

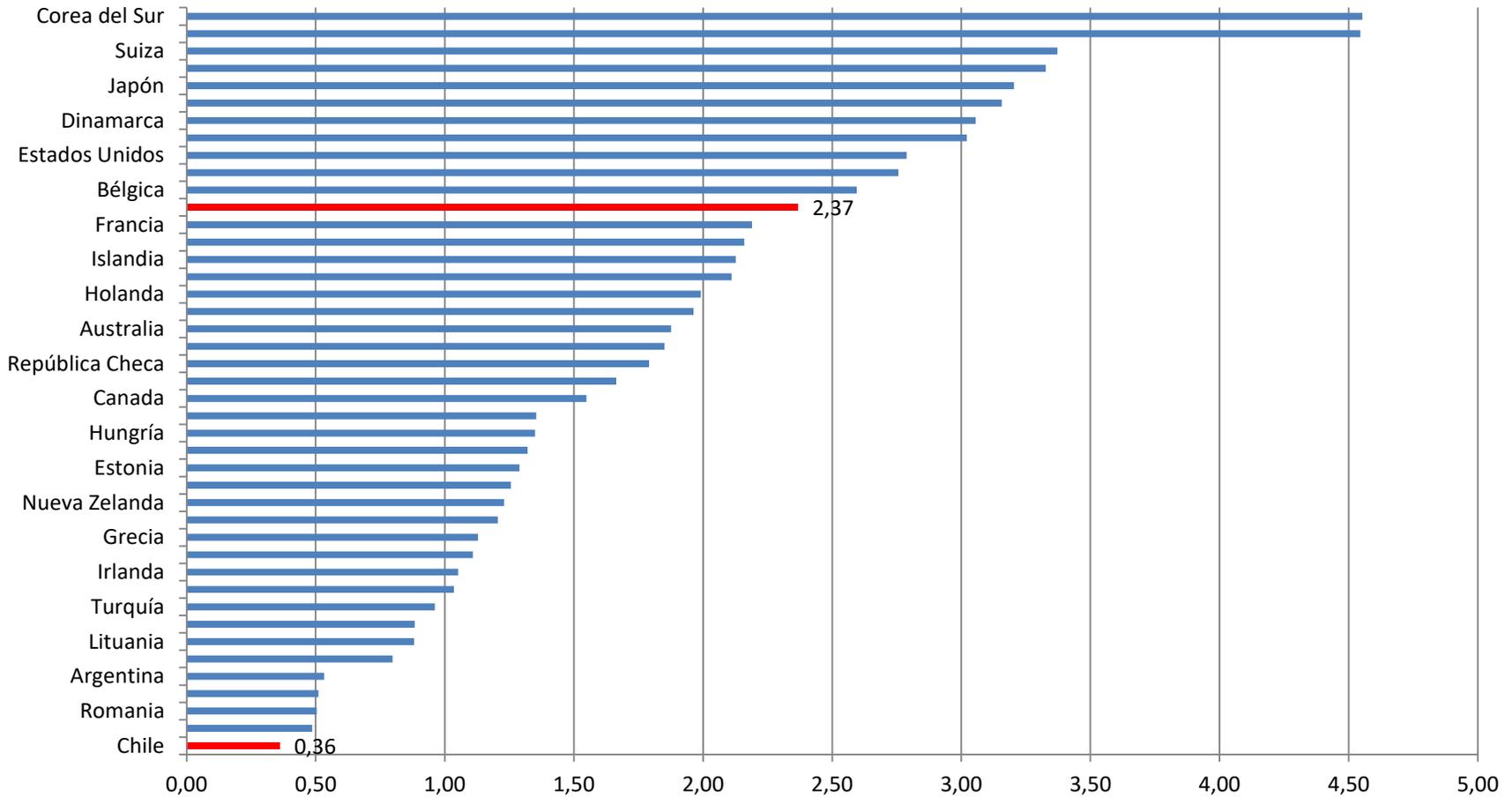


# **HOW IS CHILEAN REGULATION AFFECTING INNOVATION ?**

APRIL 2019

# Overview

## Total expenditure in R&D in relation to GDP



OECD Stats April, 2019

# Overview

## Where are we?

- In Chile, unlike other OCDE countries, economic resources invested in R&D come mostly from the public sector. CORFO - Chilean State corporation- offers a variety of instruments and programs aiming to co-finance initiatives / Tax incentive in R&D investments / Public funds for investigation: Fondecyt and others.
- While in the US and many developed nations private institutions and enterprises contribute with 80-90% of the total expenditure in R&D, in Chile this is slightly over 35% (although it has increased in the latest years).

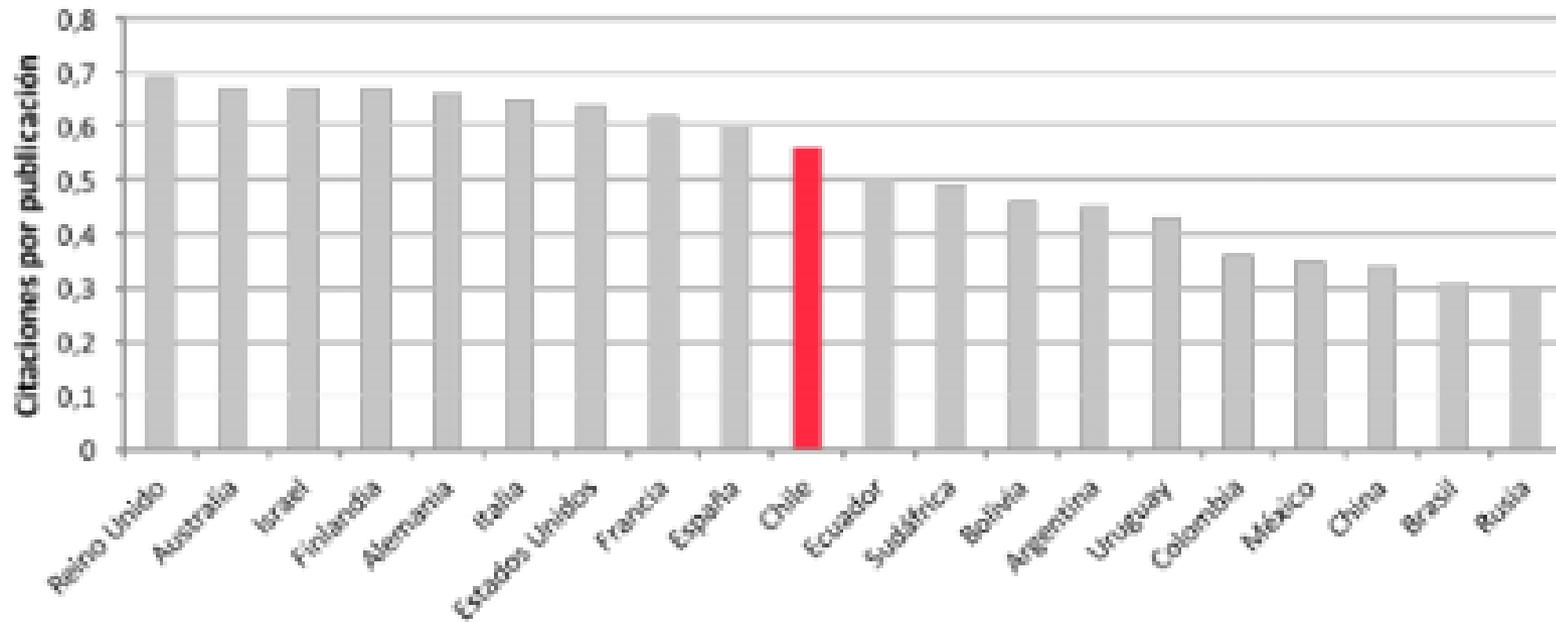
# Overview

- Average R&D expenditure in Chile is far distant from that taken place at OCDE countries: 0,36% / 0,38% of GDP. This investment increased (36%) during 2007-2012, but it is still way below the growth registered in Argentina on the same period of time.
- Anyway, it is important to point out that part of the resources dedicated to R&D in other countries, such as US, France and Korea, are destined to military objectives, which doesn't happen in Chile.
- Why isn't Chile taking off? Possible reasons: Lack of promotion of the relevant policies/programs; lack of coordination between R&D institutions and enterprises, deficient incentives and/or poor distribution of resources.

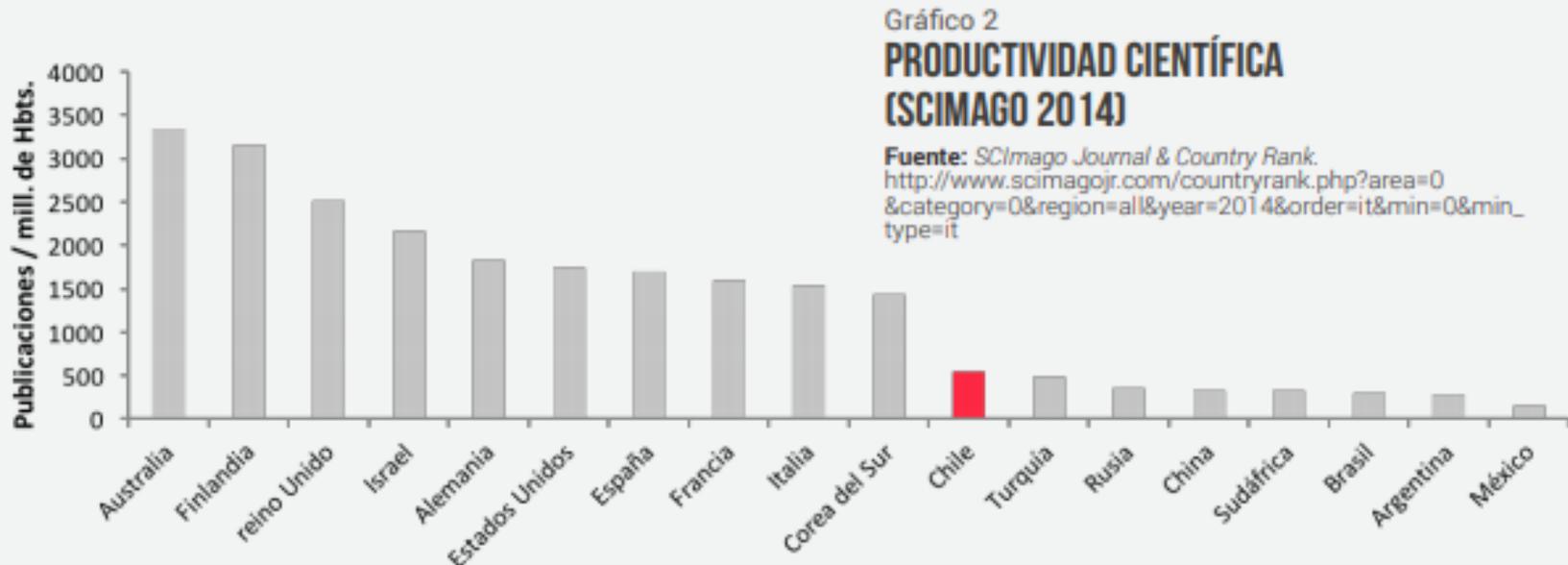
# Overview

- Our country produces good quality investigation, although not in considerable quantities.
- Quality is comparable to developed nations, registering similar figures.
- In this sense, Chile is far superior than countries from the region (Latin America).

# Overview



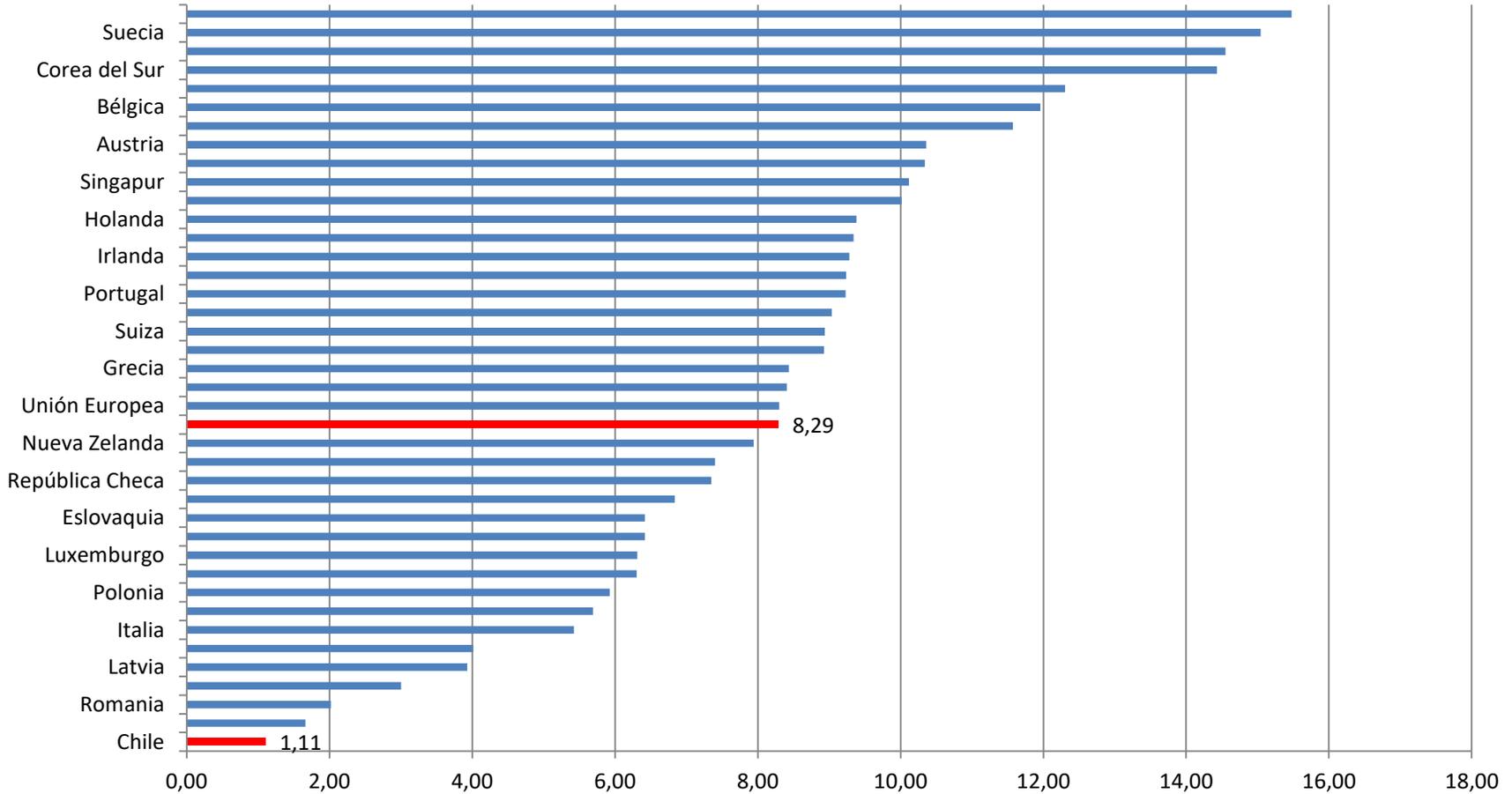
# Overview



However, Chilean's productivity in scientific publications is lower than those of developed countries, presenting an inferior level of publications per inhabitant.

# Overview

## Total personnel dedicated to R&D for every 1000 workers



OECD Stats April, 2019

# Overview

- Private sector expenditure (enterprises, entrepreneurs) in R&D is increasing in the latest years. Evidence shows that in 2016, investment of private firms in the area was around \$216.731 million, which represents a real increase of 8,6% in relation to 2015, and the intensity of the innovation, understood as the relationship between the investment in R&D and the sales of the company went to 0,21%, which means 0,05% annual.
- Same evidence concludes that the expenditure in R&D, financed by private companies, is around 40% of the total amount spent by the country.
- The investment, however, is far away from achieving what our peers from OCDE are doing. Chilean firms are the 4<sup>th</sup> -from bottom to top- that spend the least amount of money in R&D within OCDE countries. Their peers from Israel, Korea and Japan spend near 80% of the total amount spent in R&D.

# Overview

- Data also shows that big size companies are the ones concentrating the highest expenditure in R&D. However, in terms of average intensity, the tendency is reverted, being micro enterprises the ones leading the run.
- This means that, in relative terms, compared to their sales, big size companies are spending less followed by medium size companies. Total expenditure in R&D of PYMES is relatively small when compared to big size companies. But if we consider the expenditure as a percentage of sales, PYMES y micro enterprises are doing more intensely R&D than bigger companies. This is one of the reasons why the Government is interested in promoting that the R&D tax benefit becomes a useful tool to small size companies.
- A similar trend can be observed in long standing companies. These companies spend more in R&D, but in relative terms the trend gets reverted, being young companies more intense in R&D investment which reveals the importance of entrepreneurship for a more dynamic and innovative economy.

# Overview

- **By economic sectors:** \$815.033 million is the sum invested in R&D between 2013 y 2016. The biggest share of that cake belongs to firms in the mining sector, followed by firms involved in financial activities, insurance, agriculture, stockbreeding, hunting, silviculture and fishing. Least amount spend is shown in the area of administrative and support services, accommodation, food services and construction. As a general observation there is no positive correlation between expenditure in R&D and the level of intensity.
- **Geographically speaking:** Greatest expenditure is located at Metropolitan Region, followed by the Biobío Region and del Libertador General Bernardo O'Higgins. Least expenditure is in Magallanes and Antarctica, Arica y Parinacota, and Aysén.
- **Capital composition of firms investing in R&D:** 50% of expenditure in R&D is done by companies wholly owned by Chilean capitals, followed by those that have foreign capitals (27,87%) and State owned (13,39%). Mixed companies are in the fourth place with a 8,75%. However average expenditure shows that State owned companies exceed the rest (State owned mining companies). Intensity of the average expenditure is leaded by Chilean owned firms, which exhibit an increasing trend.

# INSTITUTIONAL OVERVIEW

## Institutions

- **Ministry of Science, Technology and Innovation (Law No. 21.105 , 2018)**
- **Consejo Asesor Ministerial**
- **Agencia Nacional de Investigación y Desarrollo (National Agency R&D)**
- **Consejo Nacional de Ciencia, Tecnología, Conocimiento e Innovación para el Desarrollo (National Advisory Board)**
- **Comité Interministerial de Ciencia, Tecnología, Conocimiento e Innovación Ministry of Economy, Innovation Division**
- **MINECON / INAPI**
- **Laboratorio de Gobierno**
- **Comisión de Productividad**
- **Private Initiatives**

## Estrategies / Instruments

- **Sistema Nacional de Ciencia, Tecnología, conocimiento e Innovación**
- **Estrategia Nacional de Ciencia, Tecnología, Conocimiento e Innovación para el Desarrollo**
- **Política Nacional de Ciencia, Tecnología, Conocimiento e Innovación**
- **Plan de Acción / Plan Innovación 2014-18**
- **Fondo de Innovación para la competitividad**
- **Fondo Nacional de Desarrollo Científico y Tecnológico**
- **Corfo Instruments**
- **Specific tax incentives and other initiatives**

# Main challenges

- Institutionally speaking, there are no requirements for great transformations (although an efficiency review could be needed). What we really require is to foster articulation, coordination, combination and connection of the different initiatives/systems and do it in a more efficient way. We need to achieve greater coherence and integration between the different programs (fragmented system) at a national level.
- Private enterprises and institutions have good incentives to invest in R&D. They pursue innovation and promote the creation of new abilities and skills in specific areas to develop competitive advantages and to acquire further knowledge to keep track with dynamic markets.
- This is coincidental with the objectives of the academic world. Likewise, communities aspire to achieve greater development towards a better quality of life. Virtuous circle.
- They point or challenge is how to make all the gear assemble.

# Main challenges

There are different ways to assemble this:

- We need to increase the bet for science in our country. Positive effects in education, public policy development and productivity are good reasons to promote a national policy for the permanent development of science and technology.
- Public sector plays a role here, as it can: promote efficient coordination between enterprises and universities; through specific incentives (i.e. tax incentives) and promoting alliances that will allow the creation of an ecosystem that is proper for putting in practice knowledge.

# Main challenges

- Public funding or co-funding is justified because R&D has positive externalities (social benefit outgrows private benefit so market solution may lead to a suboptimal condition). BUT from there you don't necessarily conclude that the lack of public resources is the cause or barrier that limits a greater expenditure in R&D by the private sector.
- CORFO has a variety of instruments (tenders and programs) destined to promote technological development and innovation in the private sector. There are other initiatives such as technological consortiums for innovation, where lines of investigation are co-financed to generate an impact on the market.

# Main challenges

- There are other good efforts (instruments) to co- finance initiatives that encourage innovation, but they are scattered among different ministries (Education, Economy and Agriculture), as well as other public institutions without being clear what's the degree of coordination.
- A good idea (Comisión Philippi) was to reunite, in one ministry, superior education and science, technology and innovation. This didn't happen.
- FONDECYT has been an important program and we should deepen efforts in this line to amplify the base for development of scientific and technological investigation. Virtues:
  - Allocation of resources through public bids, competitive
  - External (independent) evaluators,
  - Excellency of the proposal and the aptitude of the investigators is the only criteria for allocation.
- It becomes very important that this program continues to develop, respecting the liberty and flexibility and stability that investigators require to develop its capacities. Aim: to avoid discretionary /arbitrary allocation of funds or having a select group of favorite superior education entities, either in terms of the direct contributions done by the State or through grants and scholarship programs. Allocations systems must be competitive through merit and performance. Excessive regulation, discretionarily and rules that maintain privileges wont favor the development of science in Chile.

# Main challenges

- So, alternatives for reaching out for public co-funded expenditure in technology and innovation are diverse.
- Our theory is that there are still regulatory barriers and bureaucracy that restrict the interest to invest in R&D along side with lack of coordination, networking spaces and very incipient innovation ecosystem.
- What the State can do best is strongly supervise the existence of competition; stimulate entrepreneurs and facilitate the creation of companies, reduce bureaucracy and minimizing burdens (tax and regulatory ones), as well as delivering good instruments and formation/training of advanced human capital. Public sector plays a role here as it can promote coordination between companies and universities, as well as generating tax incentives and alliances that will allow the creation of an ecosystem that is proper for the practical of knowledge.

# Main challenges

- **Participation of qualified scientific investigators is required at all levels of the education system**, either directly or through the formation of good teachers and the elaboration of good quality study texts. We require more flexibility to allow professionals and technicians to participate in scholar education within their area of specialization.
- **Universities have an irreplaceable role in creating and shaping advanced human capital and in promoting a culture of innovation = great capacity to generate high impact investigation for society and productive systems.** When defining their course of action universities should pick their role model: entrepreneurs, innovators, politics, social leaders, teachers, executives. Those that teach science need science teachers; those who aim to promote entrepreneurship and innovation require the knowledge and expertise of entrepreneurs and innovators. This also assumes changes in the way we are teaching, supplementing academic disciplines with a higher orientation to resolving concrete and practical problems (desalination, traffic congestion, clean energies, etc.).

# Main challenges

- **Centers of investigation developed around a group of companies that finance the relevant investigation in determined areas of common interest.** Companies that invest strongly in a certain university or alliances between investigators within a certain company, or universities that work together to pursue goals in innovation. Some of this has been going in Chile but not in a big scale.
- Interesting experience: Bioforest S.A. It is a scientific and technological investigation center founded by Arauco, which mission is to improve the quality and productivity of forest plantations. This center has laboratories, highly qualified personnel and infrastructure to develop its task in adequate conditions.
- **Continue promoting the decentralization of investigation.** Regional centers of investigation may open up spaces for science, with an impact in local production / local economic activity. CORFO's experience promoting "Centros de Excelencia" has been very valuable. Mining in the north of Chile, silviculture and salmon industry in the south could be further boosted.

# Main challenges

- Dependence on natural resources doesn't mean we shouldn't incorporate significant technological changes: Sophistication of our production.
- Anyone that knows productive process in mining, silviculture, fruit industry knows the enormous technological progress made. Innovation has marked the development of these sectors (shale gas). Sustainable exploitation of natural resources require a lot of science.
- Chile has programs oriented to insert advanced human capital in the industry and in the universities, with good, but slow results. What are we missing: incorporation of scientist in other instances (advisory boards, board of directors, state owned enterprises). We need to deepen the contribution between enterprises and scientific world.

# Main challenges

- Continue promoting competition in different markets: Dynamic and challenged markets generate the need to innovate (destructive creation: Schumpeter).

Chile doesn't need more public resources to promote science and innovation, but the correct incentives: Ikhlaq Sidhu (Berkeley): people usually think that smart guys go to the university where they create technology that will transform in successful companies. These happens...but generally speaking people coming from other companies form their own entrepreneurship that become big and successful. So the fundamental role of governments is to promote competition, stimulate the creation of companies, reduce bureaucracy and minimize tax burdens and regulatory ones.

- Tax incentives for technological companies to come to Chile, bringing investigators and scientists who help form national ones.
- Promote networking for entrepreneurs (Start Up Chile), connections with mentors, market and investors but specifically oriented to the development of science, technology and innovation. The aim is to generate an entrepreneur culture in the area.
- Spread the news of available programs!

... Now in terms of new legislation/regulation  
/institutions... where are we going to?

... In the right direction



# Initiatives in the correct direction

- **Opening new businesses: Easy and expedite / Friendly regulation regarding failure**
- **Chilean State modernization**
- **Well oriented institutions and microeconomic initiatives:**
  - **Ministry of Science, Technology and Innovation / Ministry of Economy**
  - **Pro investment Bill**
  - **Pro productivity Bill**
  - **Pro consumer Bill**
- **Bill to modernize SENCE (training and continuing education program and institution) and amendments to the industrial property law (bill)**

# Expedite Opening and Closing of Businesses



- [“Tu Empresa en un Día”](#) (Your Company in One Day). Is designed for use by small /medium size companies and the process can be carried out online. Simple and costless through an electronic form and advanced electronic signature. (2013)
- Individual Limited Liability Company (EIRL); Limited Liability Company (SRL); Corporation (S.A.), closed; and Stock Company (SpA). As of 2020 other types of companies will integrate the online platform

*Chile is one of the 35 countries in the world where opening a business takes the least time. According to the World Bank’s Doing Business 2018 ranking, setting up a company in Chile is quicker than in, for example, the United States.*

- Chile’s entire bankruptcy regulation experienced the most profound modification in decades. The new Law of Insolvency and Re-Entrepreneurship provides a completely new set of rules for bankruptcy and insolvency, including new debt reorganization proceedings for companies and for individuals. The law was designed to simplify and shorten insolvency and bankruptcy procedures and make them more efficient and flexible (2014).

# Chilean State Modernization

- Corporate governance of the process: Presidency, Ministry of Finance, Ministry SEGPRES.
- Initiatives / Institutions
  - Digital Government Division / SEGPRES
  - Moving towards shared / Open data platforms
  - Bill: Digital transformation of the Chilean State
  - Bill: Modernization of the National Statics Institution
  - SUPER: Unified online system/platform for processing investment projects permits
  - Coming bill for regulatory simplification

# New / Refreshing Institutions - Strategies

- New Ministry of Science, Technology and Innovation.
- Ministry of Economy:
  - Innovation Division. Enables net collaboration, coordinates initiatives among ministries, promotes the formation of scientific excellency centers. Policy not centered in clusters (capture) – Cross sector policy.
  - Future Economy Unit.
- OPEN: Aims to simplify diligences, reduce bureaucracy. Focused on promoting competition, full incorporation of small/medium size companies to the modern economy. Coordinated with the National Productivity Commission (independent and political transversal).
- Bill to boost productivity and entrepreneurship: According to OCDE data, Chile ranks 6th among those countries with more regulatory barriers for entrepreneurs. Diminish complexities, increase productivity, facilitate entrepreneurship.

# Boosting Advanced Human Capital

- Changes in the concept of training and continuing education.
- The franchise can only be used in relation to effective expenditure.
- Articulation mechanisms with professional and technical education.
- Amplifies the scope of the system:
  - Inactive persons.
  - Providers' personnel.
- Copayment (20% as a minimum)
- Strengthens the National Training Fund



# Amendments to IP Law

- Procedural efficiencies (incorporation of technologies).
- More robust protection to IP rights, making enforcement stronger (new criminal figures: trademark falsification; civil compensations).
- Recognition by law of new signs and figures that can be registered as a trademark.
- Lines up our regulation with well oriented international trends.
- Provisional patents.
- **Issues for thoughts**
- No effective use of trademarks triggers expiration of the registration
- **Worrying issues**
- Civil or labor courts getting to know about IP issues when we have special IP courts
- Compulsory licensing: ambiguous wording allowing them when sanitary issues emerge or emergencies

# Tax Incentive R&D

- In force as of 2008 (Law N° 20.241), amended in 2012 (Law N° 20.570): benefits were amplified and the system was made more flexible.
- 35% tax credit against corporate tax (over the amounts invested in R&D activities duly certified by CORFO). Maximum annual credit amount 15.000 UTM / USD\$ 1.000.000 aprox. (before it was 5000 UTM).
- Remaining 65% of the expenditure is considered as a necessary expenditure to produce rent, deductible from the tax base.
- Benefit applies to recurrent expenditure and capital expenses. ¿Tax losses? Benefit may be carried forward, adjusted by inflation, up to 10 years.
- “Inhouse” (projects) and “Out of the house” R&D activities (agreements).
- Minimum amount invested so that CORFO certifies the activity: 100 UTM / 7.100 USD
- Company freely decides in what to invest / Compatible with other public financing

# Tax Incentive R&D

*T8. Iniciativas aprobadas por contribuyente, año y según marco legal. Periodo 2008 – 2015*

| <b>Año</b>   | <b>Ley 20.241</b> | <b>Ley 20.570</b> | <b>Total</b> |
|--------------|-------------------|-------------------|--------------|
| 2008         | 2                 |                   | 2            |
| 2009         | 9                 |                   | 9            |
| 2010         | 22                |                   | 22           |
| 2011         | 48                |                   | 48           |
| 2012         | 28                | 17                | 45           |
| 2013         |                   | 61                | 61           |
| 2014         |                   | 107               | 107          |
| 2015         |                   | 190               | 190          |
| <b>Total</b> | <b>109</b>        | <b>375</b>        | <b>484</b>   |

2013: Certified amount by CORFO \$ 18.508 million.

2014 Certified amount by CORFO \$ 33.281 million, 80% increase.

# Tax Incentive R&D

T11. Postulaciones aprobadas y rechazadas según sector socio económico. Ley 20.570

| Sector Económico                    | Aprobado   | Rechazado | Tasa de rechazo |
|-------------------------------------|------------|-----------|-----------------|
| Pesca y Acuicultura                 | 39         | 5         | 11,4%           |
| Minería                             | 38         | 1         | 2,6%            |
| Agropecuario                        | 29         | 3         | 9,4%            |
| Alimentos                           | 19         | 3         | 13,6%           |
| Multisectorial                      | 18         | 2         | 10,0%           |
| Frutícola                           | 15         | 1         | 6,3%            |
| Biomedicina                         | 13         |           | 0,0%            |
| Construcción e Infraestructura      | 13         | 2         | 13,3%           |
| Química                             | 13         | 2         | 13,3%           |
| Tic's                               | 12         | 12        | 50,0%           |
| Vitivinícola                        | 10         | 1         | 9,1%            |
| Energía                             | 9          | 5         | 35,7%           |
| Forestal                            | 9          | 1         | 10,0%           |
| Logística y Transporte              | 8          | 6         | 42,9%           |
| Biotecnología                       | 7          |           | 0,0%            |
| Farmacología                        | 7          | 3         | 30,0%           |
| Otros                               | 6          | 1         | 14,3%           |
| Servicios de Ingeniería             | 5          |           | 0,0%            |
| Manufactura                         | 4          |           | 0,0%            |
| Servicios Financieros               | 3          | 1         | 25,0%           |
| Materiales                          | 2          |           | 0,0%            |
| Acero                               | 1          |           | 0,0%            |
| Entretención                        | 1          |           | 0,0%            |
| Envases                             | 1          |           | 0,0%            |
| Industria Automotriz                | 1          |           | 0,0%            |
| Industria Manufacturera no metálica | 1          |           | 0,0%            |
| Ingeniería                          | 1          |           | 0,0%            |
| Metalmecánica                       | 1          | 2         | 66,7%           |
| Salud Humana                        | 1          |           | 0,0%            |
| Telecomunicaciones                  | 1          |           | 0,0%            |
| Bienes raíces                       |            | 1         | 100,0%          |
| S.I.                                |            | 1         | 100,0%          |
| <b>Total</b>                        | <b>288</b> | <b>53</b> | <b>18,4%</b>    |

... In the wrong direction



# “Free-of-charge” higher education



- Along side with public funds allocated to investigators through FONDECYT, certain universities (CRUCH) receive a direct fiscal contribution theoretically destined to finance investigation since operational costs are financed by enrolment.
- Gratuity assumes that only the regulated fee or tariff will be financed which is already revealing deficits (universities won't cover up their real costs): Victim of this public policy: Investigation. Other consequences: Standardization of superior education, degradation in quality.

# Fármacos II



- Drugs, food and elements of medical use will be considered as **essential goods for purposes of the general nation's interest and public health.**
- It considers the **creation of a system, with obligations and conditions, that shall allow the effective availability of drugs and pharma products** referred to in the Sanitary Code.
- **Price fixing:** Ministry of Health shall issue a Decree containing guidelines to regulate drugs' prices, so as to guarantee access to medicines, food and medical elements (remember that those are considered essential goods for the general interest of the nation and for public health purposes.....). It is "meant" to prevent barriers of access (economic) and abusive exploitation from the actors in the chain /dominant position....**but we already have Antitrust authorities and regulation for that!**

# Fármacos II



- **Compulsory licensing:** Allowed. Must be declared by the relevant authority. Reasons: public health, national security, non commercial public use, national emergency or other reasons of extreme urgency. It shall be understood that there is a public health reason involved with respect to pharma products, food and medical elements when they become included in the plans and programs of the Ministry of health, due to economic inaccessibility or shortage No advertising for OTC products. No actions to incentivize sales...**How will consumers be informed of new innovative products? Competition? More information?**
- **Packaging / Container restrictions:** Name DCI must use at least 1/3 of one its main sides. Fantasy denomination may be included but its size cant go beyond 1/5 of the space used for the DCI **¿Value of trademarks?**
- **Limited distribution channels:** No drug expenditure other than in drugstores...**Competition? Price reduction? Availability in places where there are no drugstores?**

# Technological transfer to the State

- Amendment to Article 9 of Fondecyt Law: Publicly funded projects or programs, resulting in inventions that may be patented will have a compulsory license in favor of the Chilean State (non transferable, irrevocable, against payment).
- If the relevant center or investigator doesn't apply for IP protection, IP rights will be allocated to the Chilean State (Ministry of Science) by the sole ministry of the law.
- If after patenting the invention, it is commercialized: Inventor will have to restore 100% of the allocated funds to the State, plus 5% of the income obtained.
- **Chilean State Leviathan? Investor with retribution rights?**

# So....Hands on!

We need to confront the challenge! Now, not tomorrow!

- **Chile's investment in R&D 0,4% del PIB. The least relative investment in Latin America (with Ecuador and Puerto Rico) Brazil (1,3%), Argentina and Costa Rica (0,6%), and México (0,5%).**
- **OECD countries average: 2,4%**
- **Israel y Korea: over 4,2%.**
- When other developed countries had a similar GDP to Chile's current one (New Zealand, Denmark, Canada and Australia), they had 7 times more investment in R&D than Chile in various indexes: application for technology patents, human resources in R&D and scientific and technical publications.



LIBERTAD Y DESARROLLO

**THANK YOU!**

APRIL 2019