International good practice case studies of University-Industry Cooperation

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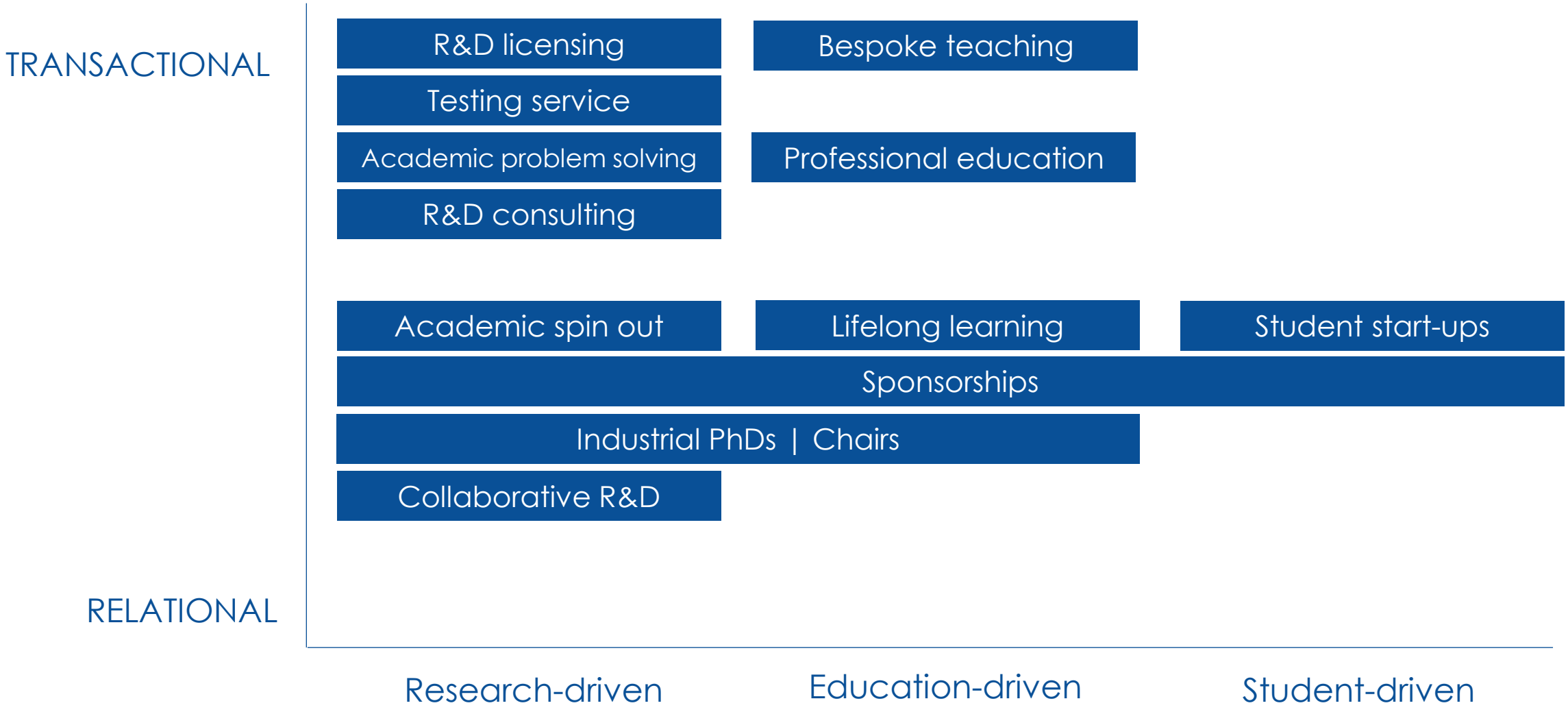
TRADITIONAL VIEW OF UNIVERSITY-BUSINESS COOPERATION

> Any activities aimed at transferring knowledge or technology that may help either the company or the academic institute – depending on the direction of transfer – to further pursue its activities.

Source: Arvanitis, S., Kubli, U., Woerter, M., (2008a), University-industry knowledge and technology transfer in Switzerland: What university scientists think about co-operation with private enterprises ,Research Policy, 37(10), 1865–1883.

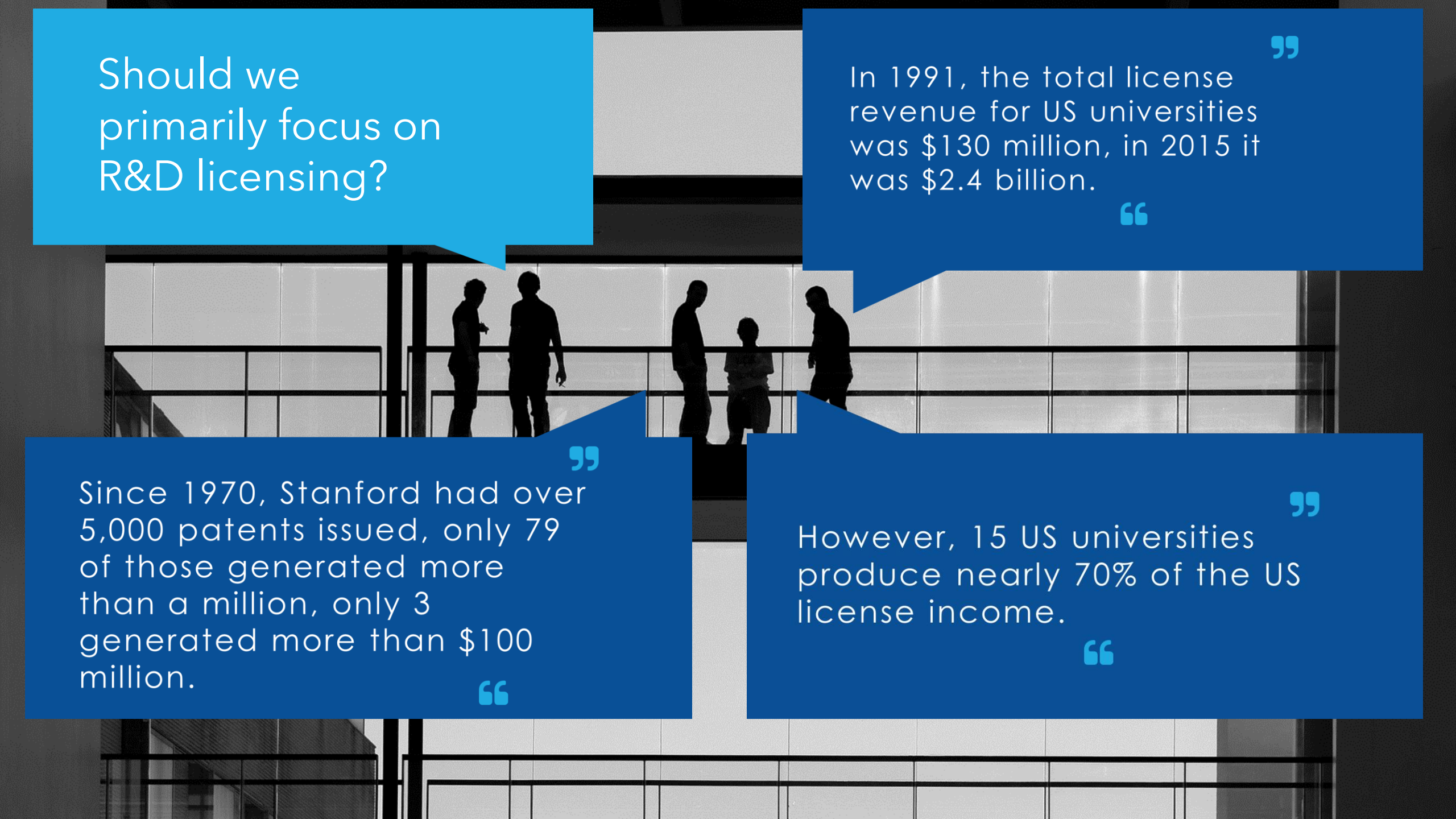
Traditional university-industry cooperation activities



Traditional university-industry cooperation activities

	Description	Advantages*	Disadvantages*
R&D licensing	A formal agreement that allows the transfer of technology between two parties	• Upfront and reoccurring fee possible • Uniqueness, point of difference	• Further involvement often required to make it work • Cost: Patents, legal fees, fees
Testing service	Work involves analysis, measurement or testing and a high degree of intellectual input	• Fee for work • Can lead to consulting work • Scientific validity	• Takes the academic away from other research work • Fees, timeframe uncertain
Academic problem solving	Advisory services provided by individual academic researchers to their industry clients	• Fee for work • Can be lucrative • Direct result	• Takes the academic away from other research work • Can be costly
R&D consulting	Directly commercially relevant research to firms and is explicitly commissioned by firms to be applied	• Fee for work • Solves immediate problems	• Takes the academic away from other research work • Lack of investment from academic
Academic spin out	A new company founded to exploit a piece of IP created in an academic institution	• Academic autonomy • Research/tech-driven leads to potentially higher returns	• Time consuming and bureaucratic • Takes the academic away from other research work
Collaborative R&D	Joint research funded by both business supplemented with govt. funds or academic time dedicated	• Funded research • New knowledge and technologies • Builds reputation	• Differences in motivations and desired outcomes • No result emerges

Note: Advantages and disadvantages for academics and business marked in black and blue respectively



Should we primarily focus on R&D licensing?

In 1991, the total license revenue for US universities was $130 million, in 2015 it was $2.4 billion.

Since 1970, Stanford had over 5,000 patents issued, only 79 of those generated more than a million, only 3 generated more than $100 million.

However, 15 US universities produce nearly 70% of the US license income.

MODERN VIEW OF UNIVERSITY-BUSINESS COOPERATION

Exchanging, co-creating

People with knowledge and technology

“Any activities aimed at transferring knowledge or technology that may help either the company or the academic institute – depending on the direction of transfer – to further pursue its activities.”

Networks
Innovation / supply chains

Academics
Students

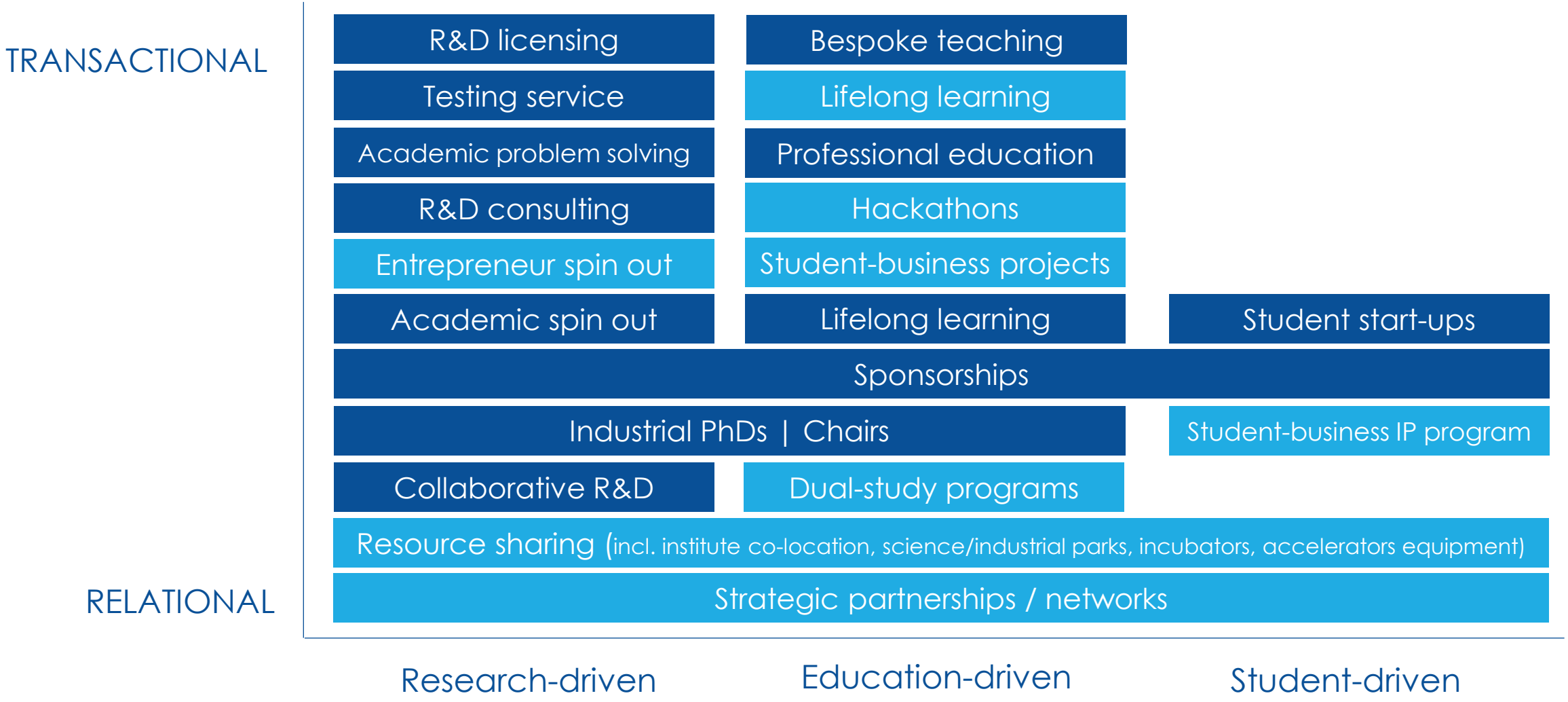
Society
Government

Startups
SMEs
Large

Campus as a platform | Digital platform

Source: Arvanitis, S., Kubli, U., Woerter, M., (2008a), University-industry knowledge and technology transfer in Switzerland: What university scientists think about co-operation with private enterprises ,Research Policy, 37(10), 1865–1883.

Modern university-industry cooperation activities



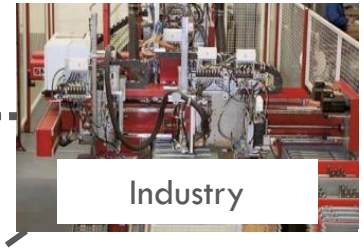
Early-stage (strategic) research partnerships

Münster University of Applied Sciences, Germany

FH MÜNSTER
University of Applied Sciences

Old paradigm of technology transfer

?



New paradigm of knowledge transfer through early-stage partnering

Strategic (innovation and recruitment) partnerships

Siemens, Germany

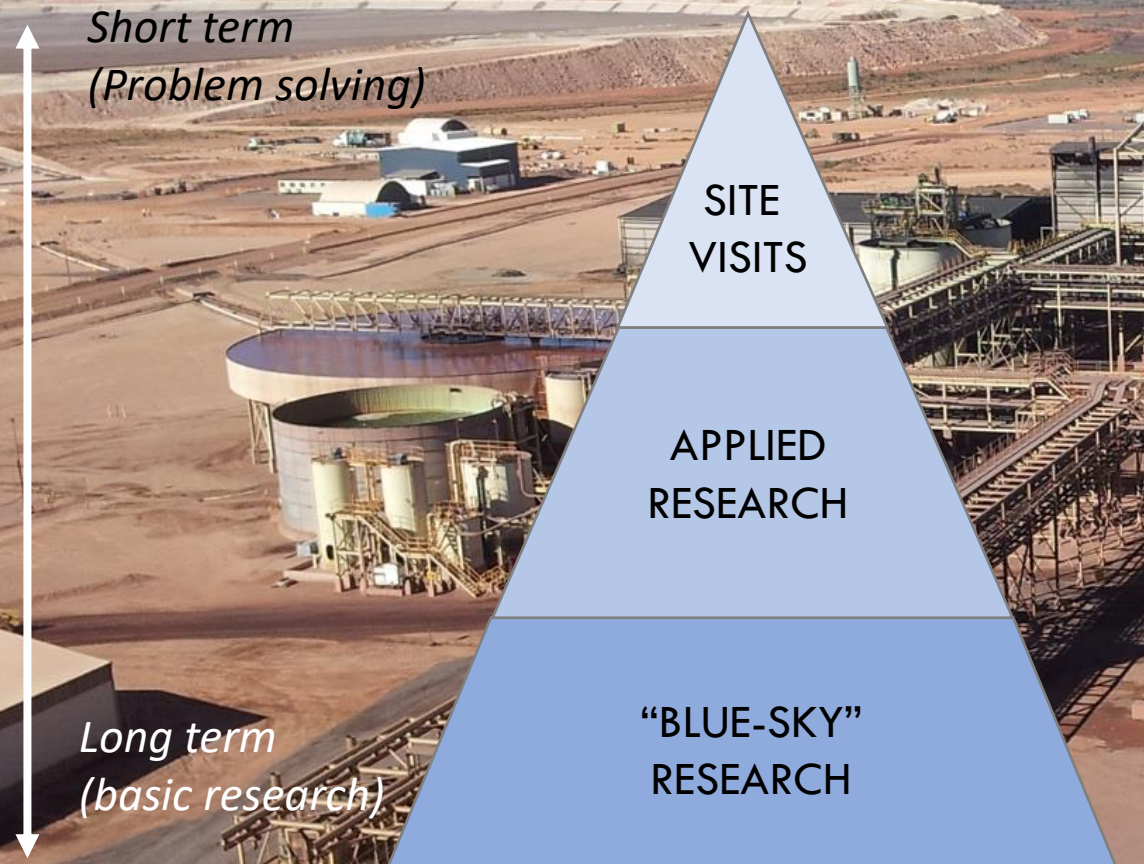
Siemens university-industry interaction approach is based on various stages, from one-time collaboration, to framework contracts to a strategic partnership

Key success factors:

1. ***Long-term commitment e.g. CKI programme***
2. *Relationship management e.g.* ***Siemens CKI Managers resident within universities.***
3. *Aligning research and innovation to talent acquisition*

Early-stage (strategic) research networks

AMIRA P260 Supply Chain Research Partnership



Includes:

- Consortium of large mining / minerals companies
- SME supply chain partners
- Research institutions

Running for over 29 years
Project iterations (3-4 years each)
Co-funded (industry supplemented by government)

RESULTS
300 refereed research publications
50 PhD students
41 working mining and processing sector

Total benefits: $1AU billion (€670 Million)

Recognise motivations & (ideally) ensure desired stakeholder outcomes

Student-Business IP Program

Tampere, Finland

DEMOLA

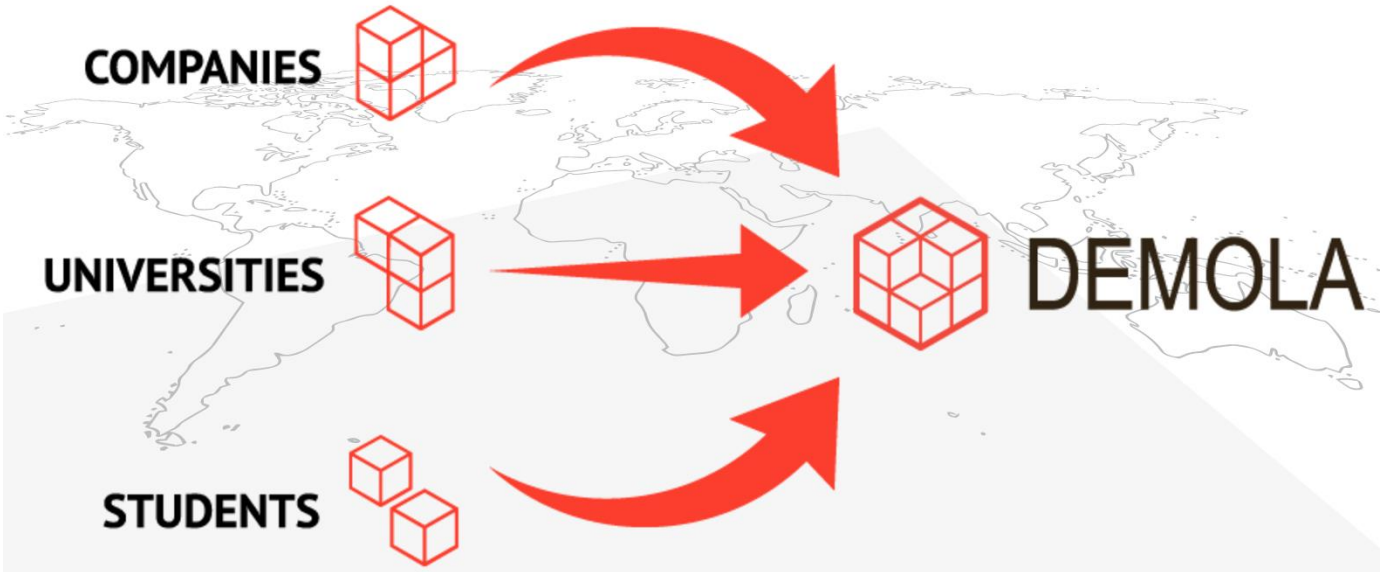
BUSINESS - **Bring business challenges, technologies, ideas** to students. Businesses buy the idea back at the end of the project based on three models

STUDENTS - (cross-disciplinary) Develop **solutions, new technologies and new business concepts** over 4 months, including 3 pitches and creation of a prototype. Get to own the **idea if the business doesn't want it, gets paid if they do.**

UNI - manage the **programme** and IP, provide **mentorship** and assign marks and credit points to students

RESULT

- 96% of completed Demola projects are licensed by the project partners.
- Over 10% of students are headhunted by the companies they worked with; and all students get a taste of entrepreneurship.

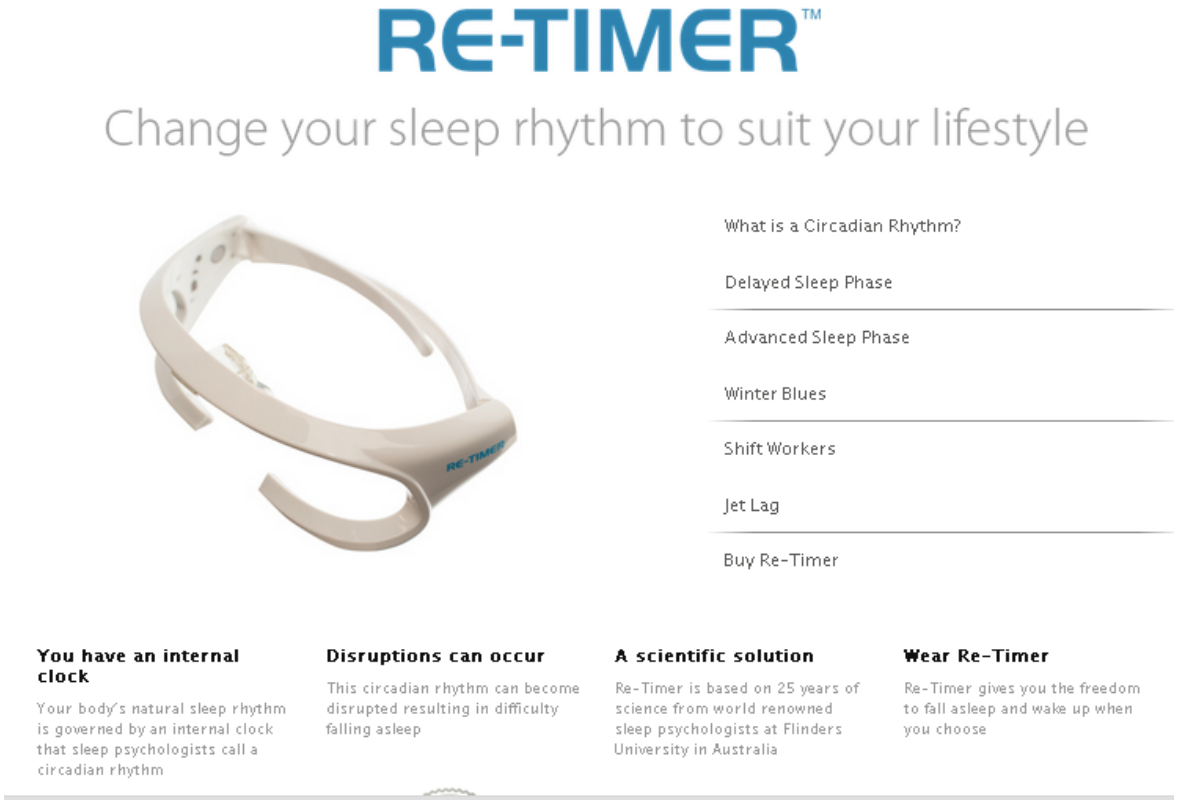


(Entrepreneurship) Academic-SME spin-out

Flinders University, Australia

- University recruited an entrepreneur to develop the academic spin-out within the university incubator.
- University provides the patent license and incubation and takes a share in the enterprise

- **EXAMPLE**: RE-TIMER
  - Partnered with an industry partner: SMR Automotive, a medium-sized Australian contract manufacturer who wanted to grow and diversify.
  - Competencies in lighting and injection moulding
  - The incubator supplied the entrepreneur and technology
  - International (expert) focus



Student-business projects

Münster University of Applied Sciences, Germany

Poster for centre

Student certificate

Press release

Deliverables for everyone

€7,500 each project

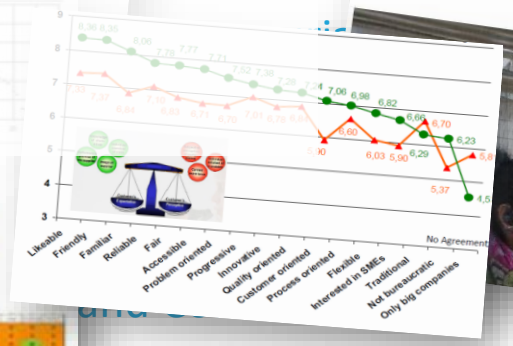
Financed curricula-bound projects support research at the centre and increased student employability:

- Projects overseen by a PhD student with experience
- Projects managed by Master students
- Projects executed by bachelor students

Features:

- Intial briefing and then re-briefing
- Taking minutes weekly sent to partner
- On site visit
- Tools used each semester
- Research undertaken
- Presentation

Potential material for publication



AIMday

A simple concept of getting scientists and professionals from industry to get to build trust through collaboration

Uppsala, Sweden

“One question, one hour, one group of experts”

An event where **businesses and public organisations** get to **discuss actual problems**. It is organized since 2008 by Ångström Academy, a part of Uppsala University Innovation (UUI). Between 2008 and 2019 **more than 50 AIMday events** were organised.

Outcomes:

- Creation of new contacts and trust building
- Knowledge transfer between researchers and businesses/organisations
- New approaches to solving problems
- Collaborative projects

Infrahack Hackathons

Global

"Hackathons are a testing ground for new ideas. They attract a diverse pool of participants, bringing multiple perspectives. The time-sensitive nature of a hackathon creates a uniquely productive atmosphere that encourages participants to distil their ideas into actionable solutions. After all, necessity is the mother of invention."

Format

- Short design sprints that aim to solve specific challenges or problems
- The teams consist of data scientists, designers, developers, and entrepreneurs, and the solution can take the form of software, an app, a website, and more

Themes

- Digital Twins: Can digital replicas of infrastructure be used for better planning and maintenance?
- Energy Utilisation: How can we accelerate the adoption of clean energy and utilise energy more efficiently?
- Defect Detection: How can we use artificial intelligence to predict and prevent faults from occurring?
- Connected Infrastructure: What can we achieve if our assets are allowed to talk to each other?

Challenge Projects

Institute Mines Telecom Business School, France

WHAT IS AN URBAN CHALLENGE?

'Students' incl

- Bachelor
- Master
- Phd
- Academics
- Industry
- Societal actors
- …

… act as consultants to solve city/regional issues

(delivered in a programme run by universities)

Elements:

- Seminars | Master classes
- Workshops
- Immersion (site visit)
- Mentors
- Online system support
- Tools

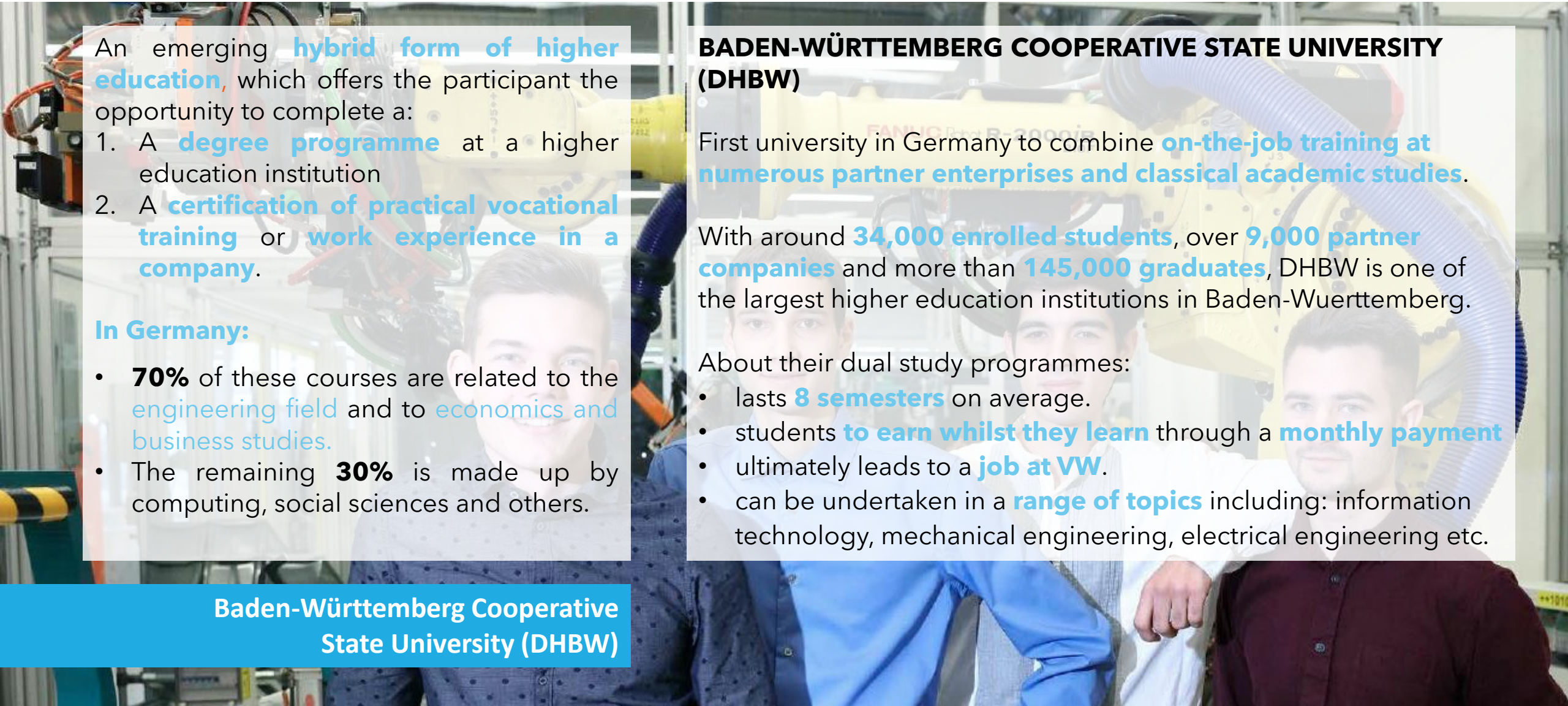
Timeframes:

- 2 days
- Semester long
- Summer school
- Curricula bound or extra curricula

EXAMPLE: URBAN CHALLENGE

Dual study programmes

VW & Baden-Württemberg Cooperative State University, Germany



An emerging **hybrid form of higher education**, which offers the participant the opportunity to complete a:

1. A **degree programme** at a higher education institution
2. A **certification of practical vocational training** or **work experience in a company**.

In Germany:

- **70%** of these courses are related to the engineering field and to economics and business studies.
- The remaining **30%** is made up by computing, social sciences and others.

Baden-Württemberg Cooperative State University (DHBW)

BADEN-WÜRTTEMBERG COOPERATIVE STATE UNIVERSITY (DHBW)

First university in Germany to combine **on-the-job training at numerous partner enterprises and classical academic studies**.

With around **34,000 enrolled students**, over **9,000 partner companies** and more than **145,000 graduates**, DHBW is one of the largest higher education institutions in Baden-Wuerttemberg.

About their dual study programmes:

- lasts **8 semesters** on average.
- students **to earn whilst they learn** through a **monthly payment**
- ultimately leads to a **job at VW**.
- can be undertaken in a **range of topics** including: information technology, mechanical engineering, electrical engineering etc.

Dual study programmes

VW & Baden-Württemberg Cooperative State University, Germany

VOLKSWAGEN GROUP

Dual study programmes can be undertaken in any of the **six VW locations in Germany.**

Areas of specialisation include business studies; electrical engineering; body structure development; automotive information technology; information technology; mechanical engineering; sales management; mechatronics; materials sciences; logistics; industrial engineering; and, economics.

The **programmes** should:

- Allow extended periods of time in the company,
- Flexible to the academic curriculum requirement
- Executed in 12-week periods
- Last 8 semesters

Baden-Württemberg Cooperative State University (DHBW)

Lifelong learning focus

Danube University Krems, Krems, Austria

Founded in 1994 as a centre for continuing education, DUK's entire educational structure is geared towards the particular standards and requirements of middle-aged professionals and executives.

More than 9,000 students from 91 countries studying 200 different courses make it one of the leading universities of continuing education in Europe today.

- 50% of students have worked in their fields for more than 10 years
- 15% of the students have successfully launched their own companies after their studies.

Curriculum development & delivery | Research

Clemson University International Center for Automotive Research

An exemplary automotive-sector public-private cooperation in research and education

Deep orange

- Vehicle prototype 24-month program where students, multi-disciplinary faculty, and participating industry partners work together to produce a new vehicle prototype each year.
- Hands-on learning experience in multi-disciplinary teams.
- Sponsored by major automotive industries of Toyota, Mazda, General Motors and BMW.

"It's the only program of its kind where students begin with nothing more than ideas and finish with a vehicle"

DEEP ORANGE

HOME ABOUT DEEP ORANGE PROJECTS NEWS CONTACT

Deep Orange Vehicle Prototyping Program is an extraordinary initiative that gives students the opportunity to create a prototype vehicle in two years

URBAN MOBILITY FOR GENERATION Y & Z

DEEP ORANGE 5

Shared resources

Amsterdam Science Park, The Netherlands

The Amsterdam Science Park is home to world class research, with a focus on data science, life science and material science

- 175+ companies – Large, SME, startups
- 7000+ students
- World-class Research Institutes
- Shared R&D facilities
- Shared facilities – Cafes, Restaurants, bars, fitness

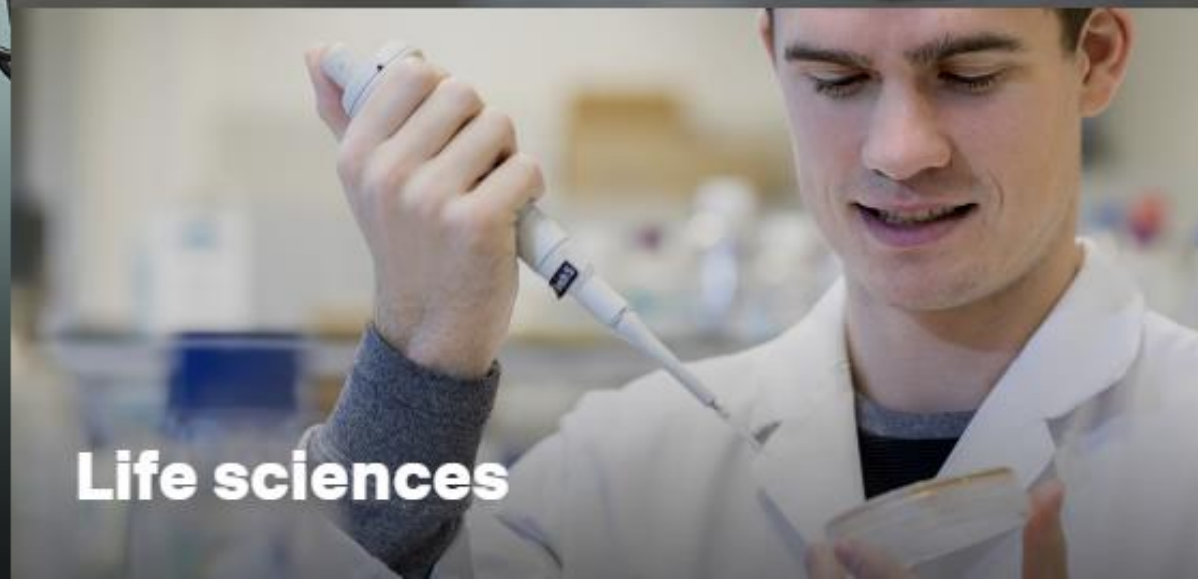
Shared resources

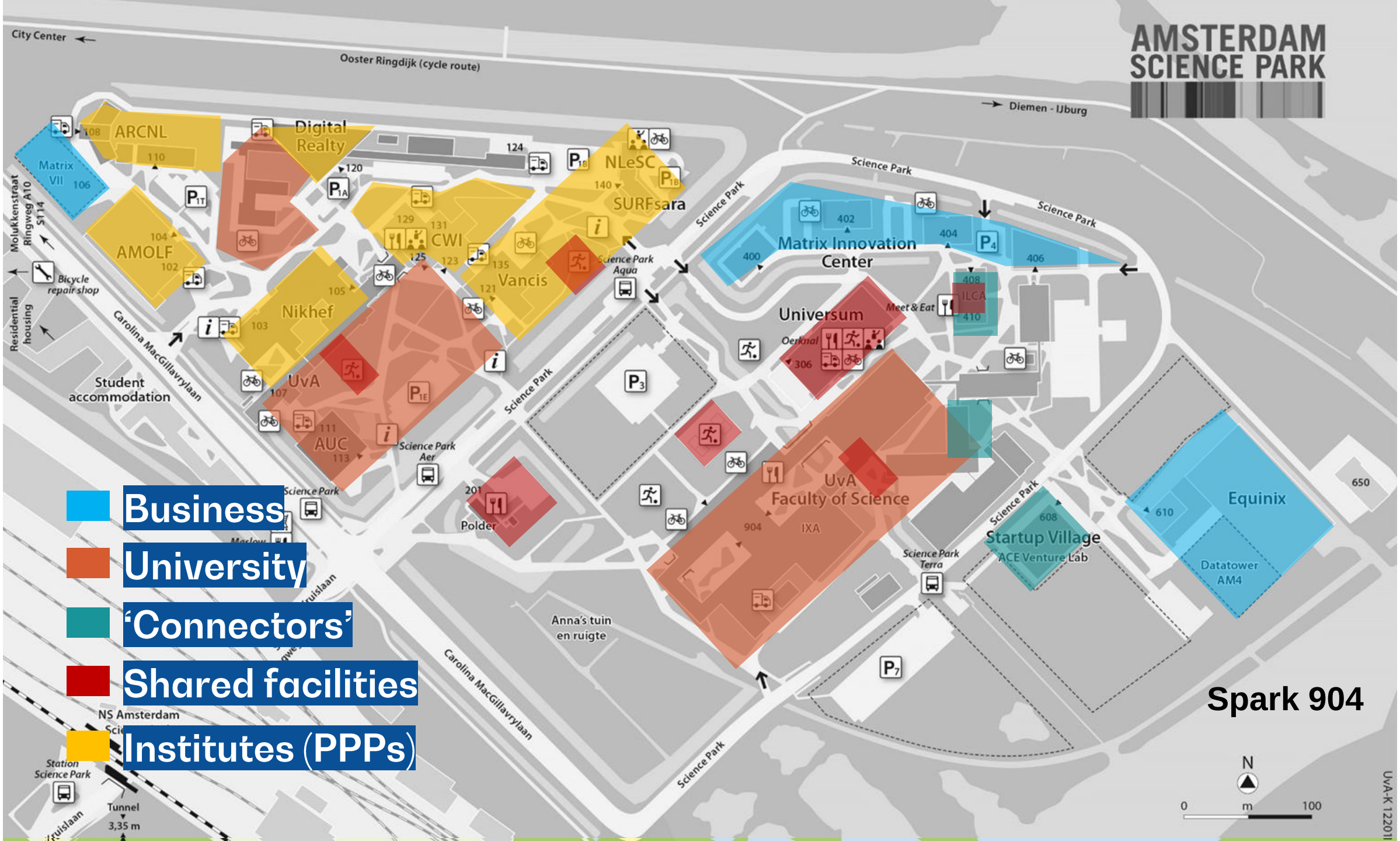
Amsterdam Science Park, The Netherlands

WORLD-CLASS RESEARCH INSTITUTES

- AMOLF academic institute for fundamental physics with high societal relevance
- CWI Dutch National Research Centre for Mathematics and Computer Science
- Nikhef National Institute for Subatomic Physics
- SURFsara Computing and Networking Services
- NLeSC Netherlands eScience Center University of Amsterdam, Faculty of Science* Amsterdam University College
- ARCNL Advanced Research Center for Nanolithography (joint venture with ASML)
- Qusoft Research Center for Quantum Software

AI & data science




AMSTERDAM SCIENCE PARK
City Center
Ooster Ringdijk (cycle route)
Diemen - IJburg
Molukkenstraat
Ringweg A10
S114
Residential housing
Bicycle repair shop
Carolina MacGillavrylaan
Student accommodation
ARCNL
Digital Realty
Matrix VII
AMOLF
Nikhef
CWI
Vancis
NLeSC
SURFsara
Science Park Aqua
Science Park
Matrix Innovation Center
Universum
Meet & Eat
ILCA
Oerknal
UvA
AUC
Science Park Aer
Polder
P3
UvA Faculty of Science
IXA
Science Park Terra
Startup Village
ACE Venture Lab
Equinix
Datatower AM4
Anna's tuin en ruigte
Carolina MacGillavrylaan
NS Amsterdam
Station Science Park
Tunnel
3,35 m
Business
University
'Connectors'
Shared facilities
Institutes (PPPs)
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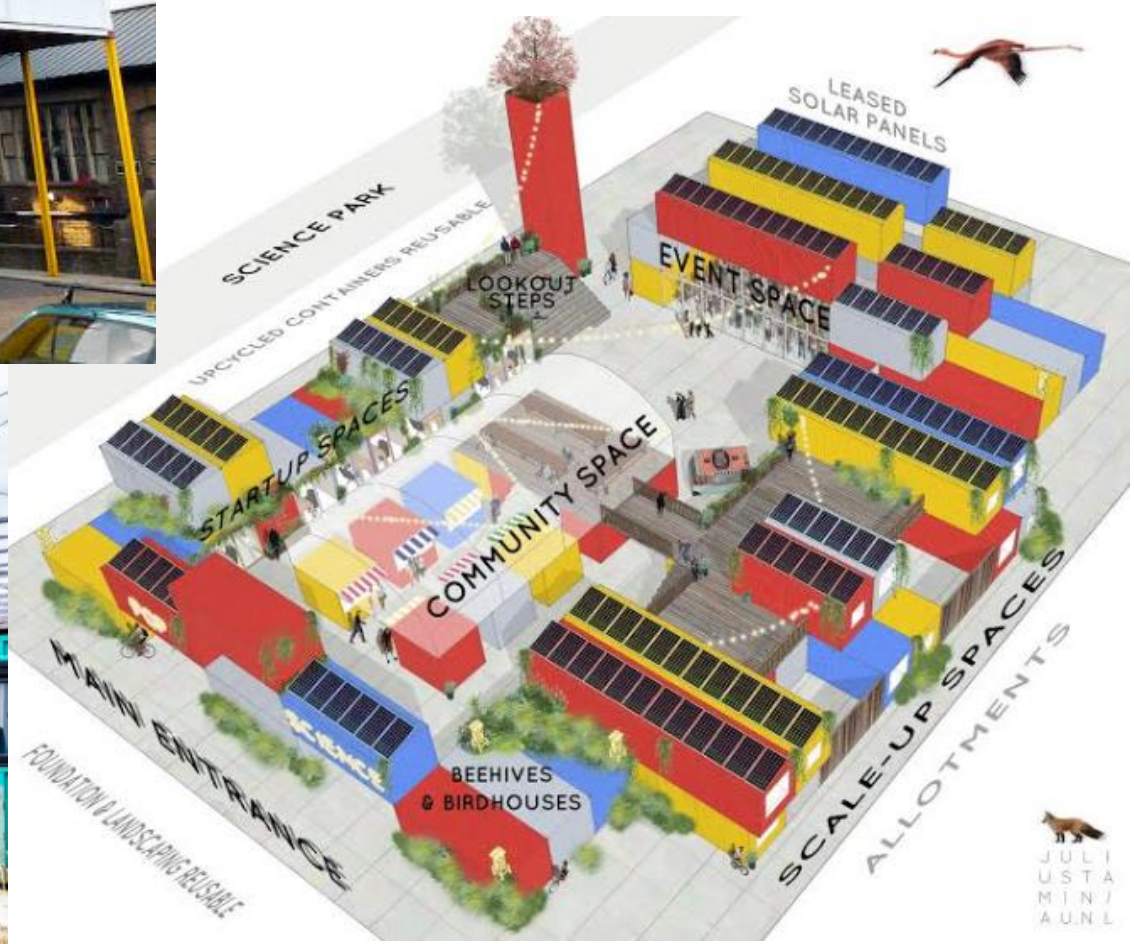
Shared resources

Amsterdam Science Park, The Netherlands

Amsterdam Science Park
START UP VILLAGE



Questions or comments?

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