# TERMS OF REFERENCE – CH-T1151

**“Strategic Selectivity Study**: **Learning from the Korean experience”**

**I. Context**

Chile’s growth record has been strong over the past decade, with rates of human and physical capital accumulation sufficient to reduce the output per worker gap *vis-à-vis* more advanced economies. Nevertheless, according to OECD estimates (Johansson et al., 2012) total factor productivity (TFP) growth has remained flat. Furthermore, Chile’s TFP growth slowed sharply in the last decade raising worries about the sustainability of its growth pattern (Fuentes et al., 2008). For instance, Magendzo and Villena (2012) showed that TFP annual growth slowed from an average of 2.8% between 1992 and 1997 to approximately zero over the period 1998-2010, raising concerns about the feasibility of long term income convergence towards higher living standards. In order to recover its TFP dynamism, Chile needs to go beyond good framework conditions and to strength its innovation system[[1]](#footnote-1).

Chile’s innovation spending is the lowest in the OECD, with most of R&D expenditure heavily concentrated in the publicly funded university sector. More broadly, evidence from Innovation Surveys showed that about one-third of firms innovate (Minecon, 2009), which is less than the 40% or so that is usual in EU countries. Furthermore, business innovation spending *fell* in Chile as a percentage of GDP through the mid-2000s (Benavente, 2006), and data suggests that it had not recovered by the end of the decade.

The Chilean economy has few knowledge intensive sectors. The economic complexity of country’s exports is not only lower than other LAC countries but is also lower than natural resource intensive OECD countries[[2]](#footnote-2). Between 1984-2010, in relative terms to the rest of the world, the economic complexity of Chilean exports has actually declined. A change in economic complexity depends on the productive capacities of a given society to move towards more complex goods while the complexity of existing goods is eroded by other competitors. In the case of Chile, the entry into more complex goods has been insufficient to compensate by this erosion effect (BID, 2014). This problem of low complexity can also be seen in important sectors for Chilean economy such as mining, energy and services. According to different estimates, this low complexity explains more than 40% of the innovation investment gaps in the private sector with respect to the OCDE (BID, 2014).

Many of these problems are not new, and they have been recognized as such by policy makers. Indeed, since early 90s Chilean authorities have set up a rather complex system of interventions and several technology development funds were established in order to simulate innovation by the private sector[[3]](#footnote-3). However, these funds operate mostly following a demand driven and horizontal approach, which lead to problems of fragmentation and critical mass in many sectors. Furthermore excessive degrees of freedom are left to the two most important executing agencies[[4]](#footnote-4), leading to problems of overlap and lack of coordination. In 2005 a National Council for Innovation and Competitiveness (CNIC), with the mission of proposing general guidelines for a national innovation strategy and a ministerial cabinet to ensure a coherent policy mix in line with the innovation strategy were set up. However, there is still a long way to go in order to rebalance the policy mix towards strategic priorities[[5]](#footnote-5), to redesign public programs in order to align them better with market failures and to improve the efficiency of public investments in science, technology and innovation. Coordination problems also go beyond the interactions between the different agencies within the central government but also extend to issues of multilevel governance between the central and the regional (sub-national) governments[[6]](#footnote-6).

The new Chilean Government (GCL) (2014-2018) understands innovation as a critical driver of inclusive growth. In order to achieve this, the GCL has set four broad objectives: (a) to promote the productive diversification; (b) to encourage sectors with high growth potential; (c) to increase SMEs productivity and (d) to generate new exports. The GCL has requested IDB’s support for the implementation of this National Competitiveness and Innovation Agenda (2014 -2018) and a lending program is currently under preparation for this (CH-L1088).

The Korean Evaluation Industrial Technology Institute (KEIT) is considered a good practice in terms of the implementation of innovation policies oriented to strategic sectors. As such learning from this experience could be particularly relevant at this stage of development of Chilean innovation policies.

**II. Objective**

**General Objective.** The purpose of this consultancy will be to contribute to the implementation of the National Competitiveness and Innovation Agenda (2014-2018). Specific objectives are: (i) To learn from the experience of KEIT and (ii) To build capacities at the Ministry of Economy on how to orient innovation interventions toward strategic sectors.

**III. Activities**

To prepare a background report collecting detailed evidence on the mission, goals, operational procedures, staff, recruiting, talent management, information technology systems, sector prioritization, project cycle covering call for proposal, assessment, contracting, monitoring and evaluation carried out by KEIT.

To present the background report in a workshop organized by the Minitery of Economy of Chile in Santiago.

To carry out interviews with Chilean key policy makers in order to assess the feasibility to transfer the KEIT model to Chile.

To extent the background report with an extensive analysis on the Chilean context and the provision of recommendations.

**IV. Product**

Report with scoping study of KEIT operations coupled with recommendations for the Chilean government.

**V. Characteristics of the Consultancy**

Type of consultancy: Individual International

Starting Date and Duration: Starting on XXX, 2015; duration of XX months for a total of XXX days**.**

Place of work: Home Country, Seoul and Santiago

Qualifications: PhD Degree in statistics, economics, higher education or innovation economics or public policy studies. At least ten years of research experience in the field of the economics of innovation, competitiveness and public policy.

**VI. Supervision**

The individual consultancy will be supervised by the IDB Competitiveness and Innovation Specialist (IFD/CTI) in Santiago.

# TERMS OF REFERENCE – CH-T1151

“**Building Institutional Capabilities for the Chilean Regional Innovation Councils”**

1. **Context**

Chile’s growth record has been strong over the past decade, with rates of human and physical capital accumulation sufficient to reduce the output per worker gap *vis-à-vis* more advanced economies. Nevertheless, according to OECD estimates (Johansson et al., 2012) total factor productivity (TFP) growth has remained flat. Furthermore, Chile’s TFP growth slowed sharply in the last decade raising worries about the sustainability of its growth pattern (Fuentes et al., 2008). For instance, Magendzo and Villena (2012) showed that TFP annual growth slowed from an average of 2.8% between 1992 and 1997 to approximately zero over the period 1998-2010, raising concerns about the feasibility of long term income convergence towards higher living standards. In order to recover its TFP dynamism, Chile needs to go beyond good framework conditions and to strength its innovation system[[7]](#footnote-7).

Chile’s innovation spending is the lowest in the OECD, with most of R&D expenditure heavily concentrated in the publicly funded university sector. More broadly, evidence from Innovation Surveys showed that about one-third of firms innovate (Minecon, 2009), which is less than the 40% or so that is usual in EU countries. Furthermore, business innovation spending *fell* in Chile as a percentage of GDP through the mid-2000s (Benavente, 2006), and data suggests that it had not recovered by the end of the decade.

The Chilean economy has few knowledge intensive sectors. The economic complexity of country’s exports is not only lower than other LAC countries but is also lower than natural resource intensive OECD countries[[8]](#footnote-8). Between 1984-2010, in relative terms to the rest of the world, the economic complexity of Chilean exports has actually declined. A change in economic complexity depends on the productive capacities of a given society to move towards more complex goods while the complexity of existing goods is eroded by other competitors. In the case of Chile, the entry into more complex goods has been insufficient to compensate by this erosion effect (BID, 2014). This problem of low complexity can also be seen in important sectors for Chilean economy such as mining, energy and services. According to different estimates, this low complexity explains more than 40% of the innovation investment gaps in the private sector with respect to the OCDE (BID, 2014).

Many of these problems are not new, and they have been recognized as such by policy makers. Indeed, since early 90s Chilean authorities have set up a rather complex system of interventions and several technology development funds were established in order to simulate innovation by the private sector[[9]](#footnote-9). However, these funds operate mostly following a demand driven and horizontal approach, which lead to problems of fragmentation and critical mass in many sectors. Furthermore excessive degrees of freedom are left to the two most important executing agencies[[10]](#footnote-10), leading to problems of overlap and lack of coordination. In 2005 a National Council for Innovation and Competitiveness (CNIC), with the mission of proposing general guidelines for a national innovation strategy and a ministerial cabinet to ensure a coherent policy mix in line with the innovation strategy were set up. However, there is still a long way to go in order to rebalance the policy mix towards strategic priorities[[11]](#footnote-11), to redesign public programs in order to align them better with market failures and to improve the efficiency of public investments in science, technology and innovation. Coordination problems also go beyond the interactions between the different agencies within the central government but also extend to issues of multilevel governance between the central and the regional (sub-national) governments[[12]](#footnote-12).

Chile is in the process of defining a complete overhaul of the institutional framework that governs and regulate innovation policies. Institutional reforms include, among others, the drafting of a new legislation for the CNIC and redefining the innovation public policy relationships between the central government and regions, through the establishment of Regional Innovation Councils. A critical factor for the success of such a strong decentralization effort is to effectively enhance and build the regional institutional capabilities needed for defining a strategy for regional development, designing policy aligned with such a strategy and implement the policy.

1. **Objective**

To propose, test and transfer a methodology for enhancing and building strategic capabilities within the scope of science technology and innovation at regional level in Chile.

1. **Activities**

To **design** a methodology for assessing and enhancing the regional strategic capabilities in Science, Technology and Innovation in Chilean regions. Such methodology should consider the heterogeneity of the Chilean regions, be participative, and assess the needs of human resources.

Implement and **test** the methodology in two regions of Chile with different levels of institutional development (regarding the innovation regional system) for improving the final design of the methodology.

Based on the design and test phases, generate **recommendations** and **capability transfer** to the CNIC in order to enable it to replicate the process in the rest of the country.

1. **Products**

One report with a preliminary design for assessing and fostering institutional capabilities at regional level for defining a strategy for regional development, designing policy aligned with such a strategy and implement the policy. Such design should consider the variety of the Chilean regions regarding its capabilities and the need of human resources training and therefore should allow different sets of actions depending on the local scenario. Also, it should aim to foster capabilities at strategic level, policy design level and policy implementation level.

Implementation of the design in two regions of Chile as a pilot phase of the methodology for fostering institutional capabilities. This pilot phase should consists in a number of activities involving the regional actors such as workshops, seminars, training, among other activities, according to the preliminary design, which will be improved with the results of this pilot phase.

A manual or set of practical recommendations and training in order to enable the CNIC to adopt the methodology and apply it in the rest of the country after the present project ends.

**V. Characteristics of the Consultancy**

Type of consultancy: Firm International

Starting Date and Duration: Starting on XXX, 2015; duration of 6 months for a total of XXX days**.**

Place of work: Home country and Santiago**.**

Qualifications: PhD Degree in statistics, economics, higher education or innovation economics or public policy studies. At least ten years of research experience in the field of the economics of innovation, competitiveness and public policy.

1. **Supervision**

The individual consultancy will be supervised by the IDB Competitiveness and Innovation Specialist (IFD/CTI) in Santiago.

# TERMS OF REFERENCE – CH-T1151

# “Industrial Property Rights for Development”

1. **Context**

The National Institute of Industrial Property of Chile requests the assistance of an international advisor to conduct and elaborate a methodology for the development of a national strategy on Industrial Property (IP). Further, the advisor shall develop a methodology of diagnosis including data-collection from key stakeholders, in order to make their views known and being considered for the strategy.

Industrial Property plays an essential role regulating the protection of knowledge and information, which makes part of inventions, creations and even distinctive signs and words, turning them into intangible and tradable assets in the market, for a given period of time. Moreover, IP is an important tool to promote innovation and competitiveness.

Though Chile has signed many multilateral as well as bilateral trade agreements including IP related matters, these have not been accompanied by a state policy related to industrial property; the country has been rather problem driven to the international obligations provided under such agreements[[13]](#footnote-13). Bilateral agreements in particular have demanded the implementation of even higher standards to the ones stated under the TRIPS agreement[[14]](#footnote-14), which constitutes an additional reason to elaborate a national strategy of Industrial Property to provide a navigation chart *vis-à-vis* the proliferation of international trade agreements.

An IP framework should provide not only a starting point for future trade agreements being negotiated but it should also allow the promotion and diffusion of IP in universities and research centers. Furthermore, it is deemed necessary to define an IP strategy to reinforce and complement the national strategy of innovation[[15]](#footnote-15).

Several countries are currently developing or implementing strategies related to IP. The methodology to develop these strategies differs according to the each country’s reality. However, an IP strategy for Chile should include at least some of the following principles: (a) to pay attention to sectors of the economy in which the country has comparative advantages; (b) the particular situation of each region of the country; (c) to use and exercise of IP rights (IPR) by entrepreneurs, universities, research institutes, craftsmen and artists, with special attention for small and medium-sized enterprises (SMEs); (d) to promote the commercialization of IPR´s to accelerate the productive use of creations and innovations in the interest of society, placing a particular emphasis to the cluster policy that has been promoted by the government; (e) to provide a framework for carrying international negotiations in line with the national IP policy; (f) to propose an institutional arrangement, based on the current institutions and (g) to elaboration of an IP dissemination plan.

**II.Objective**

The objective of this consultancy is to give INAPI an expert vision on how to carry-out the formulation of a national IP strategy for Chile. An international advisor should provide additional expertise to the work already done by INAPI, with actual cases and successful experiences, as well as providing a methodological view.

**Specific Objectives:**

* To take into consideration the framework developed by several countries that have already implemented a national IP strategy.
* To identify and to promote the participation of key actors in the public policy field, academics and the entrepreneurial world, as well as other stakeholders during the different phases of the design of the project.
* To present the results of the advisory in a large-scale event.

**III.Activities:**

* To review the Chilean IP legal framework
* To carried out a first mission to Chile
* To elaborate a report including a proposed methodology to collect the necessary information to develop an IP strategy.
* To elaborate work plans to put in place the methodology for collecting information.
* Collecting and processing information.
* To elaborate a report with suggestions after the collection and processing of the information gathered by INAPI. The report should include specific matters in which INAPI should place emphasis in the national strategy.
* Second visit of the advisor to Chile: Presentation of the results to INAPI
* Meeting with government agencies to present advancement of the strategy.

**IV.Products:**

Consultancy report on a methodology to develop a national IP strategy and presentation of the work plan in a national workshop.

1. **Characteristics of the Consultancy**

Type of consultancy: Individual International

Starting Date and Duration: Starting on XXX, 2015; duration of XX months for a total of XXX days**.**

Place of work: Montevideo and Department XXX**.**

Qualifications: PhD Degree in statistics, economics, higher education or innovation economics or public policy studies. At least ten years of research experience in the field of the economics of innovation, competitiveness and public policy.

**VI.Supervision**

The individual consultancy will be supervised by the IDB Competitiveness and Innovation Specialist (IFD/CTI) in Santiago.

# TERMS OF REFERENCE – CH-T1151

“**Fostering Technology Development Capabilities in Chile’s Research Centers**”

**I.Context**

Chile’s growth record has been strong over the past decade, with rates of human and physical capital accumulation sufficient to reduce the output per worker gap *vis-à-vis* more advanced economies. Nevertheless, according to OECD estimates (Johansson et al., 2012) total factor productivity (TFP) growth has remained flat. Furthermore, Chile’s TFP growth slowed sharply in the last decade raising worries about the sustainability of its growth pattern (Fuentes et al., 2008). For instance, Magendzo and Villena (2012) showed that TFP annual growth slowed from an average of 2.8% between 1992 and 1997 to approximately zero over the period 1998-2010, raising concerns about the feasibility of long term income convergence towards higher living standards. In order to recover its TFP dynamism, Chile needs to go beyond good framework conditions and to strength its innovation system[[16]](#footnote-16).

Chile’s innovation spending is the lowest in the OECD, with most of R&D expenditure heavily concentrated in the publicly funded university sector. More broadly, evidence from Innovation Surveys showed that about one-third of firms innovate (Minecon, 2009), which is less than the 40% or so that is usual in EU countries. Furthermore, business innovation spending *fell* in Chile as a percentage of GDP through the mid-2000s (Benavente, 2006), and data suggests that it had not recovered by the end of the decade.

The Chilean economy has few knowledge intensive sectors. The economic complexity of country’s exports is not only lower than other LAC countries but is also lower than natural resource intensive OECD countries[[17]](#footnote-17). Between 1984-2010, in relative terms to the rest of the world, the economic complexity of Chilean exports has actually declined. A change in economic complexity depends on the productive capacities of a given society to move towards more complex goods while the complexity of existing goods is eroded by other competitors. In the case of Chile, the entry into more complex goods has been insufficient to compensate by this erosion effect (BID, 2014). This problem of low complexity can also be seen in important sectors for Chilean economy such as mining, energy and services. According to different estimates, this low complexity explains more than 40% of the innovation investment gaps in the private sector with respect to the OCDE (BID, 2014).

Many of these problems are not new, and they have been recognized as such by policy makers. Indeed, since early 90s Chilean authorities have set up a rather complex system of interventions and several technology development funds were established in order to simulate innovation by the private sector[[18]](#footnote-18). However, these funds operate mostly following a demand driven and horizontal approach, which lead to problems of fragmentation and critical mass in many sectors. Furthermore excessive degrees of freedom are left to the two most important executing agencies[[19]](#footnote-19), leading to problems of overlap and lack of coordination. In 2005 a National Council for Innovation and Competitiveness (CNIC), with the mission of proposing general guidelines for a national innovation strategy and a ministerial cabinet to ensure a coherent policy mix in line with the innovation strategy were set up. However, there is still a long way to go in order to rebalance the policy mix towards strategic priorities[[20]](#footnote-20), to redesign public programs in order to align them better with market failures and to improve the efficiency of public investments in science, technology and innovation. Coordination problems also go beyond the interactions between the different agencies within the central government but also extend to issues of multilevel governance between the central and the regional (sub-national) governments[[21]](#footnote-21).

The new Chilean Government (GCL) (2014-2018) understands innovation as a critical driver of inclusive growth. In order to achieve this, the GCL has set four broad objectives: (a) to promote the productive diversification; (b) to encourage sectors with high growth potential; (c) to increase SMEs productivity and (d) to generate new exports. The GCL has requested IDB’s support for the implementation of this National Competitiveness and Innovation Agenda (2014 -2018) and a lending program is currently under preparation for this (CH-L1088).

The experience of successful catching-up countries such as Korea, Finland or Israel, suggests that research centers are key innovation system actors during the early stage of catching-up. Indeed, there are three arguments that justify RIs: (a) they can generate knowledge that is considered a public good for regulatory purposes; (b) they can address market failures related to knowledge appropriation that adversely affect the generation of knowledge in the private sector and (c) they can address systemic failures that hinder technology development and transfer between scientific institutions and firms. Chile has invested a significant amount of public funds in fostering major research centers through various public national programs ("Iniciativa Científica Milenio", at the Ministry of Economy, and "Fondap" and "Basal" at the National Commission for Scientific and Technological Research).

Those programs have effectively produced critical mass and successful research projects but still lack capabilities for developing technologies based on their scientific findings. Chile has a network of research centers comprised by four public technological institutes and about 40 research centers. Although in principle these institutions were created to fulfill the three missions, in practice the third mission is very underdeveloped institutions. Thus, a potentially high impact policy would be one that fosters the technology development capabilities of Chilean high-impact scientific research centres.

**II.Objective**

To assess and foster the technological development potential of Chilean high-impact scientific research centers by learning from the Korean and other OECD countries experiences regarding the reforms of Government Research Institutes (KGRIs).

**Specific Goals**

* Conduct an international peer review of eight Chilean high-impact scientific research centers for assessing the technological development potential and capabilities.
* Propose and implement a series of workshops for fostering the technological development capabilities of the Chilean high-impact scientific research.

**III.Activities:**

To prepare a background report collecting detailed evidence on the models to govern, assess and evaluate the operations of research centers in developed countries.

To present the background report in a workshop organized by CORFO.

To carry out interviews with Chilean key policy makers in order to assess the feasibility

To implement the most suitable of these models to Chile at a pilot level.

To extent the background report with an extensive analysis on the Chilean context and the provision of recommendations.

**IV.Products:**

One report documenting the review of eight Chilean high-impact scientific research centres focusing on the technological development potential of those centres. The report should contain an assessment of their current capabilities to achieve such potential and recommendations to breach the gap between current capabilities and those needed to achieve the development potential.

One report of the main results of the workshops conducted for fostering the technological development capabilities of the Chilean high-impact scientific research.

One document in the form of a manual or set of practical recommendations to allow the CNIC to continue fostering the technological development capabilities of the Chilean high-impact scientific research after the present project ends.

**VI.Characteristics of the Consultancy**

Type of consultancy: Firm International

Starting Date and Duration: Starting on XXX; duration of 6 months for a total of XXX days**.**

Place of work: Home country and Santiago**.**

Qualifications: At least fifteen years of recognized experience in the field of architecture and urbanism.

**VII.Supervision**

The individual consultancy will be supervised by the IDB Competitiveness and Innovation Specialist (IFD/CTI) in Santiago.

# TERMS OF REFERENCE – CH-T1151

# “Technology Guarantees Models”

**I.Context**

Chile’s growth record has been strong over the past decade, with rates of human and physical capital accumulation sufficient to reduce the output per worker gap *vis-à-vis* more advanced economies. Nevertheless, according to OECD estimates (Johansson et al., 2012) total factor productivity (TFP) growth has remained flat. Furthermore, Chile’s TFP growth slowed sharply in the last decade raising worries about the sustainability of its growth pattern (Fuentes et al., 2008). For instance, Magendzo and Villena (2012) showed that TFP annual growth slowed from an average of 2.8% between 1992 and 1997 to approximately zero over the period 1998-2010, raising concerns about the feasibility of long term income convergence towards higher living standards. In order to recover its TFP dynamism, Chile needs to go beyond good framework conditions and to strength its innovation system[[22]](#footnote-22).

Chile’s innovation spending is the lowest in the OECD, with most of R&D expenditure heavily concentrated in the publicly funded university sector. More broadly, evidence from Innovation Surveys showed that about one-third of firms innovate (Minecon, 2009), which is less than the 40% or so that is usual in EU countries. Furthermore, business innovation spending *fell* in Chile as a percentage of GDP through the mid-2000s (Benavente, 2006), and data suggests that it had not recovered by the end of the decade.

In the case of Chile, one of the factors that underlie low R&D investments are related to poor access to finance for innovation. Uncertainty may be very discouraging for firms to invest in R&D, especially for smaller firms. In the case of Chile although the degree of financial development is high, important gaps remain when looking at the financing for innovation investment. Indeed, according to a recent study while 20% of large firms reported that lack of financing was an important obstacle for innovation, this figure grows up to 42% in the case of the smallest firms. These constraints particularly affect intangible investments such as a R&D but also the acquisition of modern technology and equipment. Of course these constraints are particularly severe in the case of new firms, where Chile has a shortfall of venture capital investment.

Liquidity constraints seriously affect SMES capacities to adopt new technology, in particular when this adoption requires the deployment of intangible co-investment such as R&D, marketing, training, etc. Chile has a credit guarantee program for SMES (FOGAPE) which however does not make any special consideration for technology investment related lending. This activity will produce study providing inputs to CORFO in order to establish a technology credit guarantee fund in collaboration with the private banks and with the support of technology appraisal centers. In order to design this instrument, the experience of Korea’s Technology Finance Corporation (KIBO) will be reviewed and shared in Chile through a discussion workshop.

The new Chilean Government (GCL) (2014-2018) understands innovation as a critical driver of inclusive growth. In order to achieve this, the GCL has set four broad objectives: (a) to promote the productive diversification; (b) to encourage sectors with high growth potential; (c) to increase SMEs productivity and (d) to generate new exports. The GCL has requested IDB’s support for the implementation of this National Competitiveness and Innovation Agenda (2014 -2018) and a lending program is currently under preparation for this (CH-L1088).

**II.Objective**

**General Objective.** The purpose of this consultancy will be to contribute to the implementation of the National Competitiveness and Innovation Agenda (2014-2018). Specific objectives are: (i) To survey best practices regarding governance, funding and evaluation of technology guarantees and (ii) To produce a policy proposal to implement a technology guarantees model in Chile.

**III.Activities:**

To prepare a background report collecting detailed evidence on the KIBO model on technology guarantees.

To present the background report in a workshop organized by CORFO.

To carry out interviews with Chilean key policy makers in order to assess the feasibility to implement the model in Chile.

To extent the background report with an extensive analysis on the Chilean context and the provision of recommendations.

**IV.Products:**

Report with scoping study of KIBO operations coupled with recommendations for the Chilean government.

**VI.Characteristics of the Consultancy**

Type of consultancy: Individual International

Starting Date and Duration: Starting on XXX; duration of XX months for a total of XXX days**.**

Place of work: Home country and Santiago**.**

Qualifications: At least fifteen years of recognized experience in the field of architecture and urbanism.

**VII.Supervision**

The individual consultancy will be supervised by the IDB Competitiveness and Innovation Specialist (IFD/CTI) in Santiago.

# TERMS OF REFERENCE – CH-T1151

# “Reimbursable Grants Models”

**I.Context**

Chile’s growth record has been strong over the past decade, with rates of human and physical capital accumulation sufficient to reduce the output per worker gap *vis-à-vis* more advanced economies. Nevertheless, according to OECD estimates (Johansson et al., 2012) total factor productivity (TFP) growth has remained flat. Furthermore, Chile’s TFP growth slowed sharply in the last decade raising worries about the sustainability of its growth pattern (Fuentes et al., 2008). For instance, Magendzo and Villena (2012) showed that TFP annual growth slowed from an average of 2.8% between 1992 and 1997 to approximately zero over the period 1998-2010, raising concerns about the feasibility of long term income convergence towards higher living standards. In order to recover its TFP dynamism, Chile needs to go beyond good framework conditions and to strength its innovation system[[23]](#footnote-23).

Chile’s innovation spending is the lowest in the OECD, with most of R&D expenditure heavily concentrated in the publicly funded university sector. More broadly, evidence from Innovation Surveys showed that about one-third of firms innovate (Minecon, 2009), which is less than the 40% or so that is usual in EU countries. Furthermore, business innovation spending *fell* in Chile as a percentage of GDP through the mid-2000s (Benavente, 2006), and data suggests that it had not recovered by the end of the decade.

In the case of Chile, low R&D investments are related to three different but inter-related factors: poor access to finance for innovation, limited supply of human capital and unbalances in the productive structure. Uncertainty may be very discouraging for firms to invest in R&D, especially for smaller firms. In the case of Chile although the degree of financial development is high, important gaps remain when looking at the financing for innovation investment. Indeed, according to a recent study while 20% of large firms reported that lack of financing was an important obstacle for innovation, this figure grows up to 42% in the case of the smallest firms. These constraints particularly affect intangible investments such as a R&D but also the acquisition of modern technology and equipment. Of course these constraints are particularly severe in the case of new firms, where Chile has a shortfall of venture capital investment.

Human capital is another obstacle to productivity improvements for Chilean firms. Innovation and R&D activities are heavily dependent on well-trained workers, especially those with technological qualifications. Despite strong efforts to increase the number of Masters and PhD graduates domestically and internationally, Chile still lacks sufficient advanced human capital in key science, technology and engineering management (STEM) fields, though it is catching up among younger cohorts (OECD, 2013e).

Many of these problems are not new, and they have been recognized as such by policy makers. Indeed, since early 90s Chilean authorities have set up a rather complex system of interventions and several technology development funds were established in order to simulate innovation by the private sector[[24]](#footnote-24). Currently, the Chilean innovation public support system is based on a battery of non-reimbursable financial instruments (e.g matching grants). Although evidence from different impact evaluations suggests that these instruments have been effective to induce innovation investment by the private sector, as the system is scaling-up concerns are emerging regarding its sustainability and fiscal costs. Without losing proven advantages of the matching grants model several developed countries have set models that combine the matching-grants with a reimbursable mechanism contingent to the success of the innovation investment. This model guarantees that a fraction of the public resources involved can be recovered and used for further support. This activity will review international experiences on contingent reimbursable matching grants programs implemented in Korea and Israel and it will provide recommendations for its implementation in Chile.

The new Chilean Government (GCL) (2014-2018) understands innovation as a critical driver of inclusive growth. In order to achieve this, the GCL has set four broad objectives: (a) to promote the productive diversification; (b) to encourage sectors with high growth potential; (c) to increase SMEs productivity and (d) to generate new exports. The GCL has requested IDB’s support for the implementation of this National Competitiveness and Innovation Agenda (2014 -2018) and a lending program is currently under preparation for this (CH-L1088).

**II.Objective**

**General Objective.** The purpose of this consultancy will be to contribute to the implementation of the National Competitiveness and Innovation Agenda (2014-2018). Specific objectives are: (i) To survey best practices regarding reimbursable grants mechanisms as tools for innovation policy and (ii) To produce a policy proposal to implement a reimbursable grants model in Chile.

**III.Activities:**

To prepare a background report collecting detailed evidence on the Korean and Isareli models of reimbursable grants.

To present the background report in a workshop organized by CORFO.

To carry out interviews with Chilean key policy makers in order to assess the feasibility to implement the model in Chile.

To extent the background report with an extensive analysis on the Chilean context and the provision of recommendations.

**IV.Products:**

Report with scoping study of reimbursable grants operations coupled with recommendations for the Chilean government.

**VI.Characteristics of the Consultancy**

Type of consultancy: Individual International

Starting Date and Duration: Starting on XXX; duration of XX months for a total of XXX days**.**

Place of work: Home country and Santiago**.**

Qualifications: At least fifteen years of recognized experience in the field of architecture and urbanism.

**VII.Supervision**

The individual consultancy will be supervised by the IDB Competitiveness and Innovation Specialist (IFD/CTI) in Santiago.

1. Freeman (1987) defines an innovation system as the “network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies. [↑](#footnote-ref-1)
2. A good is complex when is produced by few countries that also produce diversified goods BID (2014). [↑](#footnote-ref-2)
3. These are the National Technology Fund (FONTEC), later called INNOVA, the Agricultural Innovation Fund (FIA) and the National Fund for Scientific and Technological Development (FONDEF).

   [↑](#footnote-ref-3)
4. These are the Chilean National Development Agency (CORFO), the National Commission for Science and Technology (CONICYT) and the National Institute for Industrial Property (INAPI). [↑](#footnote-ref-4)
5. Less the 20% of the public support for science, technology and innovation in Chile is “mission oriented”, while this figure grows up to 60% in the case of OECD countries (Mowery, 201). [↑](#footnote-ref-5)
6. The lack of institutional capacities at the sub-national level implies that while the regions explain more 50% of the GPD and employment, more than 85% of the public support for Science, Technology and Innovation is allocated to Santiago (metropolitan area) leading to unbalances in regional developments. [↑](#footnote-ref-6)
7. Freeman (1987) defines an innovation system as the “network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies. [↑](#footnote-ref-7)
8. A good is complex when is produced by few countries that also produce diversified goods BID (2014). [↑](#footnote-ref-8)
9. These are the National Technology Fund (FONTEC), later called INNOVA, the Agricultural Innovation Fund (FIA) and the National Fund for Scientific and Technological Development (FONDEF).

   [↑](#footnote-ref-9)
10. These are the Chilean National Development Agency (CORFO), the National Commission for Science and Technology (CONICYT) and the National Institute for Industrial Property (INAPI). [↑](#footnote-ref-10)
11. Less the 20% of the public support for science, technology and innovation in Chile is “mission oriented”, while this figure grows up to 60% in the case of OECD countries (Mowery, 201). [↑](#footnote-ref-11)
12. The lack of institutional capacities at the sub-national level implies that while the regions explain more 50% of the GPD and employment, more than 85% of the public support for Science, Technology and Innovation is allocated to Santiago (metropolitan area) leading to unbalances in regional developments. [↑](#footnote-ref-12)
13. After the entrance into force of the TRIPS Agreement, Chile has signed more than 10 Free Trade Agreements in recent years, which has led to a great amount of work to adapt the legislation in the different areas of Intellectual Property. Several other agreements remain under negotiations, including the Transatlantic Partnership Agreement. [↑](#footnote-ref-13)
14. The Agreement on Trade-Related aspects of Intellectual Property Rights. [↑](#footnote-ref-14)
15. The national innovation strategy was set out in the National Council for Innovation and Competitiveness’s “Agenda for Innovation and Competitiveness 2010 – 2020” as well as in the “Institution, Science, Technology and Innovation” report of the Science, Technology and Innovation Advisor Committee to the President (also known as the Philippi Committee). [↑](#footnote-ref-15)
16. Freeman (1987) defines an innovation system as the “network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies. [↑](#footnote-ref-16)
17. A good is complex when is produced by few countries that also produce diversified goods BID (2014). [↑](#footnote-ref-17)
18. These are the National Technology Fund (FONTEC), later called INNOVA, the Agricultural Innovation Fund (FIA) and the National Fund for Scientific and Technological Development (FONDEF). [↑](#footnote-ref-18)
19. These are the Chilean National Development Agency (CORFO), the National Commission for Science and Technology (CONICYT) and the National Institute for Industrial Property (INAPI). [↑](#footnote-ref-19)
20. Less the 20% of the public support for science, technology and innovation in Chile is “mission oriented”, while this figure grows up to 60% in the case of OECD countries (Mowery, 201). [↑](#footnote-ref-20)
21. The lack of institutional capacities at the sub-national level implies that while the regions explain more 50% of the GPD and employment, more than 85% of the public support for Science, Technology and Innovation is allocated to Santiago (metropolitan area) leading to unbalances in regional developments. [↑](#footnote-ref-21)
22. Freeman (1987) defines an innovation system as the “network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies. [↑](#footnote-ref-22)
23. Freeman (1987) defines an innovation system as the “network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies. [↑](#footnote-ref-23)
24. These are the National Technology Fund (FONTEC), later called INNOVA, the Agricultural Innovation Fund (FIA) and the National Fund for Scientific and Technological Development (FONDEF).

    [↑](#footnote-ref-24)