Rigorous empirical research on intellectual property

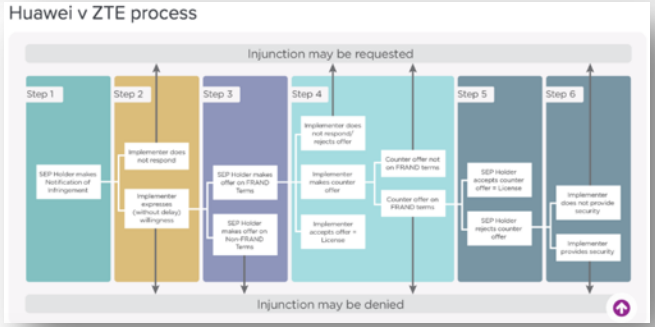
# Why researchers need an IP strategy

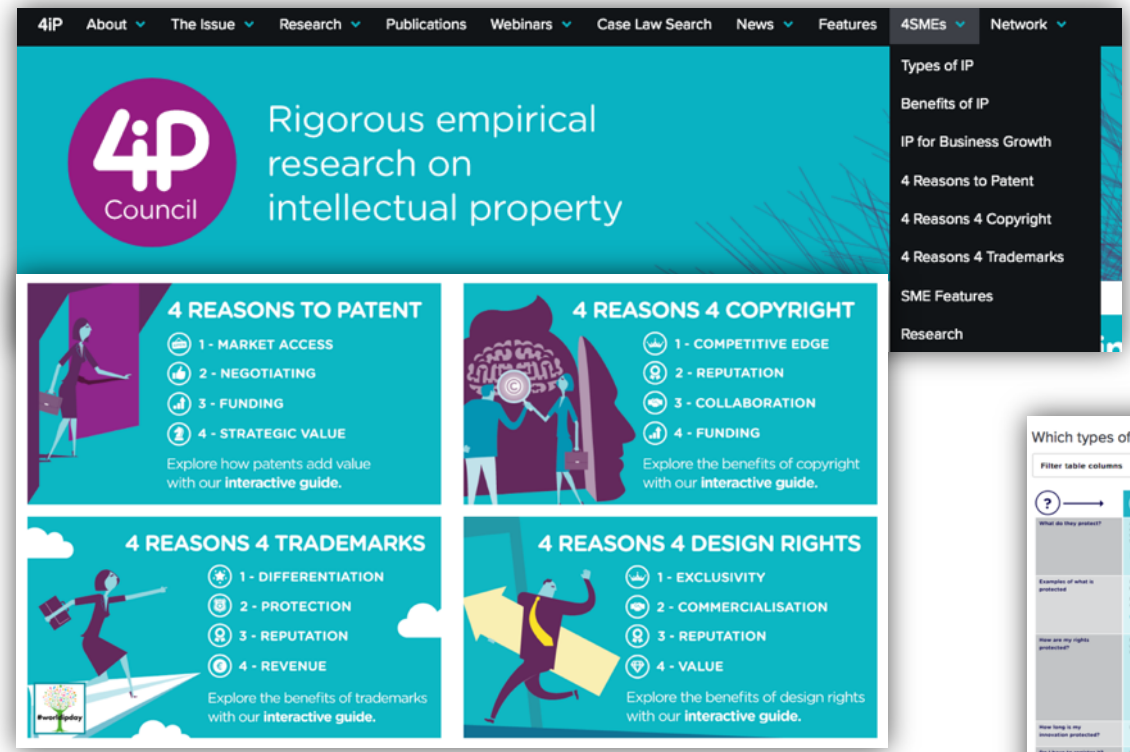
**Host:** Claudia Tapia, Chairperson

**Presenters:**
**Prof. Koenraad Debackere,** Professor of Technology and Innovation at the Faculty of Economics and Business of KU Leuven. Managing Director of KU Leuven Research & Development
**Dr. Peter Oksen,** Senior Program Officer at WIPO GREEN


Rigorous empirical research on intellectual property
The Value of Connectivity in the Automotive Sector
Prof. Bowman Heiden
Center for Intellectual Property (CIP), Chalmers University of Technology
The Hoover Institution, Stanford University
FRAND licensing levels under EU law
Dr Jean-Sébastien Borghetti
Professor of Private Law at University Paris II Panthéon-Assas
Dr Igor Nikolic
Senior Fellow at University College London (UCL) Centre for Law, Economics & Society
Dr Nicolas Petit
Professor of Law at the University of Liege and at the College of Europe
Summary
February 2020
4iP Council
Research Award Winner 2019
Pirates of the 3D Realm: Strategies for IP protection from the widespread adoption of additive manufacturing by consumers
by Alessandro Burro
Candidate at Bocconi University
LL.M. in Law of Internet Technology


Case Law post CJEU ruling Huawei v ZTE
4iP Council
Case law home
CJEU Huawei v ZTE
German court decisions
Italian court decisions
English court decisions
English/Irish court decisions
Romanian court decisions
French court decisions
Dutch court decisions
National Courts Guidance
Authors & contributors
National Courts Guidance
Negotiating Licenses for Essential Patents in Europe
Increased clarity provided on the principles established by the Court of Justice of the European Union in Huawei v ZTE.
The Court of Justice of the European Union clarified, in Huawei v ZTE (Case No. C-170/13), European law relating to the availability of injunctive relief for infringements of FRAND-based standard essential patents. In doing so, the Court provided a legal framework focused on the good faith


Huawei v ZTE process
Injunction may be requested
Step 1
Step 2
Step 3
Step 4
Step 5
Step 6
Injunction may be denied





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# WIPO
## WORLD INTELLECTUAL PROPERTY ORGANIZATION

UN specialized agency (1967)

192 member states

Dedicated to the promotion of innovation and creativity of the economic, social and cultural development of all countries through a balanced and effective international intellectual property system.

Global registration system for trademarks, industrial designs, appellations of origin, and global filing system for patents.

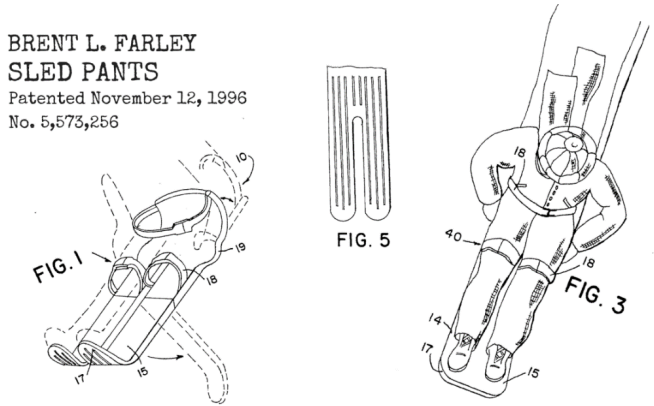
Strong capacity development mandate.

# IPR benefits

- Every new technology has an owner – clarify rules of interaction early on is wise
- IP is protected by national laws and international treaties
- More likely successful technology transfer and diffusion
- IP facilitates investment by lowering risk
- May be a pre-requisite, especially for PPPs
- Creates confidence that technology can be shared without abuse
- Can create a “level playing field” among rich and poor country institutions

# Intellectual Property Assets

- Innovative products/processes ▶ Patents
- Distinctive signs ▶ Trademarks
- Creative designs ▶ Design rights
- Cultural, artistic, literary works ▶ Copyright
- Confidential business info ▶ Trade secrets
- Geographical origin ▶ Geogr. indications



# Patents

*Invention: a product or process that provides a new way of doing something, or that offers a new technical solution to a problem*

- Patent granted by state for a fixed time (generally 20y) - in return for disclosure
- Applies to a specific territory (only valid where granted)
- Right enforced in courts
- A patent can be challenged and invalidated through administrative procedures (before granted) or in court
- Patent owner has right to decide who uses the invention and how (during protection period)
- Rights can be transferred, licensed, and sold
- After expiry, invention enters public domain (exclusive right ends)

# Patent protection – the essentials

- Once a patent granted in a country, no third party can apply patent for same invention
- In country where patent granted, patent owner decides who can use the invention and how
- In other countries, third party can copy and use/sell the invention, but cannot patent it
- If no patent is granted, risk that third party will try to patent the invention and use/sell it
- In other words:
  - Patent protects against third party patenting and against copy in country of patent

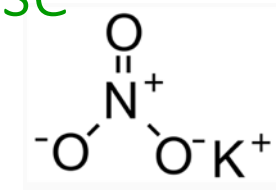
# Licensing

- *Partnership between an intellectual property rights owner (licensor) and another who is authorized to use such rights (licensee) in exchange for an agreed payment (fee or royalty)*
- Non-exclusive – lower price, more diffusion
- Exclusive – higher price, less uptake, more innovation?
- Package technology license (e.g. technology, know-how, software, commitment for training and R&D)
- Compulsory licensing – e.g. under national emergency

# Trade Secrets

- Business information not generally known that confers competitive advantage to the owner
- Protection depends on legal system and definition varies
- No registration. Confidentiality agreements common tool
- Weak protection compared to patents
  - Manufacture info, formulas
  - Quality control methods
  - Product information
  - Drawings
  - Pending patents
  - Know how
  - Consumer & supplier lists
  - Sales data

# Use of patents case Dr. Ramon Barba





- Discovered that Potassium Nitrate can induce flowering in mangoes
- Did not think about patenting until third party applied for patent
- Contested the application and was awarded the patent in the Philippines
- Patent helped Dr. Barba secure his IP rights and share it with a maximum of beneficiaries
- He does not enforce his patent


Story link: https://www.wipo.int/ipadvantage/en/details.jsp?id=2516

Picture courtesy of WIPO

# Sintesis – an Argentine SME

- Invented an inoculant for soy beans
- Patented in Argentina
- Wanted to expand internationally
- Contracted distributers on foreign markets
- Applied for patents in these markets
- Experienced strong growth and was later bought by large Indian company



Story link: https://www.wipo.int/ipadvantage/en/details.jsp?id=2572



Picture courtesy of WIPO (Karen Rubado)

# INRA and Ogura

- French National Institute for Agricultural Research (INRA)
- Ogura method to produce high-yielding rape seed
- To reach market, INRA granted non-exclusive licenses to seed companies
- Seed companies developed climate specific varieties helping diffusion
- 5% royalty up to 2011
- 1% royalty up to 2016
- Up to 2011 INRA generated €50m

Story link: https://www.wipo.int/wipo_magazine/en/2015/04/article_0003.html



Picture courtesy of WIPO (iStock.com/arturbo)

# Tu Youyou's anti-malaria drug

- Chinese scientist contributed to the discovery of Artemisinin in 1970's
- No patent applied
- Non-Chinese company applied for the patent
- China has benefitted little from the invention although deal with patent holder
- Tu Youyou won Nobel prize in medicine in 2015



Picture courtesy of South China Morning Post

# When to think about IPR

- Soonest possible
- In R&D phase a R&D agreement may specify ownership of potential outcome
- Before deployment, patent should be applied for (reverse engineering not illegal)
- Patentability test (by a consultant / law firm)
  - Can help decide which elements of an invention to patent where – business development advise
- Once granted it can be basis for sale, transfer, production license, non-commercial free use etc.
- If wish is to grant free licenses, can protect against unwanted third-party commercial exploit.

# WIPO GREEN

Online platform for accelerated adaptation, adoption, and deployment of green technology solutions

Connects seekers of environmentally sustainable solutions with technology and service providers

**Enable** adaptation and deployment of green solutions through a transparent marketplace

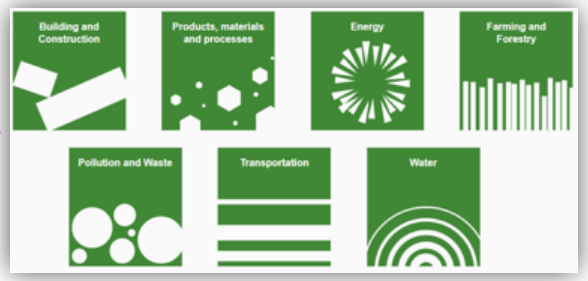
**Engage** with private sector

**Contribute** to global policy dialogue

10,000+ visitors a month on the website
7,000+ subscribers to the newsletter
WIPO official social media channels and case studies promotion

# WIPO GREEN Activities

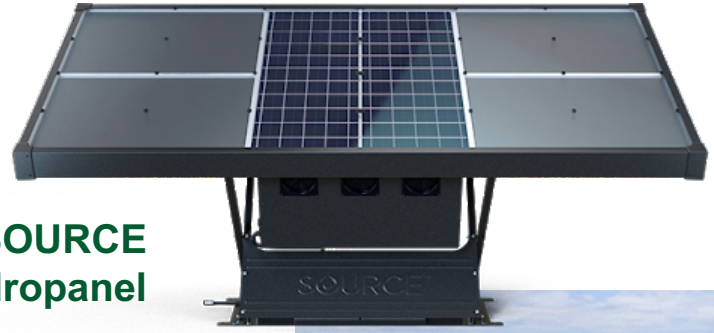
- **Database**
  - Technologies
  - Needs for products, processes, know how, transfer, collaboration and finance
  - Business expertise (Experts database)




- **Matchmaking Projects**
  - 2015 – Wastewater management in Southeast Asia
  - 2016 – Water and agriculture in East Africa
  - 2017 – Innovate 4 Water (global event in Geneva)
  - 2018 – Air, agriculture, energy, and water in Southeast Asia
  - 2019-20 – Climate Smart Agriculture in Latin America

# Water

- Water treatment
- Water use efficiency
- Water extraction
- Desalinization
- Water storage
- Water reserves assessment, monitoring & control
- Water transport & distribution
- Flood control
- Coastal protection
- Sanitation




**SOURCE Hydropanel**

By Zero Mass Water

(USA, 2019)

**Device for water production:**

Make drinking water from only sunlight and air

Free from any electricity and water supply



Credit: Zero Mass Water

# Benefits of uploading technologies/needs

- Free-of-charge international promotion
- Connect with our large networks of green technology providers and experts
- Identify potential collaborators, investors, licensees etc.
- Possibility to participate in WIPO GREEN activities (matchmaking events, Greentech exhibitions, partner events, discount on WIPO Arbitration & Mediation services, etc.)

Licensing Checklist - A walkthrough of issues to consider when planning a technology transfer licensing agreement – free download.

WIPO Academy - IP education & training. Courses, diplomas, distance learning

Register and Upload for free at
www.wipo.int/green

Peter.oksen@wipo.int
wipo.green@wipo.int
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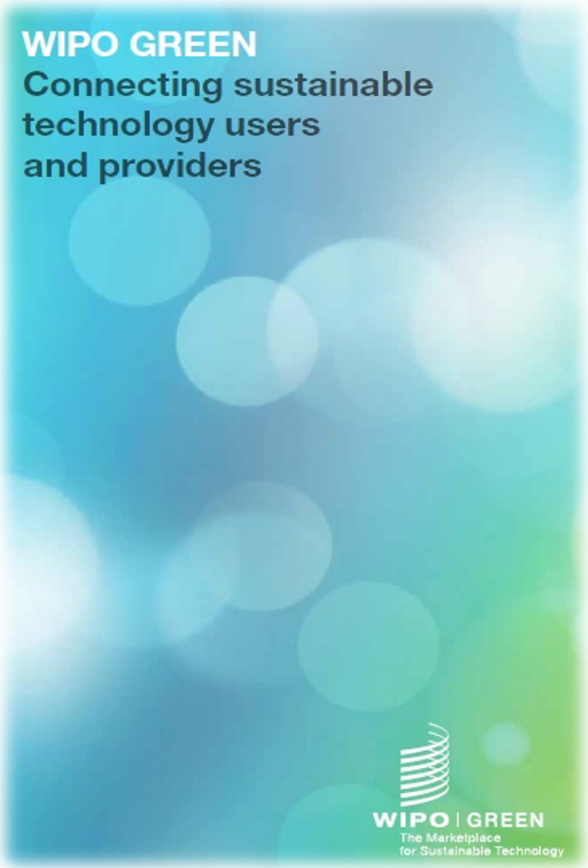
# Thank you



# Why researchers need an IP strategy

## 4iP Council Webinar

Koenraad Debackere, KU Leuven R&D

October 2nd, 2020

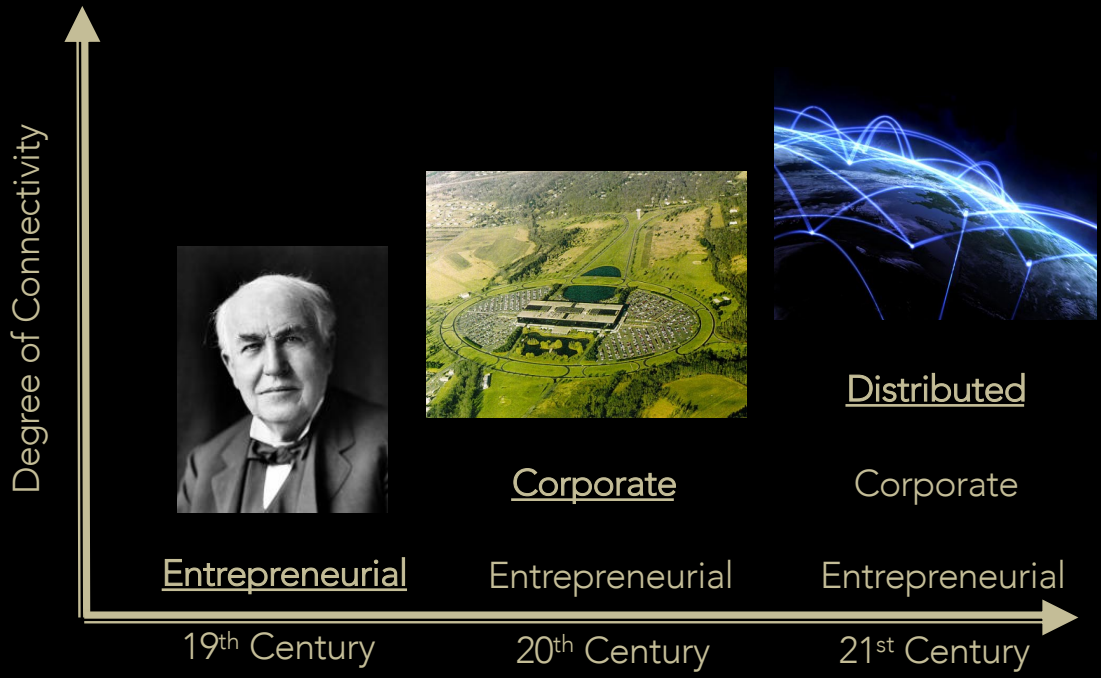
# Science's Evolution

(ex. Alfred von Harnack, Vannevar Bush)



# Innovation's Evolution

(ex. Edison, Tesla, Philips, Brainport)






Source: Dahlander & Gann, Research Policy 2010

# Science, Innovation, Market

## TECHNICAL CHANGE AND THE AGGREGATE PRODUCTION FUNCTION*

Robert M. Solow

IN this day of rationally designed econometric studies and super-input-output tables, it takes something more than the usual "willing suspension of disbelief" to talk seriously of the aggregate production function. But the aggregate production function is only a little less legitimate a concept than, say, the aggregate consumption function, and for some kinds of long-run macro-models it is almost as indispensable as the latter is for the short-run. As long as we insist on practicing macro-economics we shall need aggregate relationships.

Even so, there would hardly be any justification for returning to this old-fashioned topic if I had no novelty to suggest. The new wrinkle I want to describe is an elementary way of segregating variations in output per head due to technical change from those due to changes in the availability of capital per head. Naturally, every additional bit of information has its price. In this case the price consists of one new required time series, the share of labor or property in total income, and one new assumption, that factors are paid their marginal products. Since the former is probably more respectable than the other data I shall use, and since the latter is an assumption often made, the price may not be unreasonably high.

Before going on, let me be explicit that I would not try to justify what follows by calling on fancy theorems on aggregation and index numbers.[1] Either this kind of aggregate economics appeals or it doesn't. Personally I belong to both schools. If it does, I think one can draw some crude but useful conclusions from the results.

### Theoretical Basis

I will first explain what I have in mind mathematically and then give a diagrammatic exposition. In this case the mathematics seems simpler. If $Q$ represents output and $K$ and $L$ represent capital and labor inputs in "physical" units, then the aggregate production function can be written as:

$$Q = F(K,L;t). \qquad (1)$$

The variable $t$ for time appears in $F$ to allow for technical change. It will be seen that I am using the phrase "technical change" as a shorthand expression for *any kind of shift* in the production function. Thus slowdowns, speedups, improvements in the education of the labor force, and all sorts of things will appear as "technical change."

It is convenient to begin with the special case of *neutral* technical change. Shifts in the production function are defined as neutral if they leave marginal rates of substitution untouched but simply increase or decrease the output attainable from given inputs. In that case the production function takes the special form

$$Q = A(t)f(K,L) \qquad (1a)$$

and the multiplicative factor $A(t)$ measures the cumulated effect of shifts over time. Differentiate (1a) totally with respect to time and divide by $Q$ and one obtains

$$\frac{\dot{Q}}{Q} = \frac{\dot{A}}{A} + A\frac{\partial f}{\partial K}\frac{\dot{K}}{Q} + A\frac{\partial f}{\partial L}\frac{\dot{L}}{Q}$$

where dots indicate time derivatives. Now define $w_k = \frac{\partial Q}{\partial K}\frac{K}{Q}$ and $w_L = \frac{\partial Q}{\partial L}\frac{L}{Q}$ the relative shares of capital and labor, and substitute in the above equation (note that $\partial Q/\partial K = A\,\partial f/\partial K$, etc.) and there results:

$$\frac{\dot{Q}}{Q} = \frac{\dot{A}}{A} + w_K\frac{\dot{K}}{K} + w_L\frac{\dot{L}}{L}. \qquad (2)$$

* I owe a debt of gratitude to Dr. Louis Lefeber for statistical and other assistance, and to Professors Fellner, Leontief, and Schultz for stimulating suggestions.

[1] Mrs. Robinson in particular has explored many of the profound difficulties that stand in the way of giving any precise meaning to the quantity of capital ("The Production Function and the Theory of Capital," *Review of Economic Studies*, Vol. 21, No. 2), and I have thrown up still further obstacles (ibid., Vol. 23, No. 2). Were the data available, it would be better to apply the analysis to some precisely defined production function with many precisely defined inputs. One can at least hope that the aggregate analysis gives some notion of the way a detailed analysis would [illegible]d.

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RESEARCH IMPACT

## The dual frontier: Patented inventions and prior scientific advance

Mohammad Ahmadpoor[1,2] and Benjamin F. Jones[1,2,3]*

The extent to which scientific advances support marketplace inventions is largely unknown. We study 4.8 million U.S. patents and 32 million research articles to determine the minimum citation distance between patented inventions and prior scientific advances. We find that most cited research articles (80%) link forward to a future patent. Similarly, most patents (61%) link backward to a prior research article. Linked papers and patents typically stand 2 to 4 degrees distant from the other domain. Yet, advances directly along the patent-paper boundary are notably more impactful within their own domains. The distance metric further provides a typology of the fields, institutions, and individuals involved in science-to-technology linkages. Overall, the findings are consistent with theories that emphasize substantial and fruitful connections between patenting and prior scientific inquiry.

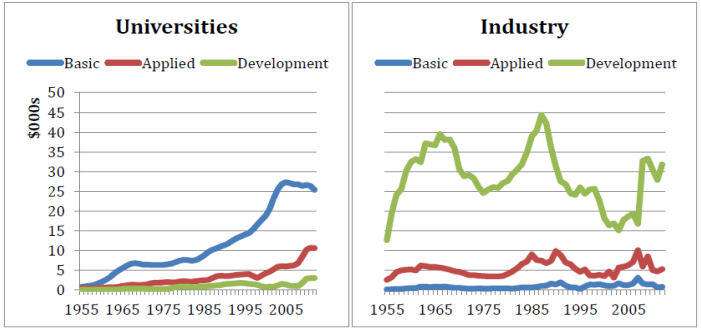
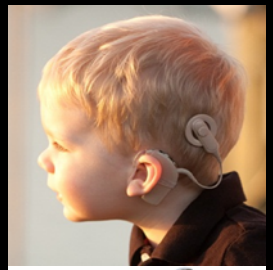



Figure 2. Character of federal research spending. All amounts in $M, expressed in 2015 dollars. (Data from the American Association for the Advancement of Science.)

# Science and Innovation, 2 Dancers

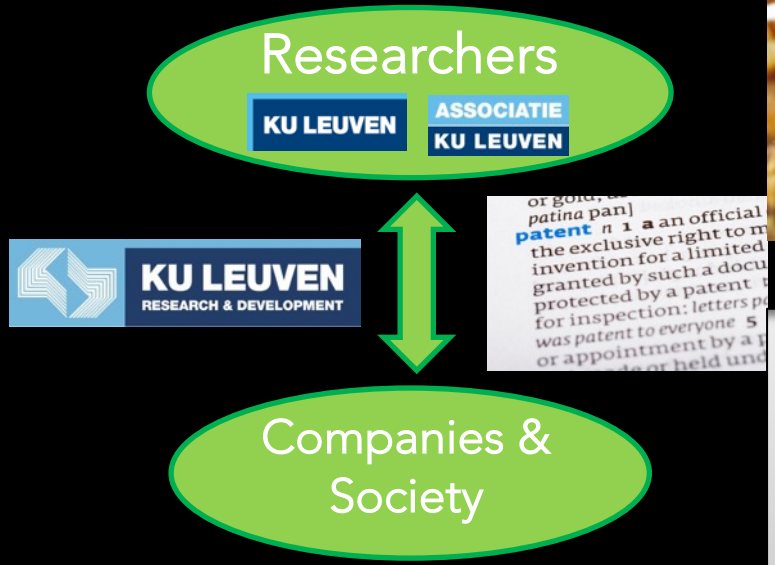
(ex. Leuven R&D)



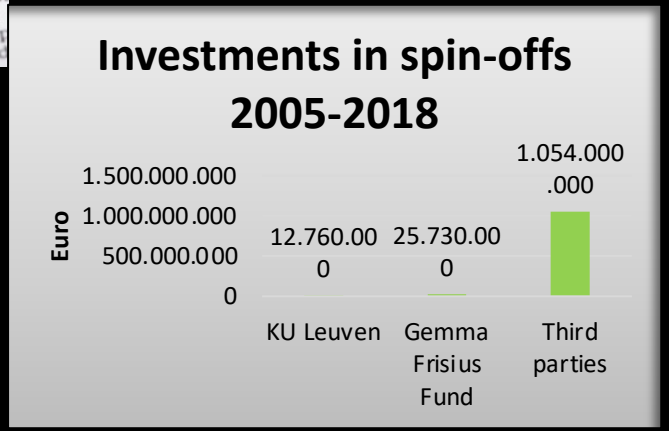

PUSH-PULL
PULL-PUSH



# Connectivity and Transfer, the Triple Helix

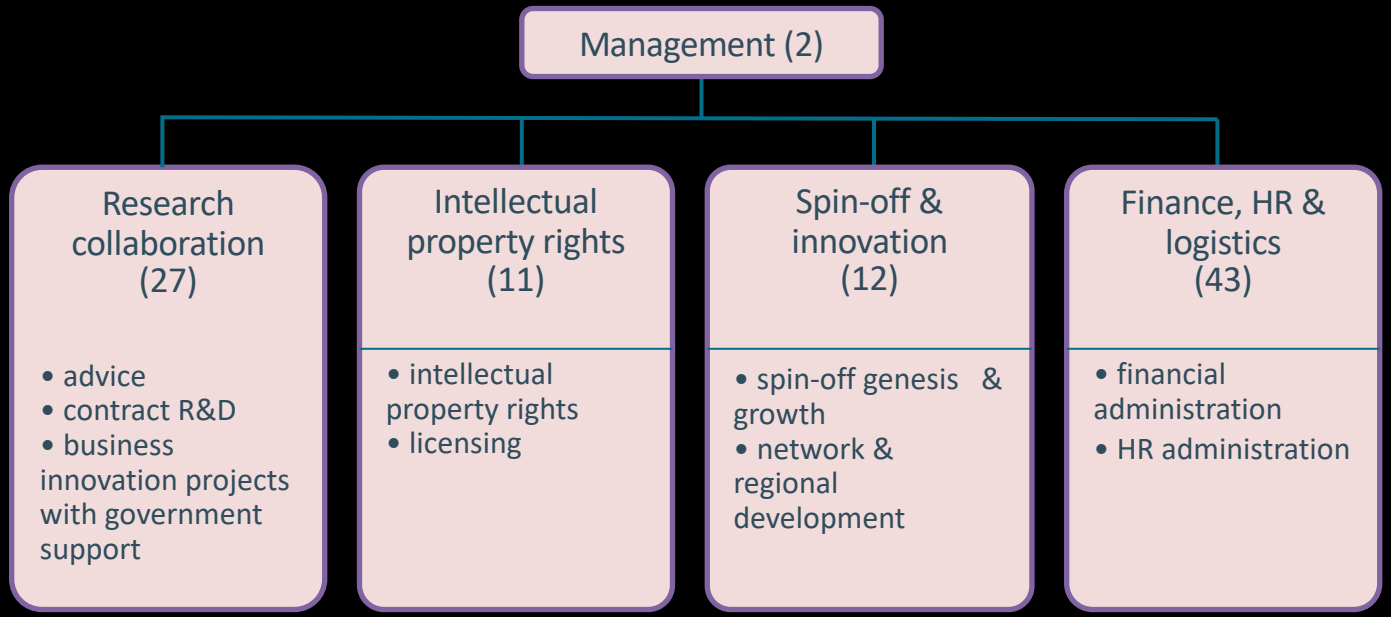



Contracts – IP – Spin-offs



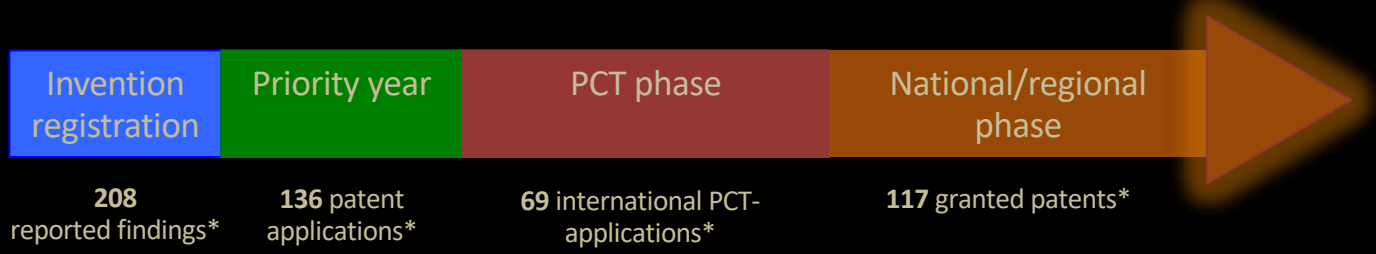
# Grow a professional, inclusive TT organisation

(ex. KU Leuven R&D)



# Grow a professional, inclusive TT organisation

- Deploy all components of the (academic) IP portfolio:
  - Patents, copyright, databases, design rights, trademarks, software, trade secrets, know-how
- Develop proper incentives for researchers and companies
- Develop and grow a professional staff at the TTO
- Develop supportive infrastructures and platforms (e.g. CD3)
- Combine IP protection with a professional licensing strategy
- Enable and make strategic selections and set a sharp focus on scope, sectors, geographies …



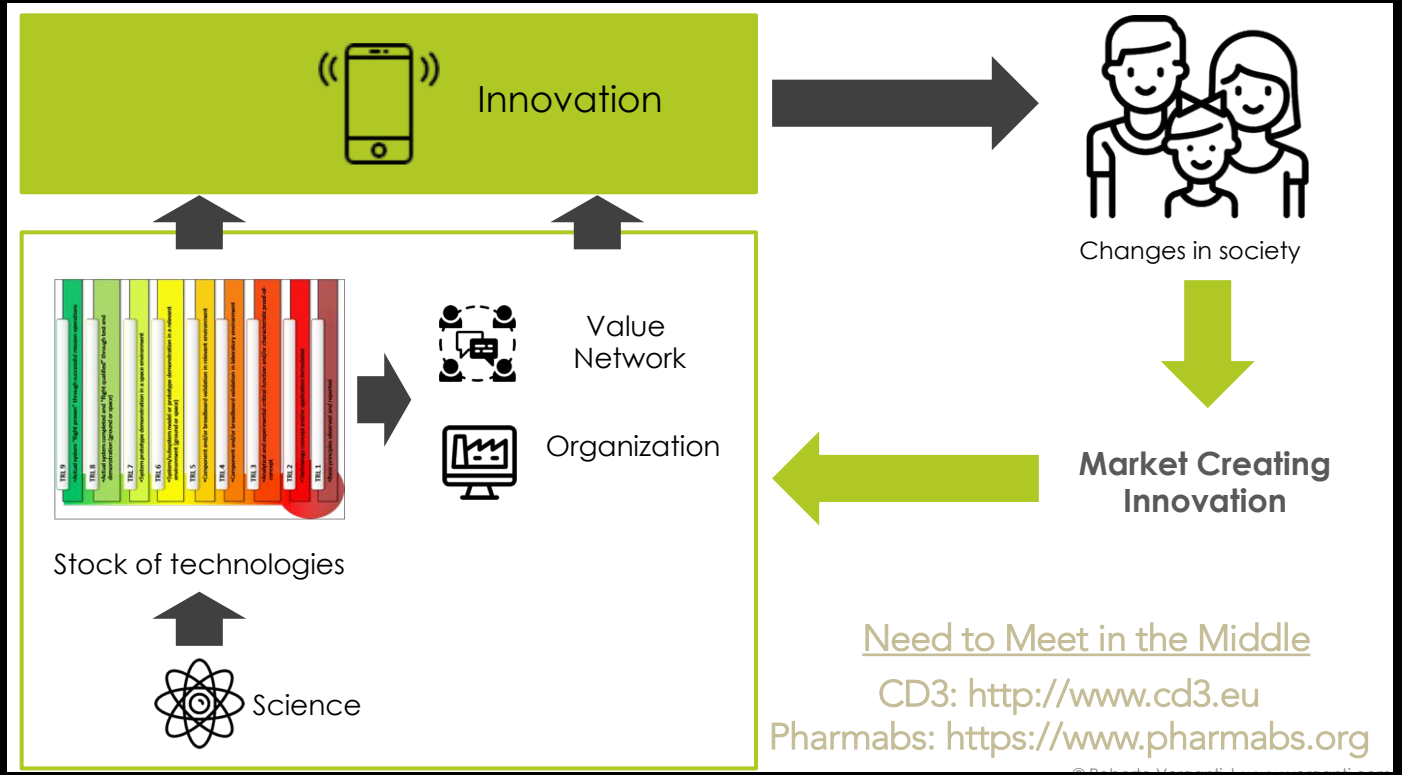
# Grow a professional, inclusive TT organisation

- Research connectivity (collaboration, consortia) calls for:
  - sophisticated training of TT officers and scientists, both senior and junior
  - implementation and execution of co-inventorship and co-applications
  - models of rights' & revenu sharing
  - exploitation initiative and follow-up
  - balanced publication (=always possible) and protection approaches
  - code-of-conduct principles and framework
- See LERU Advice Paper, January 2012

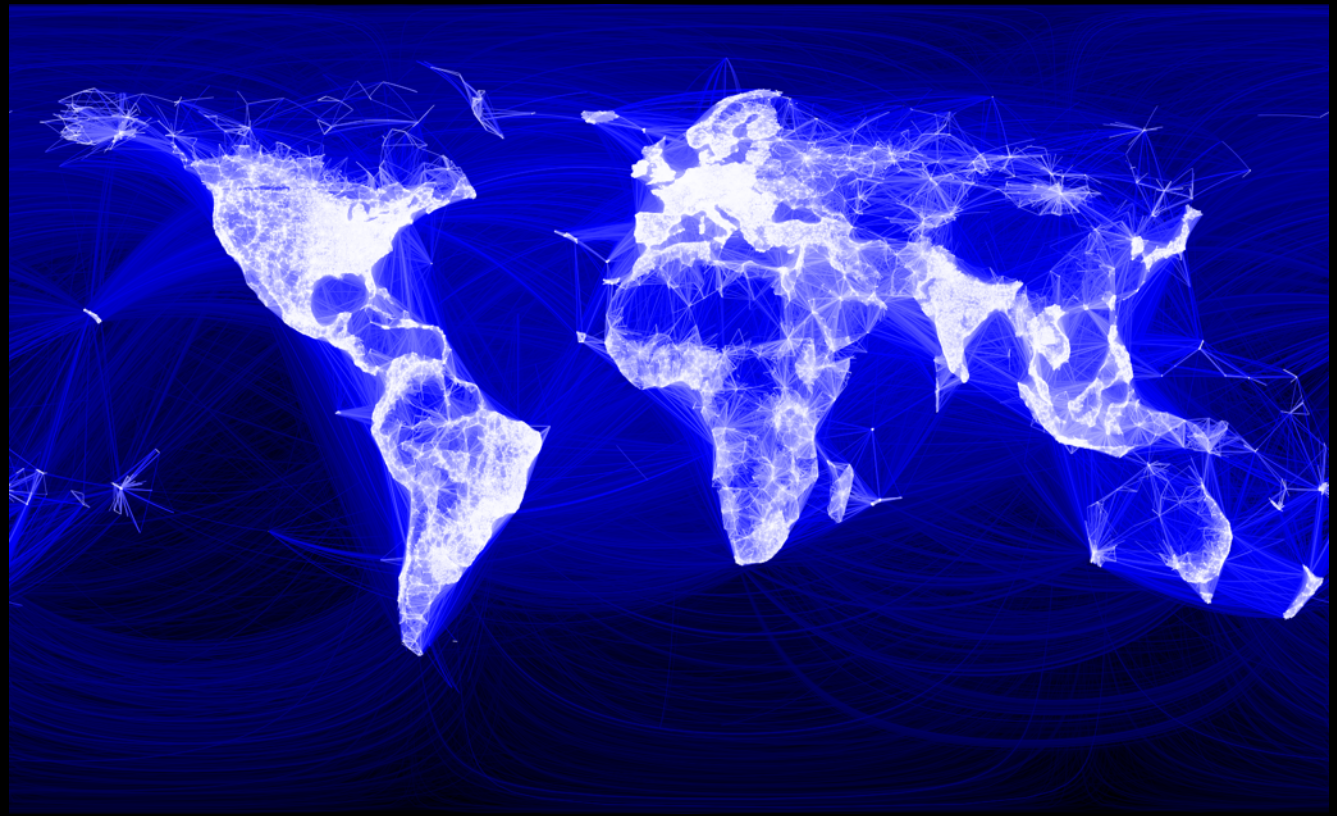
# IP challenges in the Triple Helix

- Complexity of IP ownership and exploitation distribution in multi-partner public-private consortia (e.g. co-ownership with/without accounting, scope delineation, …)
- Evolutions and expectations regarding Open Science (Plan S) and Open Data (RDM), PSI Directive ("as open as possible, as closed as needed")
- Evolutions and expectations regarding economic versus societal impact (ex. Covid research, climate research, missions, social impact licensing …)
- Novel science breeds novel IP situations demanding novel IP solutions & frameworks (ex. biotechnology, articifial intelligence, software robots, …)

# IP challenges in the Triple Helix



# Connecting, exploiting, pooling, sharing, stacking knowledge in a FAIR & FRAND world



# Thank you
# Q & A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|---|---|---|
| 15 Oct. 2020 | **License to All or Access to All? A Law and Economics Assessment of Standard Development Organizations' Licensing Rules**<br>11am EST \| 5pm CEST | **Anne Layne-Farrar**<br>• Vice President in Competition Economics at Charles Rivers Associates<br>• Adjunct Professor at the Northwestern University Pritzker School of Law<br>**Richard J. Stark**<br>Partner in the Litigation Department of Cravath, Swaine & Moore LLP |
| 27 Oct. 2020 | **The value of intangible assets**<br>11am EST \| 4pm CET | **Dr. André Gorus (LESI)**<br>Independent Consultant, former IP Valuation Director, Solvay |
| 17 Nov. 2020 | **License your valuable assets**<br>10am ET \| 4pm CET | Details coming soon |