate around strategic initiatives. The level of detail of operational conditions included in the plan hinders the flexibility of implementation and the capacity of fine-tuning according to evolving situations.

One of the strengths of the PENCYT 2010-2014 is its legitimacy among the scientific community. The fact that the plan has been developed following a participatory approach has helped translate it from a "government document" to a set of reference guidelines for the scientific community. The plan is the result of SENACYT's effort to work side by side with the key actors of the Panamanian scientific and innovation communities. The sectoral commissions are expected to retain consultation functions in the implementation phase although in practice they have been under-consulted over the last two years.

Table 2.2. **Key features of Panama's innovation policy: The National Strategic Plan for Science, Technology and Innovation (PENCYT), 2010-2014**

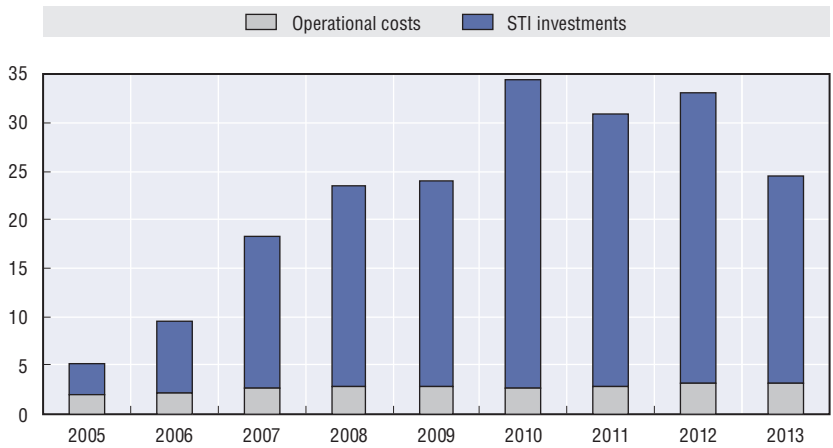
Programming period	**2010-14**	
Budget (SENACYT)	USD 98.38 million (committed from 2010-12); 90.48 million (executed from 2010-12) USD 42.48 million (committed in 2013)	
Innovation policy framework	National innovation systems framework	
Development goals	• Sustain GDP growth • Diversify the economy, and increase the knowledge and specialised human capital content in production • Develop skills and human resources for competitiveness	
Strategic objectives	• Invest in human capital for knowledge-based development • Foster social and economic innovation • Support applied research in STI for social and economic development	
Lines of actions	• Undertake high-impact projects in logistics, tourism, agriculture (i.e. priority sectors defined in government strategic plan); • Improve human resources and scientific infrastructure development; • Enhance knowledge generation and diffusion; • Strengthen private sector innovation; • Enhance STI education and public awareness; • Increase capacities of public STI institutions	
Main programmes (Iniciativas)	• Financing of "centres of excellence" in logistics, tourism and agriculture, i.e. national research institute for logistics and transport and applied research centre for agricultural research; • Direct funding of new research and development (R&D) projects, research networks and public-private platforms for technology transfer (with a focus on strengthening regional R&D capacities); • Financing of scientific infrastructure, access to electronic scientific resources and publication assistance for researchers (i.e. in biosciences); • Direct financial support to young researchers; • Introduction of specialised postgraduate study programmes and technical education schemes in logistics, tourism and agriculture; • Scholarships and subsidies for postgraduate and doctoral studies abroad; • Insertion programme for scholarship holders into academia, business and public institutions; • Attraction of foreign and repatriation of Panamanian researchers; • Financing of stationary and mobile Internet units (Infoplazas) to promote ICT access and use; • Financing of start-ups and assistance in internationalisation efforts of businesses; • Financing of programmes and evaluations to strengthen science and maths education; • Creation of innovation challenges and prizes.	
Sectoral focus	Yes	
Priority areas	*Sectoral:* Seven priority sectors 1. Bio and health sciences; 2. Agriculture, forestry, fisheries; 3. Basic sciences; 4. Social sciences; 5. Education; 6. Industry and energy; 7. Logistics and transport	*Horizontal* Five transversal programmes a. ICT development; b. STI and the environment; c. Gender equality in STI; d. STI and Ethics; e. Strategic alliances for STI

Source: Authors' elaboration based on National Strategic Plan for Science, Technology and Innovation (PENCYT), 2010-2014.

Budget

Panama has increased its investment in innovation. In respect of the PENCYT 2005-2009, the budget at the disposal of SENACYT for scientific and technological activities has increased, although with some fluctuations. While the previous strategic plan for STI was allocated an overall USD 80.6 million for the period 2005-09, the current PENCYT has already exceeded this amount, receiving more than USD 122 million in 2010-13. In spite of the increase in the amount allocated, the volatility of the annual budget has increased since 2011 (Figure 2.4).

Figure 2.4. **Evolution of SENACYT budget for STI activities, 2005-13**
USD million

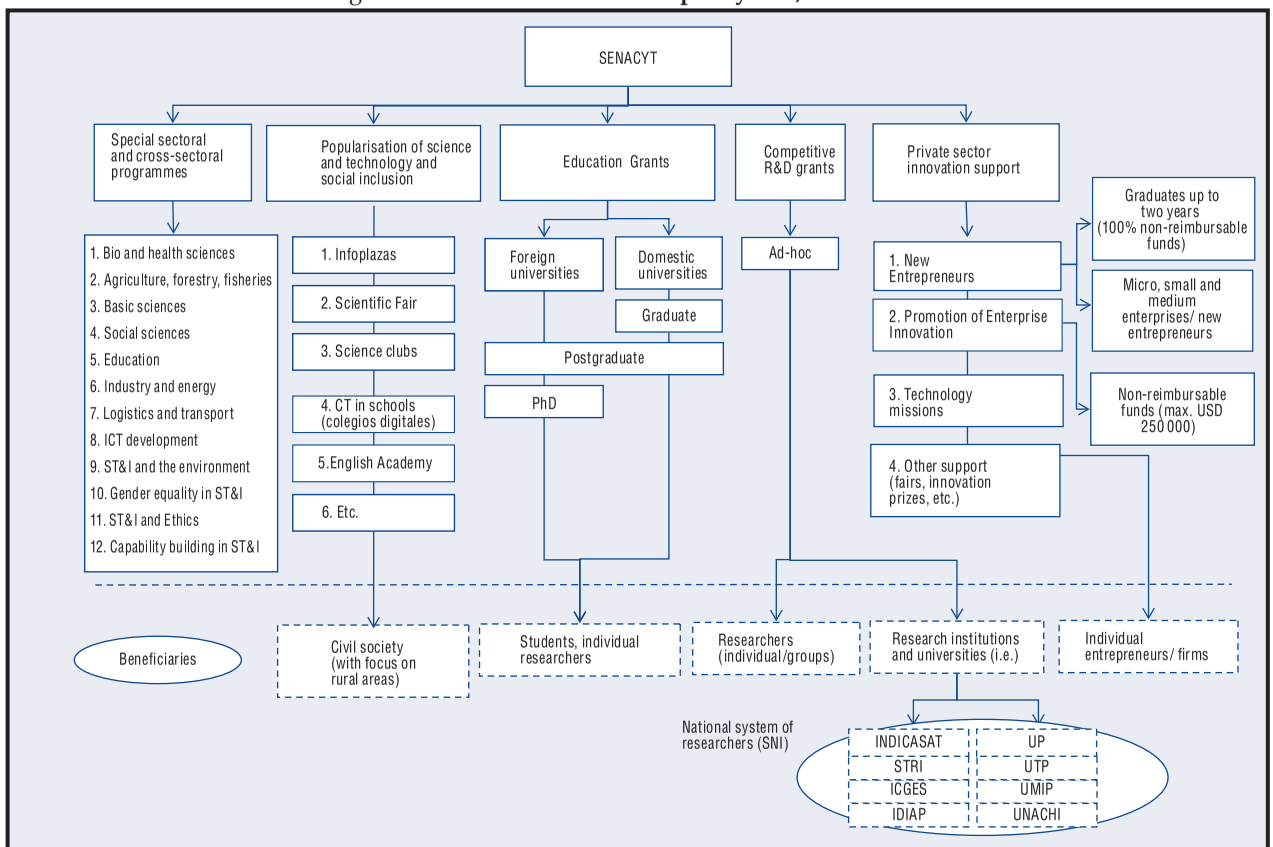


Source: Authors' calculations based on PENCYT 2010-2014 and information provided by SENACYT (2013).

A"project-based" policy mix

Panama has a wide range of policy tools at its disposal to achieve the PENCYT's priorities. SENACYT administers incentives, grants and services in four main areas (Figure 2.5).

Figure 2.5. **Panama's innovation policy mix, 2013**



Source: Authors' elaboration based on official information from SENACYT.

- Popularisation of science and technology

  The pillar of popularisation gathers together initiatives that respond to the need to raise awareness about the relevance of science, technology and innovation for Panamanian society. There is a general perception of "innovation" as an issue that is far removed from the possibilities and the realities of the lives of most citizens; while, on the contrary, science and technology could be powerful assets to help the country shift towards better living conditions for all (the examples of the impact of the advances in health research and in e-government on citizens are evident, but they are not unique; promoting innovation also supports the strengthening of domestic firms, and there is a need to increase public awareness about these issues). In this area Panama 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 presence of the government and to support community building in poor rural areas (Box 2.2). Panama has also developed relevant capacities in scientific journalism and in science and technology awareness campaigns. Other initiatives in this area include science clubs, digital colleges, the National Science and Technology Fair, and innovation prizes. SENACYT has also favoured access to scientific journals for local universities.[2]

Box 2.2. **Infoplazas**

SENACYT Infoplazas are part of a digital literacy programme, aiming to increase the accessibility of ICT in poor and rural areas and those with indigenous peoples, and therefore contributing to the reduction of the digital gap. Infoplazas are structured as community centres, and provide public access to the Internet and to e-learning platforms, as well as training in information and communication technologies. At the end of 2013, Panama had 296 Infoplazas around the country, each of them supplying, in addition to the regular services (Internet access, document printing, text editing, document digitalisation, training courses, access to digital encyclopædias), different arrays of additional services, tailored to the needs and demands of the local community. Infoplazas have so far been successful not only in facilitating access to the digital network, but also in contributing to the development of local communities and their integration into the national system. SENACYT Infoplazas constitute an important tool for the central government to reduce the distance to the poorest and less accessible areas, addressing the growing social exclusion and territorial inequality problems.

Source: Authors' elaboration based on official information from SENACYT (2013).

- Education grants

  SENACYT offers grants to train professionals for science, technology and innovation. When calls for grants are opened, beneficiaries are selected on the basis of the quality of the training proposal; there is no prioritisation in terms of areas of capabilities that need to be developed. Grants are offered for undergraduate, graduate and PhD students, as well as for strengthening the competences of trainers, teachers and professors. Over three years (2010-12), SENACYT delivered 233 grants for undergraduate, 275 graduate (including 89 within the country) and 45 PhD students. These students enrolled mostly in agriculture, engineering and technology at the undergraduate level, natural sciences at the doctoral and post-doctoral level, and social sciences and humanities at the professional level (SENACYT, 2013).

  In recent years a rebalancing of the funds has appeared to favour pre-graduate students and lower levels of education. 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 (SENACYT, 2013). Of the 641 grants, only 20% were used for education programmes within the country, while most of them went to Panamanian students who chose to pursue their studies in the US (38%), Europe (24%), or other countries in Latin American and the Caribbean (16%) (SENACYT, 2013). In Uruguay, grants for human resources training within the country are fixed, amounting to USD 700 per month for two-year masters' programmes, and USD 880 per month for three-year PhD programmes. For grants to study outside the country, the ANII has instead established an overall upper limit of USD 40 000 for masters and USD 60 000 for PhDs (Table 2.3). In the Dominican Republic from 2010 to 2012, 12 605 scholarships were granted (45% to study abroad, 89% of which were to pursue postgraduate studies). Most grants go to students enrolled in health, business, pedagogy and engineering studies in the United States, Europe, South America and Asia. The maximum yearly amount for grants is USD 1 200 to study in the Dominican Republic and USD 15 000 to study abroad.

Table 2.3. **Education grants in Panama, Dominican Republic and Uruguay, 2013**

		Panama		Dominican Republic		Uruguay	
		Maximum amount of approved grant (last five years)	Number of grants approved in 2010-12	Maximum amount of approved grant (last five years)	Number of grants approved in 2010-12	Maximum amount of approved grant (last five years)	Number of grants approved in 2010-12
Under-graduate	Within the country	N/A	N/A	USD 34 500	5 121	USD 81 000	411
	Programmes abroad	USD 180 000	233	USD 80 000	383	N/A	N/A
Post-graduate	Within the country	USD 180 000	89	USD 8 500	248	USD 348 000	372
	Programmes abroad	USD 135 000	186	USD 59 200	5 141	USD 40 000	23
Ph.D	Within the country	N/A	N/A	N/A	N/A	USD 658 800	152
	Programmes abroad	USD 285 000	45	USD 154 188	210	USD 60 000	27

Source: Authors' elaboration based on national official sources (SENACYT for Panama, ANII for Uruguay and Ministry for Education, Science and Technology for Dominican Republic).

Panama has prioritised the strengthening of human resources for science and technology, But this poses the challenge of providing productive professional opportunities for these better trained people. SENACYT grants include conditions for repatriation, but deeper co-ordination with industrial and production development policies would be needed to ease the absorption of these highly skilled people into the domestic economy.

- Promotion of scientific research and development (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. For example, in 2002 it instituted the Institute of Scientific Research and High Technology Services (INDICASAT, Instituto de Investigaciones Científicas de Alta Tecnología) to carry out frontier research in chemistry and biology (Box 2.3), and recently it signed an agreement with a major academic publishing company to facilitate access to scientific knowledge.

Box 2.3. **INDICASAT**

In 2002, SENACYT established the Institute of Scientific Research and High Technology Services (INDICASAT), as a platform for promoting scientific and technological development in Panama. The institute is devoted to training researchers and technicians in the fields of R&D which have applications in the sectors identified as priorities for the country. Among its objectives, the institute supports the competitiveness of production, facilitating the interaction of academia and research centres with the private sector in innovation. Today INDICASAT has one of the most comprehensive infrastructures for R&D in chemistry and biology in Central America, and can count on specialised expertise in key areas of biomedical research, as well as biotechnology, natural product chemistry, immunology, neuroscience, pharmacology, toxicology, parasitology, clinical trials and other related areas. The institute is organised around four centres – biodiversity and drug discovery, neuroscience, cell biology and molecular diseases, and the centre for clinical trials and translational medicine – which provide high-tech services to the community. Now that it has become an established research hub in the country, the aim of INDICASAT is to assert its position as a centre of exellence not only nationally but also in the global landscape, and to facilitate technology transfers from and towards other countries, especially in the Latin America and the Caribbean region. In order to fulfil this vision, INDICASAT is focusing on the selection of highly qualified human resources, on the interdisciplinarity and internationalisation of its biomedical research programme, on the diffusion of a scientific culture and on the provision of supporting services and knowledge-sharing in Panama's priority sectors.

Source: Information from INDICASAT (2013) www.indicasat.org.pa/.

- Incentives to promote innovation in the private sector

  SENACYT offers incentives and grants to promote innovation in firms. New Entrepreneurs (NE, *Nuevos Emprendedores*) is a programme started in 2009 that offers grants covering up to 100% of total project costs to graduate students whot want to set up a company within two years after their graduation. Eligible beneficiaries need to be trying for the first time to set up a business and need to be affiliated to an incubator that operates in the City of Knowledge (CDS, Ciudad del Saber). The programme also offers support to new entrepreneurs in setting up micro enterprises. In Uruguay, a similar programme for new entrepreneurs funds up to 80% of the total cost of a project, within the limit of USD 25 000 per project. Promoting the creation of start-ups is an emerging phenomenon in Latin America, and Panama is in line with this trend, although its policy mix is less elaborate (see Box 2.4).

  SENACYT also manages a fund to promote innovation in existing firms (FIE, *Fomento a la Innovación Empresarial*), offering grants up to USD 250 000 for research projects in companies. SENACYT had a line to finance

technology missions abroad to favour access to technology by a group of firms and universities. This line has been recently discontinued, leaving an empty space for promoting modernisation and entrepreneurial networks in the country.

Box 2.4. **Promoting start-ups in Latin America: What are the governments of the region doing?**

Start-ups are an emerging phenomenon in Latin America's innovation strategies. Latin American countries are highly heterogeneous and are implementing different support mechanisms. Argentina has been successfully introducing performance-based management criteria in its business incubators and in its intermediate agencies facilitating access to public programmes. Brazil and Chile have accumulated knowledge in supporting start-ups since the 1990s. Over the past two years both countries have introduced new incentives to promote start-ups, combining financing with business and training services. Mexico has improved its legal framework to facilitate start-up creation and expansion. Colombia and Peru are currently designing "new generation" support tools that combine seed capital with business training services for new entrepreneurs. In spite of country specificities, two common trends are emerging in the region: *i)* the increasing role of sub-national and local governments (such as the Ciudad de Buenos Aires in Argentina and the states of Porto Alegre, Amazonia and Sao Paulo in Brazil); and *ii)* the emerging role of large companies that are increasingly involved in financing and coaching start-ups as part of their new open innovation strategies. The case of Wayra in Peru is an example of a private sector initiative that is helping to bring dynamism to support start-ups.

The OECD study identifies some recommendations to improve designing and implementing policy to support start-ups in the region:

- **Increasing co-ordination in strategy planning**. Start-up support programmes can only reach their full potential when they are set within broader productive transformation strategies that contribute to generating a favourable environment for these companies to develop.
- **Ensuring the availability of a balanced policy mix targeted at the different development stages.** Public policies play an important role in promoting start-ups by facilitating access to finance, development of entrepreneurial skills and by setting up a business-friendly regulatory framework. Nevertheless, some countries tend to focus on one particular tool, overlooking other important elements which are critical for these firms to develop. The experiences of OECD countries – especially Australia, Finland and Israel – show the importance of offering adequate financing at all stages of firm development, such as seed funding in the creation stage and venture capital and business angel investments in the expansion stage. Seed capital typically requires permanent public support. Venture-capital and business angels, however, mainly need support in the initial stages of their development. As the sector develops, direct public-sector support can be withdrawn while control is handed over to private investment, as was the case in Australia and Israel.

Box 2.4. **Promoting start-ups in Latin America: What are the governments of the region doing?** (*contd.*)

Table 2.4. **Targeted policy tools to promote start-ups in Latin America: A comparison between countries, 2012**

● Implemented ◐ In development ▨ Recently created ○ Need to be created or reformed

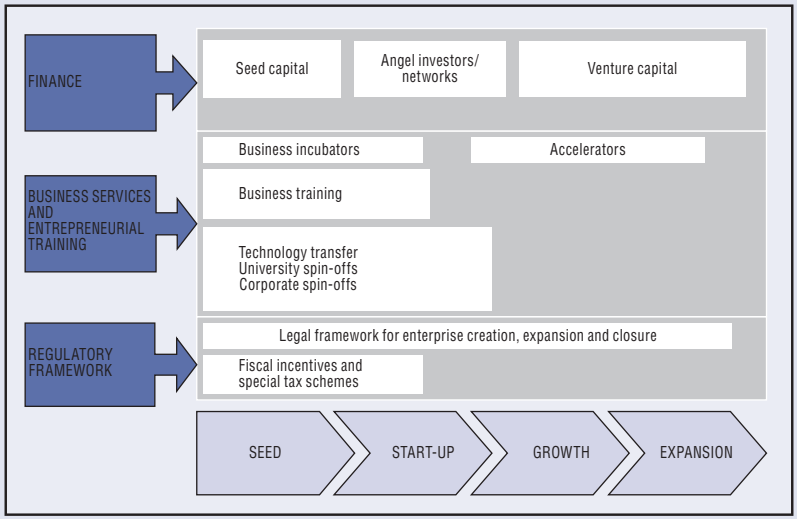
Category	Tool	Argentina	Brazil	Chile	Colombia	Mexico	Peru
Financing	Seed capital	◐	●	●	▨	○	▨
	Angel investors	○	●	◐	▨	○	○
	Venture capital	○	●	●	▨	◐	○
Business services and entrepreneurial training	Incubators	●	●	●	◐	◐	▨
	Accelerators	◐	◐	◐	○	◐	○
	Corporate spin-offs	○	○	○	○	○	○
	Tecnology transfer and university spin-offs	◐	●	◐	○	●	○
	Business training	●	●	●	◐	◐	◐
Regulatory framework	Ease of creating or closing down businesses	○	○	◐	◐	◐	◐
	Taxation and special legislation	○	◐	◐	○	◐	○

Note: This table is not meant to present an international classification. It is based on qualitative information gathered in the country case studies in Chapters 4 to 9 of an OECD 2013 report (see below). The goal is to summarise visually the variety of instruments created to support innovative entrepreneurship and how developed they are in the countries in the region.

Source: OECD (2013a).

Box 2.4. **Promoting start-ups in Latin America: What are the governments of the region doing?** (*contd.*)

Figure 2.6. **Taxonomy of targeted policy tools to promote start-ups**



Source : OECD (2013a).

- **Designing and implementing more sophisticated support tools that are more in line with emerging global trends**. In spite of the region's recent progress in promoting start-ups, Latin American countries still face major barriers that need to be overcome by: *i)* simplifying the regulatory framework to facilitate the creation and expansion of innovative start-ups; *ii)* identifying opportunities to promote business angel networks; *iii)* investing in promoting an entrepreneurial culture, particularly among young people; *iv)* introducing performance-based management criteria in incubators and agencies that facilitate access to public development programmes; and *v)* designing integrated support programmes that simultaneously offer financing, business services and entrepreneurial skills learning.
- **Taking advantage of emerging private sector open innovation trends, corporate venture capital and knowledge-sharing** to foster the quantity and quality of innovative entrepreneurial projects in the region.
- **Evaluating programmes and adjusting incentive schemes based on performance.** This also requires investing in creating new, better metrics for measuring the dynamics of creation and expansion of start-ups in Latin America in order to improve the capacity to design better policies based on results.

Source : OECD (2013a).

The innovation policy mix in Panama is mainly "project-based". 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. SENACYT is still experimenting with the policy tools to put in place and ways to balance them. A further step would involve moving into a consolidation phase of rationalising and increasing the effectiveness of the support for innovation.

Innovation is a cross-ministerial issue and a key challenge for SENACYT is to increase the co-ordination with the actions managed by other ministries and institutions, including the MEF, the Ministry of Commerce and Industry, and the Authority for the Promotion of Small and Medium-sized Enterprises (AMPYME, Autoridad de la Micro, Pequeña y Mediana Empresa). Another key challenge is to promote innovation in specific areas/sectors. Many countries in the region have introduced sectoral technology funds to address this issue (Box 2.5). In 2008, Panama introduced a fund of this type, requiring companies working in the telecommunication sector to devote a part of their revenue to R&D, but the tool has not been utilised.

Box 2.5. **Promoting innovation through sectoral technology funds: The cases of Brazil and Uruguay**

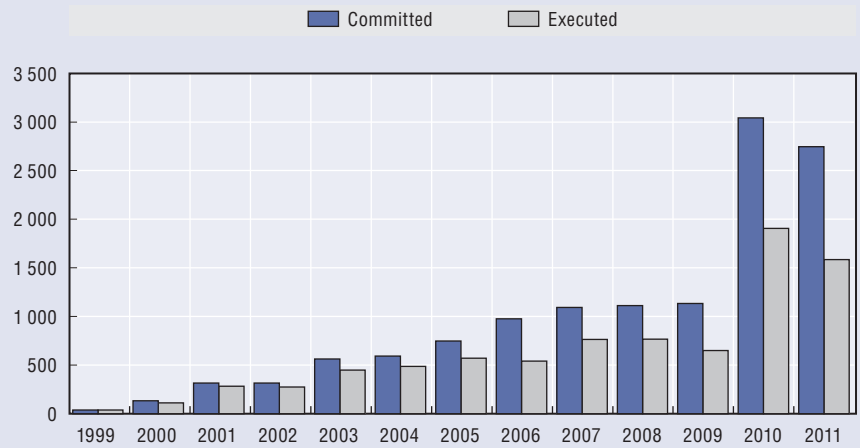
Brazil

In 1999, Brazil introduced a system of sectoral technology funds to finance scientific and technological development. It is based on the creation of several sectoral funds (12 at the start, now 14) and two horizontal funds for innovation. Each fund is financed by channelling specific rents from each sector to the federal fund; in addition, a percentage is channelled to the horizontal funds to finance improvements in R&D infrastructure and co-operative R&D projects between universities and firms. Each fund is managed by a committee composed of members from the Ministry of Science, Technology and Innovation, other sectoral ministries, regulatory agencies, the scientific community and the business sector. Brazil has funds for all major sectors, including oil and gas, biotechnology, energy, information and communication technologies, and health. This system represented an innovation in the existing mechanisms to finance scientific and technological development. Even though it entails complex management schemes that require co-ordination between government, the private sector and academia, it overcomes the limits of incentive schemes designed to follow only a supply-side or a demand-side approach. The resources invested through the sectoral technology funds have increased over the years.

Box 2.5. **Promoting innovation through sectoral technology funds: The cases of Brazil and Uruguay** (*contd.*)

Figure 2.7. **Budget for sectoral technology funds in Brazil, 1999-2011**

million Brazilian reals (BRL)



Source: OECD (2013b).

Uruguay

Sectoral funds in Uruguay were created following co-operation agreements between the ANII and institutions relevant to the sector of reference of the fund. The funds have been designed as tools for removing bottlenecks and supporting research, technological development and innovation in those areas identified as priorities in the National Strategic Plan for Science, Technology and Innovation (PENCTI, *Plan Estratégico Nacional de Ciencia, Tecnología e Innovación*), i.e. energy, fisheries and aquaculture, agriculture and livestock, health and digital television. Projects submitted for approval and financing can be either projects of research and development targeting public or private non-profit research institutions in the country (Category I), or projects of corporate innovation and technological development, targeting public or private local companies (Category II). Once submitted, the projects are evaluated by a Programme Evaluation and Monitoring Committee, constituted of at least five members chosen by the ANII governing board and approved by the CONICYT, as well as representatives of each one of the institutions engaged in the specific fund. These institutions, together with the ANII, define the agenda and themes of each call, and provide the resources for the realisation of the approved projects.

Box 2.5. **Promoting innovation through sectoral technology funds: The cases of Brazil and Uruguay**(*contd.*)

The first sectoral fund to be established in 2010 was the sectoral fund for energy, involving the National Administration of Power Plants and Electrical Transmissions (UTE, Administración Nacional de Usinas y Trasmisiónes Electricas) and the National Administration of Fuels, Alcohols and Portland Cement (ANCAP, Administración Nacional de Combustibles, Alcoholes y Portland). Together with the three institutions, the Ministry of Industry, Energy and Mines (MIEM, Ministerio de Industria, Energía y Minería) also contributes to the definition of the agenda. The fund supports projects aimed at improving the efficient use of energy, social inclusion in energy consumption, the use of smart grids and the territorial management of energy supply. Other sectoral funds in use are the innovagro fund, the health fund, the digital TV fund, and the fund for fisheries and aquaculture.

Source: Based on information from ANII and CEFIR and IDRC (2010) (Uruguay) and MCTI (Brazil).

Implementation: Legal and operational details/bottlenecks

Government plans do not guarantee effective implementation. They are a relevant starting point, but they are effective only when matched with execution capacities and 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 its implementation.

One of the first areas in which the country moved forward in setting the conditions for policy implementation was the creation of the National Research System (SNI, *Sistema Nacional de Investigación*). The SNI was instituted in 2007 and it became operative in 2008, with the objective of formally recognising the profession of "researcher" in Panama. The system responds to the double function of allowing the identification of the potential set of beneficiaries of the research incentives offered by SENACYT and of effectively granting the possibility to carry out research to the individuals attached to bodies (such as universities) where their contract requires them to perform other activities, such as teaching. The SNI has been defined by the Law 56/2007, which establishes: *i)* the existence of different levels of researchers according to their level of seniority and excellence in research impact; and *ii)* the monetary and non-monetary incentives (including reduction in teaching hours) associated with

each category. The peculiarity of the SNI is that it formally recognises groups of researchers and research centres, besides individual researchers. This is aimed at supporting work in clearly identified groups and at favouring a co-operative approach to research. In November 2013, the SNI counted 102 members. The main fields of research represented in the SNI are biodiversity and ecology, bio-medical sciences and health. A major challenge for Panama is the capacity to reach a critical mass at least in certain priority areas; for example, Uruguay, which has the same population as Panama, has more than 1 600 researchers enrolled in the system.

Since the elaboration of the 2005-09 pluri-annual plan for science, technology and innovation, Panama has taken steps to move forward in creating the conditions to implement its innovation policy, but major bottlenecks remain that reduce the capacity to achieve the planned results.

First, Panama lacks an active and targeted agency for the implementation of innovation policy. The SENACYT is responsible for planning, implementation and evaluation at the same time; on an organisational level, this is challenging the capacity to monitor the implementation of programmes and to follow up with the beneficiaries. For example, the National Agency for Research and Innovation in Uruguay has a dedicated unit of 8 people out of a total of 53 in charge of evaluation with multidisciplinary backgrounds, ranging from economy, statistics, political science and sociology.

Second, even though the innovation plan covers a five-year period, the budget for its implementation is assigned on an annual basis, thus creating uncertainty in respect of the possibility of implementing pluri-annual actions. This is a common challenge for most Latin American countries where often budgets are assigned on an annual basis. Science, technology and innovation policies aim at implementing actions that go beyond a one-year horizon; therefore it is important to identify a mechanism to guarantee a reduction in the level of annual discretion in budget allocation. Chile, for example, introduced in 2005 Law number 20.026, which channels part of the royalties from mining production into the Innovation for Competitiveness Fund (FIC, *Fondo de Innovación para la Competitividad*). The FIC was established in 2006 as one of the instruments to finance the implementation of the innovation policy with a long-term horizon (IDB-OECD, 2010). A similar initiative has also been launched in Colombia, with the general royalty system. Implemented in 2012, it guarantees that at least 10% of the royalties are allocated every year to the science, innovation and technology fund managed by Colciencias, the Department of Science, Technology and Innovation (OECD, 2013c).

Third, administrative burdens hinder policy implementation at different levels. A major bottleneck which is responsible for long delays in resource allocation derives from the legal requirement that SENACYT has to respect in assigning resources to beneficiaries. Because of its legal status, SENACYT is required to get an authorisation from the national audit office for each financial disbursement, even after the allocation of resources has been approved and cleared. This administrative requirement, which applies, for example, to each grant assigned for human resource training, contributes to an increase in both the operational management costs and to the time delay in policy implementation. 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 operative 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 operative 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" (*Persona Pública no Estatal*) (Law 17 930/2005, art. 256). In the Dominican Republic, the Ministry of Higher Education (MESCyT, Ministerio de Educación Superior, Ciencia y Tecnología) is also required to get authorisation from the national audit office for each financial disbursement, but the method developed guarantees that payments are disbursed within seven days of the request for payment. The process starts with the audit office registering each signed contract for every individual research project or study grant, using specially designed software for this purpose. The ministry then requests a payment through the Financial Management Integrated System (SIGEF, *Sistema Integrado de Gestión Financiera*). Upon the receipt of the request for payment from the ministry, the audit office processes the payment using the internal audit system, the total number of steps to conclude the audit amounting to five. To expedite this process, the national audit office has staff located in each government dependency which functions under the Law 10-07. The number of personnel for these offices depends on the number of financial transactions in any given institution.

Fourth, there are a high number of laws that set incentives to promote innovation in Panama, but many are under-used and little co-ordination is available between them (Table 2.5).

Table 2.5. **Main laws and regulations influencing innovation policy in Panama, 2013**

Law/decree	Main government body of reference	Content	Examples of specific provisions
Political Constitution of Panama 2004	All	Establishes the role of the Panamanian state in formulating S&T policy	• Art. 83: The country commits itself to design policies to promote the development of science and technology.
Law 25/1992, modified by Law 32/2011	Ministry of Commerce and Industry	Establishes special regime for Panamanian export processing zones (now free zones)	• Art. 27-30: Fiscal regime: firms in export processing zones are exempt from income tax, import tax on required assets, export tax on produced assets, value added tax, patents tax, real estate tax, capital and dividends tax • Art. 41-55: Labour and Migratory regime: foreigners with an invested sum of at least USD 250 000.00 have the right to a permanent resident visa. Technical staff will receive a temporary resident's visa for the term of the contract duration. Foreigners making transactions in export processing zones receive a merchant resident visa valid for a year
Law 13/1997, modified by Law 50/2005 and Law 55/2007	National Secretary of STI (SENACYT), Inter-ministerial council for STI (CICYT), National Commission on S&T (CONACYT), National Fund for S&T (FONACITI)	Establishes the institutional framework and policy instruments for science, technology and innovation in Panama	• Art. 5: Stipulates that PENCYT must include both specific sectoral and general policy instruments • Art. 6: Ensures that PENCYT policy actions are prepared and carried out according to annually assigned government budget • Art. 8: Establishes SENACYT as an autonomous body with legal personality and own assets. The national audit office performs supervision and control functions • Art. 10: Establishes SENACYT's functions (22 functions in total), incl. (1) the preparation, co-ordination, implementation, evaluation and revision of PENCYT, (12) proposes to the executive the creation of any other institutional or legal instrument deemed necessary to support S&T development • Art. 16-18: Establishes inter-ministerial council for STI (CICYT) as co-ordination mechanism between SENACYT and other ministries consists of relevant ministers as suggested by president. • Art. 20: Establishes the National Commission on STI (CONACYT) as cross-sectoral advisory body for SENACYT • Art. 24: Establishes National Fund for S&T (FONACITI) as mechanism to finance and support research, technological development and innovation

Table 2.5. **Main laws and regulations influencing innovation policy in Panama, 2013** (*contd.*)

Law/decree	Main government body of reference	Content	Examples of specific provisions
Law 6/1998	Ministry of Commerce and Industry (Proinvex)	Establishes the "Ciudad del Saber" International Technopark	• Incentives for firms engaging in scientific, technological, human development or cultural activities. Duration: 25 years (renewal possible) • Fiscal incentives: exemption from all taxes, levies, fees or import duties on machines, equipment, furniture, vehicles, appliances or materials; exemption from value added and remittances tax • Immigration benefits: Special visas for affiliated staff and families • Labour benefits: Authorisation to hire international staff as required
Law 54/2001 modified by Law 32/2011	Ministry of Commerce and Industry	Extends the benefits of Panamanian export processing zones (now free zones) to call centre operations	• Art. 2: Stipulates that natural or corporate persons that own a concession issued by the Autoridad Nacional de los Servicios Públicos for the provision of the call centres Services for commercial export purposes (Call Centres) may have recourse to the benefits granted by Law 25 of 30 November 1992, of the free zones.
Law 41/2007, modified by Law 45/2012	Ministry of Commerce and Industry (Proinvex)	Establishes benefits and incentives for multinational companies (MNCs)	• Art. 6-8 (Law 45/2012): Fiscal incentives: *i)* exemption from income and value added tax for services provided to its business group outside the country; *ii)* exemption from income tax for executives, when their salaries come from foreign sources; *iii)* for the services provided within Panama, payment of half of the income tax on the amount to be taxed. • Art. 9-14 (Law 45/2012): labour incentives: MNCs may hire foreign executives of high and mid-levels that they consider necessary to carry out their activities; permanent visas for executives and temporary.
Law 56/2007	Creates the National Research System (SNI) and establishes a series of incentives for R&D		• Formally recognises individual and groups of researchers, and research centres. • Establishes economic incentives for members of the National Research System (SNI) that can be used by the researchers for personal and research and development expenses. • Beneficiaries can lose their status if they fail to comply with the requisites.

Table 2.5. **Main laws and regulations influencing innovation policy in Panama, 2013** (*contd.*)

Law/decree	Main government body of reference	Content	Examples of specific provisions
Law 59/2008 modified by Law 62/2012	National authority for governmental innovation (AIG)	Establishes funds for universal access to telecommunications	• Ch. 3, Art. 4: Establishes operator-specific funds which serve to finance projects approved by the Advisory Board. • Ch. 3, Art 4/1: Establishes financing of the funds: all ICT operating companies (as outlined in Art.3/15) are obliged to establish universal services and access fund; operating companies are obliged to contribute 1% of their taxable income to the fund, including the taxable income for incoming international calls to Panama. • Ch. 3, Art 9: Establishes that 10% of the universal services and access fund is for financing research and development activities. This 10% has to be transferred to FONACITI.
Law 76/2009	Ministry of Commerce and Industry	Establishes the measures for the promotion and development of the Panamanian industry (CFI)	• Ch. 3: Governs the modalities of obtaining an Industrial Promotion Certificate (*Certificado de Fomento Industrial,* CFI), which reimburses payments for permitted activities: *i)* research and development; *ii)* management and quality assurance systems/ environmental management; *iii)* investments and reinvestments of utilities; *iv)* training of human resources; *v)* increment in the employment associated to the production (Art. 16-34).

Source: Authors' elaboration based on information from SENACYT and the Ministry of Commerce and Industry.

Conclusions

Panama, like most Latin American countries, does not have a Ministry of Science, Technology and Innovation. It has a national secretariat (SENACYT), which mostly promotes scientific research and technological development. Since the mid-2000s SENACYT has started to develop programmes to promote innovation. Panama first prioritised access to ICT, especially in rural and indigenous areas and training of human resources for research and innovation. The country has set up a National Research System (SNI), which is, however, still limited in critical mass and has invested in training human resources abroad. The productive integration of skilled people and the support ot entrepreneurship

is still quite limited. Panama is in the process of learning how to set up and implement an innovation policy. The introduction of an innovation survey and the formal requirements of evaluating the implementation of the policy are assets that can help the country in making the most of its investments in science, technology and innovation. However, much needs to be done to increase the impact of public policy in this area. Chapter 3 presents a short assessment of the implementation of the innovation policy in Panama, and identifies a key set of policy recommendations for moving forward.

Notes

1. The PENCYT 2010-2014 was approved with the Resolution No. 2 of 27 September 2010, and by the executive with the Resolution No. 215 of 10 December 2010.
2. A similar project has been undertaken by Uruguay, through the creation of the Timbó (*Trama Interinstitucional y Multidisciplinaria de Bibliografía Online)* portal, providing access to international STI journals and books, many of these for free, and to the national innovation system patent banks. The aim of the project is to bring down barriers and facilitate access to information.

References

ANII (n.d.) Agencia Nacional de Investigación e Innovación, Montevideo, www.anii.org.uy/web/.

CEFIR and IDRC-CRDI (2010), "Innovación y desarrollo: Desafíos pendientes para Uruguay" ("Innovation and development: Pending challenges for Uruguay"), *Serie Cuadernos del CEFIR* 008, Centro de Formación para la Integración Regional, Montevideo.

IDB and OECD (2010), "Strengthening institutional capacities for innovation policy design and implementation in Chile", *Technical Notes* No. IDB-TN-130, Social Sector , Science and Technology Division, Inter-American Development Bank, Washington, DC.

INDICASAT (2013) Instituto de Investigaciones Científicas y servicios de Alta Tecnología, Panama, www.indicasat.org.pa/.

MCTI (n.d.), Ministério da Ciência, Tecnologia e Innovação do Brasil, Brasilia, www.mcti.gov.br/

MEF (2010), *Panamá Plan Estratégico de Gobierno 2010-2014* [Government Strategic Plan 2010-2014], Ministry of the Economy and Finance of Panama.

OECD (2013a), *Start-up Latin America: Promoting Innovation in the Region*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264202306-en.

OECD (2013b), *Perspectives on Global Development 2013: Industrial Policies in a Changing World,* OECD Publishing, Paris, http://dx.doi.org/10.1787/persp_glob_dev-2013-en

OECD (2013c), *OECD Economic Surveys: Colombia 2013: Economic Assessment*, OECD Publishing, Paris, http://dx.doi.org/10.1787/eco_surveys-col-2013-en.

OECD (2012a) *Attracting Knowledge-Intensive FDI to Costa Rica*, OECD Development Centre, Paris, www.oecd.org/countries/costarica/E-book%20FDI%20to%20Costa%20Rica.pdf.

OECD (2011), *Hacia un mecanismo para el diálogo de políticas de innovación: oportunidades y desafíos para América Latina y el Caribe* [Towards a mechanism for policy dialogue on innovation: opportunities and challenges for Latin America and the Caribbean], OECD Development Centre, Paris, March, www.oecd.org/centrodemexico/47435448.pdf

SENACYT (2013), Departamento de Seguimiento de Becarios, Dirección de Gestión de Ciencia y Technología (Department of Liaison with Scholarship Grant Holders, Management of Science and Technology Direction), Panama.

SENACYT (2010), *National Strategic Plan for Science, Technology and Innovation (PENCYT), 2010-2014*, Panamá.

UNCTAD (2012), *Science, Technology and Innovation Policy Review – Dominican Republic* (*Examen de las Políticas de Ciencia, Tecnología e Innovación – República Dominicana*), UNCTAD/DTL/STICT/2012/1, United Nations Conference on Trade and Development, New York and Geneva.