# TC ABSTRACT

## I. BASIC PROJECT DATA

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|---|---|
| ▪ Country/Region: | Chile (CH) |
| ▪ TC Name: | Support for the National Competitiveness and Innovation Agenda |
| ▪ TC Number: | CH-T1151 |
| ▪ Team Leader/Members: | Team Leader: Gustavo Crespi (CTI/CUR). Team Members: Pablo Angelelli (CTI/CUR); Gabriel Casaburi (CTI/CAR); Carlo Pietrobelli (IFD/CTI); Carlos Guaipatín (IFD/CTI); Patricia Reyna (IFD/CTI); Mariela Rizo (IFD/CTI); Francisco Lois (CSC/CHL); Raul Lozano (CSC/CHL); Roberto Monteverde (CSC/CHL); Maria Isabel Palomer (CSC/CHL). |
| ▪ Indicate if: Operational Support, Client Support, or Research & Dissemination. | Operational Support |
| ▪ If Operational Support TC, give number and name of Operation Supported by the TC: | Program Support for the Competitiveness and Innovation Agenda (CH-L1088) |
| ▪ Reference to Request: (IDB docs #) | IDBDOCS38804496 |
| ▪ Date of TC Abstract: | 05/06/2014 |
| ▪ Beneficiary | Ministerio de Economía, Fomento y Turismo |
| ▪ Executing Agency and contact name | Inter-American Development Bank (BID), Gustavo Crespi (CTI/CUR) |
| ▪ IDB Funding Requested: | US$400,000 |
| ▪ Disbursement period | 24 months for disbursement and 18 months for execution |
| ▪ Required start date: | 08/01/2014 |
| ▪ Types of consultants | Firms and Individual Consultants |
| ▪ Prepared by Unit: | Competitiveness, Technology and Innovation Division (IFD/CTI). |
| ▪ Unit of Disbursement Responsibility: | CSC/CHL |
| ▪ Included in Country Strategy (y/n): | Yes |
| ▪ TC included in CPD (y/n): | Yes |
| ▪ GCI-9 Sector Priority: | Priority Area 1: Equity and Productivity<br>Priority Area 3: Growth and Welfare |

## II. OBJECTIVE AND JUSTIFICATION

2.1 Chile's growth record has been strong over the past decade, with rates of human and physical capital accumulation sufficient to reduce the gap in the level of output per worker *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 trend 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.

2.2 Raising TFP growth is a nontrivial challenge, in particular because existing evidence for Chile indicates that the earlier TFP improvements in a number of industries can be tied to reforms in financial and product markets from two decades earlier (Crespi, 2006; Bergoeing et al., 2006; Schwellnus, 2010). These reforms induced considerable structural change that reallocated productive factors to more dynamic sectors and allowed the expansion of more efficient firms. But the gains from those reforms may have been substantially realized. Good framework conditions are an important prerequisite for long-term investments, and Chile's stable macroeconomic policies and trade openness provide useful preconditions. Restrictions on competition could be reduced further, though these policies are quite favorable towards businesses and entrepreneurs especially when compared with other Latin American countries. Given this in order to recover its TFP dynamism, Chile needs to strength its innovation system

2.3 Chile's innovation spending is the lowest in the OECD, with the limited 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. Low R&D by private firms may have to do with market failures, as evidence suggests that private rates of return to R&D investment are generally quite high (Benavente et al., 2006)

2.4 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 of innovation investment. Indeed, according to a recent study while 20% of the 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 affect particularly 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 an incomplete development of

the market for 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 postgraduate 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).

2.5 Many of these problems are not new, and they have been recognized as such by policy makers. Indeed, Chile has gradually built an institutional framework for innovation policies since early 90s. However, this institutional framework has not been strong enough as to maintain a consistent strategy over time. The National Council of Innovation for Competitiveness (for example) has not managed to overcome the swings in the political cycle and it remains a weak institution so far. The problems in the institutional framework lead to several government failures that produce programs overlapping, proliferation of instruments of scare amount and without strategic orientation and sheer gaps in the policy mix (for example there no interventions for technology extension and technology transfer, despite that in the diffusion of knowledge is where the social returns should be higher in a lagging behind economy).

2.6 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 three broad objectives: (a) to increase the investment in science, technology, innovation and the development of advanced human capital; (b) to increase the incentives for mission oriented innovation – aligning public resources with the solution of national challenges; and (c) the overhaul of the institutional framework. 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 discussion for this (CH-L1088).

2.7 **General Objective.** The purpose of the technical cooperation is to contribute to the implementation of the National Competitiveness and Innovation Agenda (2014-2018). **Specific Objectives:** In particular, the project will support the Government of Chile regarding: (i) Strengthening the institutional framework for the design, coordination and implementation innovation policies and (ii) Redesign of Science, Technology and Innovation Public Support Programs.

2.8 This technical cooperation is consistent with the Ninth ($9^{th}$) IDB Capital Increase guidelines (GCI-9) as the different activities supported through it will strengthen SMEs productivity and facilitate the increase of start-up rates. Furthermore, a stronger institutional framework for innovation policies will contribute to the growth and welfare of the country and the region in general. This project will contribute to the competitiveness and innovation sector of the Bank's strategy with the country and to the indicator of private investment in research and development.

## III. DESCRIPTION OF ACTIVITIES AND OUTPUTS

3.1 To reach the objectives the project will finance consultancy activities, travels and experts visits. Implementation of the following components with their products and associated activities is contemplated:

3.2 **Component I. Strengthening the Institutional Framework for Innovation Policies**. This component includes tasks and activities associated to knowledge sharing and institutional capacity building in order to improve de governance of the Chilean national innovation system. These activities are:

3.3 **Strategic Selectivity Study**: **Learning from the Korean experience**. Most of innovation policies in Chile are horizontal. The National Council of Innovation for Competitiveness (CNIC) has not built yet the institutional capacities to identify and orient public investments in science, technology and innovation towards activities with high spillovers and multiplier effects. This background study will build institutional capacities by learning from the Korean experience for both identifying sectors to be targeted by technological policies and, most importantly, based on mechanisms for implementation (call for proposal, tender, etc). Additionally the study we look at how strategic priorities set at the national level (top-down) can be coordinated with priorities set at the regional/local levels (bottom-up). The study will also generate metrics to monitor and evaluate the impacts of strategic policies.

3.4 **Institutional Review Study**: 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, the reform of the Chapters that govern the different innovation agencies and redefining the innovation public policy relationships between the central government and regions (for example through the establishment of Regional Innovation Councils). This study will provide the CNIC with technical inputs in order to design the institutional reforms. The results of this study will be also important input for updating the National Innovation Strategy.

3.5 **Intellectual Property Rights for Development**: During the last decade the GCL has gradually strength the institutional capacities in this area, mostly through the establishment and then deployment of the National Institute for Industrial Property (INAPI). Other important actors of the system still lag behind in terms institutional capacity building. This study will carry out a review of the national system of intellectual property (which includes not only industrial property but also copyrights and plant varieties) in order to provide technical inputs for a better coordination among the different rights. Particular emphasis will be put on generating inputs for devising a strategy that facilitate access to public domain

technological information by SMES. In order to implement these activities the Korean experience will be highly relevant. It is expected that the implementation of the different studies in this section will count with knowledge sharing experiences of the Science and Technology Policy Institute (STEPI), the Korean Evaluation Industrial Technology Institute (KEIT) and the Korean Intellectual Property Office (KIPO).

3.6 **Component II. Redesign of Science, Technology and Innovation Public Support Programs:** This component includes assessments and studies that will provide inputs for improving the effectiveness of public programs in key areas of interest of the Chilean Government. The activities are:

3.7 **Standards, Certifications and Innovation Policy**: Most of the times, innovation policy is set in terms of subsidies and incentives for business innovation (carrots). However, much less is understood – at least in the Chilean context on the importance of standards as a regulatory mechanism to induce changes in firm innovation behavior (sticks). This study will assess using quasi-experimental techniques the impacts of the CORFO Clean Production program. The program set a series of standards for clean production in different sectors and then funds the adoption of them by companies. Standards, however, might also be an obstacle for innovation when they are badly design or implemented. The study will also review same cases of this in sectors such as construction, energy and waste management. The study will provide specific recommendations on how to better integrate standards setting as a tool for innovation policy.

3.8 **Re-deployment of the Business Innovation Matching Grants Program**: Chile has based most of the public funding for business innovation on a rather generous R&D tax credit system. Although in the long term this could be a movement in the right direction, in the current transition this system concentrate a large fraction of resources in a small number of large companies. This study will provide inputs for re-launching a business innovation small grants program targeting SMES and Start-Ups based on international best-practices such as the US-SBIR.

3.9 **Technology Finance Guarantee Programs**: 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 study will provide inputs to the Chilean National Development Agency (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 very important.

3.10 **Early Stage Venture Capital Fund**: The system that promotes technology based entrepreneurship in Chile suffers from a "missing middle" problem. Indeed, although CORFO has established over time a comprehensive network of business

incubators and a stock exchange reform was passed to strength private equity investment, the system still suffers from a missing instrument that could leverage business angel resources in order to facilitate Start-Ups' transition between the pre-seed and incubation stage and the private equity phase. This study will review international experiences on early stage venture capital funding and will provide recommendations for its implementation in Chile.

## IV. BUDGET

| Activity/ Component | Description | Activities | IDB/Fund Funding | Counterpart Funding | Total Funding |
|---|---|---|---|---|---|
| **Component I** | **Institutional Framework** | 1) Strategic Selectivity Study | 80,000 | 0 | 80,000 |
| | | 2 )Institutional Review Study | 100,000 | | 100,000 |
| | | 3)Intellectual Property for Development | 50,000 | 0 | 50,000 |
| | | **Sub-Total** | **230,000** | **0** | **230,000** |
| **Component II** | **Redesign of Public Support Programs** | 4)Standards, Certification and Innovation Policy. | 50,000 | 0 | 50,000 |
| | | 5) Business Innovation Programs | 20,000 | 0 | 20,000 |
| | | 6)Technology Finance Guarantees | 70,000 | 0 | 70,000 |
| | | 7) Early Stage Entrepreneurship | 30,000 | | 30,000 |
| | | **Sub-Total** | **170,000** | **0** | **170,000** |
| **TOTAL** | | | **400,000** | **0** | **400,000** |

## V. EXECUTING AGENCY AND EXECUTION STRUCTURE

5.1 The executing agency will be the Bank. This is based on its capacity to implement technical cooperation projects and its knowledge to identify highly qualified international consultants because of its experience in similar operations among different countries in the region. The beneficiary of this TC, the Ministry of Economics, Tourism and Foment will contribute to the discussion of the terms of reference of the different studies, assist the international consultants during their missions to Chile and approve the final outcomes of the different studies.

## VI. PROJECT RISKS AND ISSUES

6.1 A risk with the implementation of this TC is that the GCL disagrees with the recommendations emerging from the some of the studies and so does not move forward with the policy implementation of some of them. In order to mitigate this risk the project team will be deeply involved in the dialogue with the beneficiary in order to accompany the process of discussion and assimilation of the different policy recommendations.

## VII. ENVIRONMENTAL AND SOCIAL CLASSIFICATION

7.1 This TC does not have environmental issues. Regarding Social strategy, this project will be designed addressing gender and minorities' social inclusion concerns. The TC has been qualified by ESG as category "C" which confirms an environmental, social and / or cultural minimum or no impact (see Safeguard Policy Filter and Safeguard Screening Form).