EARTO Innovation School
Open Science & Open Innovation
9 December 2015

EARTO
IMPACT DELIVERED

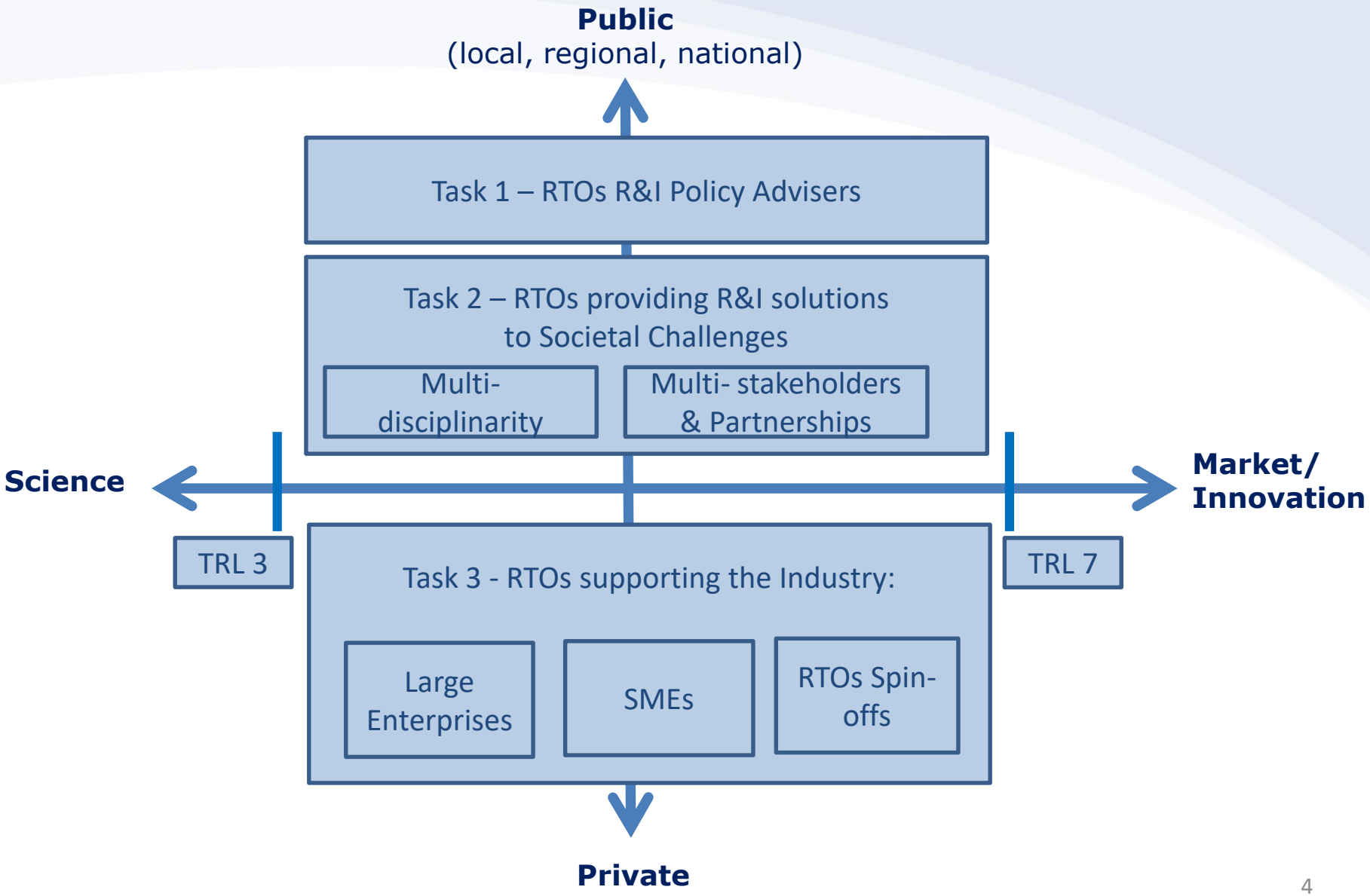
Representation of
North Rhine-Westphalia
Brussels

Agenda

12.00 – 12.30	**Sandwich Lunch & Networking**
12.30 – 12.40	**Welcome – Muriel Attané, Secretary General, EARTO** • What are Research and Technology Organisations (RTOs)?
12.40 – 13.10	**Module 3: Understanding the Open "X" Debate** • Definitions – Ernst H. Kristiansen, Executive Vice President, SINTEF • Interlinked Challenges of EU Policies – Stefanie Mielert, Head of Legal Corporate Governance, Fraunhofer-Gesellschaft
13.10 – 13.40	**Module 4: What "Open" Means in the RTOs' World - Examples** • Michel Neu, International Expert, Technology Transfer Division, CEA • Folkert Teernstra, Licensing Associate & IP Legal Counsel, TNO
13.40 – 14.00	**Discussion & Closing – Muriel Attané, Secretary General, EARTO**

EARTO Vision: **Technology for a Better World**
EARTO Moto: **Impact Delivered!**

Understanding European RTOs



EARTO Working Groups

Policy Working Groups:

1. Horizon 2020
2. Structural Funds
3. Legal Experts
4. Financial Experts
5. Working with SMEs
6. Communication
7. Human Resources
8. Cooperation with EIB – InnovFin Advisory Services
9. European Innovation Council

Technical Working Groups:

10. Security Research

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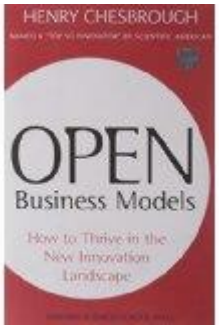
Module 3: Understanding the « Open X » Debate – Definitions

Ernst Kristiansen,
Executive Vice President, SINTEF

What is «OPEN»?

- Open Innovation
- Open Access
- Open Source
- Open Data
- Open Science = Science 2.0
- Digital Single Market

History



2003 2006 2011 2014

Open Innovation (1)

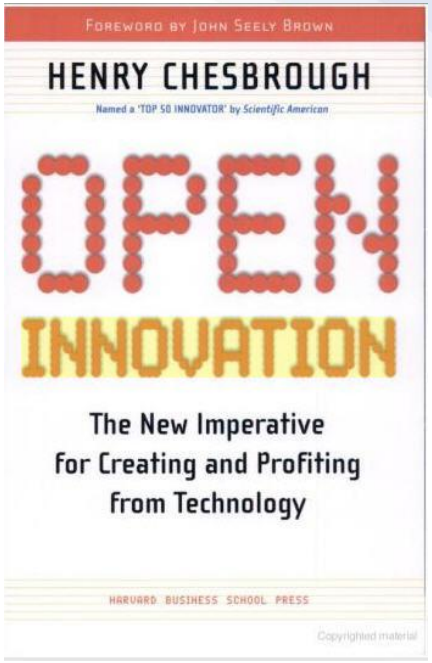
Open Innovation (2)

Open innovation needs a different mindset and company culture than traditional or closed innovation

«Closed Innovation» Principles	«Open Innovation» Principles
The smart people in our field work for us.	Not all the smart people work for us. We need to work with smart people inside and outside our company.
To profit from research and development (R&D), we must discover it, develop it and ship it ourselves.	External R&D can create significant value; internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to market first.	We don't have to originate the research to profit from it.
The company that gets an innovation to market first will win.	Building a better business model is better than getting to market first.
If we create the most and the best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
We should control our innovation process, so that our competitors don't profit from our ideas.	We should profit from others' use of our innovation process, and we should buy others' intellectual property (IP) whenever it advances our own business model.

Open Innovation (3)

- Characterized by simultaneous presence of:
  - Value Creation
  - Value Capture
- When both conditions are met:
  - powerful incentives for technology creators and technology buyers to interact with each other
  - Costs and benefits of research are allocated proportionally between the investing entities
- **Open Innovation** is the way for RTOs to perform collaborative research



Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2003)

Open access contributions include original scientific research results, raw data and metadata, source materials, digital representations of pictorial and graphical materials and scholarly multimedia material.

Open Access to Publications

Open Access to Data

The Open Definition

- The **Open Definition** sets out principles that define "openness" in relation to **data and content.**
- It makes **precise** the meaning of "**open**" in the terms "**open data**" and "**open content**" and thereby ensures quality and encourages compatibility between different pools of open material.
- It can be summed up in the statement that:

"Open means **anyone** can **freely** access, use, **modify**, and **share** for any purpose (subject, at most, to requirements that preserve provenance and openness)."

Source: http://opendefinition.org

Open Source

- **Definition Open Source:** refers to a computer program in which the source code is available to the general public for use and/or modification from its original design.
- **Definition Open Source code:** is meant to be a collaborative effort, where programmers improve upon the source code and share the changes within the community.

Typically this is not the case, and code is merely released to the public under some license. Others can then download, modify, and publish their version (fork) back to the community. Today you find more projects with forked versions than unified projects worked by large teams.

Open Data

- **Definition:** Open data is data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and share alike

- **What kinds of open data?**
  - Cultural, Science, Finance, Statistics, Weather, Environment, Transport

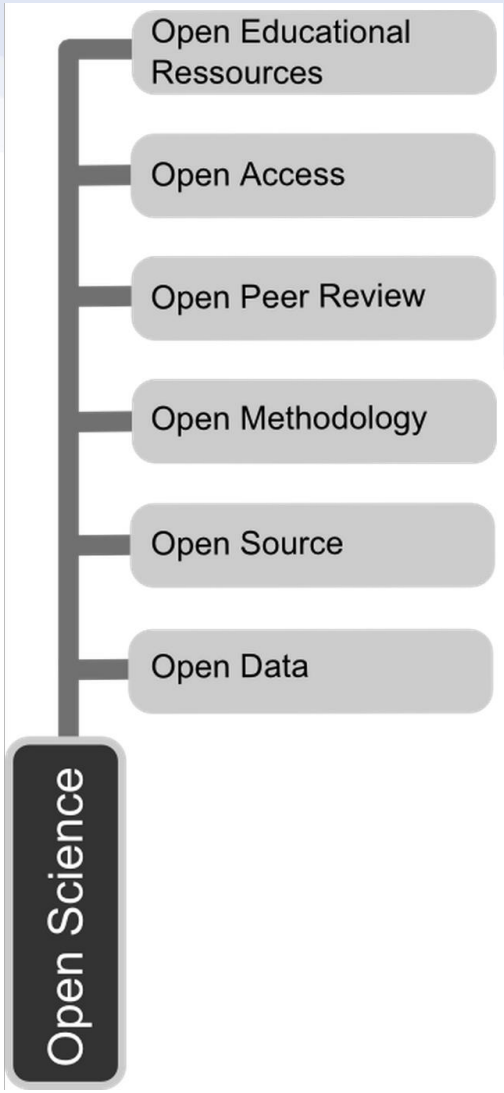
- **Why open data?**
  - Transparency, Releasing social and commercial value, Participation and engagement

- **Sources:** http://opendatahandbook.org/guide/en/what-is-open-data/ and https://okfn.org/opendata/

Open Science

- **Definition:** Transformation, opening up and democratization of science, research and innovation, through ICT

- **Objectives:**
  - Improving efficiency, transparency & interdisciplinary
  - Changing the interaction between science & society and enabling broader societal impact & innovation



Digital Single Market

- **Definition:** Open, data-intensive and networked research as a driver for faster and wider innovation

- **3 pillars**:
  - Better access for consumers and businesses to digital goods and services
  - Creating the right conditions and a level playing field for digital networks and innovative services to flourish
  - Maximizing the growth potential of the digital economy

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Module 3: Understanding the « Open X » Debate – Interlinked Challenges of EU Policies

Stefanie Mielert, Head of Legal Corporate Governance, Fraunhofer-Gesellschaft

Open X (1)

Open X Debate:

- Attempt to 'democratise' science, Research & Innovation
- RTOs often rely on Open Access/Open Data/Open Source

BUT: this is NOT to be confused with « free-of-charge access for all »

Open X (2)

- **There MUST be a fair return-on-invest for upfront R&D expenditures**
  - to secure funds needed for future pre-competitive R&D
  - to maintain competitive edge & advance thinking and the incentive to innovate

Open X (3)

Carefully balance:

- « **Open** », where reasonably possible

  « **Restricted** », where reasonably required

To AVOID WORKING AGAINST any effective European Innovation Policy!

Open X (4)

Carefully balance:

« **Open** » vs. « **Value creation & capture**»

There is NO empirical evidence that « open » as such provides the necessary incentive and funds needed to invest in R&I.

Technological advancement and innovation DO NOT come at no cost!

Challenges & Opportunities (1)

- Foundations (business, technology, law)
  MUST remain intact

- NO empirical evidence to support change

- Stable and transparent (legal) framework will best serve digital economy

Challenges & Opportunities (2)

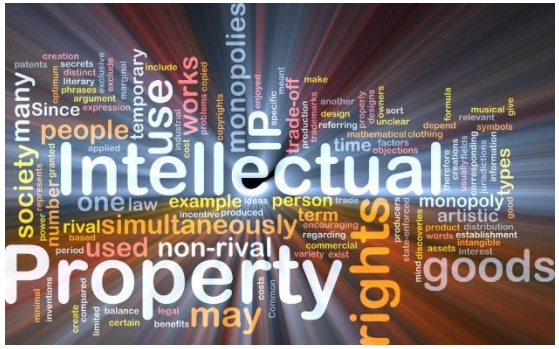
Roles and responsibilities of various parts of the innovation eco-system MUST remain intact for:

- IP owners, IP users, courts and regulators, technical standard setting organisations (SSOs), government/s

- Fundamental legal rights (property!) CANNOT be altered through policy

- Legal certainty is key for innovative businesses /SMEs

- Restrictive policy risks to constitute non-tariff barriers to trade



Role of Policy

Policy is to base work on foundations that are:

- International
- In existence at convention or treaty status
- Incorporated into domestic law
- So fundamental they exist regardless of:
  - Legal jurisdiction (e.g. common law, civil law)
  - Individual interests of parties (objective mechanisms for an international or inter-regional context, and national sovereignty remains)

Examples: WTO TRIPs Agreement, UN Convention on the International Sale of Goods (CISG)

Impact of IEEE - Example 1:
The new IEEE rules: a threat to innovation & consumers

Before the IEEE policy change

- The functionality of the claimed invention, or inventive feature, contributes to the **added value** of the final product.
- The royalty rate is based on the **added value** of the inventive feature for the final product.

After the IEEE policy change

- The royalty rate is based on the cost of the "**smallest saleable unit** and no longer on the **added value** of the inventive feature for the final product.
- The new calculation is merely based on the **cheapest component** of the product.

Impact of IEEE - Example 2: iPhone 6 example

- The cost difference between the components of an iPhone 6 and an iPhone 6 Plus is around $15,5 (source: teardown.com).
- The consumer price difference between the two devices is $110.
- Similarly, an iPod is, in essence, an iPhone 6 without the added-value of the 3G/4G connectivity (same processors, Wi-Fi, cameras, etc.)
- The cost of the 3G/4G baseband connectivity components is around $27,5 (source: see above)
- The consumer price difference between and iPod and an iPhone is... over $500.

Impact of IEEE - Example 3:
J.K. Rowling would be your average Joanne

Before the IEEE policy change

J.K Rowling would get royalties on the **added value** of the Harry Potter story on paper (the book).

After the IEEE policy change

J.K Rowling would get royalties on **the price of a piece of paper** (the smallest saleable unit of a Harry Potter book).

Impact of IEEE - Example 4:

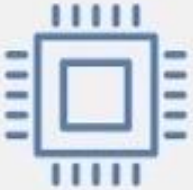
A real life example: the invention of Near Field Communication

Before the IEEE policy change

$230 * 0,09% = • $0,2

- Inside Secure claimed a **royalty fee** of 0,09% of the price of a smartphone (average price 230$).
- **Potential return** for Inside Secure = between 100M$ and 200M$ (based on 6 billion unit)

After the IEEE policy change



$3 * 1% * 4% = • $0,0012

- **The new calculation** is based on the price of the NFC components (3$), the ARM license precedent (1%) and the apportionment rule (4% of total NFC patent portfolio).
- **Potential return** for Inside Secure = between 2M$ and 7M$ (based on 6 billion units)

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Module 4: What « Open » Means in the RTOs' World – Examples

Michel Neu, International Expert, Intellectual Property and Technology Transfer, CEA

Definition of Innovation

"**Successful Exploitation of a New Idea**"; E. von Hippel; Professor of Technological Innovation in the MIT Sloan School of Management

"**The process of translating an idea or invention into a good or service that creates value or for which customers will pay**"; source: Business Dictionary

Definition of Innovation (2)

- Science process (from public basic research to public applied research and then to the market) is part of the global innovation process. So no reason to oppose the two.
- Ideas often appear also in basic research and not only in applied research!
- Basic research Patents (pioneer patents) have often the greatest economic potential (disruptive innovation), but need applied research in order to reach the market.

Example of invention made in basic research: Peter Grünberg's patent about Giant Magneto Resistance (DE 3820475; 16/06/1988: the same year than his scientific publications about GMR). The 2007 Nobel Prize in Physics was awarded to Peter Grünberg for the discovery of GMR in 1988.

Common Issues

Common issues:

- It is about open innovation = value creation + value capture in a collaborative context
- Collaboration rules clearly defined: agreement = rights + obligations
- Intellectual property clauses (ownership, access rights) in agreements facilitate and secure the collaboration for each partner

RTOs' Hardware Open Innovation Platforms

- **Open to universities & industry**
- **Owned & managed by RTOs**

Common features:

- Advanced technological resources (equipments, sensors, hardware and software tools,…..) (often: huge investments)
- Unique expertise
- A wide range of skills
- A network of key partnerships
- Possibility of different level of partnerships according to effective involvement

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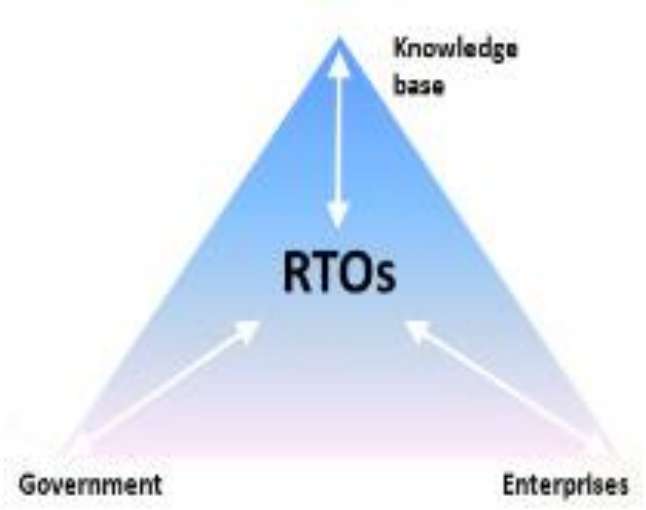
Module 4: What « Open » Means in the RTOs' World – Examples

Folkert Teernstra
IPR Legal Counsel, TNO

RTOs Open Innovation Paradigm (1)

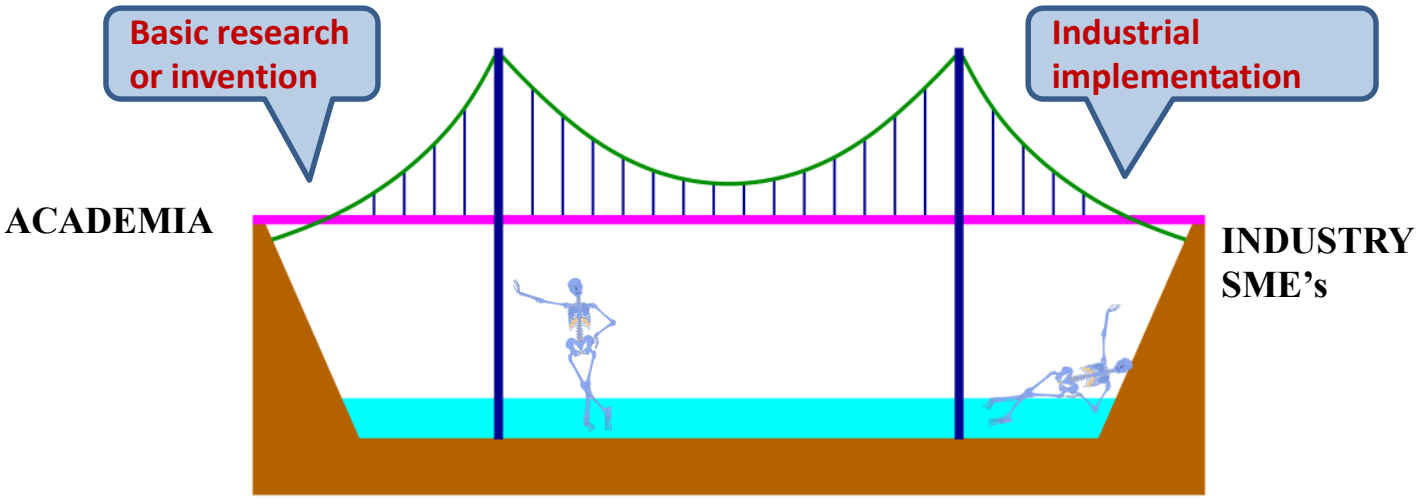
Role of RTOs

- The innovation gap / market failure
- RTOs take up fundamental knowledge
- Translation to applied knowledge
- In close collaboration with market
- Initiate new entrepreneurial activities



RTO's Open Innovation paradigm (2)

RTO'S CLOSE THE "VALLEY OF DEATH"



"Valley of Death":

- High Risk
- High Cost
- Long timescale
- No direct shareholder value
- Industry reluctant

➔ **Market failure !**

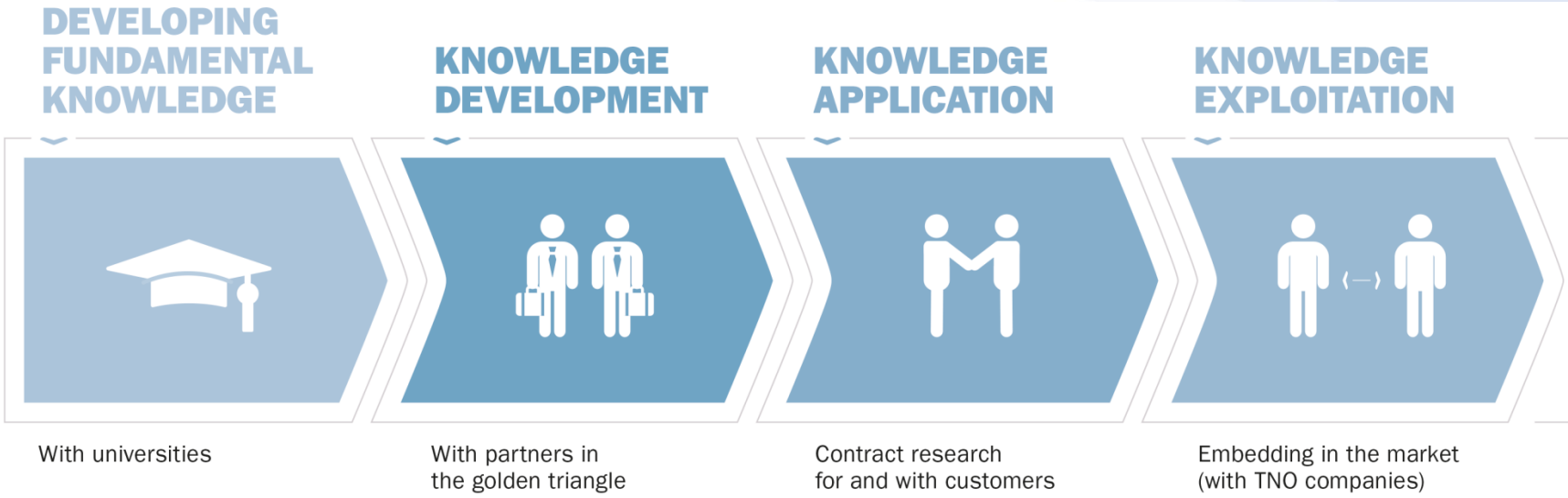
MIND THE GAP

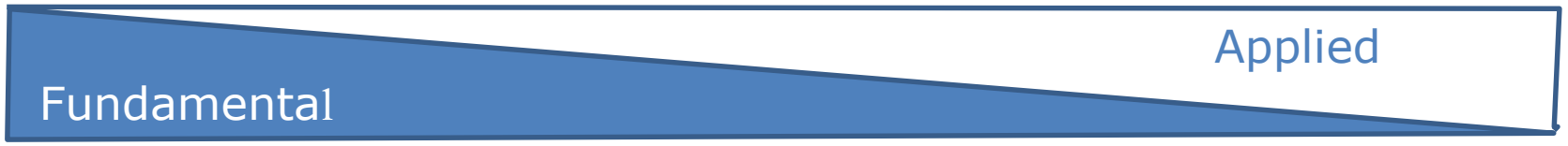
RTO's Open Innovation paradigm (3)

WHERE NOTHING FLOURISHES..

UNTIL FERTILIZED !

RTOs Open Innovation Paradigm (4)



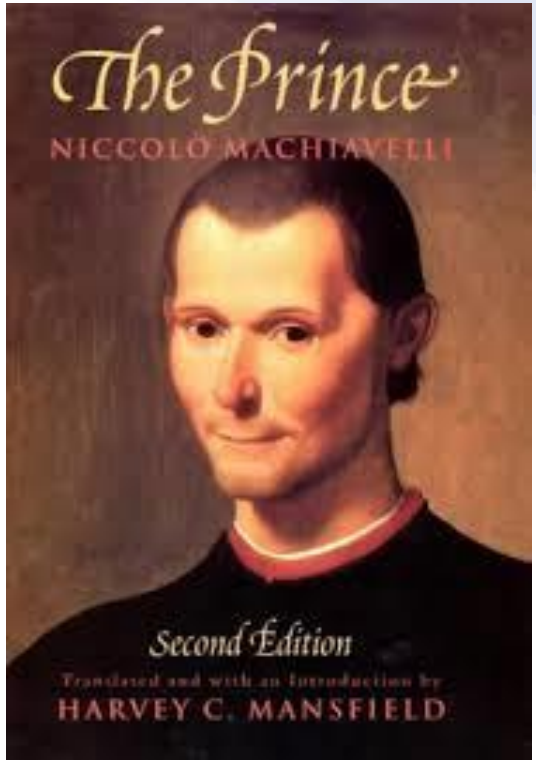


Not-For-Profit: Revenues ploughed back into new research

RTOs Open Innovation Paradigm (5)

"And let it be noted that there is no more delicate matter to take in hand, nor more dangerous to conduct, nor more doubtful in its success, than to set up as a leader in the introduction of changes. For he who innovates will have for his enemies all those who are well off under the existing order of things, and only lukewarm supporters in those who might be better off under the new"

Niccolo Machiavelli, Il Principe (1513)



New Forms of RTO Open Innovation

The innovation gap revisited:

- market failure for long term innovation
- industrial research driven by short term goals
- cannot be performed by universities
- often too costly to be borne by just one partner

→ Solution in Shared Research / Open Innovation

Shared Research Programmes: TNO - examples

Holst Centre
Open Innovation by imec and TNO

van 't Hoff Program

QUTech

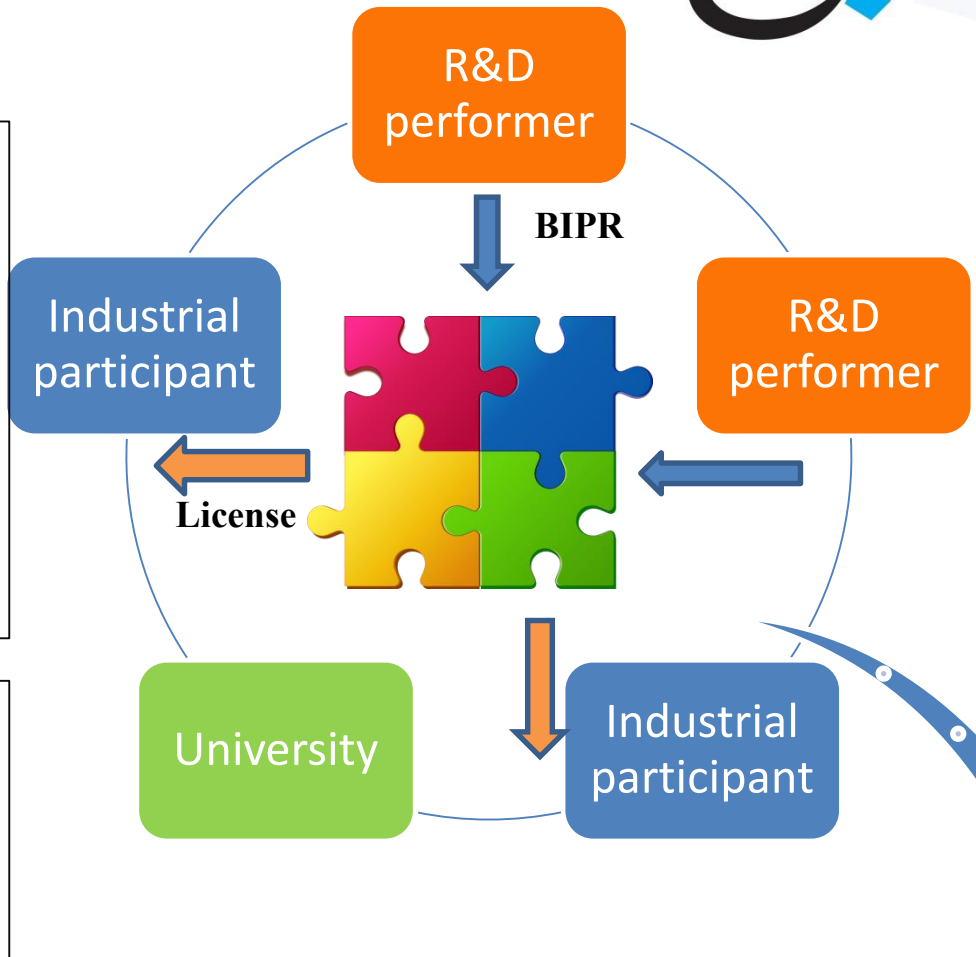
SOLAR RESEARCH
SOLLIANCE

Industry Participants:

- Pay access fee for existing Background IP
- Pay part of the R&D costs
- Have free right to use the Foreground
- Foreground added to Background pool

Universities:

- PhD studies
- Publications
- May perform part of R&D



R&D Performers:

- Contribute Background IP and knowhow (BIPR)
- Access fee required
- Lead projects
- Perform the R&D
- Proceeds reinvested in Program.

Shared research: Holst centre

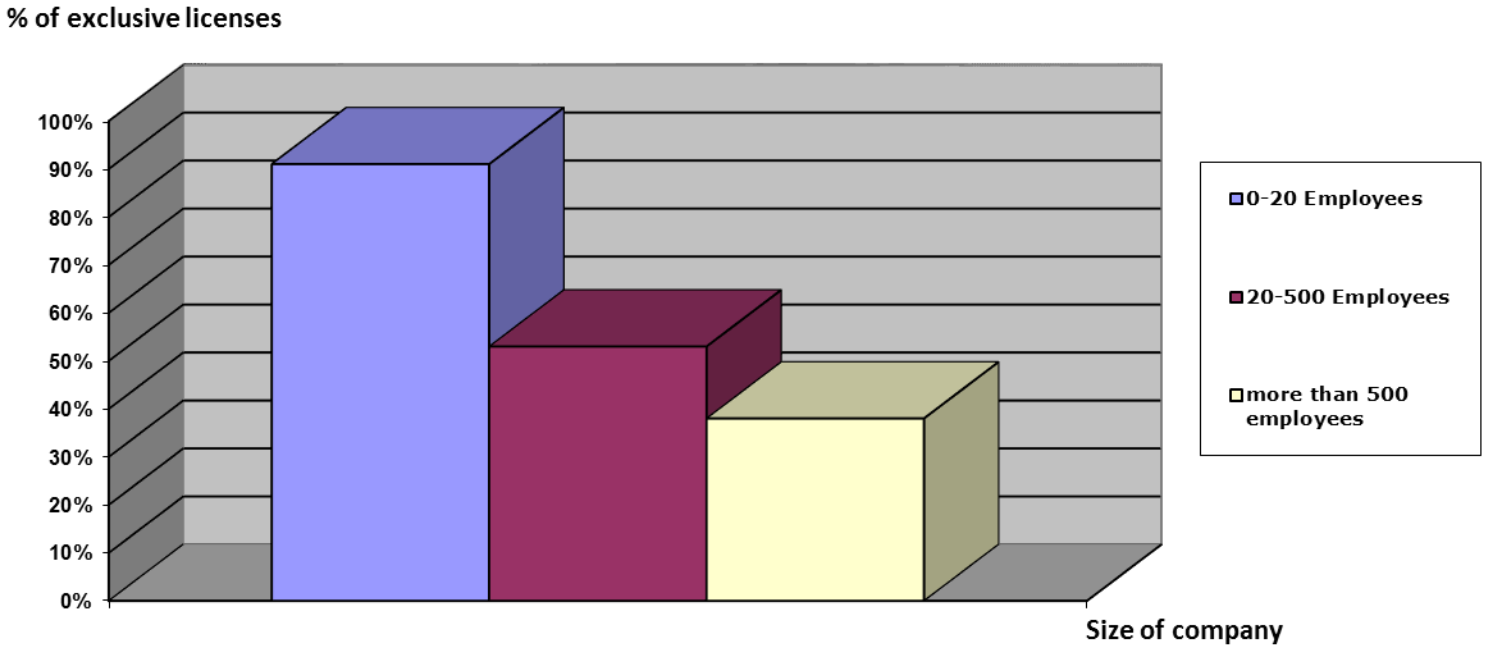
- Founded in 2005 by TNO and IMEC
- Located on High Tech Campus Eindhoven
- Now 200 employees from 28 countries
- Very strong Background IP pool (essential!)
- Over 40 industrial partners
- Aim: developed technology reaches market in 5-10 years
- R&D on e.g. OLED, PV and flexible / freeform electronics

Shared research: Lessons Learned

- Shared research on high-tech **requires** a solid Background IP (BIPR) pool to generated industrial interest
- Usually BIPR is created (in part) with public means
- New Results are added to BIPR-pool, no **FULL** excl. licenses !
- Background IP must be reserved for R&D partners
- Access to new participants possible
- New participants pay “entrance-fee” for BIPR-pool
- Open Source / Open Data not suitable for a BIPR-pool
- Full open access might destroy more value than it creates

Start-ups and SMEs need strong IPRs in order to compete and develop

- Sectorial exclusive licenses granted to industry by US public research organizations **increase when size of the company decreases**.
- For the start-ups and SMEs: the smaller is the SMEs, the more sectorial exclusivity she needs to develop further and to compete.



Graph: % of sectorial exclusive licenses from public research depending the company size in USA

Thank You for Your Attention!

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