RESEARCH UNIVERSITY

University-wide research & innovation programs: Tech & ELSE, from low to high TRL
- Robotics (>200 researchers)
- Artificial Intelligence (>200 researchers)
- Important themes: MedTech & Personalized Health, Digital Society, Cyber-Security, Smart Industry, Resilient World, Smart Materials, Nano-Technology, Photonics

Iddo Bante
Business director
Digital Society Institute,
University of Twente, NL

Europe's most valuable tech companies founded after 1990

	Name	HQ	Founded	Valuation
#1	Booking.com	Enschede	1996	€60B
#2	adyen	Amsterdam	2006	€42B
#3	worldpay	London	1993	€39B
#4	Spotify	Stockholm	2006	€39B
#5	Infineon	Neubiberg	1999	€24B
#6	HEXAGON	Stockholm	1992	€24B
#7	ocado	London	2000	€20B
#8	Delivery Hero	Berlin	2010	€19B
#9	zalando	Berlin	2008	€15B
#10	Takeaway.com	Enschede	2000	€14B

techleap.nl | CBRE | dealroom.co

ENTERPRENEURIAL UNIVERSITY

Scientific Impact:
Times 'Higher Education-QS World University' ranks UT among top 200 universities in the world
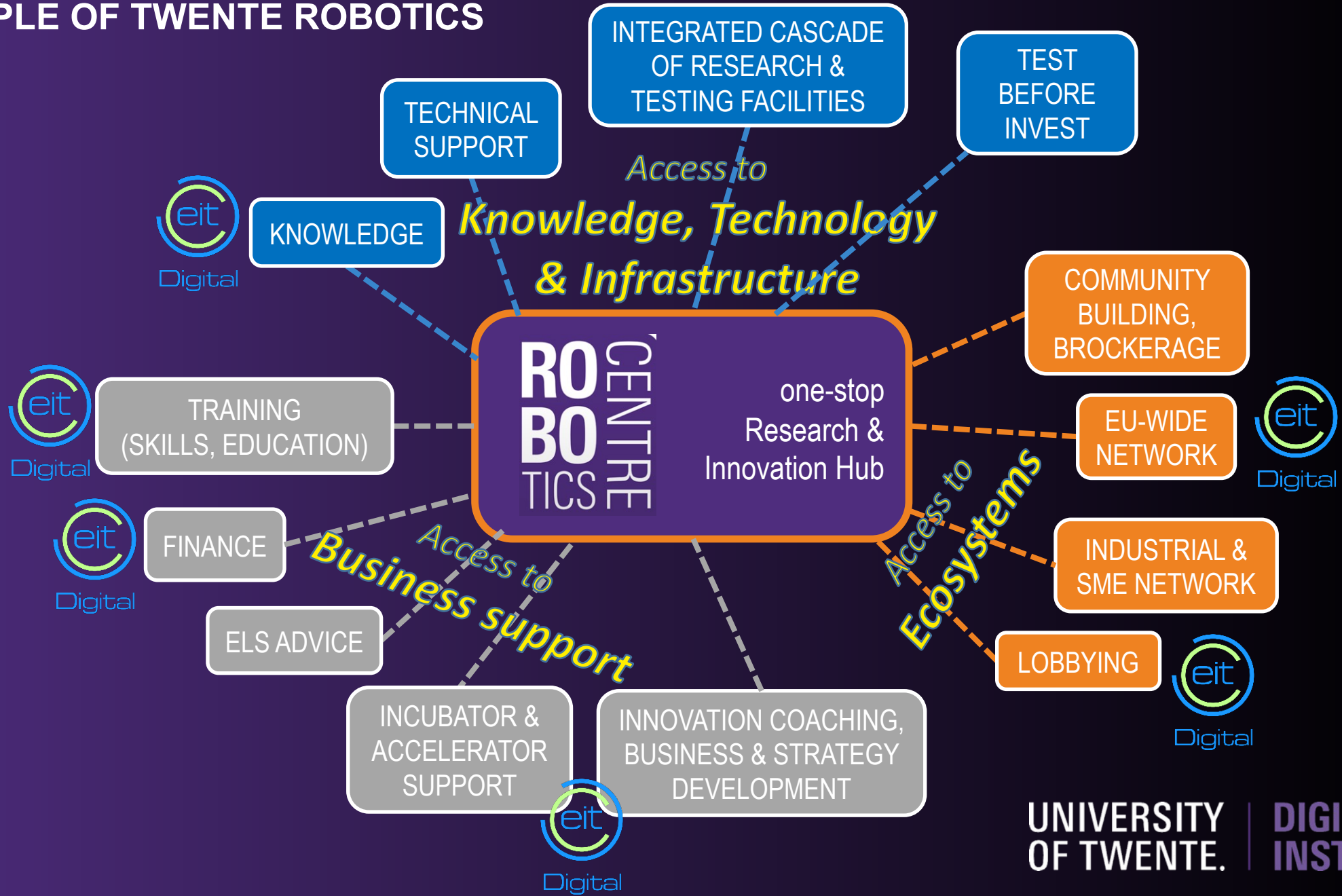
Societal & Economic Impact
Involved in large number of PPPs.
>1,000 start-ups since 1984:
many international scale-ups, 2 Unicorns,
>14,000 direct jobs in region.

HIGH TECH, HUMAN TOUCH

UNIVERSITEIT TWENTE.

Born in Twente

Takeaway.com

Booking.com

Security MATTERS
Rethink Cybersecurity

DEMCON
SCISPORTS

NoWiresNeeded
WiFi
XSENS

BUILDING REGIONAL ECO-SYSTEMS
EXAMPLE OF TWENTE ROBOTICS

BUILDING REGIONAL ECO-SYSTEMS
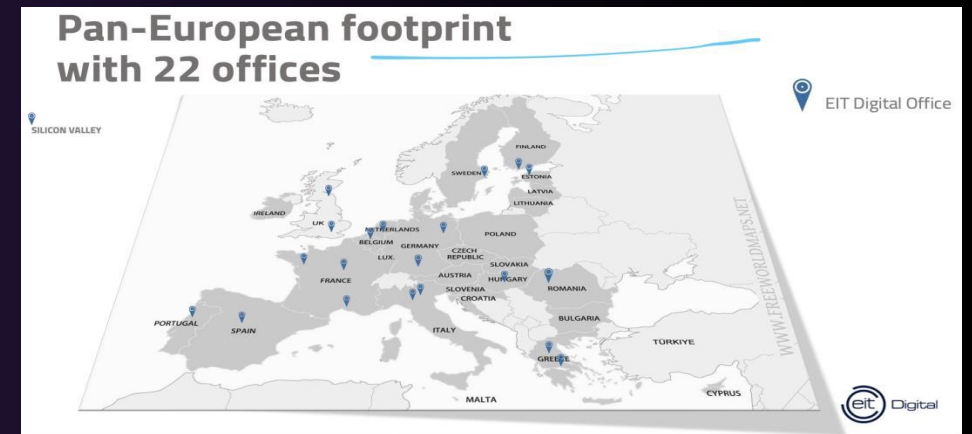
EIT DIGITAL

EIT DIGITAL - ADRA

EIT Digital: Ecosystem of >350 EU corporations, SMEs, start-ups, universities, research institutes.

Over the past 13 years, EIT Digital has built an effective organization, able to deliver pan-European innovation and education activities.
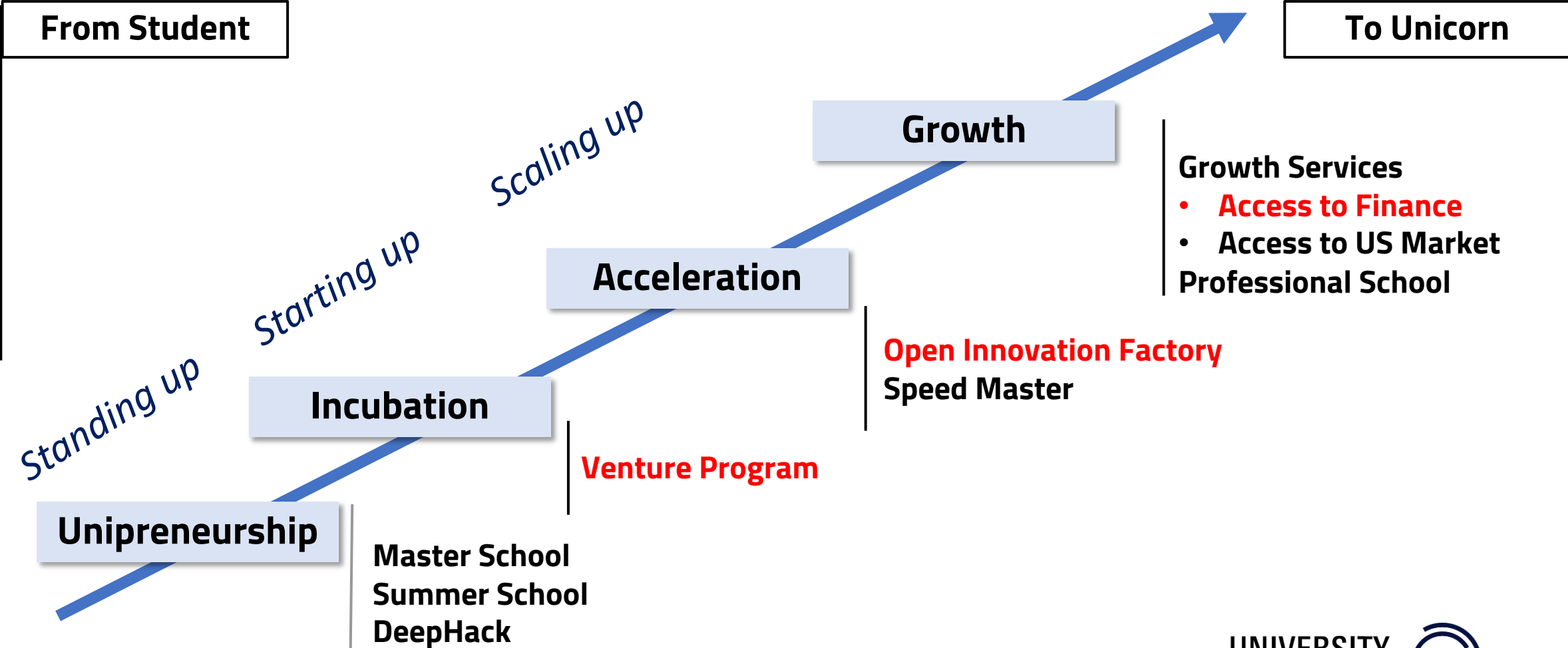
Strategic focus areas: Digital Industry, Digital Wellbeing, Digital Cities, Digital Tech, Digital Finance

Shared Goals:

- Promote EU excellence
- Develop strong innovation ecosystems across EU and beyond
- Support tech transfer, spin-offs, startups, scale-ups, SMEs
- Bringing EU values in technology
- Europe becoming a key player in ADR

Pan-European footprint with 22 offices

UNIVERSITY OF TWENTE. | DIGITAL SOCIETY INSTITUTE

ENABLEMENT PROGRAM GRAPH

From Student

To Unicorn

Scaling up

Starting up

Growth

Growth Services
- **Access to Finance**
- **Access to US Market**

Professional School

Acceleration

Standing up

Open Innovation Factory
Speed Master

Incubation

Venture Program

Unipreneurship

Master School
Summer School
DeepHack

UNIVERSITY
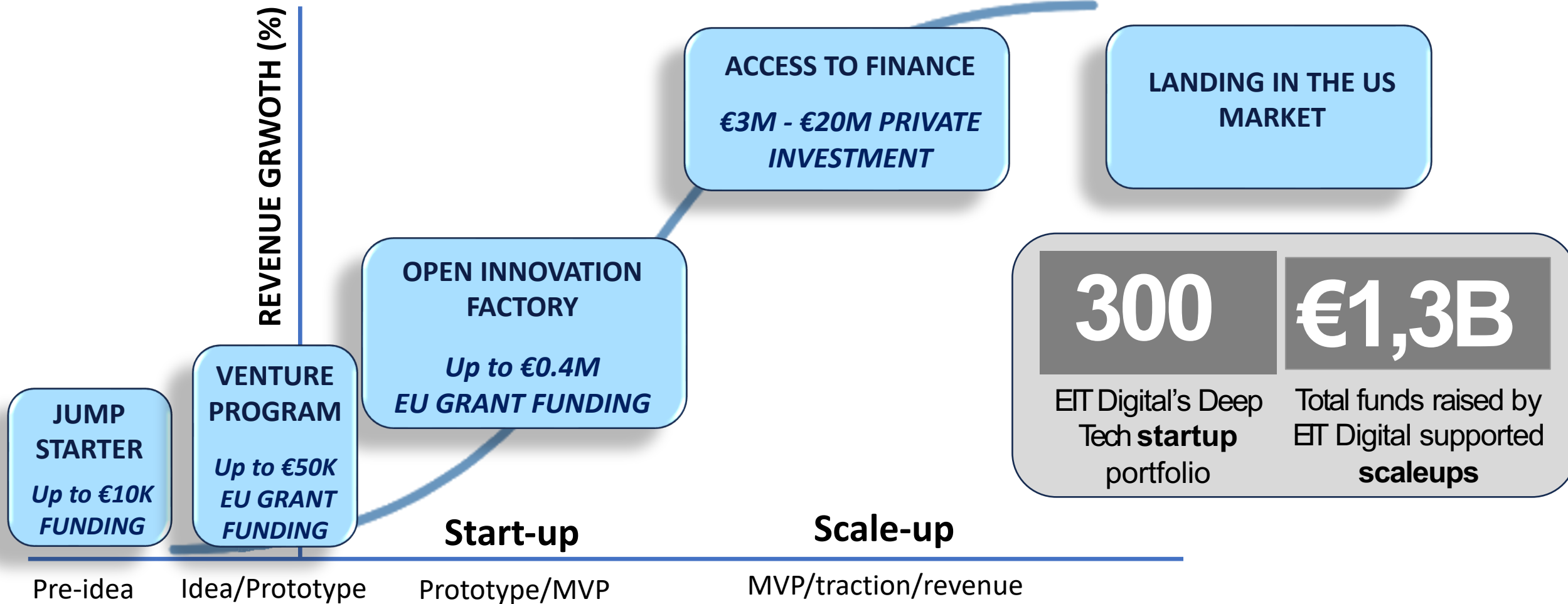OF TWENTE.   eit Digital

UNIPRENEURSHIP

International EIT Digital Master School:

- Next generation real enterpreneurial and innovation-oriented tech students
- Makers & Shapers → Courses: 70% Tech + 30% ELSE/enterpreneurship/innovation/impact
- European entree + European exit university (dual degree)
- MSc Autonomous Systems, Data Science, Cybersecurity, Human-Machine-Interaction & Design, …

Summer School: re-skilling, up-skilling of professionals

- Deep-dive into emerging digital technologies, learn how to turn
  technology into business, and eventually launch deep-tech startups
- E.g.: Boosting enterpreneurship in digital wellbeing,
        Cybersecurity between tech and business,
        Resilient Industrial IOT, …

UNIVERSITY
OF TWENTE. eit Digital

STARTUP, SCALEUP, SME SUPPORT PROGRAMS

REVENUE GRWOTH (%)

JUMP STARTER

Up to €10K FUNDING

VENTURE PROGRAM

Up to €50K EU GRANT FUNDING

OPEN INNOVATION FACTORY

Up to €0.4M EU GRANT FUNDING

ACCESS TO FINANCE

€3M - €20M PRIVATE INVESTMENT

LANDING IN THE US MARKET

300

EIT Digital's Deep Tech **startup** portfolio

€1,3B

Total funds raised by EIT Digital supported **scaleups**

Start-up

Scale-up

Pre-idea

Idea/Prototype

Prototype/MVP

MVP/traction/revenue

UNIVERSITY OF TWENTE.

eit Digital

STARTUP, SCALEUP, SME SUPPORT PROGRAMS

Research & Seed

JumpStarter Financial support up to € 10k, Idea stage incubation program, Entrepreneurship skills and prototype creation.

EIT Digital Venture Program Financial support up to € 25k, Incubation program through partners to create MVP and attract first investor, Business development help.

EIT Digital Innovation Factory
Investment between € 10k - € 400k, Mentoring & Coaching, Network of investors, corporates, partners

Seed+ & Series A/B

Scouting and acquisitions for corporates & VC and growth funds
Thematic scouting for corporates and investment funds for market research or acquisition targets.
Specific mandates or as part of EIT Digital Champions.

EIT Digital Access to Finance for scaleups
Series-A, Series-B fundraising support, Extensive business development support,
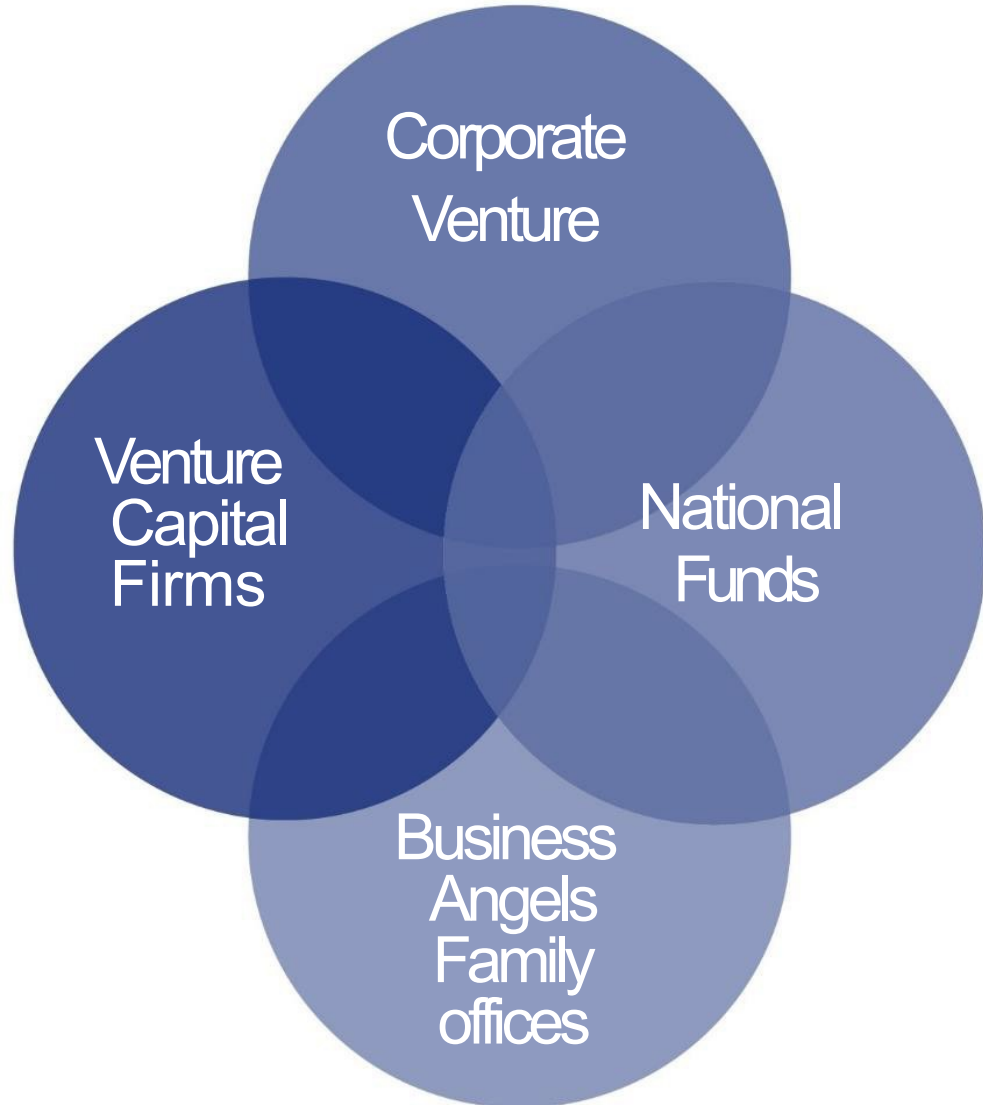Warm introductions to VCs, CVCs, corporate clients

Landing in the US market
Professional preparation and coaching for US market entry, Customized program
getting you ready to make your move into the US market

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eit Digital

TALK DIRECTLY TO THE RIGHT INVESTORS

Access to over 1000 investors

Corporate Venture

Venture Capital Firms

National Funds

Business Angels Family offices

Brand Name VCs
The usual suspects
Multi-sector
Overwhelmed with deals

Under the Surface
Sector specialist funds
Corporates
Family Offices
Private Equity Funds
Asset Managers
Europe
North America
Asia
Hungry for Opportunities

Balderton capital
Index Ventures
NOTION
octopus
partech
EARLYBIRD
ACCEL PARTNERS

PHŒNIX CONTACT
Innovation Ventures GmbH
lifeArc
PALADIN CAPITAL GROUP
NEWZONE
HEVELLA CAPITAL
ELKSTONE
HorizonsVentures
McRock CAPITAL
Five Elms Capital

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eit Digital

STRATEGIC PARTNERSHIPS

40	35%	20	€100M
2023 Project pipeline	Success rate in Horizon Europe & Digital Europe programs	Currently running EU projects	Total value of currently running EU projects

EIT Digital is a portal for partners to attract EU funds via joint EU projects with **13 year experience** in securing funds and handling large grants via EU projects.

Currently, there are **20 actively running projects** worth a total value of **€ 100M.**
In the **first 10 months of 2023**, EIT Digital secured 12 EU projects together with its partners, worth of total **€ 80M**.

Most relevant programmes:
Horizon Europe, Digital Europe Programme, InvestEU, EIC, EIF, EIB, European Defence Fund.

Partner with EIT Digital in developing Regional Innovation Valleys

Strengthen and advance European innovation ecosystems, connecting all EU territories

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EIT COMMUNITY ARTIFICIAL INTELLIGENCE

A community coordinated by
EIT Digital covering:

- The entire innovation chain;
- Offering training and education programs;
- Supporting the journey from research to the market;
- Conducting innovation projects and establishing business incubators and accelerators.
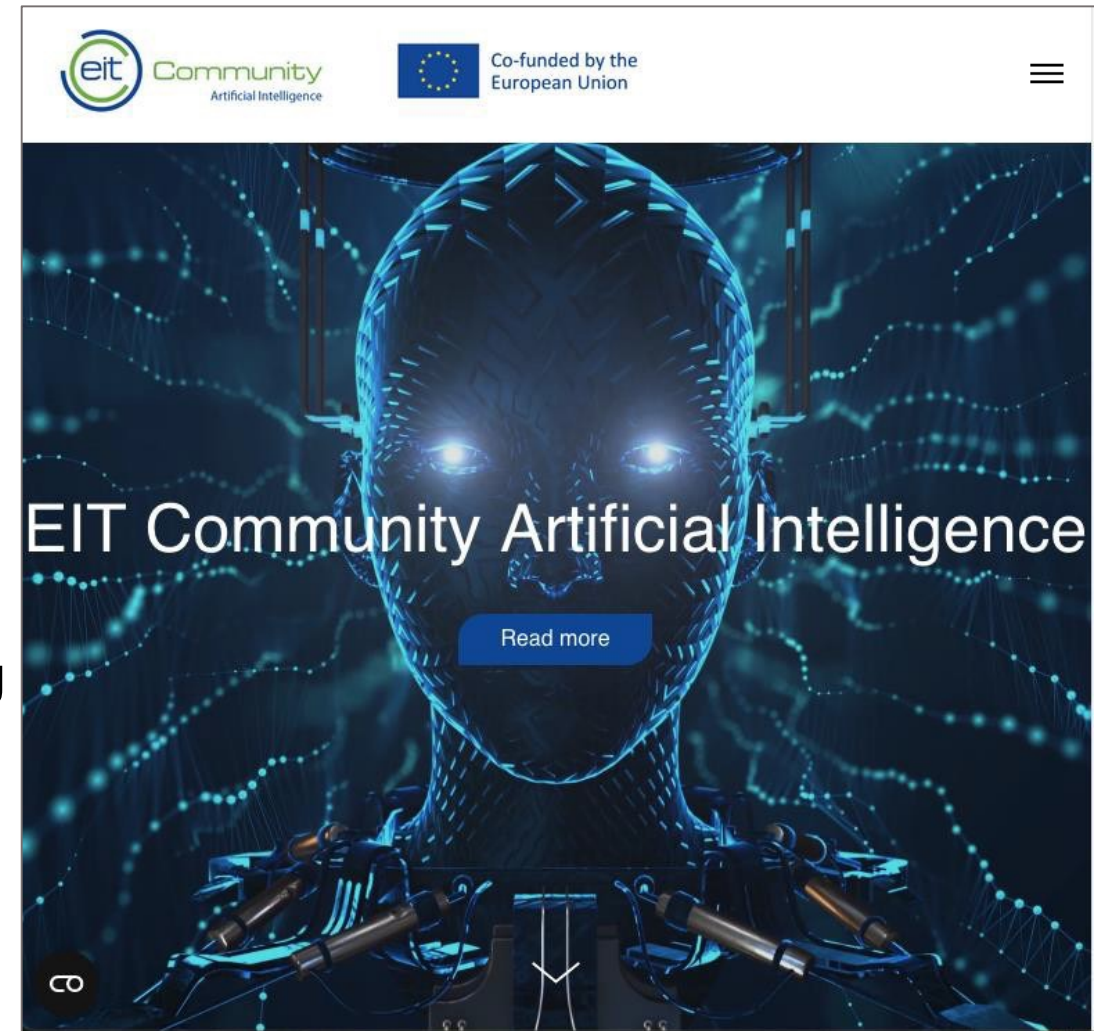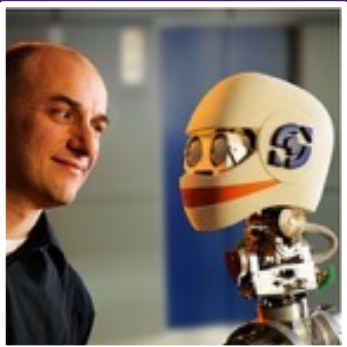
Additional slides
(for discussion)

VALUE AND IMPACT-CREATION INSTRUMENTS

MAKERS & SHAPERS

Technological
Physical/Embedded AI, Robotics

Ethical
Legal
Societal Acceptance
Economical

inspiring, guiding, mutually shaping, co-design

National EU

EDUCATION

THE EUROPEAN CONSORTIUM OF INNOVATIVE UNIVERSITIES

Tech + ELSE
challenge-based
micro-credentials
MSc, EngDoc, LLL

INTEGRATED CASCADE OF RESEARCH & TEST FACILITIES (shared facilities, partners)

In-house research labs		Outdoor test facilities	Living Campus	Smart Cities & Agriculture

*Develop
Low TRL
Controlled Environment*

Fieldlabs, TEF,
Test-before-Invest
DIH, EDIH (FIP)

Adopt
High TRL
Open environment

WHOLE INNOVATION CHAIN
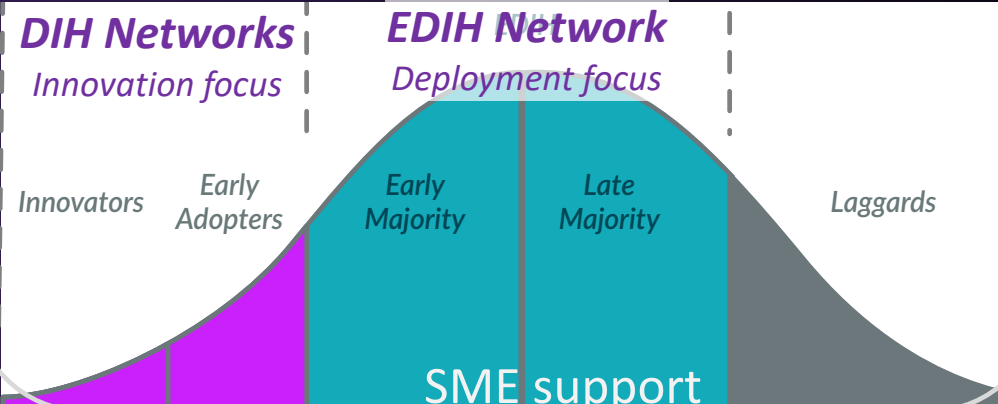
Many
Regional, national
Technology focus

Limited number
National, international
Application domain

DIH NETWORKS, INNOVATIVE REGIONS

RIMA · DIH HERO

EDIH BOOST Robotics East NL

DIH Networks
Innovation focus

EDIH Network
Deployment focus

Innovators | *Early Adopters* | *Early Majority* | *Late Majority* | *Laggards*

SME support

PARTNERSHIPS
EUROPEAN NETWORKS
member of

Adra — The AI Data Robotics Association
BDV — Big Data Value Association
CLAIRE
eu ROBOTICS
QI — HealthTech4EU Alliance
Inside — Industry Association
eit Digital

DIGITAL SOCIETY INSTITUTE

CREATING IMPACT: (1) Way of working

Researchers

Application domains, societal challenges, SDGs

Curiosity-driven project

How to realize more than only scientific impact ?

Application-inspired project

Risk of sub-optimalisation

Programmatic group of projects

outside-in

Co-designed integral programmatic approach, Reversed impact pathway

Two-stage rocket:
- (inter)national R&I program
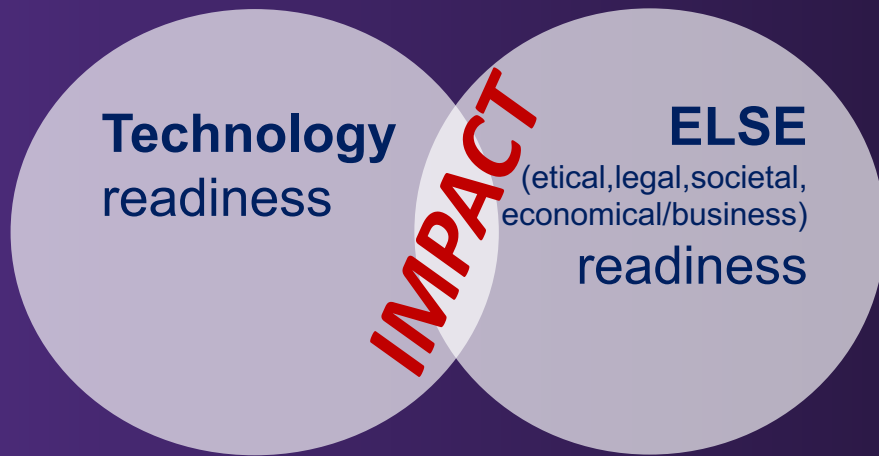- individual projects

Examples: NLAIC, ADRA, EIT Digital, …

Creating impact:
25% technological innovation
75% social innovation

Examples: Tech + ELSE in Robotics, AI

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CREATING IMPACT:
(2) Makers & Shapers / High Tech & Human Touch / Tech & ELSE

Technology readiness

IMPACT

ELSE
(etical,legal,societal, economical/business)
readiness

MAKERS & SHAPERS

Technological
Physical/Embedded AI
& Robotics

Ethical
Legal
Societal
Economical

STOP GO

Inspiring, guiding,

mutually shaping, co-design

(because it's certainly not about technology alone)
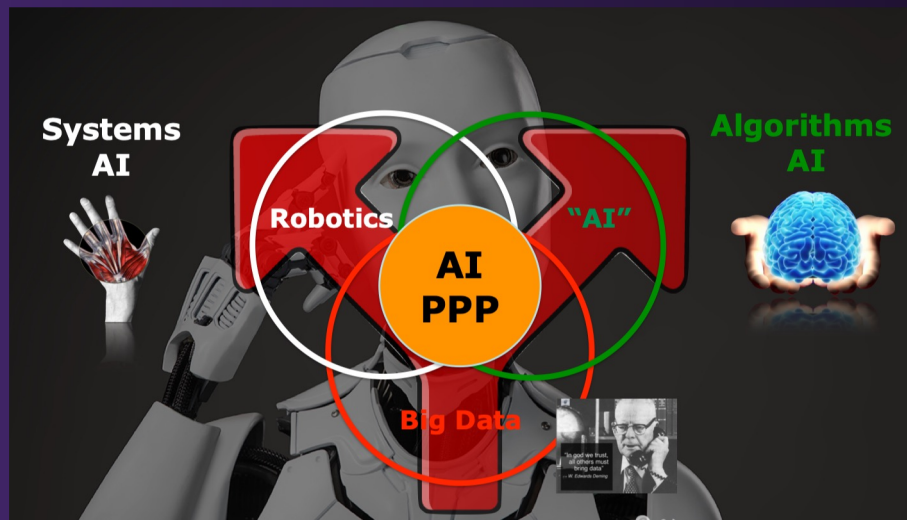
The great challenges are found in the intersection of Robotics and AI: Embedded, Physical or Embodied AI

Systems AI

Algorithms AI

Robotics   **"AI"**

AI PPP

Big Data

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TWENTE ROBOTICS CENTER (example)

Integrated research & innovation approach of Makers & Shapers

TECHNOLOGIES

ELSE (etical, legal, societal, economical)
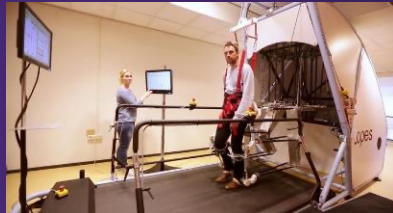
Wearable, Rehabilitation, Surgical Robotics

200 Researchers
in robotics

Ethics, Societal Acceptance, Responsable
Design & Use, Legal, Adaptation
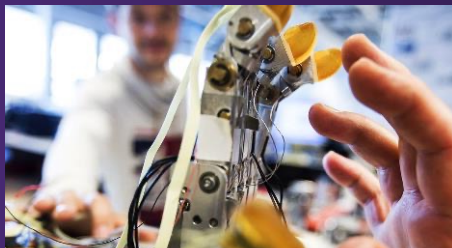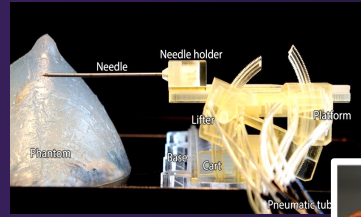
Human-Robot-Interaction,
Inspection, Maintenance & Service Robotics

Integrated
MSc Robotics

Co-bots, HRM, Business Modelling, Business
Creation, Access2Finance, …

Enabling Sciences & Technologies
Sensor systems, Data & AI, Dependable Systems,
Safety & Security, drones & earth observation, disaster
management, cognition, self-negotiating avantars, …

200 researchers in AI

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CREATING IMPACT: (3) Education

International EIT Digital MSc:

* Creating next generation real enterpreneurial and innovation-oriented tech students
* Makers & Shapers approach → Courses: 70% Tech + 30% ELSE/enterpreneurship/innovation/impact
* E.g. MSc Autonomous Systems, Data Science, Cybersecurity, Human-Machine-Interaction & Design, …

European ECIU University (MSc, LLL):

* From academic diplome to micro-credentials / micro-modules
* Challenge-based learning
* EU-funded initiative of the alliance of 13 ECIU universities
  to create a ground-breaking and innovative educational model on a European scale

MSc Robotics:

* Integration of Robotics & AI
* Enterpreneurship & innovation track
* Challenge-based education
  (close cooperation with industry)

EngDoc (PD Eng):

*2 Years Engineering Doctorate degree
* In very close cooperation with industry

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CREATING IMPACT: (4) Joint labs, testing and experimentation facilities
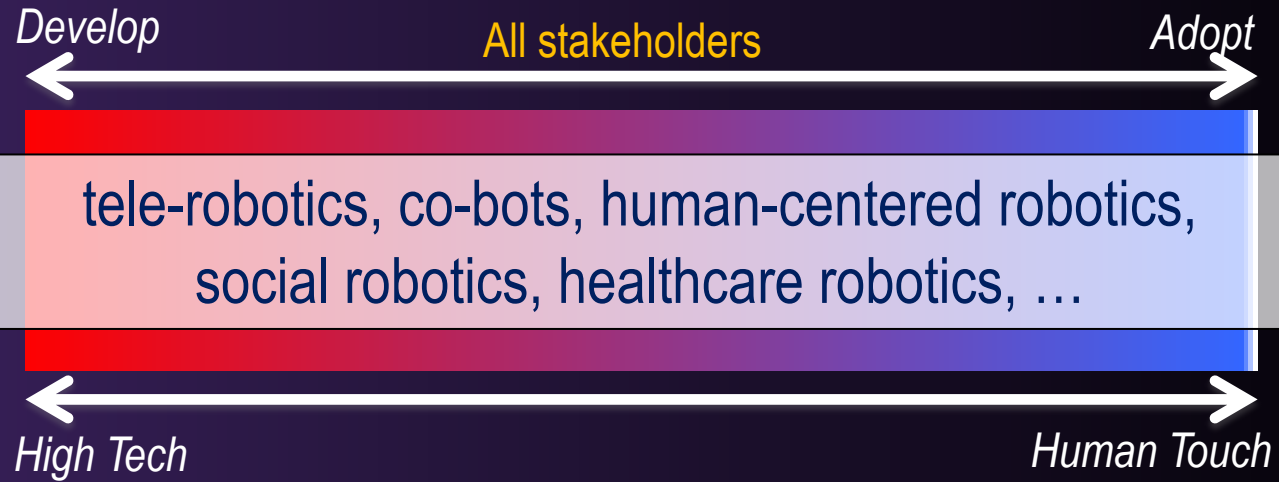
Develop   All stakeholders   *Adopt*

tele-robotics, co-bots, human-centered robotics, social robotics, healthcare robotics, …

High Tech   *Human Touch*

INTEGRATED CASCADE OF RESEARCH & TEST FACILITIES

(shared facilities, partners)

In-house Research labs   **Open space: Space53**   **Living Campus**   **Smart Cities & Agriculture**

Develop
Low TRL
Controlled Environment

One-stop-shop for SMEs

Adopt
Hight TRL
Open environment

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Twente Robotics

Develop / low TRL / Controlled Environment — Adopt / hight TRL / Open environment

Integrated cascade of research and test facilities, (shared facilities)

Drones
- In-house Research labs
- Open space: Space53
- Living Campus
- Smart Cities & Agriculture

Pipe-inspection, Maintenance robots
- In-house Research labs
- Outdoor Tech Base Twente / Safety Campus
- Real life Petrochemical plant

Rehabilitation, Wearable robotics
- In-house Research lab
- Wearable Robotics Lab UT
- Roessingh RRD Lab
- Real life – Rehabilitation clinic

Subsea / underwater Robots
- Research lab
- Living Campus
- Dive World
- Real life – Open sea

Test & Experimen-tation Facilities (TEF)

Test-before-Invest (EDIH)

DIGITAL SOCIETY INSTITUTE

CREATING IMPACT: (5) Integrated innovation chains
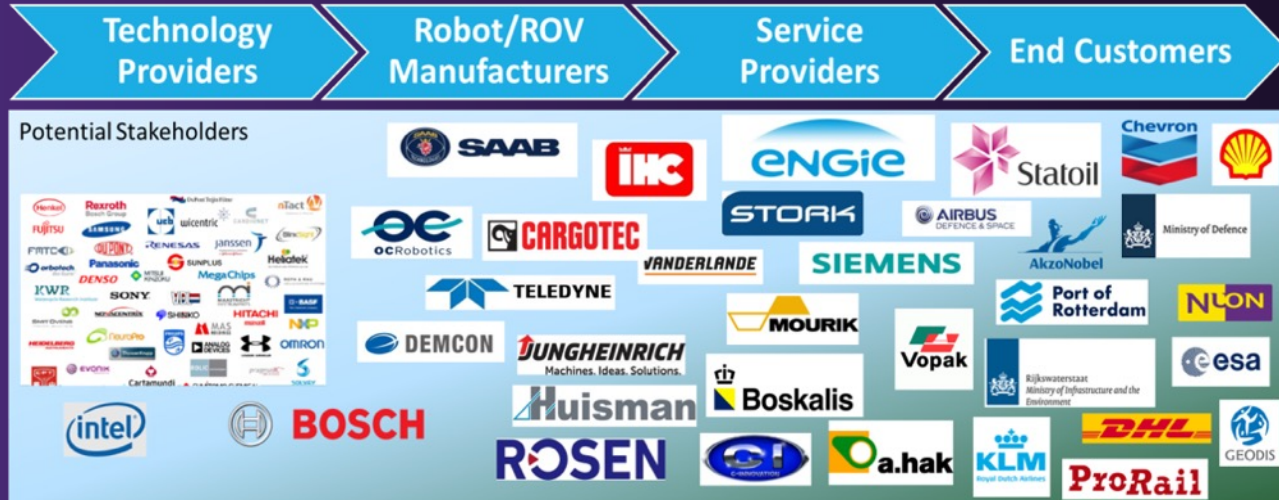
CREATING IMPACT: (6) Strategic partnering, collaboration with industry

eu ROBOTICS

Largest robotics network in EU:
>250 companies, universities, research institutes.
Largest civilian-funded robotics innovation progam in EU.

BDV BIG DATA VALUE ASSOCIATION

EFFRA EUROPEAN FACTORIES OF THE FUTURE RESEARCH ASSOCIATION

European PPP on AI-Data-Robotics — **Adra** The AI Data Robotics Association

eit Digital

Largest Digital innovation network in EU:
>130 companies, universities, research institutes

Scale-up accelerator, International Masterschool
Co-locations in EU countries + USA

DIH HERO **RIMA** **agRO BO food**

EU Networks of Digital Innovation Hubs on Robotics
DIH-HERO: healthcare (UT)
DIH RIMA: inspection & maintenance (UT, TNO, SPRINT)
DIH agROBOfood: agro-food (Univ. Wageningen)
All: 16-19 M€ to reduce time-to-market; >15 EU regions

Inside Industry Association

HealthTech4EU Alliance

Spin-off companies

DEMCON

CLEAR FLIGHT SOLUTIONS

XSENS

KITE ROBOTICS

GABLE Systems

Multi-nationals

Shell **PHILIPS**
ottobock. **SIEMENS**

COTTONWOOD technology fund

CLEAR FLIGHT SOLUTIONS

SARCOS

Cottonwood Technology

Seed and pre-seed stage technology commercialization funds.

Cottonwood has offices in New Mexico and in NL (@ campus UT)

SOFT LANDING PLACE FOR IDEAS & BUSINESSES
stimulating & supporting stand-up, start-up, scale-up

Novel T
innovate & accelerate

Well-organized integral support system, bridging the Valley-of-Death and supporting fast inter-national growth

regional incubator and accelerator

Business Ideation

Low selective phase Business Creation

High selective phase Business Creation

Ideas of endusers →

Screening & Scouting

TechTransfer

Ideas of tech providers →

Business Ideation

Matchmaking tech providers - end users

Strategic coaching

New company →

Business modelling

Access2Finance

Research projects →

Rapid Prototyping

Enterpreneurial skills development

Access to Incubators

New product / service →

Ideas of students →

Creation supply chain

Access2Finance (regional + international)

IPR, Patent Booster

Bootcamps

Masters of the **Future**

COTTONWOOD

Business Accelerator
eit Digital

INSPIRE COMMUNICATE INNOVATE TRANSFORM ACCELERATE

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INNOVATION TRIATHLON

Market Value (vertical axis)

Field Labs and Cascade of Test Facilities
Soft Landing places (ideas & companies)

New markets, ideas, PMCs, inspiration
Business Club,
DesignLab, Field Labs

Access-2-Finance
VCs en Private Investor
networks, Pitch training

Fast (international) growth
Strategic hands-on coaching,
EU business developers network,
Entrepreneurial talent development,
Matchmaking, Bootcamps,
Start-up weekends, Patent Booster

Enterpreneurial mindset, Tech Transfer
Incentives, IP policy,
Enterpreneurial education,
Screening & Scouting

Stimulating risk-taking
Pre-Venture Loans

the First   *the Fastest*   *the Fittest*

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Instruments to stimulate innovation and uptake of ARD technologies

EDIH
>150 Regional DIHs, connected via DTA

More regional focus, higher TRL than DIHs

Supporting SMEs, awareness, uptake, Test-before-Invest, skills, access2finance

DIHs
EU-networks of domain-oriented Digital Innovation Hubs

European focus

Supporting SMEs

Innovation, 1-2 TRL steps higher, Tech Transfer

TEFs
Test & Experimentation Facilities

European focus

Supporting SMEs

Healthcare, AgriFood, Manufacturing, Edge

TOPIC GROUPS
Adra, euRobotics, BDVA

Learning communities, Exchange knowledge

European focus

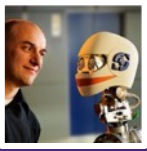Innovation, uptake, deployment of ADR technologies

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SAXION University of Applied Sciences

Ethical
Legal
Societal
Economical

Technological AI & Robotics

Integrated M.Sc. Robotics

INTEGRATED CASCADE OF RESEARCH & TESTING FACILITIES

TECHNICAL SUPPORT

Access to

Knowledge, Technology & Infrastructure

KNOWLEDGE

ROBOTICS CENTRE

one-stop Research & Innovation Hub

TRAINING (SKILLS, EDUCATION)

FINANCE

Access to

Business support

ELS ADVICE

INCUBATOR & ACCELERATOR SUPPORT

INNOVATION COACHING, BUSINESS & STRATEGY DEVELOPMENT

COMMUNITY BUILDING, BROCKERAGE

EU-WIDE NETWORK

Access to

Ecosystems

INDUSTRIAL & SME NETWORK

LOBBYING

Develop, low TRL, controlled environment

Adopt, hight TRL, open environment

TECHMED CENTRE

Roessingh Research and Development

Roessingh Centrum voor Revalidatie

INTEGRATED CASCADE OF RESEARCH AND TEST FACILITIES (shared facilities)

EU

adra The AI Data Robotics Association

eit Digital

DIH HERO

RIMA

agRO BO food

eu ROBOTICS

TERRINet

NL

i-BOTICS an initiative of TNO and University of Twente

Tanks

Holland Robotics

Region

LEO. CENTER FOR SERVICE ROBOTICS

t valley

WHOLE INNOVATION CHAIN

SIEMENS
PHILIPS
ottobock.

DEMCON

CLEAR FLIGHT SOLUTIONS

KITE ROBOTICS

GABLE Systems

XSENS

COTTONWOOD technology fund

meesters van de toekomst

oost nl

Novel T innovate & accelerate

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EDIH
as part of the SME Strategy

Test before invest

Co-investment EC-member states-regions
EU-support for one eDIH per region

Help companies to *become more competitive* by improving their business / production processes as well as products and services by means of *digital technology*

Skills & Training

Digital Innovation Hubs

one-stop-shop

Support to find investment

Provide technological expertise (AI, cyber-security, HPC, digital skills) and experimentation facilities to enable the digital transformation of the industry.

Supported by the "Digital Transformation Accelerator"

Innovation ecosystem & networking

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UNIVERSITY OF TWENTE
HUMAN-CENTERED ROBOTICS

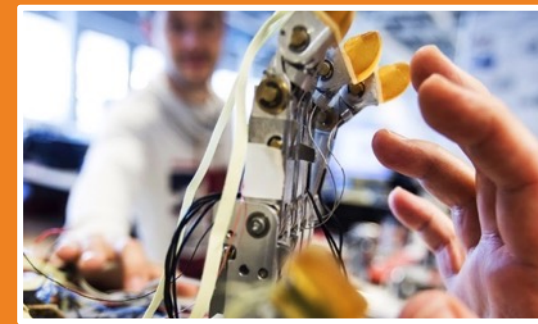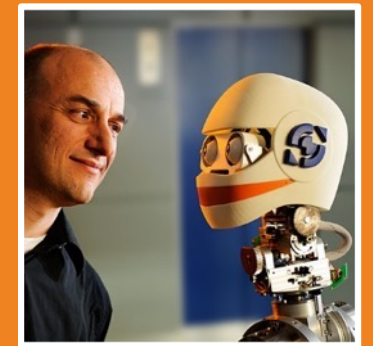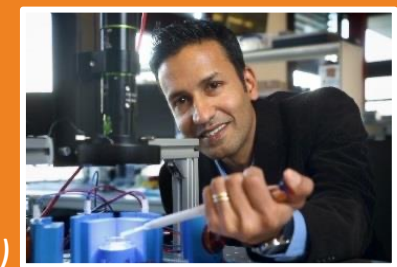# Thank you for your attention

Iddo Bante
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Digital Society Institute
University of Twente (NL)

I.Bante@utwente.nl