

Future of Education for Leading the Digital Transformation

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- Digital technologies open a new door to boost innovation and entrepreneurship (I&E)
- Business development faces an evolution due to digitalisation:
 - Digital business are more dynamic, faster, global
 - New technological innovations are needed to be introduced faster, every year in many sectors.
 - Research-based solutions are leading the market
 - Market will change to deep-tech solutions with a stronger scientific approach

The nine technologies underpinning Industry 4.0



Simulation

3-D simulations using real-time data will allow operators to test and optimize machine settings on the product line, increasing quality and driving down machine setup times.



The Industrial Internet of Things

More devices—sometimes including even unfinished products—will be enriched with embedded computing and connected using standard technologies.



Horizontal and vertical system integration

With Industry 4.0, companies, departments, functions, and capabilities will become much more cohesive, as crosscompany, universal data-integration networks evolve and enable truly automated value chains.



Big Data and analytics

The collection and comprehensive evaluation of data from many different sources (including production equipment and enterprise and customer management systems). Supports real-time decision making.



Cybersecurity

With the increased connectivity and use of standard communications protocols that come with Industry 4.0, the need to protect critical industrial systems and manufacturing lines from cybersecurity threats increases dramatically. As a result, secure, reliable communications as well as sophisticated identity and access management of machines and users are essential.



Autonomous robots

Additive Manufacturing

Manufacturing companies have used robotics for many years, but as the robots become more autonomous, flexible and cooperative, they will be able to work with one another and in partnership with humans – as is the case in Audi's Smart Factories.

Companies have just begun to adopt additive manufacturing,

such as 3-D printing, which they use mostly to prototype and

produce individual components. With Industry 4.0, these additive-manufacturing methods will be widely used to

produce small batches of customized products that offer

construction advantages, such as complex, lightweight



Augmented reality

Augmented-reality-based systems support a variety of services, such as selecting parts in a warehouse and sending repair instructions over mobile devices. These systems are currently in their infancy, but in the future, companies will make much broader use of augmented reality to provide workers with real-time information to improve decision making and work procedures.



The Cloud

designs.

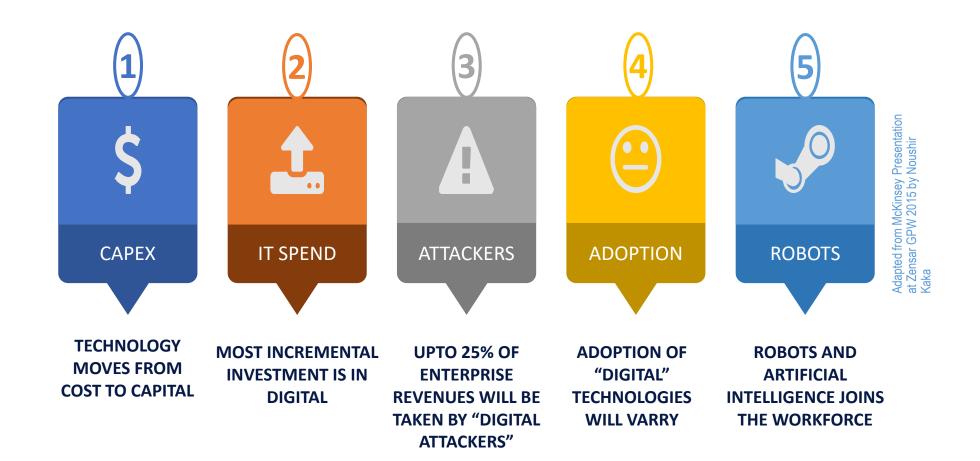
With Industry 4.0, more production-related undertakings will require increased data sharing across sites and company boundaries. At the same time, the performance of cloud technologies will improve, achieving reaction times of just several milliseconds. As a result, machine data and functionality will increasingly be deployed to the cloud, enabling more data-driven services for production systems. Even systems that monitor and control processes may become cloud based.



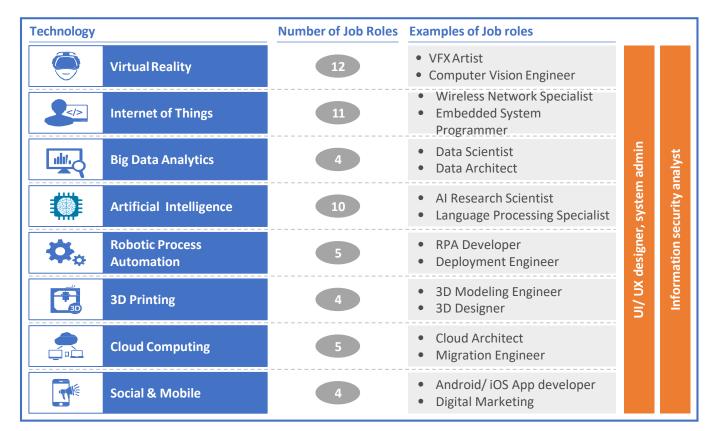
Deep Tech or Surrender...



In Deep Tech, technology is the core business



Deep Tech is changing the job roles and creating new job profiles





Global Challenge Insight Report

COMMITTED TO IMPROVING THE STATE OF THE WORLD

The Future of Jobs

Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution

January 2016



Source: LinkedIn & Indeed Analytics, Discussion with experts, Nasscom Skill Taskforce Analysis



- The market is changing
- The business rules are changing
- The jobs are changing



- The market is changing
- The business rules are changing
- The jobs are changing

What is urgent to change?

The new era of Talent:

Leadership, Disruptive, Business-oriented, Digital Technical Expertise, Transformative



The talent implications of Industry 4.0



CEOs (and general managers) need to be transformers who can identify and capitalize on disruptive trends rather than watch and fall victim to them.



All C-suite members need

digital/technology fluency
(similar to an acceptable
level of financial expertise)
in order to remain relevant.
The same holds true for
board directors.



Companies need to add technical expertise around IOT technology (sensors, connectivity and data & analytics) and there is a new war for talent in software in particular.



Traditionally vertically integrated and somewhat insular, slow moving industrial companies need to learn to operate effectively in ecosystems, partnering for the latest technology while jockeying to capture maximum value. This has created demand for a new type of ecosystem business development leader.

EIT Digital Education Hallmark







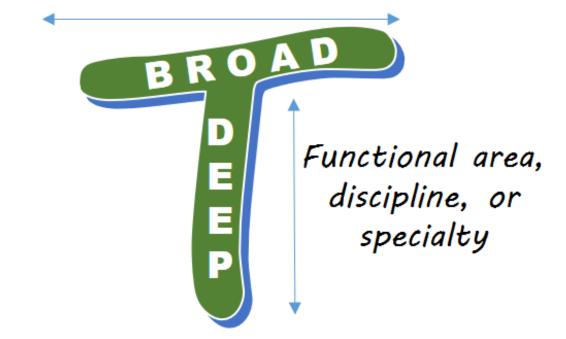






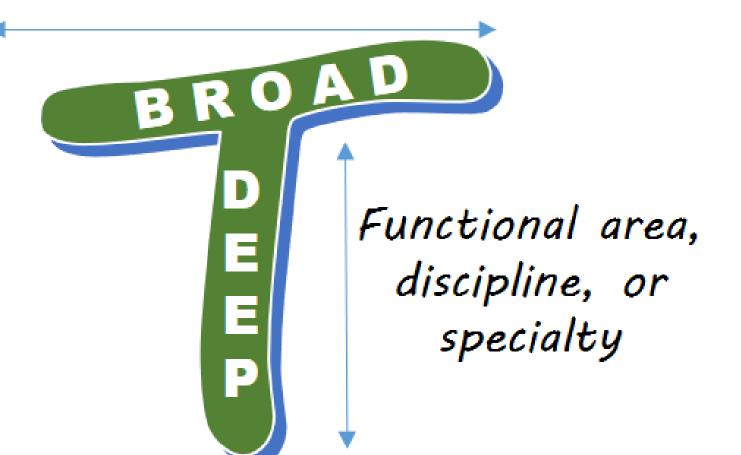


Ability to work outside of core area



T shaped

Ability to work outside of core area







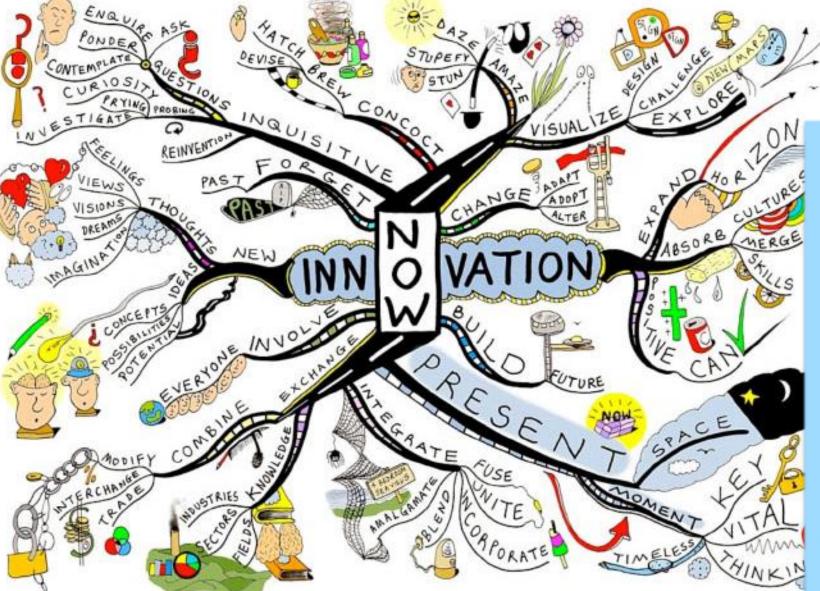






Connecting knowledge







Business Oriented





















Digital PROFESSIONAL SCHOOL



Digital SUMMER SCHOOL



Digital DOCTORAL SCHOOL





Digital PROFESSIONAL SCHOOL



The outcome







EIT Digital Master School

7* MASTERS AT THE FOREFRONT OF DIGITAL TRANSFORMATION



AUTONOMOUS SYSTEMS

CLOUD AND NETWORK INFRASTRUCTURES

CYBER SECURITY

DATA SCIENCE

EMBEDDED SYSTEMS

HUMAN COMPUTER INTERACTION AND DESIGN

VISUAL COMPUTING AND COMMUNICATION



^{*}Two new programmes in Fintech and Digital Manufacturing in 2020

A UNIQUE EUROPEAN EDUCATION SCHEME

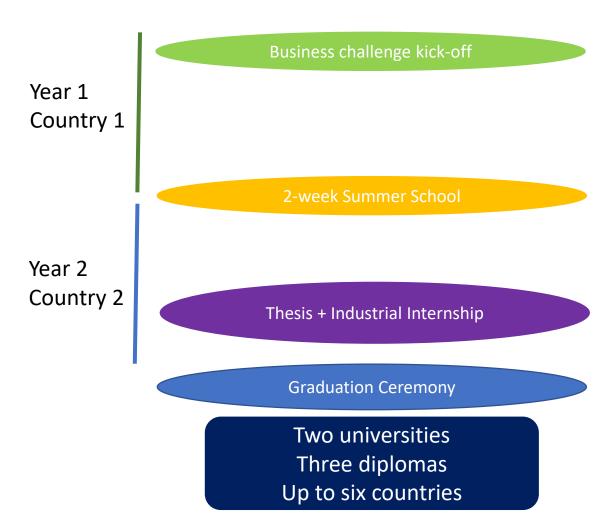


Classic university track

EIT Digital Master School

Year 1
Year 2

One university
One country
One diploma



INNOVATION AND ENTREPRENEURSHIP (I&E)



25% I&E minor = 30 ECTS

- Work closely with entrepreneurs and industry to learn how to turn ideas into products
- Training delivered in class, online and in industry (blended learning)
- A two-week Summer School (4 ECTS) to work on real business cases and an industry-based internship, associated with a Masters thesis (30 ECTS)

Students learn how to create, develop, communicate and lead



A TICKET TO A SUCCESSFUL CAREER



100% employment*:

- 76% have jobs
- 12% start their own business
- 24% enter PhD programmes

89% of the programme's graduates work in Europe

38% state that they plan to start their own company within two years of graduation.





EIT Digital Industrial Doctoral School

Placing the Doctorate in Perspective: The Doctorate in Europe

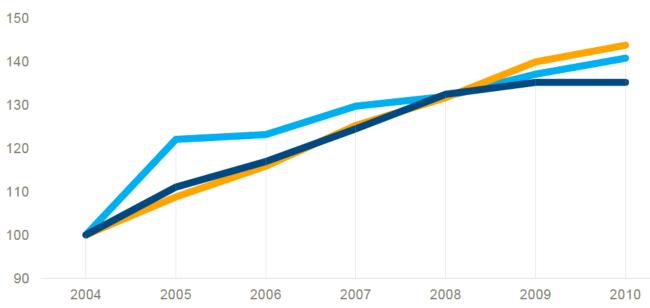


- Definition: Doctoral degrees are an intensive training through independent research under supervision aiming at creating new knowledge.
- Timeline:
 - Middle Ages to 20th century: academic apprenticeship
 - Early 21st century: 'pure' apprenticeship model comes under pressure, push for more **professional structures**
 - Today: professionalization of the **management of doctoral studies** and follow-up for **career development** of early-stage researchers.
 - Creation of innovative doctoral-programmes:
 - Professional doctorates
 - European doctorates
 - Industrial doctorates

Placing the Doctorate in Perspective: Growth of doctoral students worldwide







■ European Union (27 countries)

United States

■ Latin America



Source: EUA data

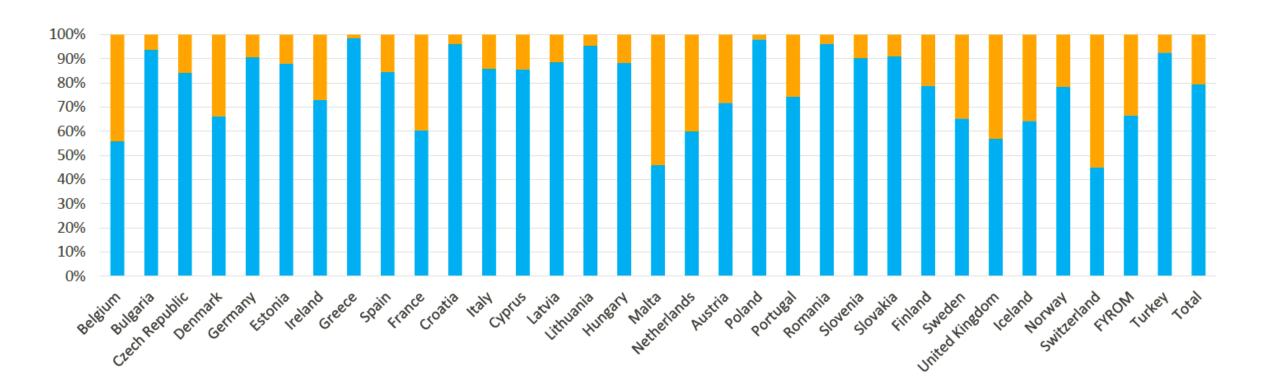
Landscape in Europe: EUA-CDE study 2018

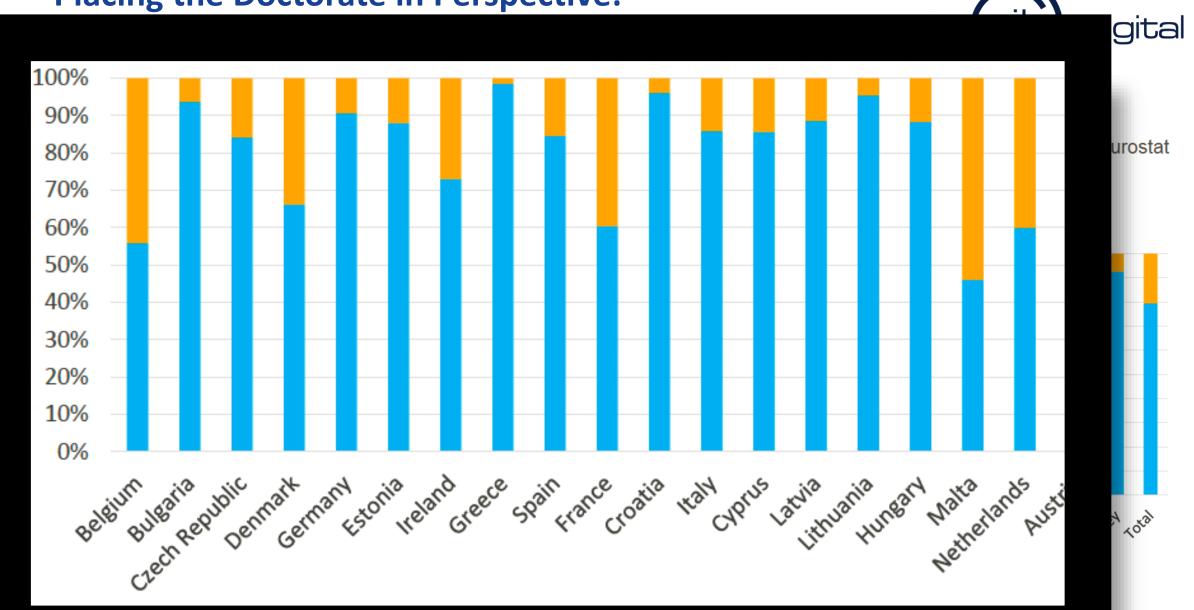


Source: Eurostat

International mobility of doctoral candidates

Non-mobile doctoral candidates (2016) Mobile doctoral candidates (2016)





Landscape in Europe: EUA-CDE study 2018



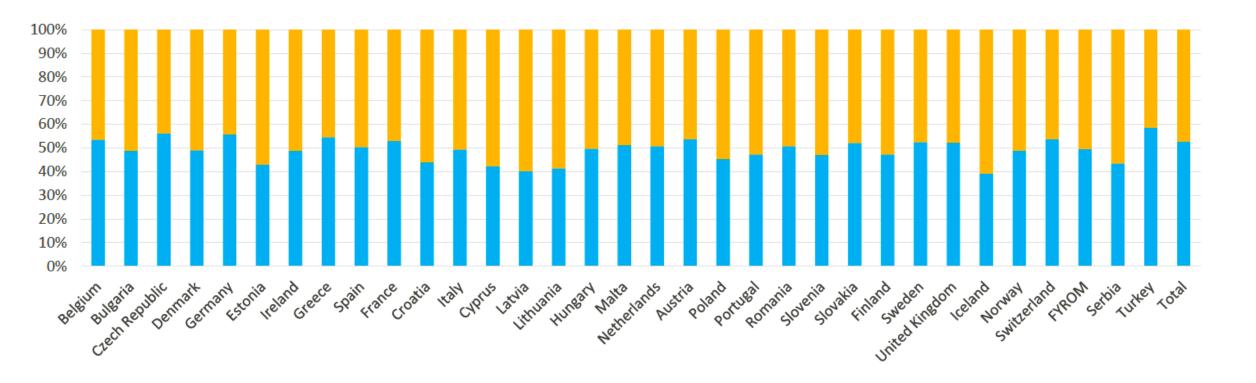
Source: Eurostat

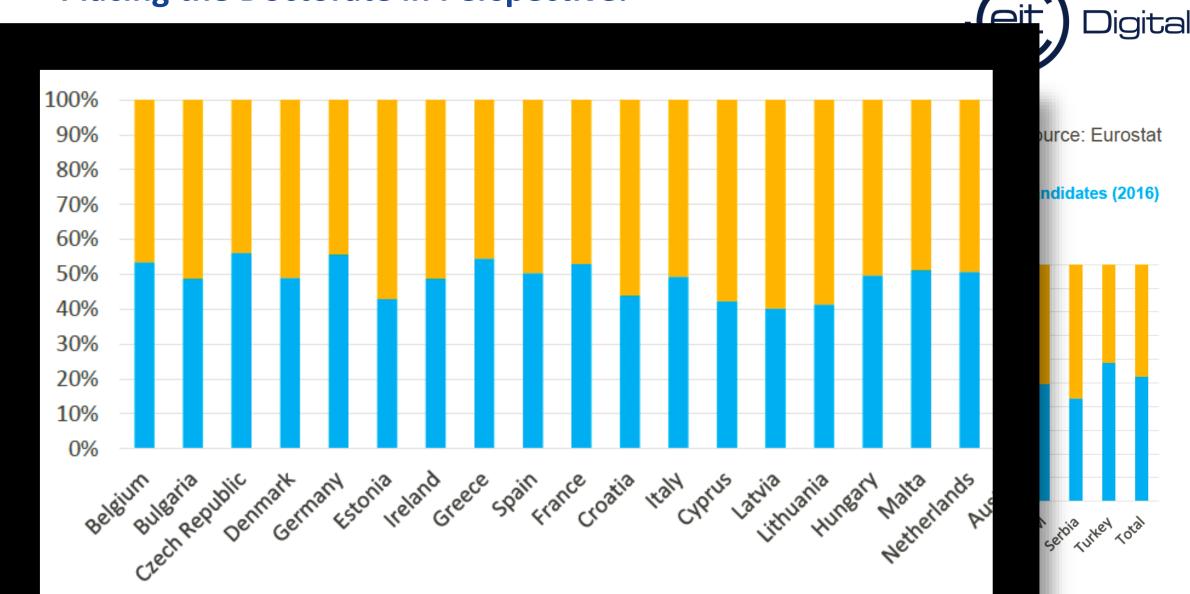
Gender distribution of doctoral candidates in Europe (2016)

(48% female doctoral candidates)

■ Male doctoral candidates (2016)

■ Female doctoral candidates (2016)





3 Perspectives, 3 Questions



 Student: Is it worth to do a PhD if I want to work in Industry?

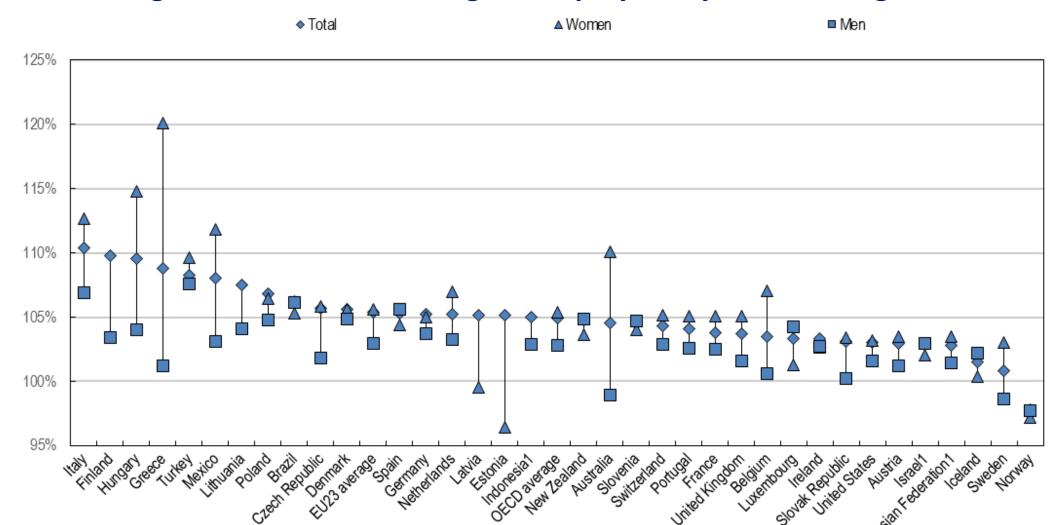
Academia: Why should I have Industrial PhDs?

 Industry: Why should I collaborate with University or hire PhD graduates?

Employability of PhDs (OECD Education at Glance 2019)

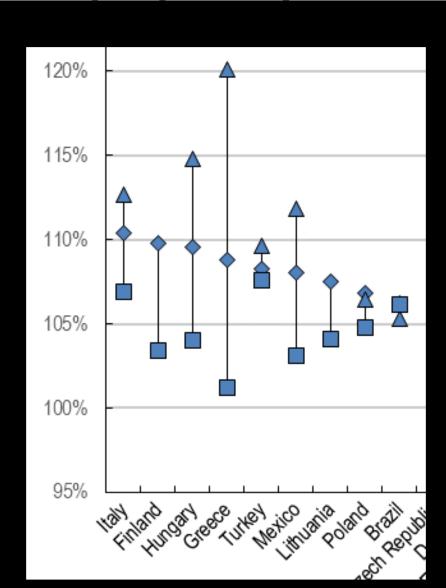


In average, PhD holders has a higher employability tan Master graduates.

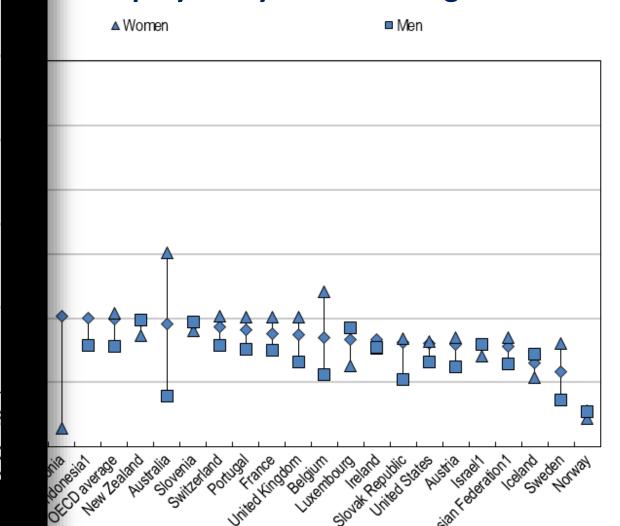


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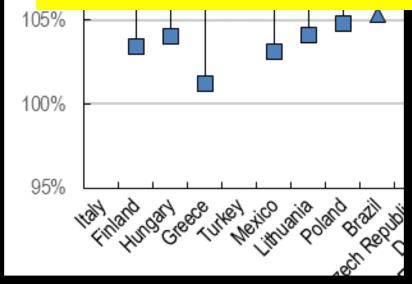
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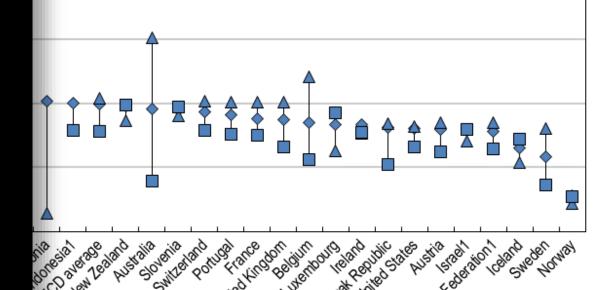


94% Employability rate of the PhD in the EU



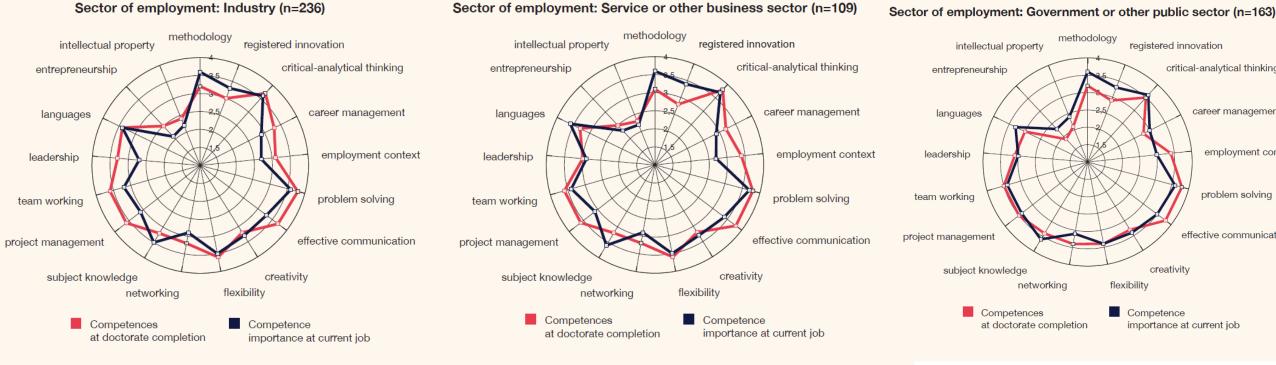
120%

115%



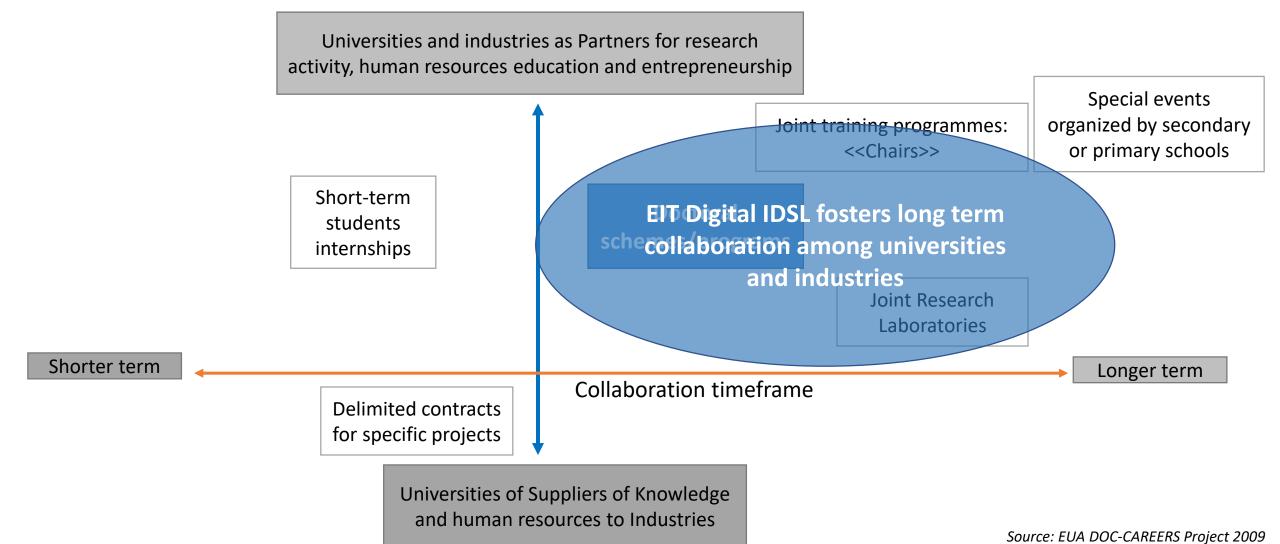
Compatibility of Skills & Competences of PhDs Digital In different employment sectors (OECD Education at Glance)

- PhD graduates in general posses necessary skills to work in industry, business and government.
- Innovation in the 4th Industrial Revolution needs a step beyond



Effective University-Industry Collaborations: Long Term is the key



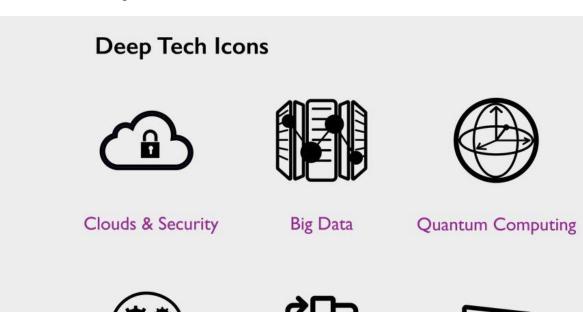


AR / VR



Deep Tech or Surrender...

Machine Learning



Blockchain





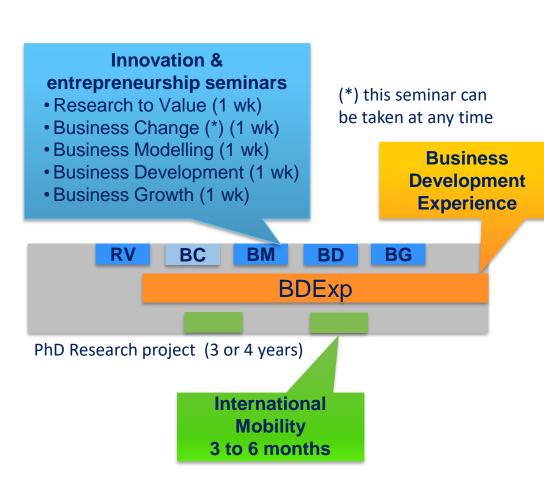
Deep Tech or Surrender. The deep tech digital transformation Deep Tech Icons requires professionals with excellent research & development skills, BUT since 2000 are gone with a deep understanding of Clouds & Security business development, innovation and entrepreneurship and innovation

IDSL: Programme at glance



Elements:

- Doctoral Programme:
 - PhD research project conducted for 3 or 4 years depending on the academic partner's regulation.
- EIT Digital PhD Label:
 - International Geo-mobility
 - Innovation and & Entrepreneurship seminars (I&E)
 - Business Development Experience BDExp



IDSL Structure

Financial scheme



- Doctoral Programme Costs:
 - Participant Industry Partner 50%
 - EIT Digital contribution 50% (max 25k€ per year)
- EIT Digital contribution for Label execution:
 - 3 to 6 months International Geo-mobility (up to 12,6 k€)
 - Participation in the Training in Digital Business and Leadership (I&E)
 - Activities for Business Development Experience BDExp (up to 16,6 k€)

Innovation Focus Areas for IDSL PhD

Topics













Digital Wellbeing

















Digital Cities







Digital Industry





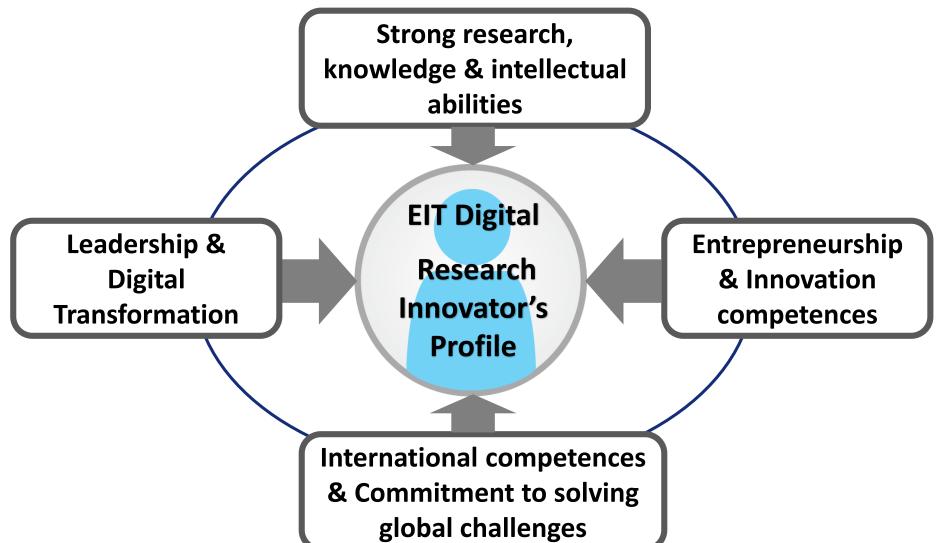






EIT Digital Research-Innovator Profile





Thank you for attention

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Head of School





Backup Slides

Examples of IDSL topics in the different Innovation Focus Areas

Why Industrial Doctorates



Industries to university:

- Provide broader views
- Raise awareness of industrial mindset
- Improve knowledge transfer expertise and management
- Improve process decision making

University

Industry

Universities to industry

- Commit to the project and education (i.e. quality)
- Access to knowledge and training
- Find balance between boundaries, structure and flexibility

Student

Doctoral candidates to university and industry:

- Bridging the University and Industry
- Make all partners aware of each other's expectations and responsibilities
- Adding creativity, innovation, energy. Highly-skilled research & entrepreneur

Adapted from: DOC-CAREERS I, 2009

Industry Value Proposition



Talent harvesting - getting the right and the best talent

- Company indicates the desired candidate profile
- Our IDSL PhD Students develop strong research and business skills
- Possibility to propose candidates (e.g. company's employee)

Pursuing industry research - innovation goals:

- co/development of the research landscape
- Interaction with EIT Digital Innovation Leaders
- Access to university excellence in research

Knowledge transfer

- Steering the creation of "usable" knowledge
- Co-investment in generating a start up
- Linking to broad research ecosystem

University Value Proposition



Fostering Structured University-Business Collaboration

- Raise awareness of industrial mindset
- Research outcomes meeting potential industrial needs

Strong participation in regional innovation goals:

- Improve knowledge transfer expertise and management
- Improve process decision making for innovation strategies
- Fostering entrepreneurship among students, academic staff and alumni

Knowledge transfer

 Participation in the EIT Digital European University Network for the development and execution of Innovation and Entrepreneurship Education

PhD Student Value Proposition



Fostering Structure University-Business Collaboration

- Provide broader views
- Raise awareness of industrial mindset
- Improve knowledge transfer expertise and management
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Application Procedure



- Submission of the application form has to be sent to the Head of the Industrial Doctoral School by the industrial applicant.
- Our internal procedure:
 - First review and feedback to the applicants by Head of School
 - Evaluation of the innovation valorisation and appropriateness of the PhD Topic into the EIT Digital InnovationFocus Areas by our Innovation Leaders
 - Submission of the proposal to the EIT Digital Management Committee
 - The industrial applicant receives the result by the Head IDSL
- Estimated time from submission to final approval: 1.5 months.
- Starting date of the PhD: in accordance to the regulation of the academic partner

Research-based Innovation in Digital Tech

Deep digital transformation on communication, computing and cybersecurity technologies.

- 5G development
 - 5G edge computing
 - Architectural, planning, and integration challenges and methods for 5G
- Network
 - Softwarisation of the network architecture
 - Network management
 - Cooperation with end-hosts in Next-Generation Networks
 - Traffic handling solutions for the Next-generation networks
 - Network technologies for Big Data applications
- Security
 - Cryptographically secure, on-chain pseudorandom number generation (PRNG)
 - Anonymity and Authentication in Large Database











Research-based Innovation in Digital Industry

Deep tech is here to revolutionise the manufacturing industry across the whole value chain



- Production side
 - Data Driven Solutions
 - Factory floor solutions with focus on predictive maintenance
 - Circular economy and waste management
- Retail side
 - Customer insight understanding
 - Product customisation at the retail point
 - Product service customisation through the end usage
 - On-line shopping and automatic offer portfolio













Research-based Innovation in Digital Finance



Creative reshaping of finance services for better, faster and secure solutions to improve customer experience

- Future of Retail Banking
 - Improving customer relationships
 - Cashless Society
 - Micropayments
- Modernise Corporate Banking and Insurance Tech
 - P2P risk distribution
 - Digitalisation of equity capital markets
 - Cybersecurity, blockchain
- Digitalise Wealth Asses Management
 - Al and ML for investment decisions







Research-based Innovation in Digital Wellbeing

Digital technologies bringing a real impact in the quality of life of society: Health and Wellbeing

- Behavioural changes
 - Increase personal awareness through sensors, wearables, data analyses
 - Assessing economic impact of healthier life style
- Support to Chronic Ailments
 - Early depression signs detection
 - Support to cancer treatment, improving quality of life
 - Address autisms syndrome from early detection to early stage therapy to supportive therapy through lifetime













Research-based Innovation in Digital Cities

- Leveraging city data for vital urban living
- Fostering autonomous driving in cities
 - Vehicle to everything
 - Al for autonomous driving
- Municipalities Services & Infrastructures
- Service support platforms
- Security and Safety





