



# Chilean Innovation System and Cluster Development

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# TOPICS



**Chile's Economy and Innovation System in brief**

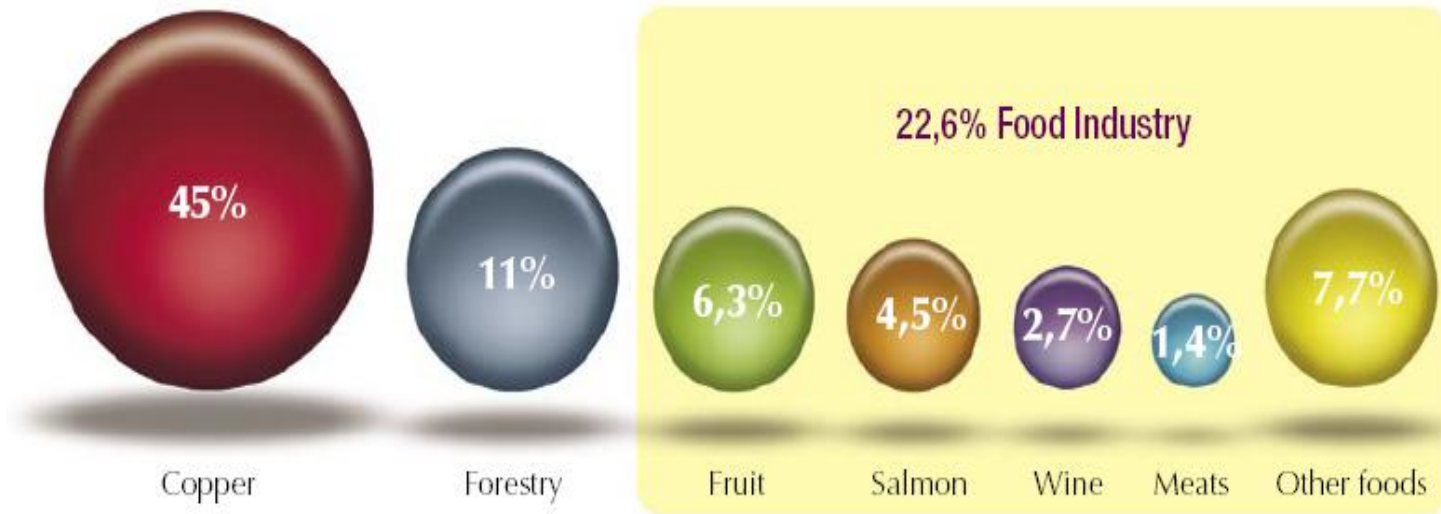


**Cluster Development**

# Chilean Economy

- Small, open, natural resource-based export economy (US\$ 183 billions GDP -2008, 16,8 million population, US\$ 65 billion Exports).

Chilean export distribution



*Note: The other 21.4%, corresponds to other types of exports*

- **GDPpc = US\$ 11.000 ,    GDPpc -ppp = US\$ 14.400**

# Chilean Economy (cont.)

- Micro and SME (Smaller Size Enterprises) account for **99% of business**, **17% of total sales** and **53% of employment**.

INFORMATION ON ACTIVE ENTERPRISES, BY SIZES (Source: SII, 2006)

SIZE <sup>1</sup> (sales base criterion)	NUMBER OF FIRMS		TOTAL SALES (mill. CL\$)		EMPLOYMENT <sup>2</sup>	
	NUMBER	SHARE	SALES	SHARE	EMPLOYMENT	SHARE
MICRO	586.465	80%	5.131.833	2%	553.405	9%
SMALL	120.864	16,5%	15.884.798	7,5%	1.453.344	24%
MEDIUM	18.052	2,5%	15.818.494	7,5%	1.138.338	19%
LARGE	9.377	1%	177.351.641	83%	2.817.294	47%
<b>TOTAL</b>	<b>734.758</b>	<b>100%</b>	<b>214.186.766</b>	<b>100%</b>	<b>5.962.381</b>	<b>100%</b>

**Notes:** (1) Micro (annual sales up to 2.400 UF, = US\$ 100.000), Small (annual sales between 2.401-25.000 UF, = US\$ 100.000 - 1.000.000), Medium (annual sales between 25.001-100.000 UF, = US\$ 1- 4 millions), Large (annual sales over 100.000 UF, = over US\$ 4 million). (2) Refers to employment (not workers) reported by employers to SII, excluding employers. Includes full-time and part-time employment.



# Chilean Economy *(cont.)*

- High GDP growth (7% in the nineties, but smaller in 2000s. Decrease in TFP.)
- Ranked among high middle-income countries
- Sound macroeconomic management but still **weak in innovation and human capital**



**Challenges to move from developing to developed country**



# Main weaknesses of Chile's Innovation System (\*)

- Low level of R&D and innovation investment (< 0.7 % GDP)
- Very low business participation (< 1/3 of financed and executed)
- Focus on basic research carried out by universities (>2/3)
- Low supply of seed and risk capital
- Underdeveloped infrastructure for knowledge and for technology diffusion
- Shortage of specialized human resources for innovation (technical and managerial skills)
- Weak governance, lack of strategic vision and evaluation, fragmentation.

(\*) OECD Review of Chile's Innovation Policy (OECD(2007))

# Latest Changes in Innovation Policy

Growing political awareness on the challenge of innovation for the country's future resulted in 2 key decisions:

- The creation (2005) of a **National Innovation Council for Competitiveness (CNIC)**, with the mission of proposing guidelines for a long term national innovation strategy and for improving the performance of the domestic innovation system. (First report: 2006.)
- The introduction of a specific mining tax (royalty) and creation of an **Innovation Fund for Competitiveness (FIC - 2006)**, where increased resources could be used to promote innovation.

Public investment on innovation doubled in 2005-2008.



# Latest Changes in Innovation Policy *(cont.)*

- A **Inter-ministerial Committee (CMI)**, created in 2007) in charge of implementing the innovation policy. Establishment of guidelines for 2008-2012 and **Action Plan 2008-2010**
- +New strategy approach: more **selectivity (focus)** is needed -  
-not only good horizontal policies-- around traditional **clusters** (mining, food industry, aquiculture) and emergent ones (off shoring –Chile ranks 7th by AT Kearney--, tourism).
- Set of **competitiveness studies on clusters** conducted by BCG, to build **road map** and **priority agendas on innovation**.

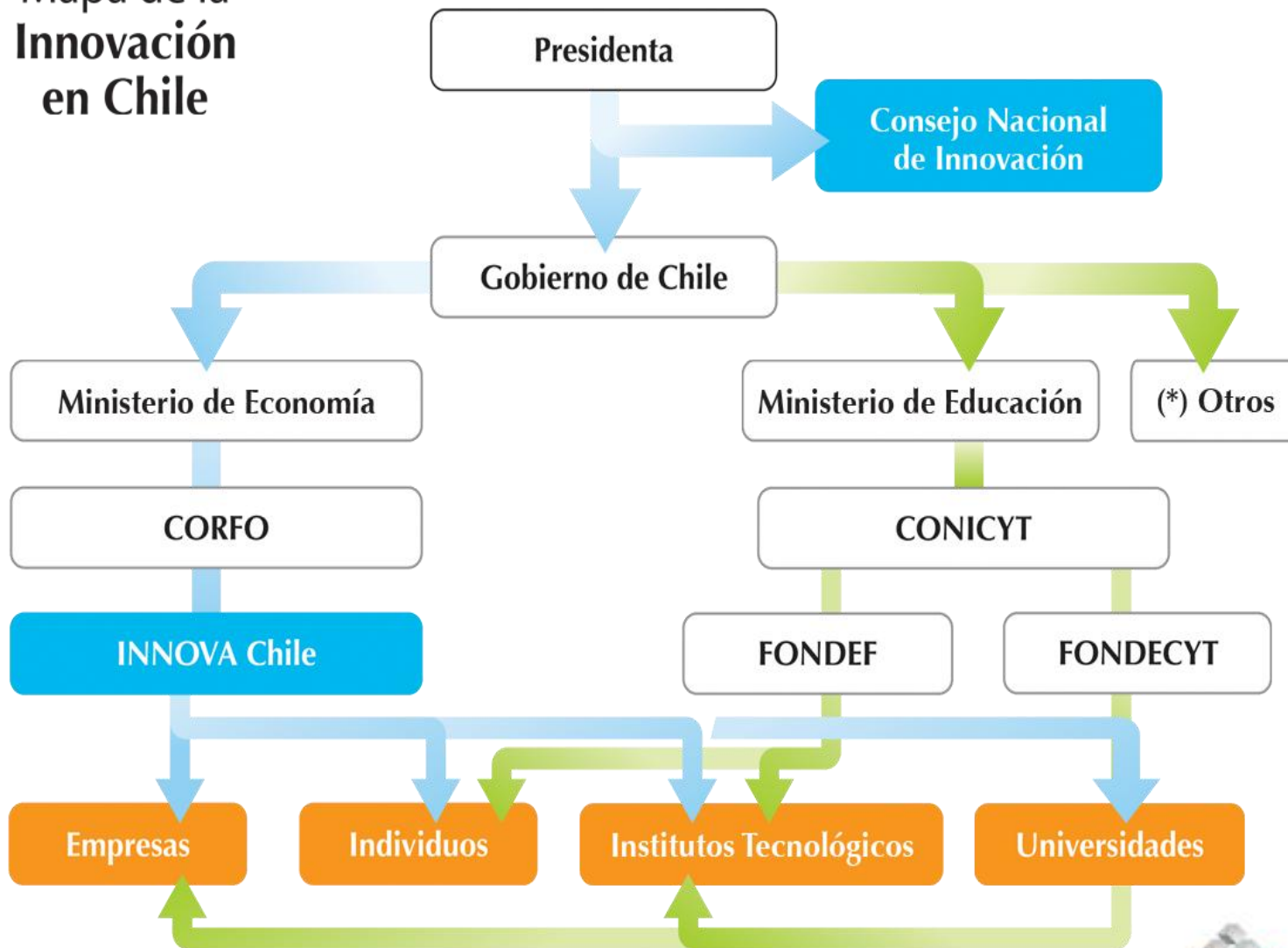
# Ministers Committee- Innovation Policy

Ministers Committee for Innovation (CMI) adopted and Action Plan 2008-2010, following the strategy proposed by CNIC, which can be materialize en 7 areas:

- ✓ New institution for innovation
- ✓ **Programs of high potential clusters**
- ✓ **Human capital to innovate**
- ✓ **Capacities of R&D and world class horizontal platforms**
- ✓ **Entrepreneurship and technological transfer**
- ✓ **Regionalization of innovation**
- ✓ Pro- innovation and entrepreneurship culture



# Mapa de la Innovación en Chile



(\* ) Otros: FIA - Programa Milenio

# Programs of High Potential Clusters

- Program allow to better organize the collaborative efforts on R&D and innovation, around the principal challenges and opportunities in these industries.
- Selection of 5 priority clusters, based on their current competitiveness and /or growth potential:
  - ✓ Mining (may 2008)
  - ✓ Aquiculture (end of 2009)
  - ✓ Food industry (May 2008)
  - ✓ Special Interest Tourism (July 2009)
  - ✓ Off shoring (Nov. 2007)
- **US\$ 147 millions** was the public-private investment directed to these clusters, between 2007 and 2008.



# Strategic Guidelines for Clusters

- **Mining**

- 5 strategic areas of work for future innovative development: high level of innovation and research, human capital, suppliers networks, associative behavior and business environment.

- **Aquiculture**

- Strategy looking for: product diversification (+ alimentary alternatives) and improvement of regulations and institutions (ensure sustainability).

- **Food Industry**

- Strategic lines of products: processed food products (fruits and horticulture), poultry and pork, fresh fruits, wines, red meats.
- Priorities are: genetic improvement, food standards/safety, agriculture (of precision), digital connectivity and improvement of human capital.



# Strategic Guidelines for Clusters

- **Tourism**

- Strategies looking for tourism positioning of Chile given its good infrastructure and security, development of touristic products and destinations, development of human capital and touristic culture, as well as regulatory and support institutions to ensure sustainability.

- **Off-shoring**

- Raw material includes people's talents, social and language skills as well as technical ones.
- Strategies looking for improvement of regulations, international promotion, and mechanism to ensure continuous improvement of human capital.



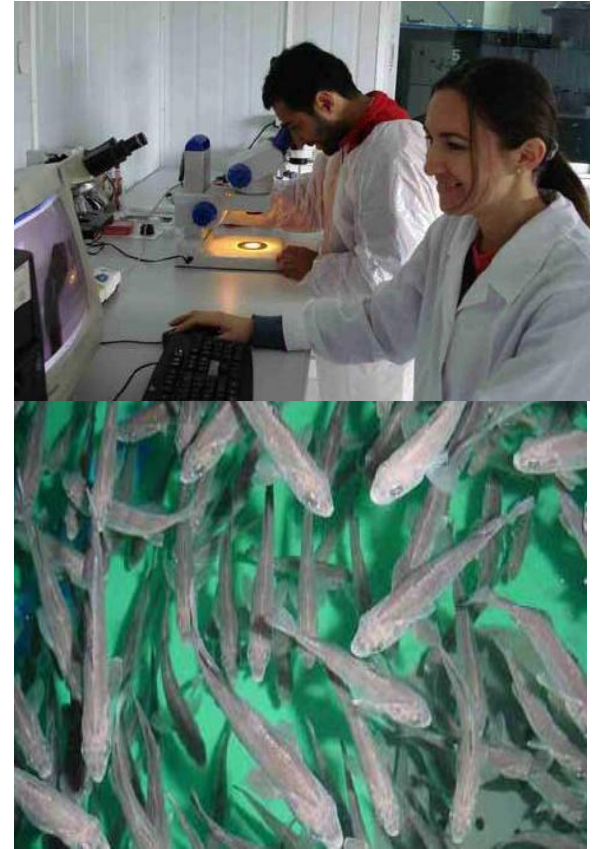
# Some Examples - AQUICULTURE

- **Consortium AQUAINNOVO:** 2 Fishing Companies + University of Chile, applying for salmon industry the innovations developed in biotechnology and genetics to generate and protect high value salmon species.
  - ✓ Looking to become an international level Biotechnology Center.
  - ✓ Investment: US\$ 10 millions.
- **Firm's innovation for PRODUCT DIVERSIFICATION:** reproduction, growth and harvest of Golden Fish (*Seriola Lalandi*).
  - ✓ Artificial reproduction of fish in hatchery, and later cultivation at sea, in order to attain mass production and being able to internationally commercialize.
  - ✓ Investment: US\$ 1,7 million.



# Some Examples - AQUICULTURE

- **Vaccine development for Salmon's Rickettsial Syndrome (SRS):**
  - ✓ Chile's Foundation, Science for Life Found. and Cobequid Life Science inc. developed a vaccine that impedes SRS propagation (causing losses to the industry of US\$ 100 millions)
  - ✓ Total Financing: US\$ 1 million (40% from Innova -Chile, Corfo)



# Some Examples - FOOD INDUSTRY (1)

- **Consortium VINNOVA for Wines:** 55 wine firms (80% of industry) in association with Catholic University and Concepcion's University.
  - ✓ Multiple R & D program for genetic improvement and product diversification
  - ✓ Total Investment: US\$ 5,5 millions.



## Some Examples - FOOD INDUSTRY (2)

- **Consortium Bio-Fruits:** Biotechnology Innovation for new varieties of grapes and specific fruits, by Chile's Foundation, 8 firms and cooperatives, 3 universities.
  - ✓ Focusing on a long term program, based on biotechnology, designed to face challenges in export fruit markets, for significant Chilean exports (grapes, apples, peaches, etc)
  - ✓ Total Investment: US\$ 5,7 millions.

# Some Other Examples

- **OFF SHORING:** More than 60 off shoring Centers
  - ✓ Yahoo, Unysis, Packard Bell, Air France, BBVA, Oracle, Soluziona, Pioneer, Syngenta, Bayer, BHPbilliton, Evalueserve, among others
  - ✓ Technological Building (Corfo, in Curauma), with 120 professional providing services to US firms.
- **MINING:** PUCOBRE, use of a bacteria to liberate copper
  - ✓ A research team studied properties and possible industrial use of *Termofilas*, autochthon bacteria able to oxidize mineral substrates and liberate cooper. Investment: US\$ 230.000
  - ✓ Objective: increase mineral reserves through greener production mechanisms.



# Consortiums, Unprecedented Alliances

- **Three years ago:** there was no technological business consortium in Chile.
- **Today:** 24 consortiums, formed by new and powerful alliances between enterprises and research centers, and supported by the government.
- **Research areas** cover biotechnology, genomics for forestry, robotic solutions, ITCs, among other



- **Public-private Investment amount to US\$ 130 millions.**
- **Private share: 48%**



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