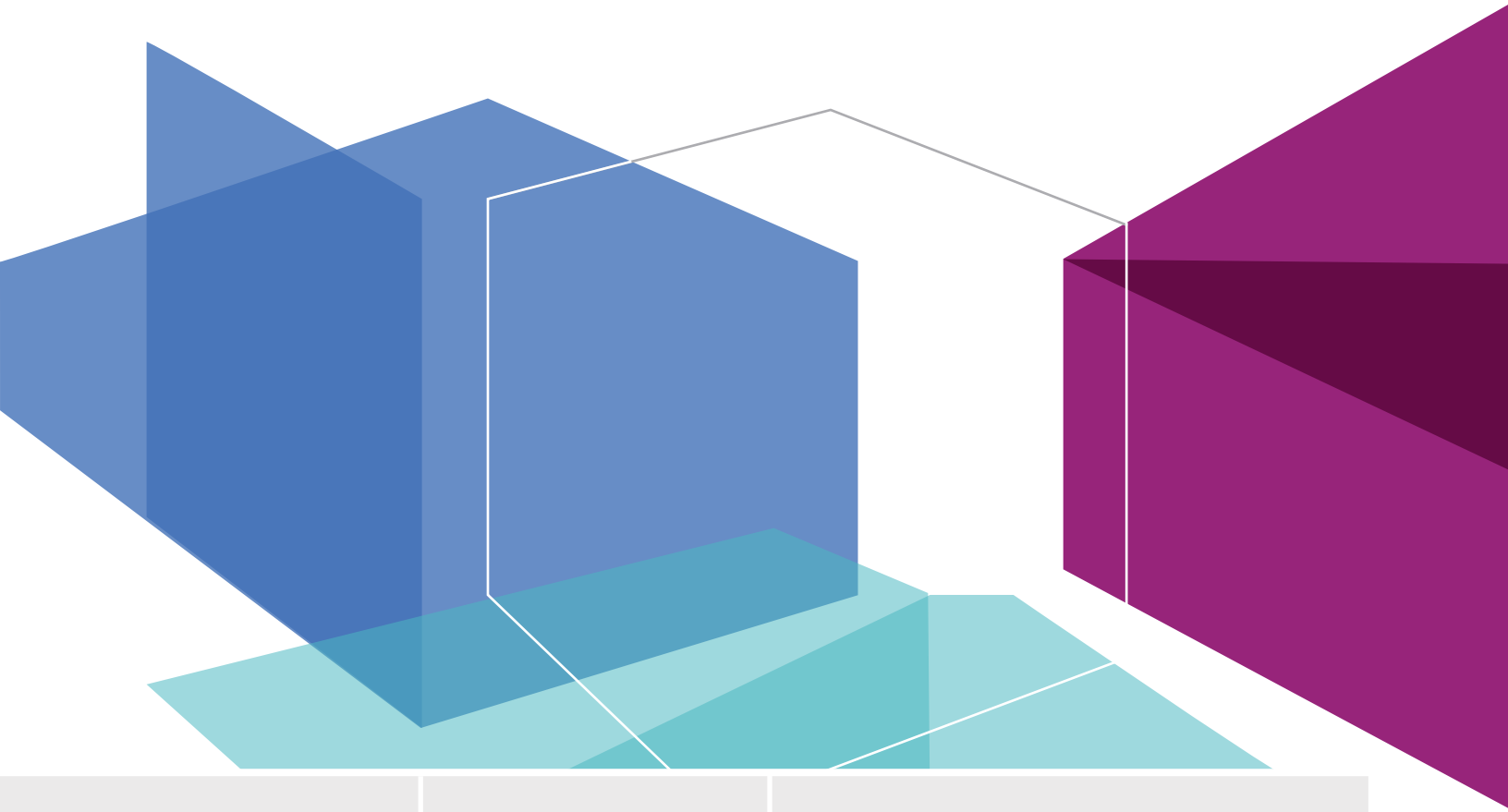

National Innovation Policy 2010 2014

Chile: Latin America's Innovation Hub

Ministry of Economy, Development and Tourism
Innovation Division

Ministerio de Economía, Fomento y Turismo

Gobierno de Chile

National

Innovation

Policy

2010 2014

Chile: Latin America's Innovation Hub

Ministry of Economy, Development and Tourism
Innovation Division

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The challenge that our country bears this decade is probably one of the biggest in its history. Chile is one step away from becoming a developed country (the first one in the region) and eradicating poverty.

The accomplishment of this goal will be possible if every Chilean is able to imagine a happier and fairer country and have the guts to create it.

When President Sebastian Piñera assumed the office in 2010, he received a country with a low sustainable productivity index, which damages the competitiveness of our economy. One of the first challenges assigned to the Ministry of Economy was to reverse this situation.

In fact, the challenge of becoming a developed country comes with the knowledge that the needs of the world are different. The knowledge economy especially rewards the capability to imagine, design, create and execute, and much more importantly, the ability to be one step ahead of what the future may bring.

All these new conditions situate entrepreneurship and innovation as the keys to reach development. The difference between the countries who have reached the summit and the ones that have stayed halfway is the capability of being innovative and entrepreneurial and to create value. It is not enough to have a solid democratic system, a competitive market economy, and an efficient state. There are necessary at least four pillars that President Piñera´s government has adopted to make Chile a developed country and a society of opportunities: the human capital of our people, the investment in science and technology, more dynamic and flexible markets and societies, and the encouragement of innovation and entrepreneurship.

The National Innovation Policy 2010-2014 is a document which reflects the route of the different public policies on science, technology and innovation implemented in this government.

The eight pillars that the policy set are: culture and environment, human capital, institutions and regulations, global connection, R&D, technology, entrepreneurship and commercialization, funding. These are the cardinal principles to accomplish the vision stated: "Chile grows steadily at rates over 6% per year, mainly because of raises in productivity and competitiveness. This raise was the consequence of the quality and quantity of innovation and entrepreneurship in the last decades. Chile is the innovation hub of Latin America ".

The National Innovation Policy 2010-2014 reflects that the efforts in creating a propitious environment for entrepreneurship and innovation, are not only responsibility of the public sector, but also of the enterprises, universities and the civil society.

Natural resources are limited, but imagination, creativity and talent have no limits. The true wealth of a country is its people and their ability to create value. This is what we are trying to reveal as government in these four years of mandate.

Tomás Flores Jaña
Executive Secretary of the Committee
of Ministers of Innovation for Competitiveness

01 Vision

Chile grows consistently at rates superior to 6% per year, thanks to the increases in productivity and competitiveness. These advances can be attributed to the quality and quantity of innovation and entrepreneurship.

Chile is an innovation hub of Latin America.

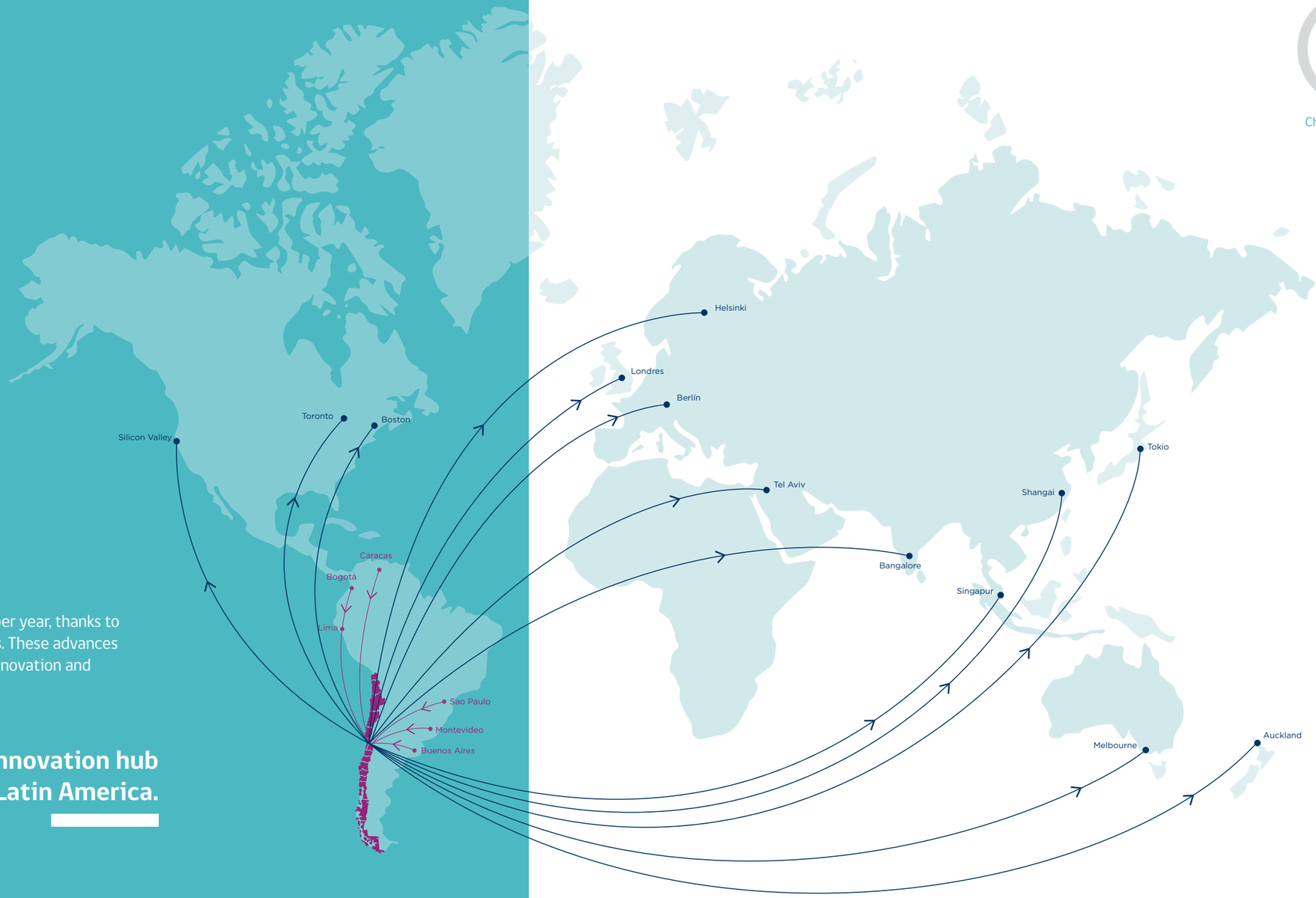

Figure 1

+6%
annual

Chile **growth rate**

02 Mission

Our mission is to increase the productivity and competitiveness of Chile's economy and society by creating the conditions that facilitate innovation. We define innovation as the process of creating value that is recognized by the market through the introduction of new (or significantly improved) products, processes, or methods of commercialization and organization.

Chile's greatest development challenge is to increase the productivity of our economy, for which innovation is fundamental.

It is necessary to cultivate the development of an ecosystem for innovation and entrepreneurship that enables the society to develop its full creative and productive potential.

03 Pillars of the National Innovation Policy 2010 - 2014

To achieve this mission, it is necessary to cultivate the development of an ecosystem for innovation and entrepreneurship that enables the society to develop its full creative and productive potential.

This requires the correction of several flaws that have been observed in the design and implementation of policies to promote innovation and entrepreneurship. It is important to account for these challenges — such as appropriability of public goods, information asymmetry, and externalities (positive and negative) — that lead to suboptimal levels of investment and impede access to adequate financing, especially for startup companies in uncertain phases.

According to the Oslo Manual[i] from the Organisation for Economic Co-operation and Development (OECD), innovation is defined as the utilization of new knowledge to create a new product, process or method, or the redefinition of business models to generate new value in the market. The process of transforming knowledge into value is led by individuals and can occur through either a

startup or an existing company. This process is understood as diffusion and technology transfer.

This policy is based on a strong belief in people, their ideas, their creativity; recognizing individual liberty to innovate and act entrepreneurially; and acknowledging the diversity of our country as a source of wealth. Considering market dynamics, this plan does not consider commercial or productive sectors as "winners", but instead focuses on increasing the productivity and competitiveness in all initiatives, projects, tools, plans, and programs that benefit the country, according to their own merit.

The National Innovation Policy 2010 - 2014 includes several pillars that the majority of the world's most innovative countries have considered fundamental enablers of innovation, and adds Global Connection and Financing (see Figure 2).

These pillars are fundamental variables in the innovation ecosystem. To reach our full potential, we must develop all pillars at a high level. Failure in one area could put the innovation process at risk. This is why the government of President Piñera has decided to focus on improving the areas that present the most opportunities and challenges.

An innovation program cannot be static. The rhythm of global change requires permanent openness and a commitment to identifying new opportunities and threats.

Throughout the innovation ecosystem, government, and National Innovation Council for Competitiveness (CNIC, for its acronym in Spanish), various actors are examining topics of vital importance, such as Antarctic studies, astronomy-based technology, cloud computing for the modernization of the government, food, green innovation, renewable energy, seismology, water, and many more.

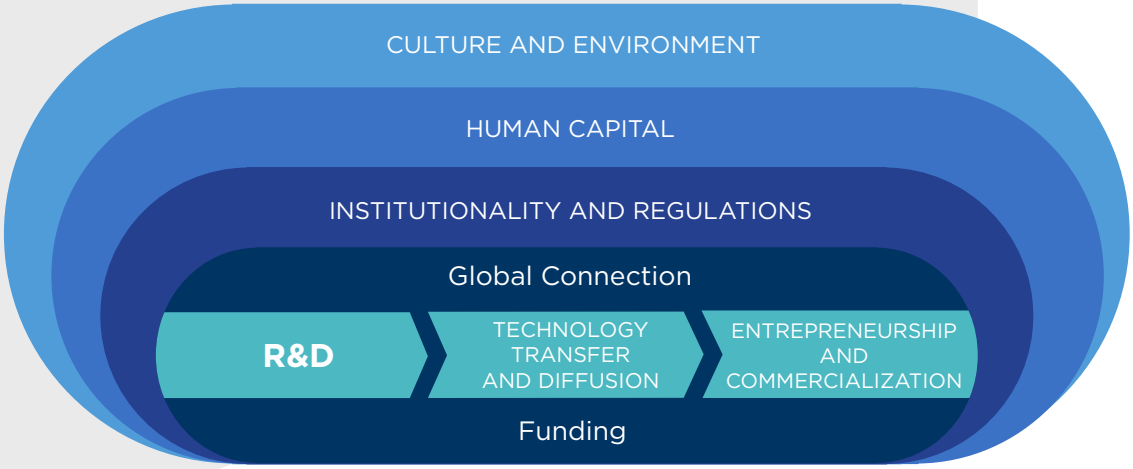

Figure 2

3.1 CULTURE AND ENVIRONMENT

A key element in the successful experience of Silicon Valley and other hubs of innovation, such as Israel[ii], has been the favorable culture for innovation and entrepreneurship.

Of especially vital importance is the society's tolerance for failure in business[iii] . Other relevant cultural elements include creativity, curiosity, identifying opportunities instead of problems, thinking big about global markets, perseverance, and the acceptance of the option to become an entrepreneur, both within families and in the society as a whole.

Transforming Chile into a society that truly values innovation and entrepreneurship is a task that requires everyone's collaboration. This policy proposes initial steps towards a real movement that is pro innovation and entrepreneurship.

This movement coordinates the most relevant actors and favors innovative and entrepreneurial attitudes in all aspects of national activities.

This initiative supports the cultivation of a good environment (ecosystem) for innovation and entrepreneurship, especially through the generation of networks, the diffusion of experiences, and the development of educational programs, as well as open innovation competitions focused on thematic challenges.

Other topics of study include social innovation, which is understood as creative and novel ways to resolve complex social problems that traditional public and private initiatives have not been able to successfully address.

This policy proposes initial steps towards a real movement that is **pro innovation and entrepreneurship**.

3.2 HUMAN CAPITAL

The capacity to innovate ultimately comes from the people. To improve Chile's productivity and competitiveness in the knowledge economy, we must first develop excellent and pertinent human capital. High levels of general education, creativity, critical thinking, and scientific curiosity, as well as entrepreneurial abilities and characteristics, are essential among citizens of all ages.

The top scientists and investigators should direct their latest discoveries and inventions to meet the economy's needs and collaborate with the most specialized professionals to enable the highest productive and technological standards in various productive sectors.

To achieve this, it is indispensable to not only improve the quality of basic and higher education in Chile, but also to specifically strengthen technical formation and expand the opportunities for continuing education and professional training, to complement programs for post-graduate students, in both Chile and abroad.

Additionally, to develop in the globalized and interconnected world of the 21st Century, it is fundamental that the country's workforce possess transversal abilities such as language proficiency (principally English), digital literacy, and skills for entrepreneurship and business.

Considering that the formation of human capital is a long-term endeavor, there should be a complementary policy to attract foreign talent, to help to strengthen local human capital through: 1) the creation of critical masses of professionals in several sectors and specialties; 2) the diffusion of abilities, skills, and better practices; and 3) the cultivation of global connections.

Various initiatives are proposed, which include a flexible migration policy and direct attraction through subsidies for entrepreneurs and investigators.

Some of the initiatives that are currently active or coming soon include Start-Up Chile, a program that incentivizes high-potential entrepreneurs from all over the world to start their companies in Chile; scholarships for foreigners in postgraduate programs in Chile; and the strengthening of the program to attract advanced human capital of the National Commission for Scientific and Technological Research (CONICYT, for its acronym in Spanish).

These programs are expected to achieve both direct and indirect results.

The capacity to innovate ultimately **comes from the people.**

3.3 INSTITUTIONALITY AND REGULATIONS

The government aims to create the conditions to promote science and technology and facilitate innovation and entrepreneurship. The Ministry of Economy, Development and Tourism defines the public policies for this system – with the support of the Ministry of Education and other ministries that participate in the Committee of Ministers for Innovation – establishing an institutional base to organize, coordinate, and oversee the most relevant national agencies.

This new institutional base for innovation aims to reduce the fragmentation of the system, improve the coordination between the principal innovation agencies, and strengthen the role of the Ministry of Economy, Development and Tourism (see Figure 3).

Coordinating the execution of the innovation policy and the various public agencies in the National Innovation System (SNI, by its acronym in Spanish) requires regular reviews of both institutional effectiveness and the hierarchy and structure of the agencies that support science, technology, innovation, and advanced human capital, with a focus on aligning incentives, avoiding duplication of instruments and programs, and improving service quality.

To support the local adaptation of this National Innovation Policy[iv], we propose to strengthen regional capacity to define, promote, and implement regional innovation initiatives, based on both the local context and the recommendations of national and international experts.

This eliminates the bureaucratic excess that has previously accompanied the regional components of the Innovation Fund for Competitiveness ((FIC-R, for its acronym in Spanish) and allows for higher levels of decentralization, better quality and efficiency, and greater impact.

Also, to guarantee the good use of public resources and the positive impact of the pro-innovation policies -especially those that apply to early-stage entrepreneurship and commercialization, and require especially swift and efficient support- a process is being established to monitor and evaluate the National Innovation System, led by the Innovation Division of the Ministry of Economy in coordination with the Budget Division of the Ministry of Finance and the evaluation units of each agency.

Coordinating the implementation of this National Innovation Policy and the distinct public agencies **requires us to review the effectiveness** of the institutions and instances created for this purpose.

3.3 INSTITUTIONALITY AND REGULATIONS

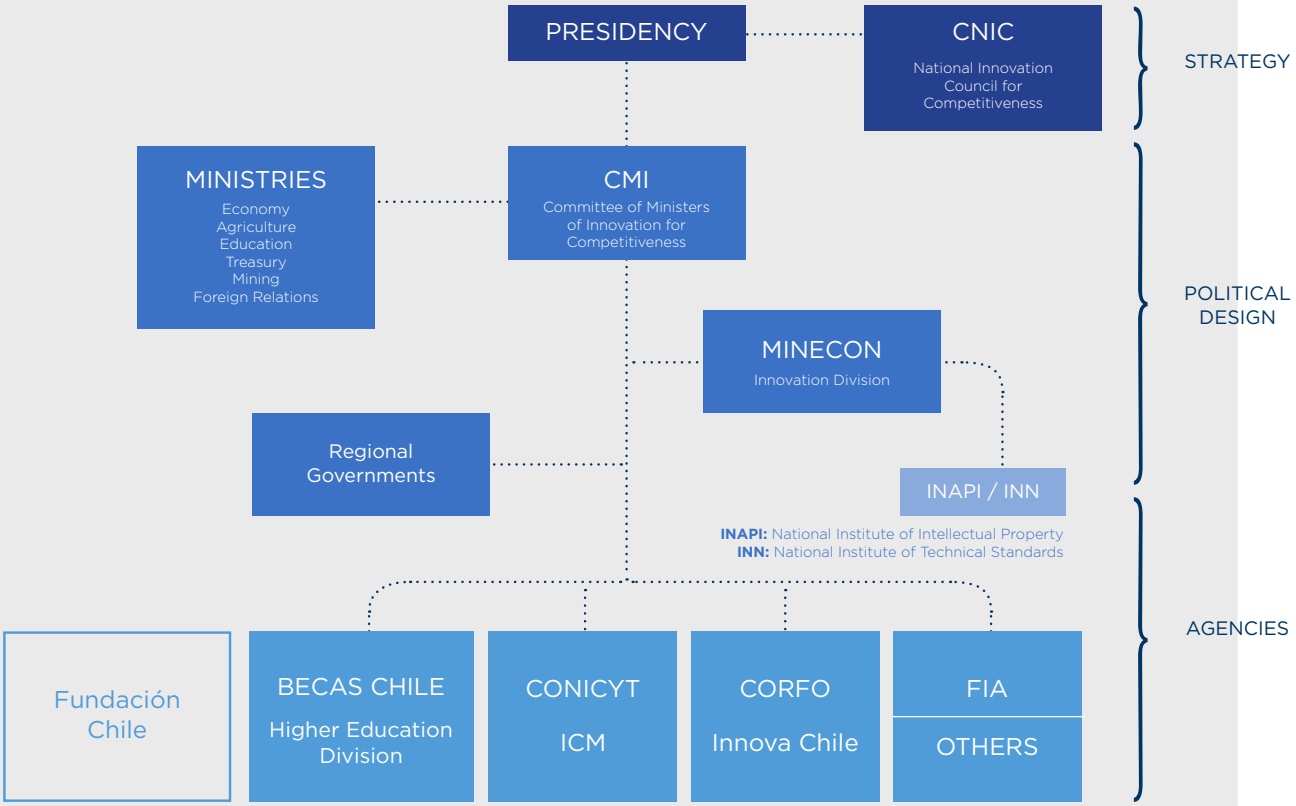

Figure 3

3.4 GLOBAL CONNECTION

To transform Chile into an innovation hub and thus cross the threshold of development, global connections are fundamental. This is especially important because Chile has a relatively small market, far from the most developed global hubs.

To complement what is already a rich and fruitful policy of commercial openness, this National Innovation Policy focuses on increasing connectivity and the flow of companies, entrepreneurs, knowledge, talent, and technology between Chile and the principal centers of innovation in Latin America and the world. This is consistent across all pillars of the political structure.

Some of the initiatives include: the building of connections between Chile and the best universities in the world, through student internships, joint investigations, and opportunities to take part in pre and post-doctoral programs; the strengthening of ties between investigation centers in Chile and the global ecosystem; the consolidation of the National Institute of Intellectual Property (INAPI, for its acronym in Spanish) as a regional hub for the field; and the Chile California Program, an initiative that cultivates connections between entrepreneurs, venture capital funds, universities and other institutions in Chile and Silicon Valley.

This National Innovation Policy focuses on **increasing connectivity** and the flow of companies, entrepreneurs, knowledge, talent, and technology between Chile and the principal centers of innovation in Latin America and the world.

3.5 FINANCING

It is critical to have an adequate chain of financing for the ecosystem of innovation and entrepreneurship. This chain should be continuous, without gaps that could lead to the failure of an innovation before it has been successfully consolidated in the marketplace. It should also be efficient, since roadblocks like illiquid markets, exigent guarantees, and excessive costs of financing can lead to decreases in competitiveness.

In general, the problem in Chile is not the availability of resources, but the difficulty that large segments of the population have in accessing these resources. In many cases this produces market failures (asymmetry of information, adverse selection, etc.) and the public instruments have not been adequately designed to make up for this.

Therefore, Chile lacks an adequate and efficient supply of capital for activities such as innovative entrepreneurship (angel investors, venture capital funds, emerging exchanges, loans for companies that are "young" or lack financial history, etc.) and long-term R&D&I projects.

In the case of seed capital, one of the principal problems has been its bothersome intermediation. To remedy this, a new instrument to assign seed capital is being implemented to better align the incentives for intermediaries and entrepreneurs.

It is also necessary to give small and medium-sized businesses (SMEs) access to credit in the financial system. To facilitate this, CORFO (the Economic Development Agency, according to its abbreviation in Spanish) has started to improve the systems for state guarantees and reciprocal guarantee societies, assuring both general opportunities for SMEs to operate adequately and a level of protection for the interests of new companies, especially high-potential startups.

It is critical to have an adequate chain of **financing** for the ecosystem of innovation and entrepreneurship.

3.6 RESEARCH AND DEVELOPMENT (R&D)

On the road to innovation, the role of science is fundamental, though it's not exclusionary or unique as a starting point. Scientific investigation and technological development expand the frontiers of what is possible and generate an ecosystem nourished with new ideas. The evidence from developed countries[v] indicates that R&D investment brings long-term benefits, such as facilitating the entire nation's development and contributing to its leadership in the knowledge economy.

Chile is embarking on its greatest scientific leap in decades. Currently we have a level of R&D investment much lower than the OECD average (0.4% of GDP in 2008 versus the OECD average of 2.3%). The goal is to double this figure before 2014, principally through greater participation of private companies in these activities, a type of investment that has historically been uncommon.

We expect to reach this goal through a series of initiatives, which include: an improved law to provide tax incentives for R&D; the expansion of the current tax benefits for "intramural" programs (R&D carried out using the company's existing capacities); the tripling of the maximum possible tax credit; and the application of this credit to other expenses such as capital. Other expected changes include the attraction of foreign investments in R&D&I, the installation of international Centers of Excellence in R&D; the strengthening of successful programs, such as the National Fund for Scientific and Technological Development (FONDECYT, for its acronym in Spanish); the establishment of new national scientific and technical Centers of Excellence; the new funding for R&D in key areas for the country; the insertion of researchers in industry and academia; the increase in regional capacity for the progress of national science and technology; and the new funds for access to scientific equipment.

We place special attention on astronomy. Astronomy is expected to attract more than three billion dollars in investment, as well as significant growth in associated maintenance and high-tech services. To transform Chile into a hub of global astronomy, it is important to support the development of advanced human capital, the preparation of our industrial sector, and the research conducted by our scientists. Strengthening the interconnections between these actors, as well as with international peers and observatories, requires that public institutions approach astronomy as a driver of innovation. Astronomy presents a unique opportunity to develop new businesses whose impact can reach many areas, such as defense, health, mining, telecommunications, and more.

Scientific investigation and technological development **expand the frontiers of what is possible.**

3.7 DIFFUSION AND TECHNOLOGY TRANSFER

Developing science and technology is crucial for technological innovation, but transforming the creation of knowledge into the creation of value in the economy requires diffusion and technology transfer. It is important to enable fluid communication and exchange between the centers of knowledge production and the productive sectors, on both a local and global scale.

Technology transfer is understood as the integration of new knowledge or new technology into the market, while technology diffusion is understood as the implementation of knowledge or technologies that already exist in the market into companies.

This National Innovation Policy is based on the conviction that creating closer connections between companies and universities can give rise to the creation of new products with high levels of added value. This includes clear incentives for the R&D funds to generate the transfer of knowledge into the marketplace whenever possible and pertinent, especially projects that are part of the Fund for the Promotion of Science and Technology (FONDEF, for its acronym in Spanish). Several specialized programs have been created to provide direct support for technology transfer.

The capacity to create new intellectual property naturally lies inside centers of knowledge. Collaborating with intermediary agents can allow Chile's knowledge to reach the market, through licenses, new businesses, patents, etc. The Offices for Technology Transfer and Development also create new spaces for communication and collaboration with entrepreneurs and investors, from which new opportunities can emerge. The participation of external agencies that serve as technology brokers is particularly important to the success of this initiative.

Additionally, it is important to consider intellectual property as a tool for innovation and not a goal in itself. It is fundamental from the perspective of protecting new creations, but it also serves a "social" function in sharing technological advances with everyone and thus improving overall welfare. These two sides are both essential for the system to function. In support of this INAPI plays a crucial role in the development of a series of programs related to education, use of information technology, and the promotion of Geographic Indication and Denomination of Origin. Also, the modernization of the Law of Industrial Property can increase the efficiency of proceedings, extend the protection of rights that are excluded from our legislation, and improve the regulations for the respect of intellectual property rights.

For the majority of Chilean companies, innovation is achieved through incremental increases in productivity obtained through better formation of human resources, increased capacity for innovation management (see next section) and the diffusion and integration of best practices for productive processes and business models.

Transforming creation of knowledge into creation of value requires **diffusion and technology transfer.**

3.8 ENTREPRENEURSHIP AND COMMERCIALIZATION

In defining innovation as a process of value creation that is recognized by the market, it appears that there are essentially two ways to achieve this. An established company commercializes the innovation (creates a new market, produces more efficiently, etc.) or an entrepreneur creates a new company to bring the innovation to market.

Of these alternatives, entrepreneurship (specifically high-potential startup entrepreneurship) is more relevant, since it has more potential for job creation and economic impact[vi].

Understanding that entrepreneurship -and especially commercialization- is a fundamentally private-sector activity, the role of the government should be limited to interventions that confront significant market failures. In this sense the instruments of support focus on the initial phase of entrepreneurship, the phase with the most uncertainty and the most limited access to financing from venture capital funds and traditional capital markets[vii].

A major goal is to help high-potential entrepreneurs build global connections. ProChile provides support for international expansion, tours to innovation hubs, connections with venture capital funds, seminars, workshops, and more.

Another objective is to make the startup process more accelerated, agile, and inexpensive, by simplifying the steps and timeframes to access government programs, reducing the bureaucratic steps necessary to start a business, and facilitating the processes to close an enterprise.

Additionally, many companies in Chile have organizational cultures that are poorly suited for projects with a high level of uncertainty, as well as limited capacity for innovation management. As a result, they do not invest substantially in projects at the frontier of innovation. In this context, CORFO looks to provide management support, particularly by facilitating access to financing and knowledge networks, and supporting disruptive business models.

Special emphasis is placed on cultivating a culture of innovation inside companies, a fundamental source of long-term increases in productivity. This is to be achieved through programs that help companies develop innovation management capacity within their organizations.

A major objective is to make the startup process
more accelerated, agile, and inexpensive.

04 Mechanisms of Evaluation

As in every type of public policy, the efforts should be focused on the policies and programs that maximize the desired impact. Programs that are not causing the desired impact should be redesigned or closed. Additionally, it is important to focus on both the "client" and the management of the agencies.

To achieve this, the Innovation Division of the Ministry of Economy, Development and Tourism has created an Evaluation and Policies Unit. Its mission is to collaborate with the agencies to monitor and evaluate the various policies and programs throughout the entire National Innovation System.

The agencies create a rubric for each program, which clearly establishes the short-term and long-term objectives for the beneficiaries and the economy as a whole.

The following indicators and evaluation methods have been established:

Indicators of Process and Management:

These measure processes and the management of programs within the agencies. They include the number of applicants and projects, total budgets, timeframes, leverage of resources, project areas and disciplines, and assigned resources, among others.

Indicators of Results:

These are the intermediate, final, and long-term results obtained by the beneficiaries of a program or instrument. For example: sales figures or the number of scientific publications, patents, employees, etc.

Using the data collected from applicants and the indicators of beneficiaries' results, impact assessments should provide feedback on the design of policies and programs.

The Evaluation and Policies Unit supports the agencies in the elaboration of client satisfaction surveys, and thus standardizes the data collected. This enables comparisons between agencies and over time — regarding entrepreneurship, human resources, innovation, investment, science, technology, and other topics — to report to the OECD and other international institutions.

i Oslo Manual, OECD, 3rd Edition, 2005: Innovation is the introduction of a new or significantly improved product, service, process, or method of commercialization or organization, in company's internal practices, workplace organization, or external relations.

ii Start Up Nation: The Story of Israel´s Economic Miracle, Dan Senor & Saul Singer, among others.

iii In the context of this document the expression "business failure" refers to those companies that, because of the risky or uncertain nature of economic activity, have not been successful in moving forward and have needed to stop their activities. Obviously it does not refer to actions that go against the law or ethics, or to those that intentionally seek to fail in commercial initiatives.

iv See: Agenda de Innovación y Competitividad 2010-2020, CNIC, March 2010, and Strengthening Institutional Capacities for Innovation Policy Design and Implementation in Chile, OECD and IDB, March 2010, among others.

v Hacia una Estrategia Nacional de Innovación para la Competitividad, Chapter 1, II.2 based on an OECD study.

vi High-Growth Firms and the Future of the American Economy, Dane Stangler, March 2010,

vii It is important to avoid confusing uncertainty with risk, and to clarify the difference between both. Risk is a probability of success (or failure) that is known or reasonable to estimate (for example: price, demand, or future costs of a project). Uncertainty is the absence of reasonable estimation regarding risk (for example: the viability of a new technology that has not yet been developed), as well as the total absence of control when facing a crucial variable that could fluctuate and radically affect the project (for example: an official regulation).

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