

## Connecting Science and Society – searching for sustainable pathways through the jungle



**Jan Cornelis** (Emeritus Professor)

1

## Modern University – Societal embedding ... the past until now

### INPUT

- Public
- Private
- Limitation: stakeholder's needs, priorities, expectations of return,...

### UNIVERSITY

- Autonomy in governance, processes, policy and vision.
- Limitation: Compliance to laws and regulations, contracts

### OUTPUT

- public goods
- private goods
- Limitation: client satisfaction, KPI's (proxies, smart indicators)

ECOSYSTEM



The public, the private and the good in higher education and research: an introduction [2007 – Jurgen Enders, Ben Jongbloed]

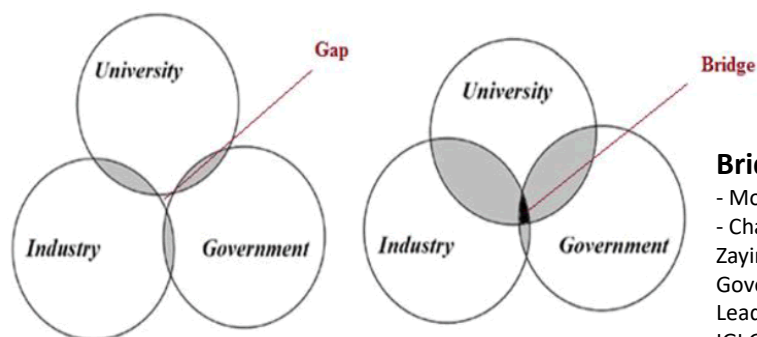
2

## Assumption: Bayh-Dole act in US - Equivalent situation in Belgium (Flanders) –ownership of results

- Bayh-Dole Act of 1980 requires U.S. universities to put into use the intellectual property rights generated from their federally funded research
- Equivalent regulation in Belgium / Flanders since 1998

3

## Knowledge and Technology Transfer - a shared societal responsibility- all have to get actively involved



Source: Adopted from Leydesdorff (2012)

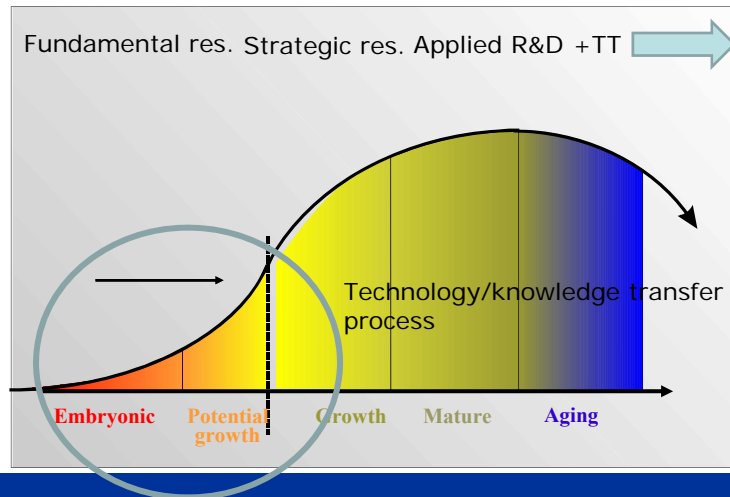
### **Bridging the gap, see:**

- Module 2: LEAD MOOC  
 - Chapter 8: Zhu, Chang, Merve Zayim-Kurtay. "University Governance and Academic Leadership in the EU and China." IGI Global, 2019. 1-369.  
 doi:10.4018/978-1-5225-7441-5

**FIGURE 1**  
**A TRIPLE HELIX CONFIGURATION WITH NEGATIVE AND POSITIVE OVERLAP**  
**AMONG THE THREE SUBSYSTEMS**

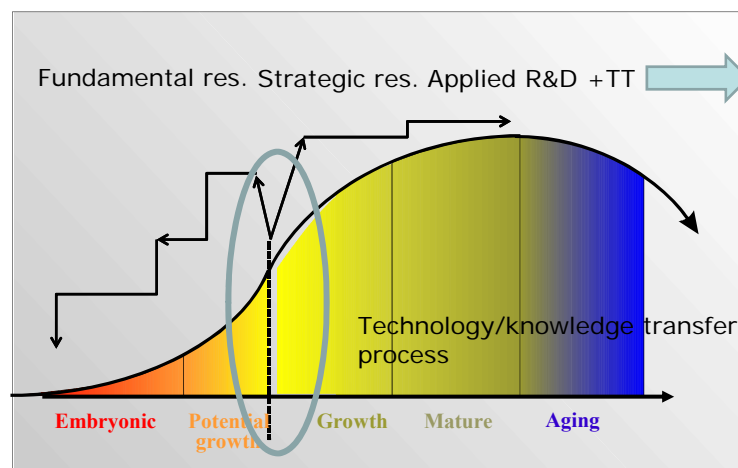
4

## 1. Simplified university R&D governance structure guided by life cycle thinking



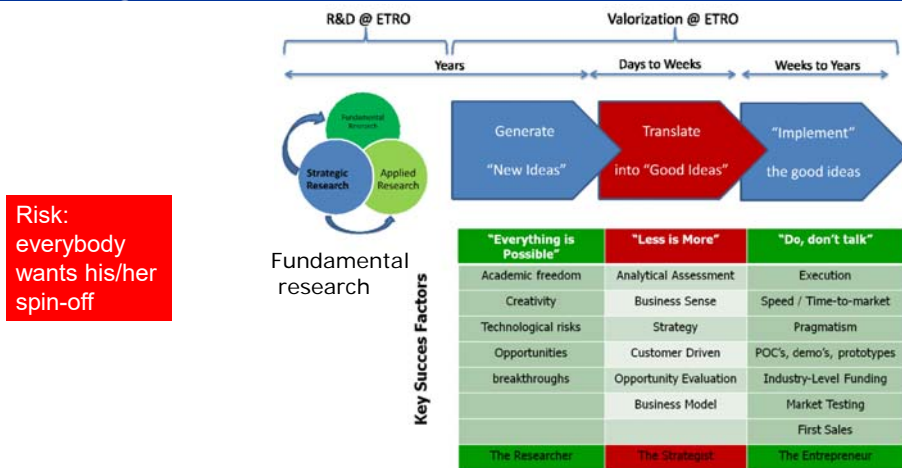
5

## Inductive versus deductive research paradigm



6

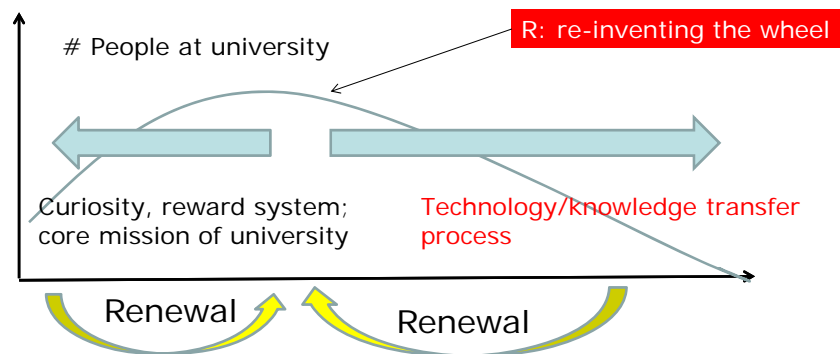
The R&D funnel at all university levels –from new to good idea  
 “The best way to have a good idea is to have a lot of new ideas” (Linus Pauling)



7

## Synergy between co-existing research paradigms

Fundamental res. Strategic res. Applied R&D + TT

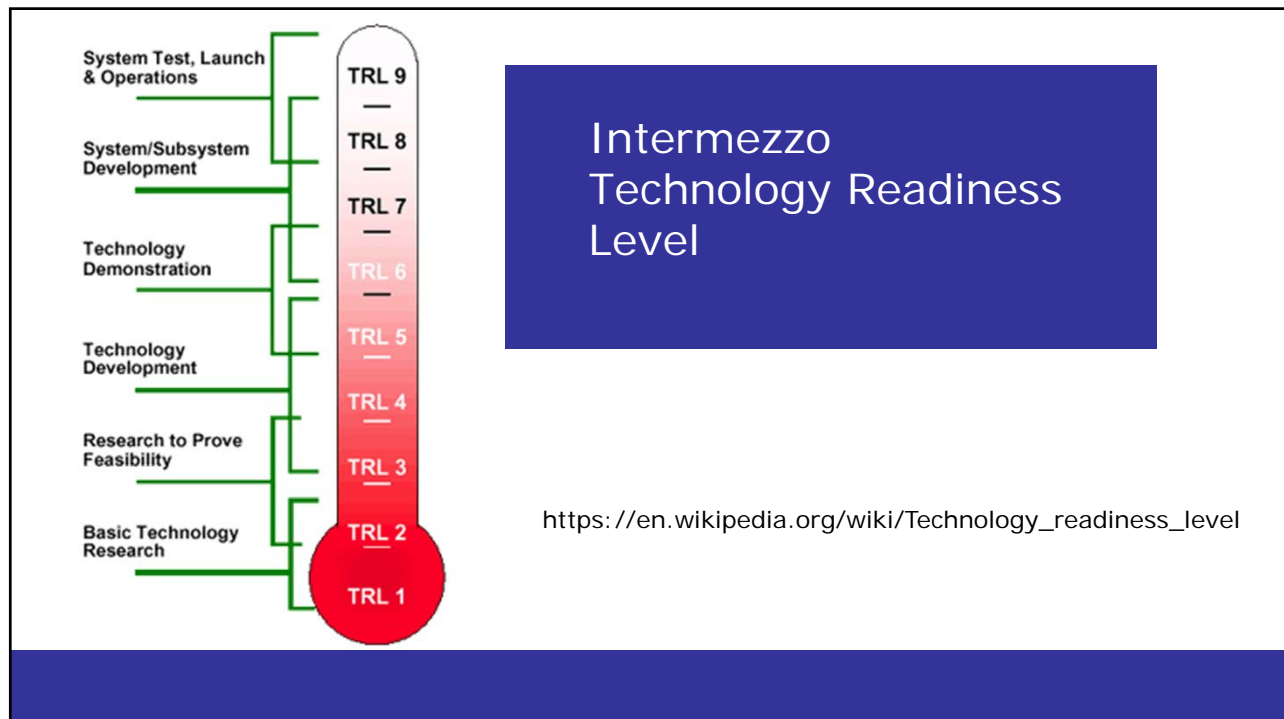


8

## About autonomy versus structure, management styles

Fundamental research	Strategic research and applied research	Innovation and valorisation
<b>Slow</b> process, <b>Quality</b> driven	Speed driven by demand	<b>Fast</b> – window of opportunity driven
No thematic steering – complete autonomy;	Thematic steering: mixed university offer and economic demand	Mainly driven by economic and societal value: product, service, process or societal need
Evaluation: quality of research and processes - peers	Evaluation: Impact broader than peers	Evaluation: Market driven attractiveness (and scientific independence of financing organism); based on unique competence or results of research
Financing: subsidies; typically acquired based on performance and competition	Financing: subsidies	Investments with expectation of RoI
KPI set (publications, PhDs, citations, external funding, joint PhDs, ...)	<b>extended</b> KPI set (#spin offs, industrial or policy advising contracts/income, patents, licensing incomes, EU FP/Horizon2020 projects ..)	
<b>international</b>	International	Target: international

9



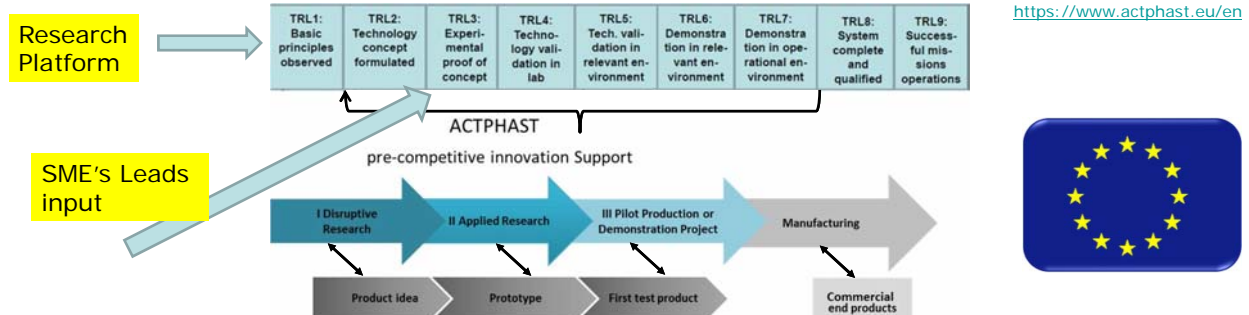
10

## University/Industry - Innovation Platform

**Bridging the Valley of Death: from “prototyping services” to “low-volume production**

***Innovation support model connecting European companies to the best in photonics***

***research technology and expertise and tailored to specific business.***



Example of implementation of a model for “innovation in SME’s within their core business” by inclusion of a new technology field

11

## 2.Funding ... the government. Minimal requirements concerning program funding in order to consolidate sustainability

**Institutional funding:** funding provided to function as an institute

### ***Principles:***

- size dependent “Fixed Funding” – Size measured with quantized output KPIs
- *Variable funding:* 45 % **research** KPIs; 55 % educational KPIs on average in the global budget HE (VUB calculation ~ 55% research; 45 % education)
- Semi-open budget: click system exists for global budget calculation if total size increases by 2%
  - NO KPIs on societal embedding, community services, in the government allocation model (Internal allocation model different from interuniversity allocation → University AUTONOMY)

12

## Funding ... the government. Minimal requirements concerning program funding in order to consolidate sustainability

**Program funding** needed for ensuring competitiveness in external project funding – acquired through global KPIs (proxies of targeted goals)

**Type A:** University funding (SRF) to ensure autonomy in fundamental research (USP of universities) – research in support of education, starting phase, growing, excellence and transdisciplinarity  
KPI , e.g. publications, PhDs, citations and collaboration, e.g. international



13

## Funding ... the government. Minimal requirements concerning program funding in order to consolidate sustainability

**Type B.1:** University Funding (IRF) to support bringing research results closer to valorization

KPI, e.g. European framework projects, spin offs, patents, incomes from projects with external funding and involving external stakeholders, PhDs

**Type B2:** Methusalem – funds attributed for longer time periods to ensure continuity of well-established excellent and large scale departments active in all three types of research and idem for new excellent researchers from abroad for creating new research groups



14

## Funding ... the government. Minimal requirements concerning program funding in order to consolidate sustainability

**Type B3:** TTI working costs and personnel – facilitating valorization, innovation and the continuity of interface actions (science communication, industry projects, contracts, policy preparing reports, industry-university contracts, patent portfolio, licensing, participation in platforms, targeted information dissemination,...)

**Type B4:** Costs of organizing Fund raising - whereby the government implicitly recognizes that the institutional funding is not covering 100 % of the institutional costs

**Type B5:** maintain an Industry-Government- University network – Crosstalks (valorization of transdisciplinary challenging themes in societal modelling)



15

## Modern University – Societal embedding ... the past until now

INPUT	UNIVERSITY	OUTPUT
<ul style="list-style-type: none"> <li>- Public</li> <li>- Private</li> <li>- Limitation: stakeholder's needs, priorities, expectations of return,...</li> </ul>	<ul style="list-style-type: none"> <li>- Autonomy in governance, processes, policy and vision.</li> <li>- Limitation: Compliance to laws and regulations, contracts</li> </ul>	<ul style="list-style-type: none"> <li>-public goods</li> <li>-private goods</li> <li>Limitation: client satisfaction, KPI's (proxies, smart indicators)</li> </ul>

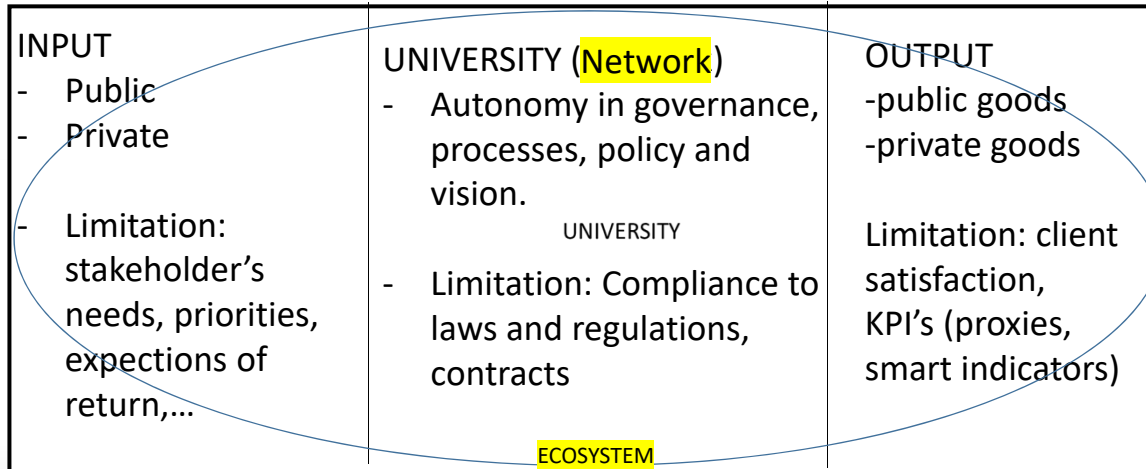
ECOSYSTEM



16

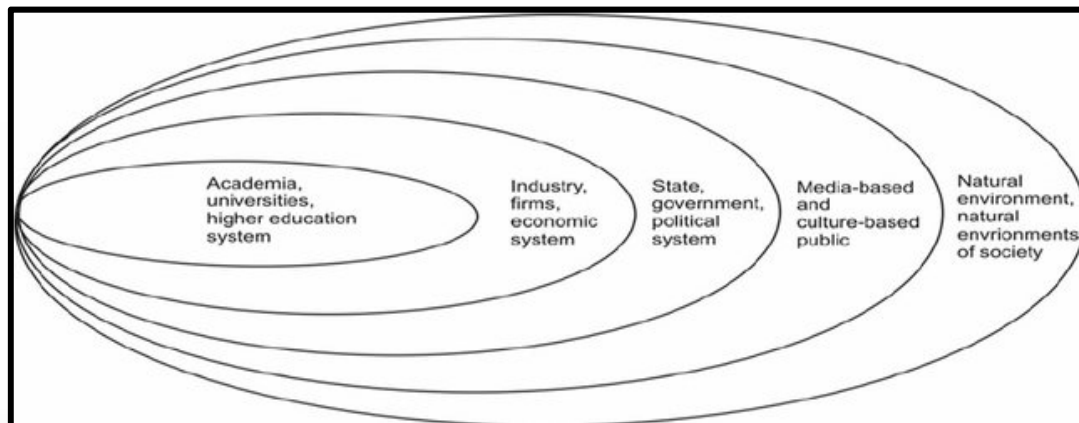


## Modern University – Societal embedding ... Now and in the future



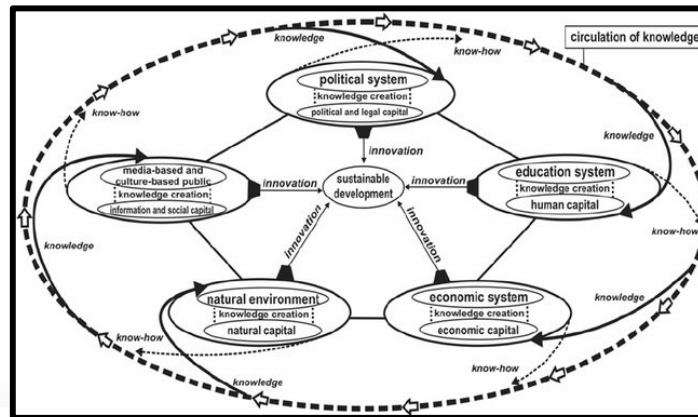
17

## Knowledge and Technology Transfer - a shared societal responsibility- all have to get actively involved

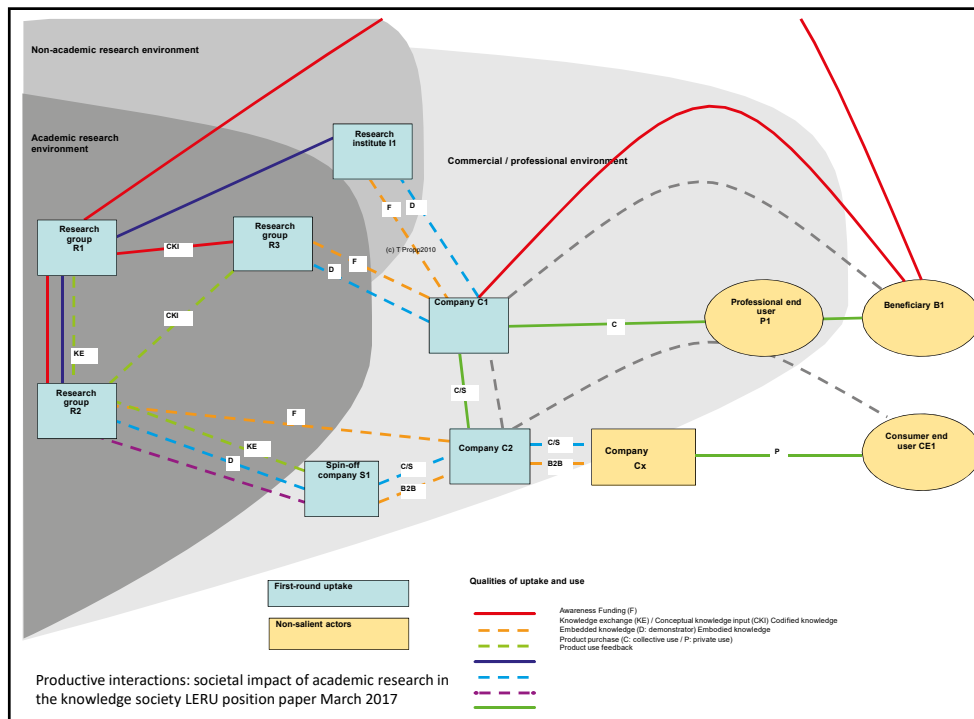


18

## Knowledge and Technology Transfer - a shared societal responsibility- all have to get actively involved



19



### 3.Platforms:

New governance paradigms and management skills – finding the entrance to the jungle


20

## Platforms – points of attention

- *Re-interpretation the life-cycle curve (non-linear; iterative)*
- *Open research and/or innovation platforms (thematic)*
- *Diverse stakeholders including citizens (e.g. citizen science), R&D players, consumers, agencies, non profit sector, ...*
- *IP partitioning (requires proximity involvement and global coaching)*
- *Inside or outside the university?*
- *New operational and design models & managing systems (e.g. living labs, virtual strategic research centers, international management structure – see part 4)*
- *Revisit the role, archiving and usage of “data”*
- *Revisit communication and interaction types*

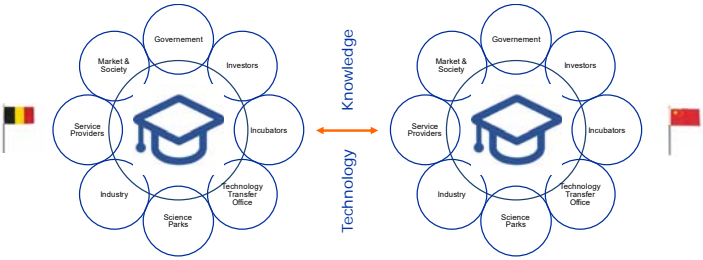
21

**PLATFORM** ▪ The old approach




**Example**  
**UCIP**  
<http://www.ucip.be/>  
**VUB** VRIJE UNIVERSITEIT BRUSSEL

▪ The new approach – finding sustainable pathways through the Jungle



Events Roadshows Meetings

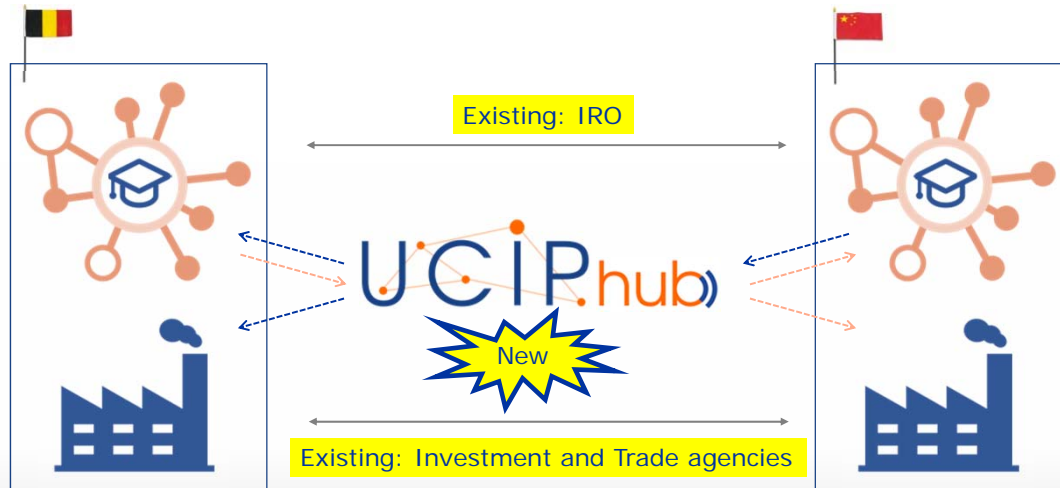


22

22

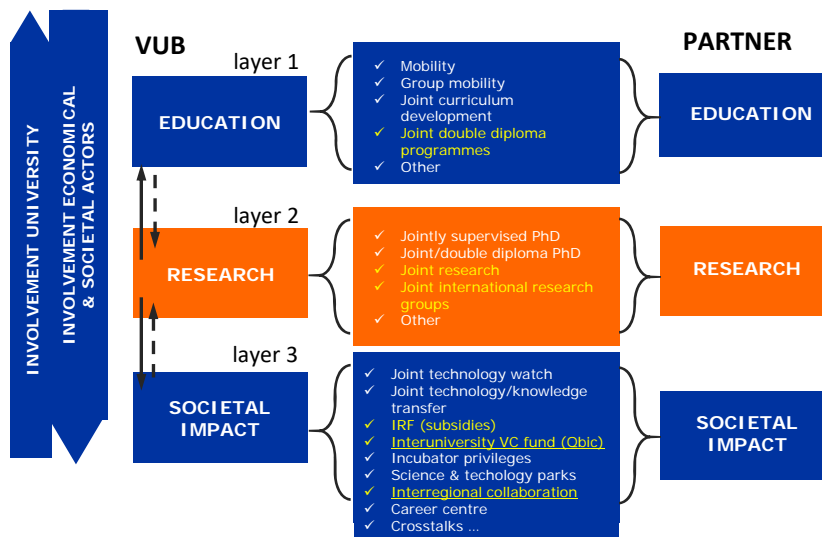
## Future approach

### TOWARDS A EU-CHINA TECHNOLOGY TRANSFER MODEL



23

## 5 International Partnerships and sustainability



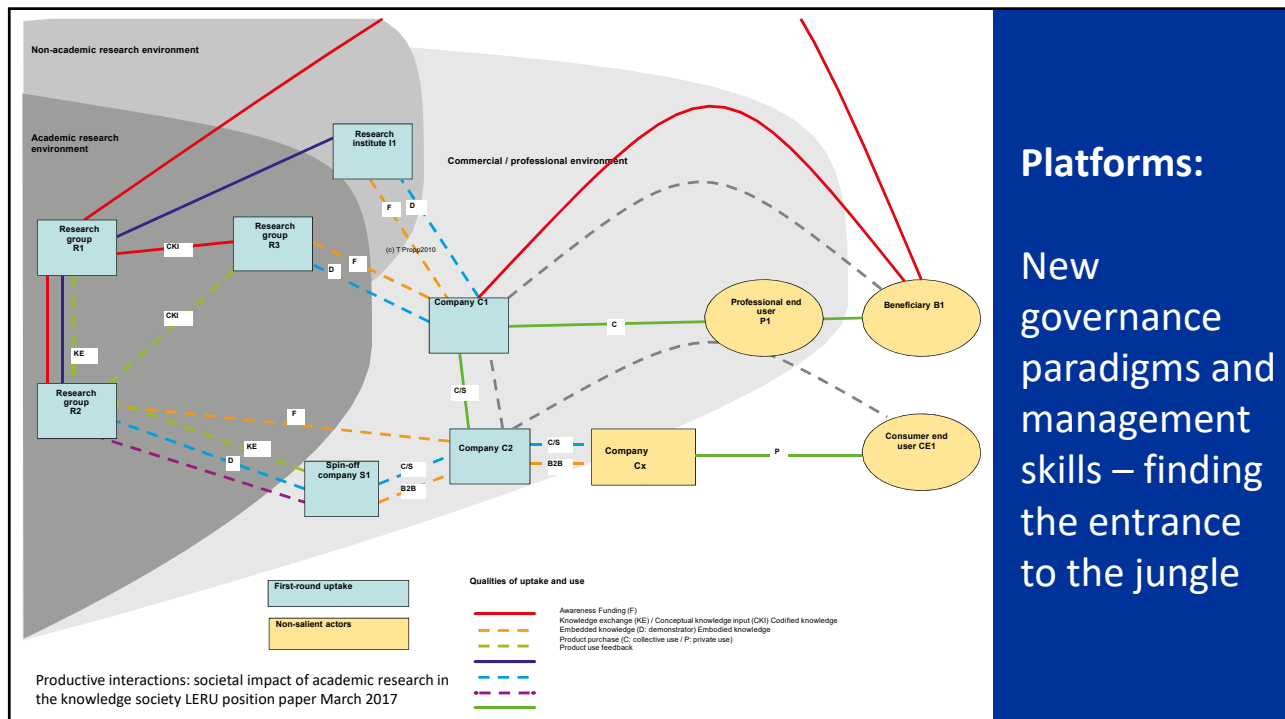
24

Operationalisation brings us in the middle of the jungle ... regionally, nationally, European and worldwide



<https://vubtechtransfer.be/en/for-researchers/finding-your-way-through-the-jungle>

25



26

## Strategic research centre (localised and virtual) SOCs – Flanders-Brussels Government thematic program funding

- Nano Electronics and Digital Technologies (IMEC)  
[www.imec.be](http://www.imec.be)
- Vlaams Instituut voor technologisch onderzoek (Mainly environmental research) (VITO)  
<http://www.vito.be>
- Vlaams Instituut voor Biotechnologie (Flemish institute for biotechnology) (VIB)  
<http://www.vib.be/en/>
- Flanders Make – Industry 4.0  
<http://www.flandersmake.be/nl>



27

## Strategic research centre (virtual) SOCs – Flanders-Brussels

*Virtual institutes, cherishing the best talents without fragmentizing or duplicating efforts and investments*

### Advantages

- research is done by university partners, residing in their local labs → *talent creation for the sector*
- *light weight central administration* dedicated to specific R&D theme (separate legal entity)
- *extra KPI's* on top of university performance
- *the best from each research domain are involved*
- *bridging gaps between different monodisciplinary research domains*
- *balanced/mixed leadership between industry and university*
- *Coherence of action*
- *Very high R&D performance*

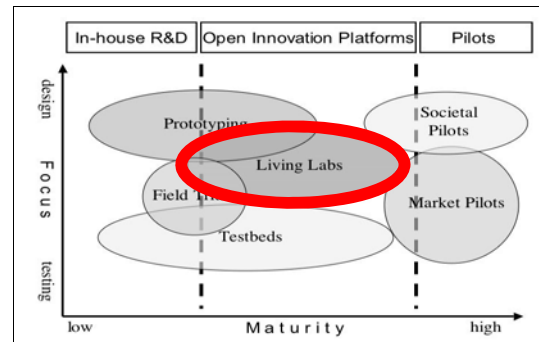
### Dangers

- *Unique entry point for all R&D* → rules for new entries and exits of research groups
- *Balance between internal competition and collaboration*

28

## Living Labs as Innovation Platforms

- Living Lab
- Local
- Experimental
- Safe
- Critical mass
- Living Lab as Innovation Platform
- Not solely technical
- Not solely the individual user
- Also communities and society
- Also non-ICT companies, SMEs and public organizations
- Also Policy Makers



Ballon et al, 2005

Care Living labs (e.g. senior citizens)  
Living labs on Electric Vehicles,  
Smart Cities (e.g. Antwerp)

29

29

## Citizen Science – Participatory Action research

**Citizen science:** the practice of *public participation* and collaboration in **scientific** research. People share and contribute to *data monitoring and collection* programs.

e.g: weather nowcasting and prediction – Royal Meteorological Institute

**Participatory action research:** PAR seeks transformative change through the simultaneous process of *taking action AND doing research*, linked by critical reflection.

e.g.” <http://diplomatic-world.com/?p=5269> – VUB “Detention camps in Syria: the repatriation of children and their families, ...”

30

30



