



Report No AB8

Updated Project Information Document (PID)

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| Project Name | CHILE-Science for the Knowledge Economy |
| Region | Latin America and Caribbean Region |
| Sector | Tertiary education (100%) |
| Project ID | P077282 |
| Supplemental Project | |
| Borrower(s) | REPUBLIC OF CHILE |
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1. Country and Sector Background

The Knowledge Economy

Far-reaching trade liberalization, structural reforms to attract foreign capital and privatization of state-owned companies have brought about considerable economic growth in Chile in recent decades. Taken together with regulatory transparency, political stability and high levels of human capital, Chile today stands out as one of the region's most dynamic and promising markets. Chile is in many respects well prepared to take full advantage of the emerging knowledge economy.

The main competitive weakness of the Chilean economy is the country's relative lack of ability to innovate and adopt technological change. Thus, despite economic achievements in Chile, challenges remain for developing science, technology and innovation.

Current situation

Unlike most developed economies, the Chilean economy is to a high degree based on natural resources, notably mining, fishing, forestry and agriculture. Copper constitute more than 10% of GDP and more than 40% of export earnings. Likewise, exports from the fruit sector grew at a rate of 20% annually in the period 1974-1994. Chile has boosted productivity and output of these sectors by adapting and improving foreign technologies.

Notwithstanding strengths of the economy, Chile's policy framework and economic incentives for innovation and human capital formation are still in need of substantial improvement.

Government strategy

The government strategy focuses on securing sustainable and equitable growth through the provision of a strong macroeconomic framework, strong public institutions, investments in human capital and social protection. As a core element, the Government of Chile (GoC) has committed itself to improving the quality and relevance of education.

The government is also emphasizing the need to stimulate innovation and technological development. Chile's investments in S&T doubled during the nineties, and the government has expressed its intention to double the country's S&T investments from 0.5% of GDP to 1.2% by the year 2006

It is against this background that the current project has been proposed. It is of critical importance to support the current initiatives of the GoC by securing continuous and adequate flows of investment to the Chilean science base and strengthening the stock of human capital and stimulating the critical interfaces in the innovation system.

2. Objectives

The project will support Chile's transition to a knowledge-based economy by investing in the innovation system and the stock of human capital. The overarching goals are to contribute to a diversification of the Chilean economy, reduce its vulnerability to external shocks, and, in the long run, provide the basis for sustainable growth. These goals will be pursued through two project development objectives, which, in agreement with the Government's strategy, are expected to place Chile on the path to a knowledge-based economy.

First, and foremost, the project will support the development of an effective innovation system. It will do so by establishing a strong and coherent policy framework, promoting high-quality and relevant science and technology activities and by supporting key interfaces in the innovation system, especially between the public and private sector as well as international linkages.

Second, and subordinate to the first goal, the project will improve the stock of advanced human capital in Chile, a development objective which is highly complementary to the establishment of an effective innovation system and per se a critical precondition for establishing a competitive knowledge-based economy.

The project development objectives will be pursued through the implementation of three components: (i) *Improving Chile's Science, Technology and Innovation System*, (ii) *Strengthening of Chile's Science Base*, and (iii) *Enhancement of Public-Private Linkages*.

3. Rationale for Bank's Involvement

The World Bank has had a long and positive cooperation with Chile in various sectors. One of the core intervention areas has been, and still is, human capital and education. Hence, the project follows on previous Bank operations in Chile and capitalizes, on the many lessons, which the bank has accrued over time. As a consequence of this long and fruitful engagement in Chile, the Bank has established a valuable network and has made contacts with most stakeholders in the Chilean education and research sector. At a more general level, the Bank benefits from its extensive experience in supporting human capital development and S&T in various countries. Thus, the Bank is able to draw on a vast reservoir of experience and consequently put the most effective solutions in place.

4. Description

To address the key development objectives, the project includes the following three components:

(i) *Improving Chile's Science, Technology and Innovation System* This component is designed to help Chile develop a coherent policy framework and an enabling environment for innovation. It will

consolidate and modernize the country's existing instruments and programs in science and technology to achieve higher levels of internal and external efficiency among researchers and their organizations and to nurture a more collaborative research culture among Chilean scientists.

(ii) *Strengthening Chile's Science Base* Chile's science base comprises its scientific and technological research personnel, its research infrastructure, and its capacity to access in a timely fashion the knowledge generated in other countries. This component will increase the capacity of the science base and accordingly contribute to Chile's social and economic development as the country moves toward a knowledge economy

(iii) *Enhancing Public-Private Linkages* This third component will support activities that strengthen linkages between the Chilean scientific community, industry and public sector users of research findings and build private sector research capacity.

Given the long-term vision necessary to consolidate institutional and behavioral changes in the S&T sector, a program approach is proposed using the Adaptable Program Lending (APL) instrument. The program will comprise two phases. The first phase will cover a 3½ year period (2003 - 2007) and will support the establishment of a coherent policy strategy and a strong policy framework. It will also provide for the continuation of the Millennium Science Initiative and a further strengthening of the science base by scaling up funding for research, develop public-private linkages in Chile's national innovative system and enhance the R&D capacity of companies. Based on a positive evaluation and the attainment of predefined triggers, the second phase (2007-2010) will continue activities to strengthen Chile's science base and scale up funding for initiatives launched in the first phase, especially with a view to enhancing private sector R&D activities.

5. Financing

| | Total (US\$m) |
|---------------------------|-----------------------|
| BORROWER | \$25.00 |
| IBRD | \$25.26 |
| IDA | 0 |
| Total Project Cost | \$50.26 |

6. Implementation

An independent Advisory Board at the government level will be established by Presidential decree. It will be chaired by the Minister of Education and include three other ministers (Economy, Agriculture and Mining), three high level representatives from the private sector, and three high representatives from the scientific community. The Advisory Board will (i) have oversight functions for the entire operation, (ii) advise on public-private interfaces in order to bring out the innovative potential of the private sector; (iii) and in particular provide guidance for the implementation of component 1

CONICYT has been designated by the government as the project implementing agency. A project coordination team will be established within CONICYT to oversee the daily implementation of the project.

7. Sustainability

The project's sustainability is closely linked to government ownership and project success. As indicated above, the government of Chile has a strong ownership of the project. In regard to project success, components have been carefully designed and critical risks have been taken into account.

8. Lessons learned from past operations in the country/sector

The project takes a holistic approach to the knowledge economy. The project design reflects lessons learnt from various Bank projects in Chile, notably the Millennium Science Initiative (MSI) and the higher education project, MECESUP. Lessons have also been included from a recent review by the Operations Evaluation Department (OED) of World Bank operations in Chile in the period 1985-1999 and from the Bank's portfolio of projects in post-secondary education and S&T in the region, particularly in Brazil and Mexico.

Drawing on lessons learned, this project would boost private sector R&D demand and absorption capacity by supporting industry R&D, encouraging outreach activities, promoting cross-sectoral researcher mobility and fostering a culture of partnership between the public and private sector.

9. Environment Aspects (including any public consultation)

Issues : N/A

10. List of factual technical documents:

Agapitova, Natalia & Lauritz Holm-Nielsen, 2002. Science, Technology and Innovation in Chile, LCSHD Paper Series No. 78, World Bank, Washington, DC.

Brunner, José Joaquín, 2003 Hacia una estrategia de desarrollo basada en capacidades tecnológicas, in Tomás Moulian (eds), Construir el futuro - aproximaciones a proyectos de país, Vol. 1, Santiago de Chile. LOM.

Dahlman, Carl et al , 2003. Chile: New Economy Study, FPSI, Forthcoming, World Bank, Washington, DC

Hansen, Thomas, Lauritz Holm-Nielsen and Patricia Garcia Zuniga, 2002. Chile – Human Resources for the Knowledge Economy, LCSHD Paper Series No 79, World Bank, Washington, DC

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Note: This is information on an evolving project. Certain components may not be necessarily included in the final project.

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