Implications of New Technologies for Public Policies: Chilean Smart Specialization Strategy

SYMPOSIUM ON NEW TECHNOLOGIES, JOBS, GROWTH AND DEVELOPMENT
The World Bank, Washington D. C. September, 2017

Eduardo Bitran C.
CORFO executive vice-president
THE FOURTH INDUSTRIAL REVOLUTION: Digital Transformation and Clean Production

Digital Revolution & INDUSTRY 4.0

Climate Change, Renewable Energy & Electro Mobility

Systemic Innovation to address the challenges of disruptive technologies
DISRUPTIVE TECHNOLOGIES IMPACT ON PRODUCTION AND SERVICES

- Smart Sensors
- Artificial Intelligence
- EV ion lithium batteries
- Robotic and automation
- IoT (Internet of Things)
- Big data
- PV Solar Technology
- Additive manufacturing

Involvement and consensus of key stakeholders who work on the identified challenge/opportunity.

A need to build Social Capital to solve coordination and systemic failures, and to develop an Industry-Academia-State-Civil Society shared vision to ensure critical mass coherence and continuity over time.
Animation and shared vision

Stage 1

Opportunities identification and gaps lifted up

Stage 2

Road Map Design

Stage 3

External Validation

Stage 4

Execution

Stage 5

Opportunities and/or challenge identification. Determination of gaps that limit to take advantage of opportunities.

Participative elaboration of the activities plan for gaps closing. Base line and impact indicators.

Validation by the Innovation Ministers Council

Implementation of actions contained in the roadmap.

Human Capital Making Up

Gaps Closing + Competitive Boost

Technological Gaps

Technological H-R - Technological Programs - Basal funding programs for R&D Centers, Public Institutes and Technology Centers that develop public goods.
SOLVING COORDINATION FAILURES THROUGH PUBLIC - PRIVATE INITIATIVES

How is articulated and identified the public investment necessary to promote innovation?

What about private investment?
NEW DISRUPTIVE TECHNOLOGIES
WHERE DO WE FOCUS?
NATIONAL STRATEGIC PROGRAMS: FOCUSED ON THE IMPACT OF KEY TECHNOLOGIES IN THE MAIN CHILEAN ECONOMY SECTORS

- MINING CLUSTER
- SUSTAINABLE SPECIAL INTEREST TOURISM
- HEALTHY AND SPECIAL FOOD
- CONSTRUCTION AND TIMBER SECTOR
- CREATIVE INDUSTRIES
- SUSTAINABLE AQUACULTURE AND FISHING
- HEALTH TECHNOLOGY SERVICES

Logistic
Biotechnology
Solar Industry / Water
Digital Transformation and Advance manufacturing
IoT, AM, Big Data: An enabling platform for sectorial productivity, economic diversification and transformation.
Lack of interoperability in M2Mm communication limits the use of Smart Systems and limit open innovation. How to capture value nationally?

Mining: Developing international standard for interoperability (Chile Australia)

In Health: Need to move to single electronic health record that follows the patient

In Cities, prevent consolidating integrated sensors networks multi parameters
Human Capital Development Framework

Critical development of specialized human capital in key verticals

How do we address the gaps in the actual formation system?

ICT Skills (software developers, cloud, networking), Data Analytics (big data, supporting technology), Foreign Language, Business Skills (technical sales, product development) and Engineering.

Knowledge, tools and general digital methodologies: ICT skills

Digital Literacy

Life long learning

Future competences and/or specialization

Vertical competences

Inter sectoral competences

Cross competences

Digital literacy
Opportunities for Chile

- **Global trend**: exponential growth of electromobility and hydrogen-based economy
- At 2030 there will be 30 millions of electrical vehicles.
- It will need a production of additional 3 millions tonf low emission Copper (15% of world Production).

**Atacama Desert singularities**

- **Highest solar potential**: >3.500 kWh/m²
- >3.000 sun hours/year
- **Biggest metallic mining district in the world**
- **Strong position in non metallic mining** - 1rst in lithium production and natural nitrates (energy storage)

**A UNIQUE OPPORTUNITY:**
CLEAN MINING AND DOWN STREAM MANUFACTURING
BASED ON SOLAR ENERGY POTENTIAL
World's largest low emission copper producer

Chile: leading supplier of lithium and low-emission copper for electro Mobility and RE

- Long term supply of lithium carbonate/hydroxide (battery grade)
- Lithium added value products (cathodes, others)
- Solar energy for continuous electricity supply (mix PV/CSP) at average cost of 50 USD/MWh
- Fossil fuels substitution, Hydrogen and Syntetic fuels based on circular economy approach

INNOVATION STRATEGY
Technological Program to pilot dual hydrogen-diesel combustion for mining trucks. Opening June 2017. To generate local capabilities. H2 demand without emissions in Chile.

The Solar Mining Institute will have as one of its areas of work, the development of H2 Economies for strategic sectors, based on solar energy in Chile.

From local capacities developed, extend to other applications:

- Other Mining Equipment
- Public transport
- Marine transport.
MINING Open Innovation Platform

Financial Impact

* Aug 2017
Next 18 months

<table>
<thead>
<tr>
<th>EXPANDE</th>
<th>Current Contracts</th>
<th>Potential Contracts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects Portfolio</td>
<td>USD 4,272 M</td>
<td>USD 25,459 M</td>
</tr>
<tr>
<td>Government Grants up to August 2017</td>
<td>400K</td>
<td>1.300M</td>
</tr>
<tr>
<td>Return over Government Grants</td>
<td>10.7</td>
<td></td>
</tr>
<tr>
<td>Potential Return over Government Grants</td>
<td>19.6</td>
<td></td>
</tr>
</tbody>
</table>

*8 Months since starting Open Innovation Program
### SOLAR ENERGY

**Open Innovation Platform**

- **Industry Needs**
  - Solar energy generating companies
  - Suppliers of goods & services for industry

- **Platform Challenges**
  - Management of fouling, water resources and cleaning of modules
  - Performance, deterioration and failure
  - Operations & Maintenance

- **Platform Focus**
  - PV plants
  - Utility Scale
  - Solar Energy for mining & agriculture
  - Distributed generation

- **Industry Providers**
  - R&D centers & universities
  - Companies & industry associations
  - Entrepreneurship ecosystem (incubators & accelerators)

### Opportunity / Gap

<table>
<thead>
<tr>
<th>Opportunity / Gap</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management of fouling, water resources and cleaning</td>
<td>Device for cleaning modules</td>
</tr>
<tr>
<td>of modules</td>
<td></td>
</tr>
<tr>
<td>Performance, deterioration and failure</td>
<td>Standardization and certification of designs,</td>
</tr>
<tr>
<td></td>
<td>equipment and systems</td>
</tr>
<tr>
<td>Operations &amp; Maintenance</td>
<td>Improve operation with local capacities and</td>
</tr>
<tr>
<td></td>
<td>predictive maintenance</td>
</tr>
</tbody>
</table>
Thank you
@Corfo
www.corfo.cl

Eduardo Bitran C.
Executive Vice President
Chilean Economic Development Agency – CORFO.