European University-Business Forum

University-Business Cooperation
A Crucial Partnership for Innovation and Sustainable Development

Forum Report
24-25 October 2019
The Square
Brussels, Belgium

Education and Training

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Contents

List of Acronyms

Acronyms	
AI	Artificial Intelligence
CSR	Corporate Social Responsibility
ECEC	Early Childhood Education and Care
ECTS	European Credit Transfer System
EE	Entrepreneurship Education
EEA	European Education Area
EIT	European Institute of Innovation and Technology
ESU	European Student Union
EU	European Union
HE	Higher education
HEI	Higher education institution (interchangeable with the term "university" in this context)
LLL	Lifelong Learning
MOOC	Massive Open Online Course
NGO	Non-Governmental Organisation
OB	Open Badges
OER	Open Educational Resources
R&D	Research and Development
S3	Smart Specialisation Strategies

Acronyms	
SDG	Sustainable Development Goal
SME	Small and medium enterprise
STEM	Science, technology, engineering and maths
STE(AM)	Science, technology, engineering and maths plus the arts
UB Forum	University-Business Forum
UBC	University-Business Cooperation
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VET	Vocational Education and Training

Executive Summary

The 8th European University-Business Forum on 24-25 October 2019 attracted **around 450 participants**. The event was organised by the European Commission and took place in the Conference Centre in Brussels. The conference was also web-streamed live, and the recordings can be consulted on the European Commission's website.[1]

The Forum focused on '**University-Business Cooperation as a Crucial Partnership for Innovation and Sustainable Development**'. It offered an opportunity for policy makers, higher education and business representatives and other relevant stakeholders to discuss challenges, opportunities and mechanisms for effective university-business cooperation (UBC) supporting innovation and sustainable development.

The Forum included high level panel discussions, key note speeches and five parallel streams around major themes which are key in ensuring higher education institutions and businesses are equipped to cooperate effectively:

- **Tackling the skills mismatch**: initiatives aimed at tackling mismatches in STE(A)M, and providing learning experiences can equip students with the best set of skills.
- **Supporting the workforce to adapt to the future**: presentations centred on students as 'lifelong learners', and the up- and re-skilling of staff and job-seekers.
- **Building local and regional ecosystems**: examples of collaborations on social innovation and Smart Specialisation Strategies (S3).
- **Addressing societal challenges and building societal trust**: presentations on UBC to reach the Sustainable Development Goals, and on the threats and opportunities of AI and automation.
- **Developing an entrepreneurial culture**: initiatives supporting innovation and entrepreneurship in HEIs, and how HEIs can best support professors, teachers and students to develop entrepreneurial skills and mind-sets.

Official opening session (day 1)

The official opening session contained a series of institutional speeches and keynote addresses. These were followed by a high-level panel discussion on key challenges and opportunities relating to UBC for modernisation. The morning programme set the context for the event, and it provided the participants with a rich framework for further debates during the workshops in the afternoon.

Tibor Navracsics, European Commissioner for Education, Culture, Youth and Sport (European Commission), opened the Forum by highlighting that education has become a top political priority for the EU. In particular universities have a key role to play in delivering skills for the future so that both students and the workforce can play a more active role in tackling the key challenges faced by society. This is why **the EU is committed to developing a European Education area by 2025**, that is: an area in which students, teachers and researchers can teach and do research across borders seamlessly.

In addition to the European Student Card Initiative,[2] the European Universities Initiative[3] and work on the Mutual Recognition of Diplomas,[4] Mr Nacvracsics underlined **the importance of the Erasmus+ programme to deliver on the ambitions under the European Education Area**, i.e. ensuring "learning abroad becomes the rule, not the exception". He was therefore very pleased that the European Parliament has asked to triple EU funding for the programme under the new programming period 2021-2027.

[1] See https://ec.europa.eu/education/events/8th-university-business-forum_en
[2] See https://ec.europa.eu/education/education-in-the-eu/european-student-card-initiative_en
[3] See https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_en
[4] See https://ec.europa.eu/education/education-in-the-eu/proposal-for-a-council-recommendation-on-the-automatic-mutual-recognition-of-diplomas-and-learning-periods-abroad_en

Mr Navracsics then continued by saying that **universities need to be better connected to business and society**. To support UBC, the EU has launched a number of initiatives:

- **Knowledge Alliances**:[5] launched in 2011, they seek to bring together universities and businesses to collaborate on common issues.

- **HEInnovate**:[6] launched in 2013, this framework seeks to help higher education institutions and systems to develop their innovative and entrepreneurship potential.

- **European Institute of Innovation and Technology (EIT)**:[7] by supporting the full implementation of the Knowledge Triangle through the Knowledge and Innovation Communities (KICs), the EIT aims to boost innovation and foster a culture of entrepreneurship in the EU.

Sabine Verheyen, Member of the European Parliament and Chair of the CULT Committee, greeted the participants through a video statement from the Plenary Session in Strasbourg. She started her speech by saying that **cooperation is at the heart of the EU**. Cooperation it is the only way to realise democracy, and its beauty is that it brings together different interests to complement each other for the benefit of all.

With regards to UBC, Ms Verheyen underlined the importance of the HEInnovate, UBF and Knowledge Alliance initiatives. She then presented **some key considerations for UBC**:

- **Academic freedom**: it is important to safeguard academic freedom in a climate of increased cooperation with the business world.

- **Cooperation with SMEs**: SMEs need more support to cooperate with universities, as most of them do not have the HR and financial capital to support extensive UBC.

- **Cooperation in the social sciences**: UBC still primarily takes place in the so-called 'hard' sciences, where innovations are easier to directly transfer and upscale to businesses and society at large. However, increased UBC in the social sciences is needed, as some of the key challenges our world is facing today are social in nature, e.g. increasing inequalities, migration, etc.

Matias Rodriguez Inciarte, President of Santander Universities, was the first keynote speaker. He said **Santander has invested more than €1.7 billion in more than 1,200 HEIs in the world**. Investments primarily focus on supporting universities to improve educational equity, develop their entrepreneurship education and digital transformation.

He then said that **automation is profoundly changing the way we work and live**. This means that businesses will need to thoroughly rethink their business models, and increase their collaboration with universities to ensure they themselves are 'tech-ready' and universities can provide them with the skilled labour they need. Universities, likewise, need to cooperate more with business to change the way they deliver education:

- **Expand and update the academic offer**: more short-term learning programmes (such as nanodegrees) to cater for people's highly individualised and lifelong learning needs.

- **Increase the use of digital technology**: here, Mr Inciarte referred to how the Georgia Institute of Technology combines face-to-face and online learning, and wondered whether this was perhaps the 'university of the future. In its strategy,[8] Georgia Tech explains its focus on five pillars: (1) transversal skills; (2) modularisation; (3) AI for study guidance; (4) AI for study mentoring; and (5) internationalisation.

- **Changing target audience**: the increasing need for up- and re-skilling across all age groups and professional sectors means that student population demographics have changed. HEIs need to develop new educational trajectories and opportunities for these groups.

[5] See https://ec.europa.eu/programmes/erasmus-plus/opportunities/knowledge-alliances_en
[6] See https://heinnovate.eu/en
[7] See https://eit.europa.eu/
[8] Georgia Institute of Technology (2018). Deliberate Innovation, Lifetime Education. Georgia Tech. Available at: https://provost.gatech.edu/sites/default/files/documents/deliberate_innovation_lifetime_education.pdf

Borhene Chakroun, Director of Policies and Lifelong Learning Systems Division (UNESCO), gave the second keynote speech, and reminded the participants that, in 2015, **world leaders committed to tackling global warming and making sure no one is left behind**. He underlined that the 17 Sustainable Development Goals (SDGs) included in the 2030 Agenda[9] do not only relate exclusively to tackling climate change, but that they also have an important social dimension, such as poverty, health, gender equality, infrastructure developments, etc.

Looking at **progress towards achieving the SDGs**, the first Global Sustainable Development Report prepared by an Independent Group of Scientists appointed by the UN Secretary General (2019) points to four areas of the 2030 Agenda where we have "*not {even} been moving in the right direction: rising inequalities, climate change, biodiversity loss and increasing amounts of waste from human activity that are overwhelming capacities to process*".[10] Mr Chakroun stressed the importance of becoming more ambitious and action-oriented and then presented how he felt UBC could contribute to the Global Agenda:

- **Universities** can contribute to achieving the SDGs by working on them in a 'T-form'. The stem of the T represents work towards achieving SDG 4 (ensure inclusive and equitable quality education and promote lifelong learning opportunities for all) through research in education and bringing about systemic change in education systems. The horizontal line of the T represents the other 16 SDGs, and these should ideally be integrated in all education and research activities the HEIs engage in.

- **Businesses** can contribute to achieving the SDGs by making sure they invest for impact. To support businesses in this, the UN's Global Compact[11] provides a set of ten fundamental principles in the area of human rights, labour, environment and anti-corruption which businesses can follow to implement the SDGs.[12] Companies are furthermore incentivised to report on their progress against implementing the ten principles through submitting annual Communications on Progress (COP).[13]

- **University-business cooperation** can make an even bigger impact on achieving the SDGs. UBC should focus on: technological and social innovation; SDG-oriented incubators and start-ups; SDG training for business and public sector leadership; and UBC to support innovation outside Europe.

In the **panel discussion on partnerships for sustainable development**, Taru Pilvi, Innovation Director, Tampere University (Finland), stressed that changes in society and private companies today are so fast that HEIs have difficulties keeping up and bringing about meaningful change. In order to bring about sustainable change, Tampere University believes that students should be empowered to drive societal change. It does so by promoting entrepreneurial mindset and skills in its students through a range of initiatives. For Pascal Métivier, Senior Executive Vice-President, Science and Technology Director, Solvay Group (Belgium), sustainability and innovation go hand in hand. Without innovation, it is impossible to reach the SDGs. In order to innovate sustainably as a business, Mr Métivier said three elements were needed: (1) collaboration with leading research organisations; (2) investing in education; and (3) investing in digitalisation. Next, Theun Baller, Dean at the Technical University of Delft (Netherlands), said that businesses and universities both (1) "*want to make the world a better place*" and (2) "*educate the younger generations*". These are the two overarching R&I goals around which he believed universities and businesses come together to exchange ideas, and then jointly to create sustainable impact. Finally, Monika Skadborg, Member of Executive Committee, European Student Union (ESU), argued that higher education is about more than preparing students for the labour market, or to become innovators. Higher education should teach students to become active citizens who care about climate change, sustainable development, social cohesion, healthy democracies and human rights.

Ms Themis Christophidou, Director-General for Education, Youth, Sport and Culture (European Commission), concluded the morning session by presenting the **finalists of the first European digital education hackathon**. The contest was organised as part of the initiatives announced under the Digital Education Action Plan and brought together education institutions, schools and businesses to come up with ideas to integrate digital technologies in education. In total, the hackathon brought together 1,700 innovators in 33 locations across 21 countries both in- and outside the EU, addressing 60 key challenges.

[9] UN (2015). Transforming our World: The 2030 Agenda for Sustainable Development. United Nations. Available at: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf

[10] UN. 2019. The Future is now: Science for achieving Sustainable Development. United Nations. Published September. Available: https://sustainabledevelopment.un.org/content/documents/24797GSDR_report_2019.pdf. [Accessed October 1 2019].

[11] See https://www.unglobalcompact.org/what-is-gc/mission/principles

[12] See https://www.unglobalcompact.org/what-is-gc/mission/principles

[13] See https://www.unglobalcompact.org/participation/report

Breakout sessions (day 1)

The first block of workshops focused on **tackling the skills mismatch**. The first workshop included presentations and discussions on 'attracting students to disciplines for jobs where shortages exist'. Here, participants underlined the challenge of increasing the attractiveness of STEM degrees and careers. Showing how STEM contributes to key societal challenges was mentioned as a potential solution, as young people are concerned with making a real difference in society. The second workshop focused on 'providing meaningful learning experiences that provide students with the knowledge, skills and attitudes they need'. Dialogue between students, teachers, institutional leadership and businesses needs to be improved, to better map and understand common skills needs. Next, interdisciplinarity is needed in order to find innovative solutions to the challenges our world is facing. Important here, is to recognise the added value of the social sciences.

The second block of workshops on **supporting the workforce to adapt to the future** covered the topics of 'preparing and supporting graduates as lifelong learners' and 'supporting up- and re-skilling'. The main challenges arising from the presentations and discussions during these workshops was that there is a lack of understanding of learning as something which also takes place outside of formal settings (and hence recognition of prior learning is lacking), and a lack of funding and recognition for efforts in LLL of policy makers, HEIs and businesses. Knowledge is temporary, and people therefore need to be equipped with transversal skills and be given opportunities to up- and re-skill throughout their lives. At the moment, however, HEIs play too limited a role in LLL, and education and training systems are too inflexible. Increased UBC, experiential learning and the use of big data / AI for curriculum design as well as to innovative teaching methods and learning pathways were highlighted as solutions to these challenges. Finally, it was highlighted that SMEs in particular should be supported to offer LLL.

The third block focused on **building local and regional eco-systems**. The first workshop on 'supporting social innovation' raised the challenge in measuring social innovation, and that there is still too great a focus on technology transfer and research as a metric for innovation. Many inspiring small-scale social innovation initiatives exist, and these should be supported to be mainstreamed more widely, including by making social innovation part of HE strategies. The second workshop on 'higher education for smart specialisation' highlighted the challenges of brain drain and of embedding HEIs in their region. Tools such as HEInnovate as well as experimenting with new governance models (e.g. partnerships involving local authorities) were mentioned as good ways to support HEIs to embed in their region, and to support bottom-up collaboration and engagement of all relevant stakeholders.

The fourth block focused on **working together to address societal challenges and build societal trust**. In the first workshop on 'implementing the Sustainable Development Goals (SDGs)', the presentations and discussions highlighted that there is a lack of understanding of the interconnectedness of the different SDGs. Since each SDG tackles a range of different issues, it is difficult to measure the impact of smaller-scale initiatives, which also do not receive enough funding to be mainstreamed. Finally, some important structural barriers remain: as one participant mentioned it, as governments and citizens "*we are actively supporting programmes that are killing us*". To implement the SDGs, it is important to make businesses understand that the SDGs offer commercial opportunities. Funding should also have a more long-term perspective in mind, and our consumption decisions were mentioned as important drivers of change, which can drive government decisions. Students as well were mentioned as important agents of change. The second workshop looked at the 'threats and opportunities of Artificial Intelligence (AI) and automation'. Technological change calls upon our education systems to rethink their design and focus, which at the moment are still too heavily focused on the transfer of knowledge. People need to be upskilled to learn about AI, in particular in relation to ethics and AI, understanding that data is inconsistent, and to develop critical thinking, data analysis and problem-solving skills. Finally, participants mentioned the importance of maintaining human agency and oversight within each AI process, and the inclusion potential of AI and automation.

The fifth block of workshops focused on **developing entrepreneurial organisations and individuals**'. The sessions underlined the need to rethink our understanding of 'entrepreneurial education' as something which not only supports students to set up their own business, but has a wider goal of teaching them critical thinking, creativity, problem-solving skills and the ability to act as responsible citizens in society. Teaching students these transversal skills remains challenging, especially in 'traditionally less entrepreneurial degrees' (such as the humanities and social sciences). HEInnovate (www.heinnovate.eu) can help HEIs to implement institutional change with an holistic approach towards entrepreneurship. Increased incentives for university leadership and academic staff to engage in entrepreneurial activities were mentioned as a way for them to act as 'drivers of change' and stimulate their students' entrepreneurial potential.

Plenary session (day 2)

The second day plenary session included short presentations of the main messages from the five parallel sessions, pitches from start-ups and projects engaged in sustainable innovation, a keynote speech from the upcoming Croatian Presidency and a panel discussion on challenges and opportunities for UBC of the future.

The presentations from **five start-ups engaged in sustainable development** were:

- **Upprinting Food**:[14] this venture, set-up by a Elzelinde van Doleweerd, student at the University of Eindhoven (Netherlands), aims to reduce food waste using 3D-printing.
- **Biomyx**:[15] presented by Atanas Eney and Vanya Milanova, this start-up uses agricultural residue and recycled paper to create sustainable packaging.
- **ASKFOOD**:[16] this Erasmus+ Knowledge Alliance was presented by Prof Paola Pittia of the University of Teramo (Italy). The project provides support for the modernisation of training and educational methodologies in the food sector.
- **BUILD solutions**:[17] Martin A Petersen explained how his consortium aims to bring intelligent living solutions for cities to the market, investigating biological systems, creating prototypes based on information technology and digital manufacturing, business plans and working with accelerators.
- **KnoWood**:[18] Viojoleta Sulciene, Architect at the VIA University College (Denmark), presented the Erasmus+ Knowledge Alliance KnoWood, which promotes the building of middle-high and tall wooden buildings.

Tome Antičić, State Secretary for Science and EU Funds (Republic of Croatia), outlined the **Croatian priorities for the EU policy agenda in education, training and research** for its upcoming EU Presidency. These will be:

- **Training European teachers for the future**: Croatia will look into initiatives to improve the quality of teachers in Europe as they play a crucial role in educating young people for future life and jobs.
- **Post-2020 framework for cooperation in education and training**: Croatia will also work at defining the new policy priorities for the post ET 2020 cooperation framework.
- **Mobility and brain circulation**: Croatia will initiate discussions on how the Erasmus+ and Horizon Europe programmes could better support balanced mobility and cohesion.
- **Future skills and jobs**: finally, Croatia will also initiate discussions on the impact of technological revolutions, and AI in particular, on the future of skills and jobs.

[14] See https://www.upprintingfood.com/
[15] See https://biomyc.eu/
[16] See https://www.askfood.eu/
[17] See https://www.build-solutions.org/activities/
[18] See https://knowood.upc.edu/ca

The **panel discussion on the future of UBC** started with an intervention by Snježana Prijić-Samaržija, Rector of the University of Rijeka (Croatia). She shared evidence of links between investments in R&D and scientific output on the one hand, and innovation and UBC on the other hand. She said that the EU does not invest enough in R&D, and that there is a big difference between the EU15 and EU13. Next, Alexandre Affre, Director for Industrial Affairs at Business Europe, observed that is difficult to have sustainable development without innovation. The challenges our society is facing require a variety of innovations, including technical innovation, social innovation and innovation in the way we produce and use products and services. Natacha Lopes, Vice-President of JADE – the European Confederation of Junior Enterprises representing more than 30,000 students –, explained how the network supports students to develop their entrepreneurial and interdisciplinary skills by providing them with strong problem-solving skills and involving sustainability in everything they do at university.

The First Vice-President of the European Committee of the Regions, Markku Markkula, underlined the importance of investments in education and R&D in order to drive sustainable societal change. He pointed to the need for more frontrunner cities where not just the local administration, but also citizens, universities and start-ups work together to take on a leading role in developing sustainable solutions to change society. Finally, Ana Trbović, Member of the EIT Governing Board (and Co-Founder and COO of Grid Singularity), mentioned the need for all three angles of the knowledge triangle (education, research and business) to be represented in the innovation process. She pointed to the difference between HEIs in the US and Europe, and found universities in Europe should become better at attracting investments from the private sector.

The Forum was closed by **Ms Themis Christophidou**, Director General for Education, Youth Sport and Culture (European Commission). She stressed that, in order to face the challenges posed by society, we need innovative solutions. **Investing in innovation means investing in people, and Europe cannot overcome challenges without a collaborative mind-set**.

She concluded her speech by saying the **EU will strengthen support for**:

- **Knowledge Alliances and Strategic Partnerships** under the post-2020 Erasmus+ programme to support innovation.
- **Digitalisation in education**: it will do so in particular by updating its Digital Education Action Plan of 2018 to increase EU citizen's basic digital competences, and to allow for more and better up- and re-skilling opportunities.
- **Innovative and sustainability-oriented research and innovation** through Horizon2020 and the European Institute for Innovation and Technology.

1.0 Introduction

The European Commission provides support to higher education institutions (HEIs) and businesses by strengthening the knowledge triangle (education-research-innovation) through actions and initiatives relating to University-Business Cooperation (UBC).[19]

One of the key initiatives is the University-Business Forum (UB Forum), which for more than ten years now has brought together HEIs, businesses and other key stakeholders, with the aim of:

- Encouraging the sharing of knowledge and experience, support mutual learning;
- Creating long-term partnerships and opportunities;
- Driving innovation, entrepreneurship and creativity.

Since 2008, 23 UB Forums have been organised, with seven European UB Forums in Brussels and 16 Thematic Forums in the Member States (the most recent ones took place in Bulgaria and Portugal). This meeting was the 8th high-level European UB Forum, which takes place every two years in Brussels.

The UB Forum events help disseminate good practices in university-business cooperation and are an opportunity to exchange experience, to network and to develop new partnerships between HEIs and businesses. The events have generated many new ideas, some of which have been translated into European policy tools. These include the Knowledge Alliances under Erasmus+ and HEInnovate,[20] which is a guiding framework for HEIs and HE systems to assess and develop their innovative and entrepreneurial capabilities.

The focus of this Forum was '**University-Business Cooperation – A Crucial Partnership for Innovation and Sustainable Development**'. The Forum offered an opportunity for policy makers, higher education and business representatives to discuss challenges, opportunities and mechanisms for effective university-business cooperation supporting innovation and sustainable development.

The Forum consisted of high-level panel discussions, keynote speeches and five parallel streams. In each stream (each consisting of two workshops), a range of inspiring examples of cooperation were presented and stimulated lively discussions. The five main themes were:

- The first stream addresses **tackling the skills mismatch**. Here, the Forum examined initiatives aimed at addressing mismatches in STE(A)M fields, and which learning experiences can provide students with the best set of skills for private and professional life.
- The second theme is **supporting the workforce to adapt to the future**. Areas covered were: preparing students as 'lifelong learners', and the up- and re-skilling of staff and job-seekers.
- The third theme is **building local and regional ecosystems**. The two sessions here looked at examples of collaborations on social innovation and Smart Specialisation Strategies.
- The sessions under the fourth theme looked at **addressing societal challenges and building societal trust** in relation to the Sustainable Development Goals, as well as the threats and opportunities posed by Artificial Intelligence and automation.
- The fifth theme is **developing an entrepreneurial culture**. Here, the Forum discussed initiatives supporting innovation and entrepreneurship in HEIs, and how HEIs can best support professors, teachers and students to develop entrepreneurial skills and mindsets.

[19] See http://ec.europa.eu/education/tools/university-business_en.htm
[20] See https://heinnovate.eu/

A group of student artists were present at the Forum and their work is documented in this report. See page 77 for more details.

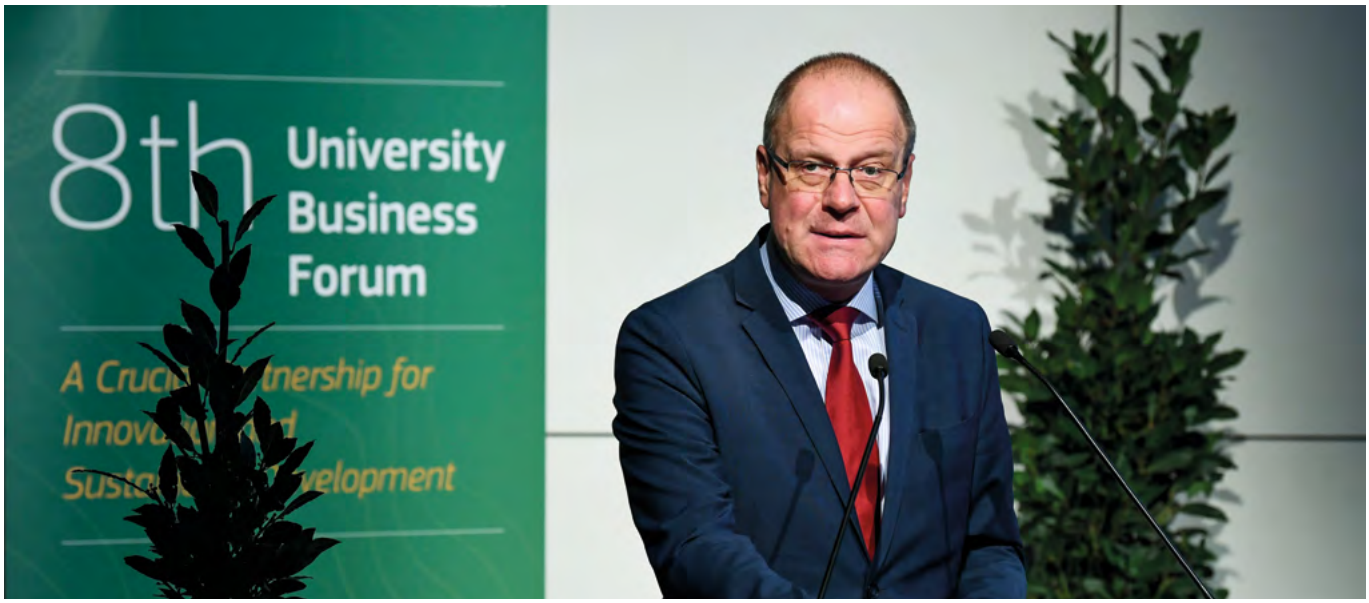
2.0 DAY 1: Official opening session

Christophe Robeet, Journalist, facilitated the 8th European University-Business Forum, welcoming the participants to Brussels. After giving an overview of the agenda for the meeting, he introduced the two high-level speakers for the official opening session:

- Mr Tibor Navracsics, European Commissioner for Education, Culture, Youth and Sport (European Commission).
- Ms Sabine Verheyen, Member of the European Parliament, Chair of the CULT Committee (Plenary Session in Strasbourg – Video Statement).

2.1 OPENING SPEECHES

Tibor Navracsics, European Commissioner for Education, Culture, Youth and Sport (European Commission), welcomed the participants, and underlined that a lot had changed since the first University Business Forum he attended, which was back in March 2015.



Today, education is once again a top political priority for the EU. He emphasised that **education plays a key role in tackling key challenges faced by the EU, such as climate change, digital challenges** and increasing polarisations in society. By developing students' creativity, critical thinking and entrepreneurship, as well as through fostering excellence and a sense of belonging, education can and must be part of the solution to these challenges.

Education has to make sure it delivers skills of the future for everyone, and this is why the EU has committed to developing a European Education Area. Such an area should be a space where it is normal for students, teachers and researchers to study, teach and do research across borders. It should be a space focused on cooperation, excellence and mobility.

Universities have a key role to play in developing the European Education Area. In order to achieve this, the EU believes universities should increase cross-border cooperation. Three initiatives in particular were mentioned as crucial to achieve this:

- **Mutual Recognition of Diplomas**:[21] following a Commission proposal in May 2018,[22] the Council of Ministers adopted a Recommendation[23] on the automatic mutual recognition of higher education and upper secondary education diplomas, as well as the outcomes of learning periods abroad. Mr Navracsics mentioned that he was very pleased to see that many Member States had taken steps to facilitate recognition procedures. In time, he said, diplomas should be recognised automatically, so that students should no longer have to go through any additional administrative procedures to study anywhere in the EU;

- **European Student Card Initiative**:[24] to further support students before, during and after their mobility, and to further reduce the administrative burden for students and universities related to mobility, the EU has supported the development of a European student card, which will be rolled out across the EU by 2021;

- **European Universities Initiative**:[25] if universities are to become truly European, students should have the opportunity to obtain 'true' European degrees, obtained by studying at different universities across the EU throughout their degree. Through a first call, the Commission has funded 17 European University Alliances, involving 114 HEIs from 24 EU countries. A second call will be launched in the autumn of 2019, and the initiative will be further rolled out in the next programming period (2021-2027), with the aim of truly reshaping the higher education in the EU.

In order to ensure "*learning abroad becomes the rule, not the exception*", Mr Navracsics said that **the Erasmus+ programme is crucial to deliver on these ambitions**. It is the EU's "*best-known and best-loved brand*", and "*we need it more than ever today, this is why we need to make it stronger*". He was pleased to see that the European Parliament has asked to triple the EU funding for the programme under the new Commission programming period post-2020.

Mr Navracsics continued by saying that **universities need to be better connected to business and society**. This is important to ensure teaching and learning practices ensure they foster key transversal skills such as creativity, critical thinking and entrepreneurship. He underlined it is important to make sure "*we do not tell universities what to do, we need to empower them*". A number of EU initiatives support the development of university-business cooperation in Europe:

- **Knowledge Alliances**:[26] launched in 2011, Knowledge Alliances are innovative transnational projects funded under the Erasmus+ programme, which seek to bring together universities and businesses to collaborate on common issues. These include: developing new innovative and multidisciplinary approached to teaching and learning or stimulating entrepreneurship. To date, the Commission has funded 126 projects.

[21] See https://ec.europa.eu/education/education-in-the-eu/proposal-for-a-council-recommendation-on-the-automatic-mutual-recognition-of-diplomas-and-learning-periods-abroad_en

[22] EC (COM(2018) 270 final). Proposal for a Council Recommendation on Promoting automatic mutual recognition of higher education and upper secondary education diplomas and the outcomes of learning periods abroad. Brussels: European Commission. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0270&from=EN

[23] Council of the EU (2018). Council Recommendation on Promoting automatic mutual recognition of higher education and upper secondary education diplomas and the outcomes of learning periods abroad. Luxembourg: Official Journal of the European Union. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H1210(01)&from=EN

[24] See https://ec.europa.eu/education/education-in-the-eu/european-student-card-initiative_en

[25] See https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_en

[26] See https://ec.europa.eu/programmes/erasmus-plus/opportunities/knowledge-alliances_en

- **HEInnovate**:[27] launched in 2013, this framework seeks to help higher education institutions and systems to develop their innovative and entrepreneurship potential. The self-assessment tool has been used by more than 1,200 HEIs all over the world.

- **European Institute of Innovation and Technology (EIT)**:[28] by bringing together universities, start-ups, companies and other civil society actors into Knowledge and Innovation Communities (KICs), the EIT aims to connect innovative research with businesses to boost innovation and foster a culture of entrepreneurship in the EU. Through the 10 KICs set up to date, the EIT has mobilised more than 1,500 partners resulting in the creation of more than 1,300 new start-ups and 6,000 new jobs, and investments of more than into the €1.5 billion into the EU economy.

Sabine Verheyen, Member of the European Parliament and Chair of the CULT Committee, greeted the participants through a video statement from the Plenary Session in Strasbourg. She started her speech by saying that **cooperation is fundamental for the EU**. Cooperation is at the heart of people's everyday lives in the European Parliament, it is the only way to realise democracy, and its beauty is the bringing together of different interests to complement each other for the benefit of all.

Two **important cooperation partners are universities and businesses**. Ms Verheyen mentioned that cooperation between these two entities can contribute to increasing:

- **The relevance of education**: by collaborating with businesses, universities can link education more closely to reality, thereby increasing students' motivation, interest and job opportunities.

- **Private investments in education**: by collaborating with universities on and investing in higher education, university-business cooperation can take on a more sustainable and long-term form, in addition to more short- to medium-term business sector investments in contracting research.

Education and research are crucial for innovation, which is why both have been brought together under the same portfolio of Mariya Gabriel, the new Commissioner for Innovation and Youth. There is a need for greater alignment between both, as well as in the way they engage with businesses. The multidisciplinary insights such cooperation brings is important to boost Europe's innovation potential.

Ms Verheyen concluded her intervention by firstly underlining the importance of the HEInnovate, UBF and Knowledge Alliance initiatives in supporting the development of university-business cooperation in Europe. However, it is important to also keep in mind some **important considerations for university-business cooperation**:

- **Academic freedom**: many stakeholders highlight the importance of universities safeguarding academic freedom in a climate of increased cooperation with the business world.

- **Cooperation with SMEs**: SMEs need more support to cooperate with universities, as most of them do not have the HR and financial capital to support extensive university-business cooperation activities or programmes.

- **Cooperation beyond the natural and engineering sciences**: cooperation between universities and businesses still primarily takes place in the so-called 'hard' sciences, where innovations are easier to directly transfer and upscale to businesses and society at large. However, some of the key challenges our world is facing today are social in nature, e.g. increasing inequalities, migration, etc. This means there is an increasing need for businesses to collaborate with the 'soft' or social sciences in order to inspire changes in people's mindsets and behaviours. Such social innovations are by nature less 'tangible' than the 'hard', concrete or tangible material innovations that can be expected from university-business cooperation in the natural and engineering sectors, but is does not make them less valuable.

[27] See https://heinnovate.eu/en
[28] See https://eit.europa.eu/

2.2 KEYNOTE SPEECHES

Two keynote speakers for the opening session were:

- Mr Matias Rodriguez Inciarte, President of Santander Universities.
- Mr Borhene Chakroun, Director of Policies and Lifelong Learning Systems Division (UNESCO).

Matias Rodriguez Inciarte, President of Santander Universities, started his intervention by saying that his reflections on UBC are the result of the deep interactions he has had with university leadership over the years. The development of higher education has always been a priority for him, and that is why **Santander is the bank investing the most in higher education** out of all banks in the world.

Universities play a key role in progressing society. Universities contribute to the development of human capital and educates the leaders of the future. They are also a key agent for economic progress, competitiveness, development and social welfare. By conveying this vision to Santander, he managed to convince the bank to invest more than €1.7 billion in more than 1,200 HEIs across the world. The investments primarily support universities to improve educational equity, develop their entrepreneurship education and digital transformation.

He then continued by saying that **automation is profoundly changing the way we work and live**. In a report by McKinsey published in December 2017, which modelled employment changes for more than 800 occupations, it is projected that more than 50% of jobs could be fully automated, and more than 80% of the skills needs of the future will be related to digital profiles.[29] This means that businesses will need to thoroughly rethink their business model, and increase their collaboration with universities to ensure they themselves are 'tech-ready' and universities can provide them with the skilled labour they need.

There is a **mismatch between the skills universities deliver and those needed by businesses**. Mr Rodriguez stressed that having a basic academic training alone is not enough. People need to update their skills continuously, and universities should be flexible enough in order to cater for this. To this end, Santander has funded the 'MetaRed' project.[30] This is a network for chief information officers in Latin America aimed at supporting businesses to address digital transformation issues in a collaborative way. Today, more than 500 universities are part of the network, who closely collaborate with businesses to help them find digital solutions which can be mainstreamed.

Next, Mr Rodriguez discussed three key issues facing the higher education sector, and how cooperation with businesses can help universities address these.

1. Expand and update the academic offer

The need for lifelong learning means that universities should work on expanding and updating their training catalogues with more short-term learning programmes such as nanodegrees. This will make it easier for students to compile courses across a range of different subjects to match their individual learning needs. Furthermore, universities should increase their work-based learning offer to ensure students can develop the right set of skills in a more independent way.

2. Increase the use digital technology

Here, Mr Rodriguez referred to the Georgia Institute of Technology's report on *Deliberate Innovation, Lifetime Education*.[31] The report outlines how Georgia Tech plans to update its educational offer through increased blending of face-to-face and online learning, using artificial intelligence (AI). Mr Rodriguez wondered **whether Georgia Tech's educational model could be 'the university of the future'**, which is based on five pillars:

(1) **Transversal skills**: the university plans to invest in developing students' transversal skills, in particular through giving more prominence to experiential and group learning activities.

(2) **Modularisation**: through the development of micro-credentials and micro-degrees in cooperation with companies, and using blockchain technology, the university wants to facilitate the accreditation of degrees and international mobility.

(3) **AI for study guidance**: the university plans to use AI technology to support students in their study choices.

(4) **AI for study mentoring**: AI technology will also be used to provide personalised mentoring or tutoring for students.

[29] McKinsey Global Institute (2017). Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation. McKinsey Global Company. Available at: https://www.mckinsey.com/~/media/mckinsey/featured%20insights/Future%20of%20Organizations/What%20the%20future%20of%20work%20will%20mean%20for%20jobs%20skills%20and%20wages/MGI-Jobs-Lost-Jobs-Gained-Report-December-6-2017.ashx

[30] See https://metared.org/

[31] Georgia Institute of Technology (2018). Deliberate Innovation, Lifetime Education. Georgia Tech. Available at: https://provost.gatech.edu/sites/default/files/documents/deliberate_innovation_lifetime_education.pdf

(5) **Internationalisation**: through the expansion of its online learning offer, Georgia Tech wants to increase its student population by actively reaching out to students in geographically remote areas. Mr Rodriguez emphasised this as a particularly important paradigm shift for universities, especially if we are to increase lifelong learning of the population. It is no longer the student who should go to campus, but the campus who should go to the student.

3. Changing target audience

Traditionally, universities focused on educating young people only. The increasing need for up- and re-skilling across all age groups and professional sectors means that the student population demographics have changed significantly. This means universities should focus on developing new educational trajectories.

Mr Rodriguez concluded his speech by highlighting the importance of the European Commission **Digital Skills and Jobs Coalition**,[32] which aims at increasing training in digital skills for the workforce, as well as the **European Universities Initiative**.[33] He also stressed the importance of mobility in education, training and the labour market. This should be further developed, as many of the skills of the future (e.g. creativity, communication skills, intercultural skills) are acquired through mobility experiences. He continued by reiterating that he believed higher education, and **blended degrees**, in particular will take up an increasingly central role in developing the skills people require.

Finally, Mr Rodriguez urged **academic and business leaders to increase their collaboration**. Instead of seeing each other as competitors in offering lifelong learning, they should to reflect on how they can both best work together for people's skills development.

[32] See https://ec.europa.eu/digital-single-market/en/policies/digital-skills#
[33] See https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_en

Mr Borhene Chakroun, Director of Policies and Lifelong Learning Systems Division (UNESCO), started his speech by reminding the participants that, in 2015, **world leaders committed to tackling global warming and making sure no one is left behind**. He underlined that the 17 Sustainable Development Goals (SDGs) included in the 2030 Agenda[34] do not only relate exclusively to tackling climate change, but that they also have an important social dimension, such as poverty, health, gender equality, infrastructure developments, etc. With regards to tertiary education under SDG 4 on 'Ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all', Mr Chakroun underlined the importance of ensuring access and affordability.

Looking at **progress towards achieving the SDGs**, the first Global Sustainable Development Report prepared by an Independent Group of Scientists appointed by the UN Secretary General (2019) points to four areas of the 2030 Agenda where we have "*not {even} been moving in the right direction: rising inequalities, climate change, biodiversity loss and increasing amounts of waste from human activity that are overwhelming capacities to process*".[35] Mr Chakroun elaborated on this:

- **Loss of biodiversity**: at the moment around 20% of all species on earth are under threat of extinction. Maintaining our biodiversity is crucial for the ecosystem we all live in.

- **Poverty**: at the moment, around 6% of the world still lives in poverty. In the EU alone, this figure amounts to more than 100 million people, and in some countries, more than 20% of people are not in good health because they live in poverty.

- **Climate change**: if we continue to consume, produce and discard in the same way, we will not be able to control climate change, and many places on the planet will become inhabitable.

- **Waste generation**: this continues to grow.

- **Gender equality**: there are mixed developments with regards to increasing gender equality in Europe. Still, more women than men remain inactive due to caring responsibilities. On average, they spend up to three hours per day more on caring than men. In addition to this, there is an under-representation of women in certain sectors such as AI (only 12% of workers are female) and software development (only 6% of workers are female). Women are also 30 times less likely to apply for patents.

Mr Chakroun stressed the importance of **becoming more ambitious and action-oriented**. He then went on to explain how universities and businesses can contribute to the Global Agenda:

- **Universities** can contribute to achieving the SDGs by working on them in a 'T-form'. The stem of the T represents work towards achieving SDG 4 through research in education and bringing about systemic change in school systems. The horizontal line of the T represents the other 16 SDGs, and these should ideally be integrated in all education and research activities the HEIs engage in.

- **Businesses** can contribute to achieving the SDGs by making sure they invest for impact. To support businesses in this, the UN's Global Compact[36] provides a set of ten fundamental principles in the area of human rights, labour, environment and anti-corruption which businesses can follow to implement the SDGs.[37] Companies are furthermore incentivised to report on their progress against implementing the ten principles through submitting annual Communications on Progress (COP).[38]

- **Collaboratively**, Mr Chakroun underlined, in cooperating, universities and businesses can make an even bigger impact on achieving the SDGs. He said UBC should focus on partnerships such as: for SDG-oriented R&D, i.e. not only collaborating on technological innovation, but also on social innovation; for SDG-oriented incubators and start-ups; for SDG training for business and public sector leadership; and to support innovation outside Europe.

Mr Chakroun concluded his intervention by providing an overview ongoing work of UNESCO in the field of mobility, inclusion and the SDGs, as well as some other key initiatives:

- In the field of mobility, UNESCO is working on a **Global Convention on the Recognition of Higher Education Qualifications**,[39] which aims to support worldwide mobility, and will hopefully be adopted at the next UN General Conference in November 2019.

- With regards to inclusion, UNESCO will continue working on **how higher education can become more inclusive and open**. In 2017, for example, UNESCO published a guide on ensuring inclusion and equity in education was.[40]

[34] UN (2015). Transforming our World: The 2030 Agenda for Sustainable Development. United Nations. Available at: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf

[35] UN. 2019. The Future is now: Science for achieving Sustainable Development. United Nations. Published September. Available: https://sustainabledevelopment.un.org/content/documents/24797GSDR_report_2019.pdf. [Accessed October 1 2019].

[36] See https://www.unglobalcompact.org/what-is-gc/mission/principles

[37] See https://www.unglobalcompact.org/what-is-gc/mission/principles

[38] See https://www.unglobalcompact.org/participation/report

[39] See https://en.unesco.org/themes/higher-education/recognition-qualifications/global-convention#

[40] UN (2017). A guide for ensuring inclusion and equity in education. United Nations. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000248254

- Through its **UNESCO Chairs Programme**, the organisation tries to support governments in working towards achieving the SDGs.

- UNESCO is also preparing a **Recommendation on Open Science**,[41] which will aim to promote open scientific research and making it easier to publish and disseminate scientific knowledge.

- It also prepared the draft text for a **Recommendation on Open Educational Resources**. The aim is to have the text adopted at the next UNESCO General Conference in November 2019. The Recommendation advocates global investment in five areas supporting OER: (1) capacity building, (2) developing supportive policy, (3) ensuring inclusive and equitable access to quality OER, (4) sustainability models for OER, and (5) international cooperation.[42]

- Finally, UNESCO has done a lot of work in the field of **AI with human values for sustainable development**.[43] Based on this, the organisation is also preparing a Recommendation on Ethics and AI.

[41] See http://www.unesco.org/new/en/communication-and-information/portals-and-platforms/goap/open-science-movement/
[42] See https://ei-ie.org/en/detail/16299/official-unesco-recommendation-on-open-educational-resources-moves-one-step-further
[43] See https://en.unesco.org/artificial-intelligence/highlights

2.3 PANEL DISCUSSION: Partnerships for sustainable development: challenges and opportunities

Four panellists then discussed partnerships for sustainable development:

- Taru Pilvi, Innovation Director, Tampere University (Finland).
- Pascal Métivier, Senior Executive Vice-President, Science and Technology Director, Solvay Group (Belgium).
- Theun Baller, Dean, Technical University of Delft (Netherlands).
- Monika Skadborg, Member of Executive Committee, European Student Union (ESU).

Taru Pilvi, Innovation Director, Tampere University (Finland), explained that Tampere University is the result of a merger between two universities, bringing together different disciplines. Ms Pilvi then stressed that the pace of change in today's society and in private companies is so fast that HEIs have difficulties to keep up and bring about meaningful change. In order to effectively contribute to tackling these challenges and bring about sustainable societal change, she emphasised that Tampere University believes in **empowering students to drive societal change**. It does so by promoting entrepreneurship in its students through a range of initiatives including:

- The **Innovation Festival for Fun Collaboration** is a collaboration of the university with companies through which students are given real-life challenges related to the SDGs in order to work on in inter-disciplinary teams. She underlined the importance of such real-life challenges, especially to promote entrepreneurship with students from the Social Sciences and Humanities. These students are "*not bothered about making money, but rather in changing the world*".
- **Y-Kampus initiatives** bring together future entrepreneurs and well as talented professionals to exchange ideas and develop these into practical innovations. Ms Pilvi highlighted **the importance of physical spaces for exchanges** like this to take place. The Smart City Living Lab (located in the Hiedanrata district of Tampere) is a concrete place where to can take action and develop new ideas.
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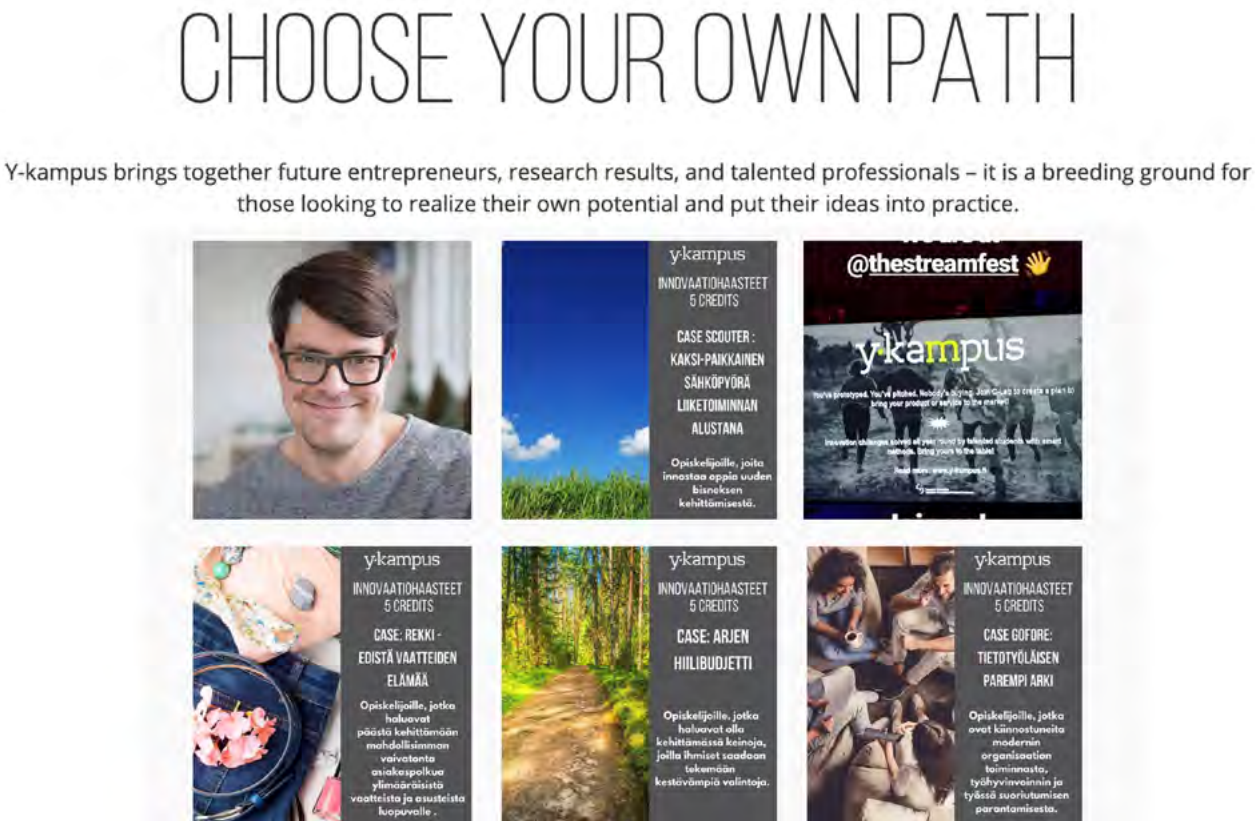


For **Pascal Métivier**, Senior Executive Vice-President, Science and Technology Director, Solvay Group (Belgium), the conference's focus on the SDGs was very important. He mentioned that it was **no longer sufficient for businesses to focus only on financial value creation. It is important for each business activity to have an impact on society as a whole**. This is the approach adopted by Solvay. Each new Solvay product must have a high 'sustainability profile' and is measured in terms of its impact on society.

Mr Métivier then continued by saying that **sustainability and innovation go hand in hand**. Without innovation, it is impossible to reach the SDGs. He highlighted three elements which were crucial in this respect:

- **Collaboration** with leading research organisations. Not only does Solvay employ more than 2,000 of the world's leading scientists, but it also partners with leading research organisations across the globe.

- **Investing in education**. The company sees it as its responsibility to foster science and education. It works closely with HEIs to develop their teaching programmes and offers scholarships and internships to students.

- **Investing in digitalisation**. Digitalisation has an impact on society as a whole, and also on the way in which research will be conducted in the future. AI in particular will have a significant impact on the way research is conducted and results are commercialised into concrete products and services for the labour market.

Next, **Theun Baller**, Dean at the Technical University of Delft (Netherlands), said that **businesses and universities both (1)** "***want to make the world a better place***" **and (2)** "***educate the younger generations***". These are the two overarching R&I goals around which he believed universities and businesses come together to exchange ideas, and then jointly to create sustainable impact.

Mr Baller then continued by saying that a **university can only be sustainable if it works on society's sustainable future**. Universities can no longer afford to be 'stand-alone ivory towers', but have to engage in nearby collaboration building ecosystems and spaces for people to actively work together on 'real' problems of the world.

Under its **X-Delft strategy**, TU Delft has developed active partnerships with companies. The aim is to create impact through purpose-built ecosystems in which students, academics and start-ups can come together to work on real-world problems. The university is also active in the EU's EIT.

Mr Baller concluded his intervention by saying that the **EU should do more to support SMEs** to take part in R&I programmes (e.g. through Horizon 2020), as they often do not have the resources to do so on their own.

Finally, Monika Skadborg, Member of Executive Committee, European Student Union (ESU), said that ESU has many discussions with policy makers, HEIs and private companies on the '**multiple purposes of education**'. According to ESU, higher education should not only be about preparing students for their first or second job, or to become a good innovator to create many jobs for others. It should also be about **empowering students to become active citizens**. Active citizens who care about stopping climate change, sustainable development, social cohesion, healthy democracies and human rights. It should help students to acquire the 'learning to learn' competence, a sense of ethics, critical thinking, etc.

Up until now, **universities have focused heavily on tackling the skills mismatch** by equipping students with the skills they need for employment after they graduate. Ms Skadborg believed this 'short-term thinking' of universities had led them to forget about the wider purpose of higher education to teach students to become responsible citizens.

Ms Skadborg said that enabling young adults to become responsible/empowered for society is no small responsibility for universities, and not one that could be solved easily by, for example, providing a course here and there on sustainability. **Sustainability should be present in everything HEIs do**, not just in the STEM, but in every discipline, for all graduates to come out with a sense of responsibility to change the world.

In the interactive Q&A session with the conference participants, the following key points were raised:

- **Young people challenge the way we think about innovation**. Instead of focusing on profit only, young people in HEIs have a genuine desire to make a sustainable difference to the world. For many young people, social innovation comes first.

- **Social innovation needs ownership across generations**. At present, social innovation is too often associated with young people and smaller university projects. Senior leadership in private sector companies should provide more space for young people in their management and quality assurance structures in order for such innovations to have a wider societal impact.

- **ESU is collecting good practices to prepare a toolbox on how sustainability can be integrated across every activity in higher education**. This toolbox has the potential of having a big impact, since at present sustainability is still absent in many university strategies, rankings or funding criteria.

- **Go beyond offering work-based learning opportunities towards building learning communities**. To really develop students' critical thinking, entrepreneurial skills and innovation potential, universities should work with businesses to create innovative learning ecosystems in which students can experiment and innovate freely.

- In terms of **what the EU could do to further support sustainable university-business partnerships**, it was mentioned the EU could attribute more weight to sustainability as an evaluation criterion, or develop specific programmes to support SMEs in collaborating with the university sector and to embed sustainability across their activities.

2.4 DIGITAL EDUCATION HACKATON: Global Award Finalists

Ms Themis Christophidou, Director-General for Education, Youth, Sport and Culture (European Commission), concluded the morning session by presenting the finalists of the first large-scale digital education hackathon. The contest was organised as part of the initiatives announced under the Digital Education Agenda.

The hackathon brought together education institutions, schools and businesses to come up with ideas to integrate digital technologies in education. In total, the hackathon **brought together 1,700 innovators in 33 locations across 21 countries both in- and outside the EU, addressing 60 key challenges**. The projects developed ranged from improving access to digital technologies, supporting individual and institutional capacity for digital skills and ways to integrate digital technologies in the classroom.

Each location selected a local finalist, from which eventually **10 finalists were selected** (based on the projects' quality, relevance, innovativeness, feasibility and transferability):

- **Booklistics - Your Reading Mentor**, Kauniainen Municipality, Finland;
- **ClimActHub**, EIT Climate-KIC, Denmark;
- **Edu-Wallet**, Bicocca University, Italy;
- **gamEmoton**, GO-AHEAD Association, Romania;
- **Inter-Portal**, University of Edinburgh, Scotland, UK;
- **Science Escape Room**, Capozzi-Galilei Secondary School, Italy;
- **Student4Students**, inLab FIB UPC, Spain;
- **Teacher's Toolbox**, Delft University of Technology, The Netherlands;
- **Teaming 4.0**, Monterrey Institute of Technology and Higher Education, Mexico; and
- **Think Playfully through 3D learning**, Aalto University, Finland.

Through public voting, three winners will be selected. Each winning team will receive €5,000 to implement their ideas and become Digital Education Ambassadors.

3.0 DAY 1: Breakout sessions

Following the opening speeches, keynotes and panel discussion of the official opening session in the morning, the afternoon of Day 1 was divided into five breakout sessions, each consisting of two workshops. Five major themes were tackled during these breakout sessions:

- BREAKOUT SESSION 1:
  Tackling the skills mismatch;
- BREAKOUT SESSION 2:
  Supporting the workforce to adapt to the future;
- BREAKOUT SESSION 3:
  Building local and regional eco-systems;
- BREAKOUT SESSION 4:
  Working together to address societal challenges and build societal trust;
- BREAKOUT SESSION 5:
  Developing an entrepreneurial culture.

3.1 BREAKOUT SESSION 1: Tackling the skills mismatch

3.1.1 WORKSHOP 1: Attracting students to disciplines for jobs where shortages exist or are emerging

The aim of this workshop was to look at examples of good practice, both in the public and private sector in Europe, and examine how aspects might be transferred to management and governance in the higher education sector. Moderator **Vanessa Debiais-Sainton**, Head of Unit B1 – Higher Education, DG EAC, opened the workshop by referring to one conclusion emerging from the discussions in the morning: there is a need for the future generation to be able to work together across disciplinary fields. For instance, social scientists need to produce good quality data for training AI algorithms.

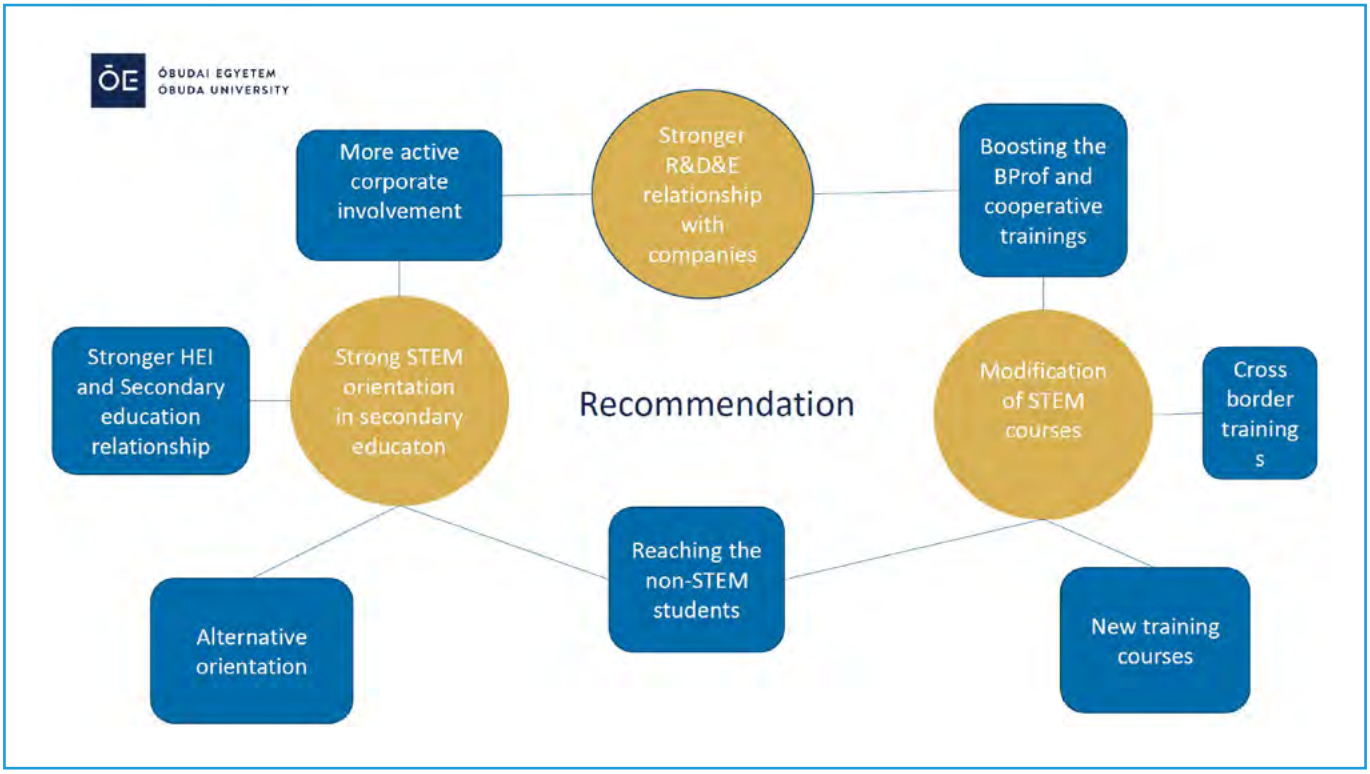
The first speaker was **Geert Asselbergs** of the EU STEM Coalition Network. The EU STEM Coalition[44] is a network of national STEM platforms aimed at reducing the skills mismatch between STEM education and the labour market. He mentioned that the network noticed an increasing skills mismatch across all Member States. In order to address the skills mismatch, we need several solutions as there are no one-size-fits-all solution. Often, **the right solution will have a regionalised character**. If countries want more STEM graduates they may need different initiatives in different regions.

Further challenges include **a lack of coordination and fragmentation of initiatives**. This is a challenge he sees in all their member countries, where a lot of good initiatives in place but lack of coordination. A final challenge is the **impact of the rapidly changing labour market on skills relevance**. In many cases, a degree may take up to five years to complete, but during that time labour market needs may already have changed. Mr Asselbergs concluded his intervention by saying that an important next step for the STEM coalition is **how to connect STEM with other disciplines** such as entrepreneurship of the social sciences.

Next, **Tamás Kersanszki**, Obuda University and Head of the Hungarian STEM Platform[45], spoke about their experiences when they established the Hungarian STEM Platform in 2018. He started his intervention by referring to a report that concluded that **44% of the EU population lacks basic digital skills**. He then zoomed in on the Hungarian context through a report looking at the most important **factors influencing students' choices for STEM**. These are:

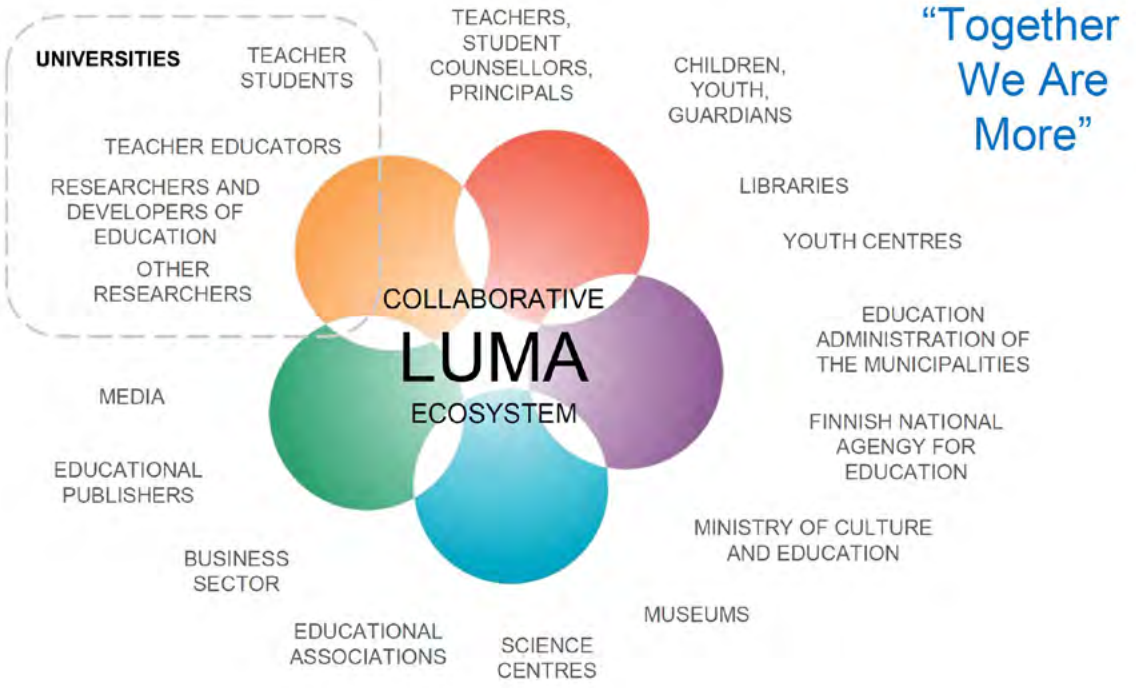
- Parental influences;
- Fashion trends;
- Dropouts;
- Guidance; and
- The quality of Maths education.

[44] See http://www.stemcoalition.eu/
[45] https://stemhungary.com/en/hungarian-stem-platform



He concluded his presentation by saying that the Hungarian STEM Platform is now working on addressing these issues by offering cross-border training to teachers, involving interested partners and making significant modifications of STEM courses.

Rima Dapous, Education Director of the EIT KIC Raw Materials, talked about her work to address skill shortages in the minerals and mining industries. She said that the raw materials sector has difficulty to attract young people for careers in, for instance, mining and mineral processing.



In order to attract people to these fields, the **KIC runs educational programmes** across all levels of education, starting in primary school. One purpose of the educational programs is to **change the negative image of industry** as being destructive and explorative. A concrete example of how the KIC work with businesses and educational institutions is to go out and ask local industries what their particular problems are. They then have a person from university translating the issues into an academic problem. Students are then asked to work on the problem and must suggest solutions with the company acting as mentors for the students.

Although Ms Dapous mentioned she was aware that it might require 1,000 students involved in the educational programmes to recruit one person to the minerals and mining sector, another positive result of the programmes is making students interested in the STEM sector in general.

Finally, Jan Lundell, Chairman of the Board of the Luma Centre Finland, talked about how the Luma Centre is **changing young people's mind-sets towards STEM**, from kindergarten to secondary school. Both primary and secondary education in Finland are very problem- and activity based, following the footsteps of phenomenon-based education. At tertiary level though, this is not the case, and students feel disappointed with this.

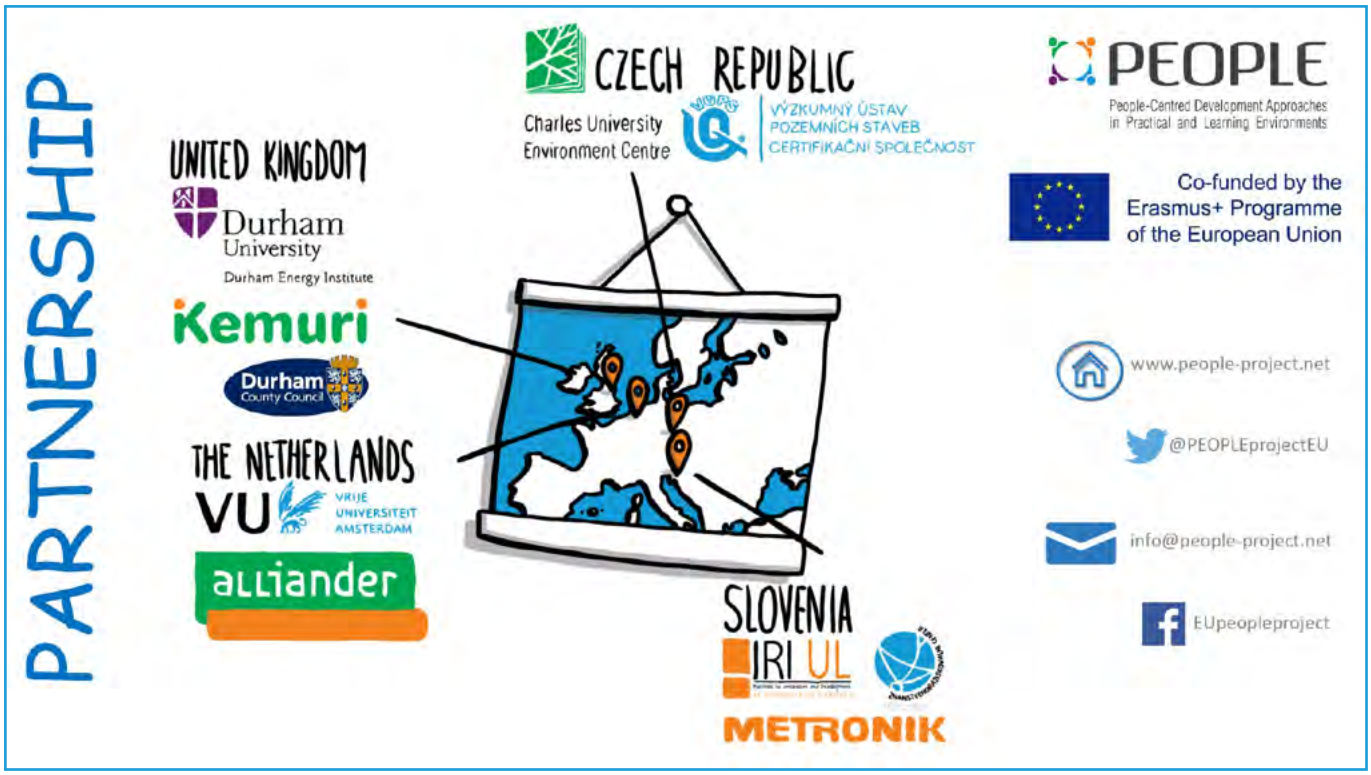
Luma therefore works closely with university teachers to change their mind-sets and the way they teach in order for them to adopt teaching methods that will foster student enthusiasm. In addition to this, through non-formal and informal activities (such as science labs or organising children's birthdays in science labs), Luma aims to promote science in wider society and amongst young people.

During the Q&A session which followed the presentations, the following main points were raised on how to make STEM more interesting for students:

- **Link STEM to societal challenges**. In many countries, climate change and other sustainability-related topics are a big topic of interest for students. By showing students how technology and other types of innovations link to 'making the world a better place', students can be motivated to take up (further) STEM studies.

- **Gamification** was mentioned as another way to make teaching and learning around STEM more engaging for students.

- **Labour market guidance**. Another suggestion to increase student's motivation for SEM subjects was to inform students on the multitude of jobs STEM degrees can prepare students for. As the labour market becomes increasingly flexible, this is an important study outcome.



3.1.2 WORKSHOP 2: Providing learning experiences that enable student to acquire the right mix of knowledge, skills and competences

The workshop moderator, **Julie Fionda**, Deputy Head of Unit E2 - Skills and Qualification, DG EMPL (European Commission), introduced the second workshop by saying that our **world today is one of transitions**. The content of work is constantly changing, and by 2022 55% of the existing workforce will need re-skilling. There is not a single skillset that is universally in demand across all of Europe, and solutions must therefore be specialised to meet local needs.

The first speaker, **Christoph Meng**, coordinator of the Eurogate Consortium at the University of Maastricht, started his intervention by sharing the results of a survey among graduates on how they experienced their own skill mismatch. They found a mismatch in all the studied countries, though the mismatch varied between countries. In Greece, just under 60 % have a clear match of their skills.

Next, **Barbara Gabriel**, Department of Mechanical Engineering, University of Aveiro (Portugal), spoke of one of the university's projects, which aims to understand the profile of a higher education engineer teachers today in order to prepare future professionals. She mentioned that the features and characteristics of the teacher profile are divided into three categories: (1) personal, (2) institutional and (3) external competences. During the first stage of the project, the project leaders invited students and teachers of engineering and currently, the second stage, companies to help define the profile of the teacher. Data processing and analysis of the second stage is still ongoing. Results show that the biggest mismatch in how the different actors viewed the optimal teacher for engineers was between teachers and companies, while the biggest match was between students and companies.

The next intervention was from **Gregor Cerinsek**, Institute for Innovation and Development of University of Ljubljana and **Sara Arko**, Metronik, Slovenia, Knowledge Alliance project: 'People-centred developed approaches in practical and learning environments'. The PEOPLE project addresses and identifies **skills mismatch between social sciences and humanities graduates on one the one hand, and industry on the other**.

They experienced that technology companies are not aware of how they can use social scientists in their product or service development. For this reason, they started the PEOPLE project, which brings together interdisciplinary teams of students to work on real-life business challenges to develop or improve the industry partners' products and services.

Inese Podgaiska, Secretary-General of the Association of Nordic Engineers (ANE), focused on the Nordic Engineering Hub, and how they are changing engineering education for the future. She highlighted that many people talk about the lack of STEM specialists, but that **few talk about the skills needed by STEM specialists**. The goal of the project is to change the mind-set of university professors by asking them how they envisage their role as teachers in the future. They are currently at the stage of interviewing university professors, and the first results will be available in 2021.

During the Q&A session which followed the presentations, the following main points were raised on how to best support students to acquire the right set of knowledge, skills and attitudes:

- **Use skills mismatch as a basis for discussions** between teachers and students, universities and businesses instead of an obstacle.
- **Take into account student opinions** when seeking to improve inter-disciplinary cooperation between the social sciences and STEM fields, or when seeking to measure the quality of a certain degree. Often, the question "Would you choose to study the same degree at university again?" provides insightful answers.

3.2 BREAKOUT SESSION 2: Supporting the workforce to adapt to the future

3.2.1 WORKSHOP 1: Preparing and supporting students and graduates as future lifelong learners

The aim of this workshop was to look at examples of good practice with respect to preparing students and graduates for lifelong learning (LLL), both in the public and private sector in Europe, and to examine how aspects might be transferred to management and governance in the higher education sector. The workshop was moderated by Denis Crowley, Head of Unit A2 – Country Analysis, DG EAC (European Commission). He introduced the topic by observing that a culture of lifelong learning has not yet taken root in Europe. There was a strong focus on LLL, and growing participation in LLL, fuelled by efforts by the first presidency of Slovenia after their accession to the EU, but the year after, participation dropped and has never recovered. He hoped that the speakers would be able to throw more light on this and to show possible ways forward.

The first speaker was Dr Brikena Xhomaqi, Director of the Lifelong Learning Platform.[46] The Lifelong Learning Platform (LLP) is an umbrella that gathers 42 European organisations active in the field of education, training and youth: learners, educators, practitioners, teachers, parents, and volunteers. **The LLP promotes a holistic vision of education and learning 'from cradle to grave'**.

By bringing all sectors together, the LLP intends to bring about systemic change in educational systems and cultures, to build inclusive and democratic education systems, to widen access, and increase the relevance of education for society. Pathways to change are presented in a new LLP **position paper on 21st century learning environments**.[47]

[46] See http://lllplatform.eu/

[47] See http://lllplatform.eu/lll/wp-content/uploads/2019/10/LLLP-Position-paper-21CLE.pdf

A group of student artists were present at the Forum and their work is documented in this report. See page 77 for more details.

Dr Xhomagi stressed the **importance of society acknowledging skills acquired in all learning venues**. Education needs to reflect its approaches to the current discourse on the future of work, but at the same time, keep focusing on cross-cutting topics, of which she named ten:

- Key competences, social inclusion. citizenship, volunteering, language learning, validation, learning mobility, employment, sports, and learning in a digital era

She emphasised there is a need to develop an LLL culture, beginning with a realisation that **learning can happen anytime, anywhere** and the spaces where it occurs are increasingly diverse. A new reality is emerging in which learning continues throughout life. Even when we retire from work, we will keep on learning to remain engaged.

She concluded her intervention by mentioning three elements to be prioritised by governments as well as education and training institutions for **preparing and supporting students and graduates as future lifelong learners**:

- **Transversal competences**, such as the ability to learn, creativity, and critical thinking, should be prioritised in education.
- **Flexible learning paths**, in particular the switching between education and jobs should be promoted more actively.
- **Guidance and counselling** should be available to everybody at all stages of life in order to ensure LLL becomes a reality.

The next speaker was **Dr Dieter Dohmen**, Managing Director of Forschungsinstitut für Bildungs- und Sozialökonomie (FiBS)[48], a private research institute focusing on education. He started by positing that **no one can avoid learning, and that almost all people are willing to learn – however, many people harbour a certain resistance against being educated and to be enrolled in the education system**.

Universities, he said, play a limited role in LLL. While this role may be increasing as the number of adults in higher education increases, **universities still focus too much on initial education**. Higher education systems contribute to this by having strict access requirements, and thereby often excluding adults without a prior qualification from enrolling in tertiary degrees.

He then outlined four possible models for future learning pathways, using popular toys as metaphors:

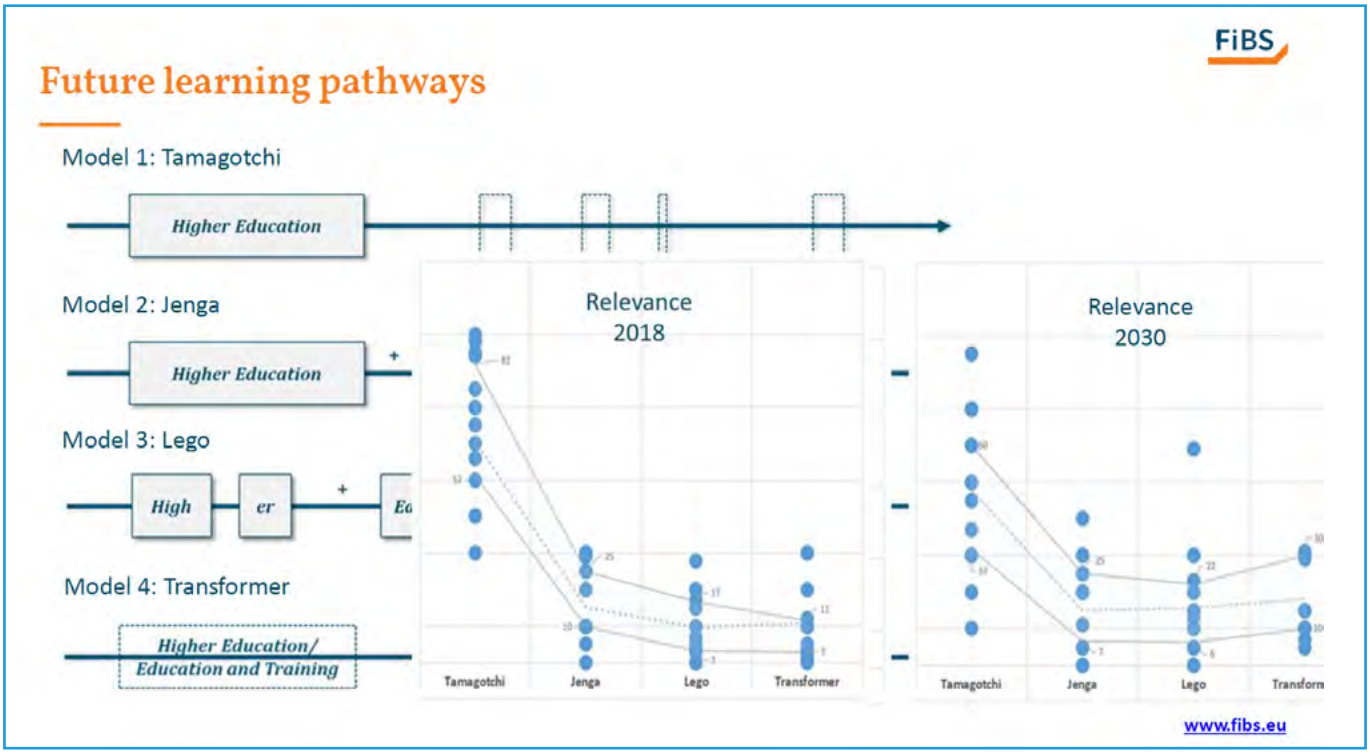
- The **Tamagotchi-model**:[49] to indicate that knowledge and skills wither and die, when they are not updated or 'fed'. In this model, the learning pathway is traditional, with education ending at graduation.
- In the **Jenga-model**,[50] knowledge is 'stacked'. The learning pathway includes initial education at university, and renewing knowledge and skills by going back to university to follow modules of educational programmes or entire professional programmes.
- In the **Lego-model**, pathways are not just vertical, as in the Jenga-model, but also horizontal. Knowledge and skills are supplemented by self-education using e.g. YouTube or other forms of online learning. The role of university in this scenario is to provide modules or chunks of learning which – if desired – can be accumulated and at some stage, exchanged for a degree.
- Finally, the **Transformer-model**[51] features learning pathways starting from VET qualifications. The owners of these qualifications may decide to 'transform' their skillset by adding courses or degrees from university.

[48] See https://www.fibs.eu/en/

[49] Tamagotchi was an electronic pet in the form of a keyring with a small screen, popular among children in the early 2000s. The owner of a Tamagotchi should 'feed' and 'cuddle' it by pressing some buttons. If not cared for in this way, if would 'die' (become defunct).

[50] Jenga is a game where the aim is to stack small wooden bricks as tall as possible, and where the player making the tower collapse loses the game. https://jenga.com/

[51] Transformers is a franchise including both a film series and toys. A transformer is a (often fanciful) vehicle that can turn into a gigantic robotic creature by turning and twisting its parts. https://transformers.hasbro.com/



Dr Dohmen underlined that the models are not mutually exclusive, but that some are becoming more prevalent while others diminish in importance. He then concluded by focusing on trends which universities and businesses should take into consideration in the context of the increasing need and demand for lifelong learning:

- **Digitalisation** is a game-changer that may make the Lego model more prevalent, but as of yet there is no sign that e-learning has replaced education, nor that it has the potential to do so in a foreseeable future. With respect to digital literacy, it is important to understand that it is not about technical skills. Digital literacy does not replace reading and maths – it builds directly upon literacy in reading and maths.

- **The demand for single learning modules is expected to grow** at the expense of the demand for full professional qualifications.

- **Target the development of individual competences and skills** will need to be a new focus for higher education in order to really contribute to LLL.

- **The demand to recognise prior learning is only expected to grow** as a result of the demand for HEIs to contribute to LLL.

- **Companies should focus more on individual skills** rather than qualifications.

The next speaker was Dr Hanne Smidt, Senior Advisor at the European University Association (EUA).[52] Her intervention was entitled 'European Universities and lifelong learning: "Same, same, but different"'. She started by reminding the audience that, within Europe, and in spite of the Bologna process, the HE landscape is very diverse. Nevertheless, **all European universities understand the importance of LLL as the world and the labour market are changing**.

She continued that European universities are well aware of the need for lifelong learning as the world and the labour market changes, the challenges that of globalisation that lifelong learning can contribute to alleviate, possibly through digitalisation. Universities have provided support to learners every time there is a major societal change. Even so, the provision of lifelong learning depends on how an HEI defines its role: as a traditional, global, entrepreneurial, innovative, engaged, regional specialised, open/digital higher education institution – and in which subject area.

She then went on to present an example of how universities in the future could provide students with lifelong educational opportunities in a 'cradle-to-grave perspective', and thus engage in LLL in the future The vision was taken from, '**Education 2027/2028' of the Swedish Royal Institute of Technology (KTH)**.[53]

The key features of the vision was to break up the current three-cycle structure, and that **students can check in and out of higher education as they would like or need to**: some may take a 'classical degree' to start, others might choose an apprenticeship-model, others again may combine

[52] See https://eua.eu/
[53] The vision can be accessed here: https://intra.kth.se/polopoly_fs/1.853652.1550155193!/KTH%20Design%20Fiction_Education%202027-2028.pdf

courses as they design their own – as and when they need new competences and skills. The key factor is that students become members of the university through an entrance exam (supported by a course to be well-prepared to pass to ensure widening participation), or start from kindergarten with academies that promote STEM education. The concept means that students can check in and out as they wish and need to for their career, but they never leave.

Students study freely with guidance, all learning happens in small modules and can be completed flexible in terms of time and space, on-line or on-campus. The learning for life concept means that the education is measured in levels and credits rather than years. All are provided with a personal AI mentor that will follow the student/member for life. The concept envisaged that the university will ensure that their students will always (at any age) be newly qualified, and the teachers are the coaches that ensure this. In short:

(1) Education should be a pleasure and a challenge throughout life;

(2) Each student/member design their own learning path based on needs and ability;

(3) Learners can be path of an international area; and

(4) Membership is an intellectual resource physically and intellectually. The vision thus builds on the idea of cradle-to-grave learning, aided by AI mentors. The 'Learning for Life' approach thus provides students with lifelong access to new learning and knowledge.

Dr Smidt concluded that European HEIs should define themselves more clearly as the lifelong learning platforms they are, and consider research, innovation and lifelong learning in a more integrated way. She continued that rethinking higher education in a different model where flexible higher education is provided in a true student-centred manner raises questions about: how a legal framework would work, how to develop a funding system that would secure a funding model that can work for both the higher education institution, and for staff and students, and how to ensure the involvement with stakeholders. This also raises questions of access models, recognition of prior learning, skills and competences, and how these will be solved. In conclusion, she underlined that nothing is more economically, socially and personally wasteful than not acknowledging and building on all of the qualifications, skills and competences that we acquire throughout our lives, and that European HEIs should raise the bar to meet the EU 2020 goals and to support the achievement of the UN SDG 2030.

Dr Henrik Runnemalm, Director of Research and Technology at GKN Aerospace Engine Systems, was the next speaker. He started by saying that, according to the aerospace industry perspective, the **most important driver of the need for LLL is the environmental challenge**. As an example, he referred to the development of solutions like electric airplanes, which would drastically reduce carbon emission associated with air transport. The development of such innovations, however, **requires electrical engineering at a highly advanced level**. This means that the workforce needs to upskill in order to be able to produce these innovations.

Dr Runnemalm then continued by giving three examples of how GKN collaborates with education and training institutions to raise its employees' skills levels:

- **GKN collaborates with smaller universities, since they find these to be the most flexible**. As an example, they cooperate with Högskolan Väst in the *ProdEx initiative*,[54] which provides short (typically 5 weeks, 2.5 ECTS) intensive courses in different learning formats, including a virtual factory. Courses are bespoke, and the range of topics covered includes automation, production management, robotics, and engineering tools within production. More than 200 GKN employees have been through these courses. The time cost is shared between the company and the employee, who must contribute their own time at a level up to half the time taken up by studies. There courses are interesting also in that they offer a space where employees can work together with students from other disciplines (such as the social sciences, for example).

- Another lifelong learning avenue for GKN is ***Innovatum PTC*** (PTC stands for Production Technology Centre),[55] which was created by the Göteborg region 12 years ago. The Centre offers a shared space for research, maturation of technology, training and inspiration. One of its key success criteria is that it collects people from different types of companies and education institutions and disciplines.

- Finally, **GKN works with all levels of the education system** to raise the interest in STEM and in the industry. For instance, representatives from the company last year paid 120 visits to primary school classes.

[54] https://www.hv.se/en/research/research-projects/production-technology/prodex-expert-i-produktions-teknik/. Description in Swedish.
[55] See http://translate.google.com/translate?hl=en&sl=sv&tl=en&u=https://www.innovatum.se/&sandbox=0&usg=ALkJrhgk3IvI_bymaZtFFgv7nwtUDJc_mw

During the Q&A session which followed the presentations, the following main points were raised on how to best support graduates and the workforce to become lifelong learners:

- **Funding for lifelong learning**. The Swedish funding system may provide a case for further exploration, since it is course-based (not education-based), and quite flexible. Reference was made to a comprehensive 2011 study by EENEE on funding for lifelong learning.[56]
- **Access to lifelong learning**. The use of micro-credentials was mentioned as a potential solution for the difficulties to access lifelong learning opportunities at tertiary level by many adults.
- **University teachers need training on how to teach adults**. Participants referred to the large body of literature on adult learning which should be used to upskill higher education staff on how to adapt their teaching and learning methods to the changed student body.
- **Mobility can improve transversal skills**, which all learners need in order to become lifelong learners.

3.2.2 WORKSHOP 2: Supporting up-skilling and re-skilling

The aim of this workshop was to look at and discuss concrete examples how HEIs and business can cooperate to support the up- and re-skilling of their staff, including unemployed people. The workshop was moderated by **Martina Ni Cheallaigh**, DG EMPL Unit E3 - VET, Apprenticeships and Adult Learning (European Commission). Ms Ni Ceallaigh introduced the workshop by saying that, as opposed to the first workshop which focused heavily on graduates, this workshop would focus on people already in the workplace.

A first thing to note is that is often **difficult for people in the workforce to find time for training**, even in a time when tasks are changing. Secondly, the workforce already has experience, and **recognition of prior learning is key** to ensure they are motivated to engage in LLL. She reminded the participants of the initiative on Upskilling Pathways, which targets low-skilled adults and provides them with tailor-made up- and re-skilling opportunities, based on their prior learning, assessment and validation.

The first speaker was **Dr Eva Cendon**, FernUniversität in Hagen and Vice-President of the European University Continuing Education Network (EUCEN). She started by observing that up-skilling and re-skilling of the workforce is very much about bridging theory and practice. In university programmes for experienced people, it is very **important to consider the experience of people in the workforce**. Approaches facilitating the integration of experience include:

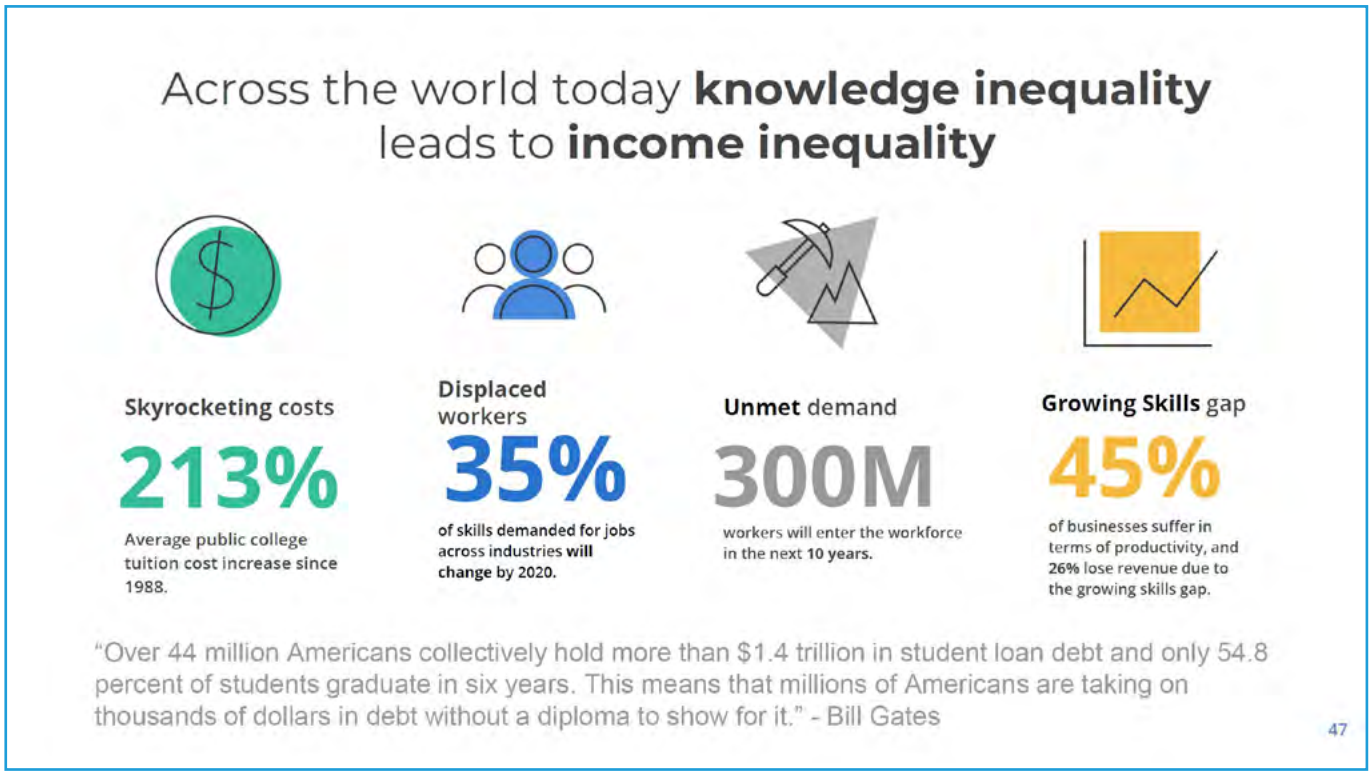
- Valuing experience through recognition.
- Facilitating experiential learning.
- Using reflection as central prerequisite.
- Acknowledging the expertise brought by students, so that teachers become co-learners and facilitators.

She then turned to **forms of bridging theory and practice**. This involves integrating professional experiences and applying theories and methods to 'living cases' brought from the workplace, and demonstrating to the students how they can relate their practice to theory and become 'practitioner-researchers'. She noted that, if the concept of modularisation is taken seriously, there are good opportunities for developing relevant and high-quality offers. The learning architectures that exceed institutional boundaries can include in-company training credited in university programs, integrating university programs into staff development programmes of companies (modules leading eventually even to a degree programme), and corporate academies as joint ventures between company and university.

She concluded her presentation with four central messages:

- Take experience as the central point of departure for the development of learning opportunities.
- Value complementarity – acknowledging that universities and workplaces contribute to learning in different, but equally important, ways.
- Consider different mixing proportions between learning at university and learning at work.
- Start small! Lots of universities in Germany have had good success starting from one small module or workshop.

[56] Falch, T. and Oosterbeek, H. (2011). Financing lifelong learning: Funding mechanisms in education and training. EENEE Analytical Report No. 10. [online] https://www.google.com/search?ei=0j-8XcrxHcnCwAKi4qGACg&q=funding+of+lifelong+learning+in+higher+education+cyrus&oq=funding+of+lifelong+learning+in+higher+education+cyrus&gs_l=psy-ab.3...9930.13631..14198...0.0..0.127.912.8j3....1..0....1..gws-wiz.....33i160j33i21j33i22i29i30.WXmmOhp3H6A&ved=0ahUKEwjK9qjemsnlAhVJIVAKHSJxCKAQ4dUDCAs&uact=5



The next speaker was Chad Pasha of Coursera.[57] Coursera is a commercial online platform offering users worldwide access to education. Their clients include individual learners, organisations, governments and businesses.

Mr Chad started by observing that the world is currently undergoing technological transformation at a speed which implies that **the average shelf life of technical skills is currently two years**. There is a great demand for employees with digital skills and credentials. At the same time, access to higher education is unequal – only around 40% of people entering the global workforce have access to higher education.

To contribute to reducing inequality, **Coursera provides free education to registered refugees**, and if they have lost their credentials, they have access to having their skills and prior learning validated for free.

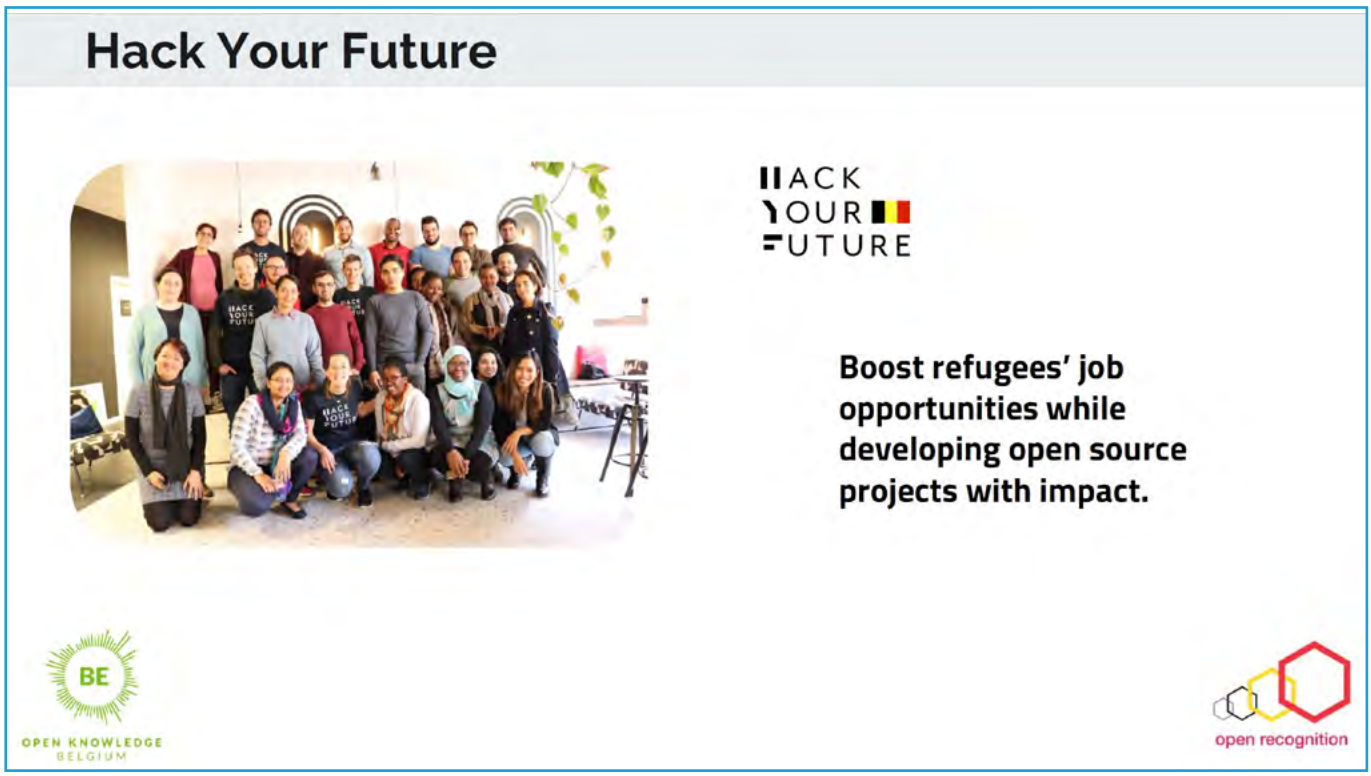
To date, **Coursera has provided its services to more than 44 million learners**. They have 200 partners (universities and large enterprises) and a catalogue of 3,400 courses offered by partner institutions. These courses form 300 specialisations and can be combined into MasterTrack™ Certificates and Professional Certificates, and ultimately into Degrees Certificates. Any university can provide courses ('Coursera for campus'). **The main philosophy of Coursera is that learning is stackable**.

Based on the data that Coursera collects, they have developed **Coursera Global skills index**,[58] which ranks countries based on data on participation and performance in courses in three fields: business, technology and data science. The results show Europe to be the world leader in skills development. The competence areas that Coursera identified as essential for the fourth industrial revolution are: Big data, AI, Cloud Computing, Applications and Web Development, Emerging Technologies, and Human Skills.

The next speaker was Bert Jehoul, Representative of Open Recognition (Belgium), which is part of Open Knowledge Belgium,[59] an umbrella organisation for Open Knowledge initiatives. It is a grass-roots organisation which consists primarily of volunteers and is also part of the international Open Knowledge network. The Open Knowledge organisations in Belgium include: Creative Commons BE, Open Street Maps BE, Open Access BE, Open Recognition BE, iRail and more. Mr Jehoul then went on the explain in greater depth a few of the member organisations' initiatives:

- '**Hack your future**' teaches coding skills to refugees as an open source project.
- '**Open Summer of Code**' involves students in open source projects. This initiative is currently being internationalised.
- '**GentleStudent**' is a smart phone app showing students in Ghent a map of learning opportunities – if they attend any of the opportunities, they receive an open badge.

[57] See https://www.coursera.org/
[58] See https://www.coursera.org/gsi
[59] See https://be.okfn.org/



He then went on to explain **Open Badges** (OB), which were originally developed by Mozilla. The OB standard describes a method for packaging information about accomplishments, embedding it into portable image files as a digital badge, and establishing an infrastructure for badge validation. OBs allow for the recognition of informal and non-formal learning, and this form of recognition was recently discussed at 'Open Belgium 2019', where experts and the European Commission discussed the status of skill recognition in the labour market.

Next, George Ubachs, Managing Director of the European Association of Distance Teaching Universities (EADTU), shared his thoughts on European MOOC cooperation (EMC).[60] The **EMC-LM-project**, where LM stands for labour market, brings together MOOC platforms, universities and public employment services to meet the learning needs of the European labour market. The aims of the project are:

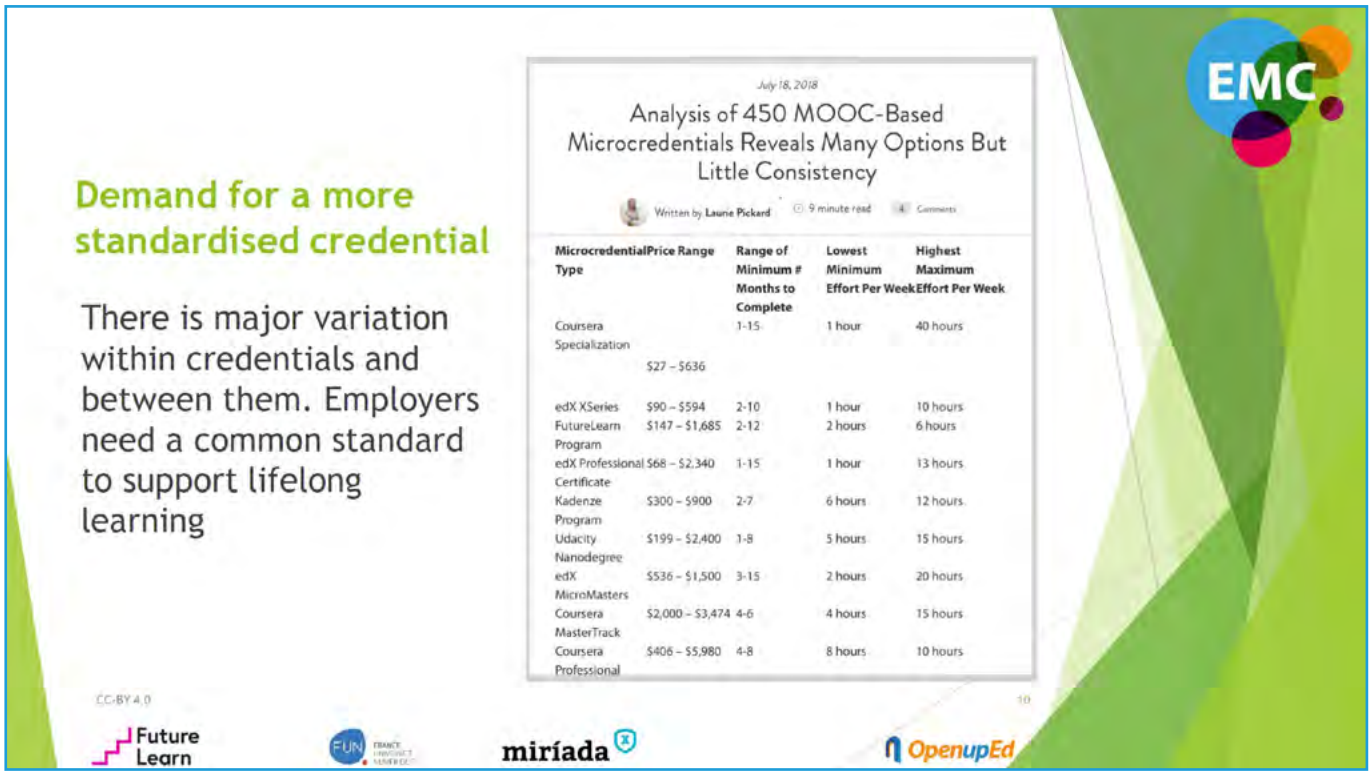
- To create a framework defining the role of MOOC platforms, universities, employment services and companies/sectors in organising MOOCs and digital continuous education and training.
- To make a validated state of the art analysis on the position of MOOCs in the labour market.
- To strengthen the European MOOC platforms by sharing expertise and by collaboration.
- To empower universities, employment services and companies in co-developing, co-delivering and using MOOCs.

He reminded the participants that **online and MOOC programmes provide opportunities for small-scale and intensive personalised teaching and learning, while also providing rich learning environments and allow for flexibility and accessibility**. The number of MOOCs is growing, but they are still not widely considered for the education of employees. Among employees themselves, 31 % of employees consider using MOOCs, while the figure who want to attend classroom training is about twice as much. A survey indicates that the main motivation for being an online student is a desire to change a career path.

Observing that there is major variation within credentials and between them, **EMC is working on a common micro-credential framework (CMF) for MOOCs**, and Mr Ubachs suggested that this would improve employer support for using MOOCs in lifelong learning.

Finally, Catherine Guyonnet, Director of Ocapiat (France),[61] noted that Ocapiat is a French 'skills operator' for the food, fisheries and agricultural sectors. Since April 2019, there are 11 skills operators (Opérateurs de compétences, OPCO), representing all professional branches in France. The OPCOs are tasked with promoting vocational education and competence development in their sectors. Hence, each company is attached to one OPCO, depending on the sector.

[60] See https://emc.eadtu.eu/
[61] See https://www.ocapiat.fr/



The food/fisheries/agriculture sector is very heterogeneous with respect to the level of jobs, HR maturity, and training offered to employees. Moreover, the sector is generally not seen as very attractive by young people, hence it is difficult to recruit skilled labour. To support the industry in addressing these challenges, ACAPIAT and its partners have implemented four new pedagogical practices:

- Multimodality.
- Personalisation of training.
- Digitalisation.
- Easy access to training and inclusive training.

Success factors of the new pedagogical approaches were: rigorous administrative and financial framework; multidisciplinary teams; multimodality; delivery of soft skills; the ability to create an inclusive process; and the comprehensive network of experts and coordinators involved.

There were, however, also some **risks**: the rigorous processes could easily become too heavy; the multidisciplinary teams required new organisational approaches; there were discussions about how to identify the best teaching methods and how to balance tailor-made offers with a rational approach; lack of experience in delivering soft skills; difficulties handling the social fragility of new target groups that have come with the inclusive approach; and the difficulties clarifying roles and responsibilities between network members.

During the Q&A session which followed the presentations, the following main points were raised support up- and re-skilling of the workforce:

- **Accessibility of MOOCs and online learning opportunities**. To ensure people with limited digital skills or from disadvantaged backgrounds can take advantage of the opportunities online for upskilling, it is important schools and mentors, through blended learning, work with people to show them how to access and work with content online.
- **Role of universities in up-skilling or re-skilling**. All participants to the workshop agreed there was a need for universities to invest in up- or re-skilling programmes. Governments could support them to do so through funding and other targeted incentives.
- **Incentivise and finance lifelong learning**. Participants suggested that providing people with 'individual training accounts' could be away forward to stimulate the workforce and unemployed people to engage more actively in LLL.

3.3 BREAKOUT SESSION 3: Building local and regional eco-systems

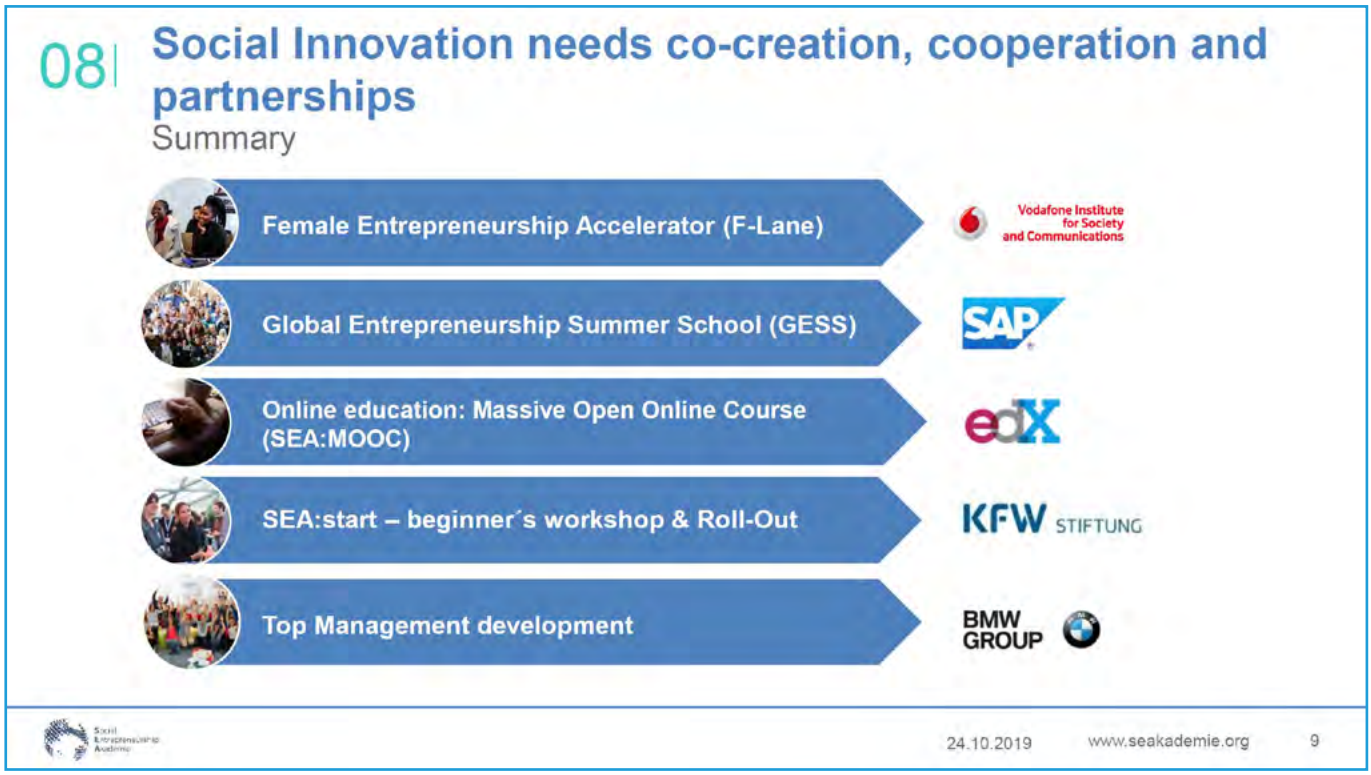
This block focused on how higher education institutions, businesses and other stakeholders can work together to support economic and social innovation at local or regional level. The speakers explored how higher education institutions and local actors can collaborate to design and implement study programmes that ensure graduates acquire the skills and competences needed at both the local and regional level.

3.3.1 WORKSHOP 3.1: Supporting Social Innovation

This workshop was about examples of collaboration between higher education institutions, business and other stakeholders in support of social innovation. Presenters also looked at strategies and concrete examples of how to support students and graduates to become lifelong learners. It was moderated by **Ulla Engelmann** (Head of Unit F2 - Clusters, Social Economy and Entrepreneurship, DG GROW, European Commission), who noted that there has been an over-focus on technological innovation, and less on social innovation. The presentations in this session would offer concrete examples of how entrepreneurship and economic enterprises can embrace social innovation.

The first speaker was **Ms Christina Weber** (Strascheg Center for Entrepreneurship, Munich), who replaced **Ms Kristina Notz** (CEO, Social Entrepreneurship Academy, Munich, Germany). She introduced her presentation by recalling that the universities in Munich in 2010 had established the social entrepreneurship academy (SEA[62]). It has six staff members who **focus on working with universities in establishing and recognising qualifications, providing support, training, start-up advice, and working across a large network**.

[62] See https://www.seakademie.com


08
Social Innovation needs co-creation, cooperation and partnerships
Summary
Female Entrepreneurship Accelerator (F-Lane)
Vodafone Institute for Society and Communications
Global Entrepreneurship Summer School (GESS)
SAP
Online education: Massive Open Online Course (SEA:MOOC)
edX
SEA:start – beginner´s workshop & Roll-Out
KFW STIFTUNG
Top Management development
BMW GROUP
24.10.2019
www.seakademie.org
9


sike
social innovation through knowledge exchange
The Melting Pot
GCU Glasgow Caledonian University
technische universität dortmund
sfs
six
SOCIAL IMPACT LAB DUISBURG
social innovation lab
VERN'
SANTA CASA Misericórdia de Lisboa
Business Innovation Brokers
Deusto
universidade de aveiro
INNOVATIVE PARTNERSHIP: 5 regions, 2 partners in each region – one HEI and one SI partner and an overarching dissemination role
INNOVATIVE CONCEPT: This project aims to lay the foundations for a radical shift in knowledge exchange practice that embraces social innovation by adapting more conventional, commercial and process innovation to the social needs of communities. As such, SIKE will both facilitate the exchange, flow and co-creation of knowledge and stimulate social entrepreneurship and entrepreneurial skills of its participants and stakeholders while also developing new and innovative approaches to teaching and learning through its training programme and online tools.
GCU Glasgow Caledonian University
Business Innovation Brokers

The Academy provides a range of programmes (from days to a year in duration), for example: a start-up lab, awards, certificates, hackathons, a MOOC, and programmes to train the trainers. A hackathon was organised to focus on urban mobility, whereby industry partners and NGOs gave challenges, and students and professionals worked in teams for over 48 hours. A Global Entrepreneurship Summer School (GESS[63]) has been in operation for over 10 years, and takes place across the world (e.g. Europe, Mexico, China, South Africa). It is funded by non-profit and by industry partners. The Academy also runs an accelerator[64] for female empowerment called F-Lane.

Mark Majewsky Anderson (Director, Research and Innovation, Glasgow Caledonian University) and Javier Finez (Director, Business Innovation Brokers – RealiZe) reviewed the activities of Sike,[65] an Erasmus+ funded programme for social innovation through knowledge exchange. Majewsky Anderson set the organisational context for **Glasgow Caledonian University**, which aims to have a global reputation for social benefit through education by 2020.

All research programmes at the university must align to one of the 17 SDGs, and the university mission is to be a university for the common good. He noticed also that some global university rankings are now measuring impact, which is positive for those with a focus on SDGs. Many universities are focused on measuring the value of knowledge via patent and money. The Sike approach is more about knowledge sharing and exchange.

Javier Finez introduced Business Innovation Brokers, which is a small non-profit cooperative in north of Spain. **Social value is at the core of their activities in helping businesses to grow**. Their Erasmus+ Knowledge Alliance project covers regions in the UK (Scotland), Portugal, Spain, Croatia and Germany. Their aim is to develop a professional office to support social innovation, for example providing online tools and training, and a knowledge exchange unit. Sike aims to develop both a broad and deep understanding, providing an open space, for example where people all over the world are offering skills and collaboration opportunities.

Tomasz Szymczak (CEO of Gdańsk Entrepreneurship Foundation,[66] Poland) presented to activities of his Foundation, which was established by the city of Gdańsk to support new start-ups. There are 9 staff (currently 6 women) who are predominantly **teaching other teachers in the aspects of the market economy, new techniques and new business solutions**.

The city historically has been strong on shipbuilding, and there is a move to reduce the male dominance in the sector – 'women build ships too'. However, that requires not only changing the gender balance in shipbuilding, but also in the levels of **female participation in the education programmes for shipbuilding**. There also is an action called 'Starter for Mums'.[67] There is a strong emphasis not just on bringing new jobs to the city, but in ensuring that the skills of all the population can be utilised.

A strategic approach also is evident in moves to attract start-ups from India to come to the city (noting the uncertainty of going to the UK with Brexit). They offer co-working spaces,[68] networking and crowdfunding support, and help cultural institutions to benefit from new technologies. In June 2019 the city and region were awarded a European entrepreneurial region award for 2020.[69]

The final presentation in this session showed with great clarity how a socially driven and ground-up initiative could empower socially excluded young people. Ibrahim Ouassari (Founder at the start-up incubator 'Molengeek',[70] Belgium) showed how young people who had low levels of official education qualifications could be provided with information technology training and business skills, and helping them to become 'included' in the high-technology labour market.

The social innovation Molengeek offers **events, training, hackathons, digital marketing, software and coding training, start-up weekends, making technology very accessible to young people who left school early**. The initiative helps young people to find entry points into the technology sector, especially young people whose educational experience has been one largely of failure.[71]

Mr Ouassari gave an example of a coding school for people aged 18-25. No academic or skill background is required, and the training is fully accessible 24/7, and the project can lend equipment to participants. The **success of the Brussels initiative has led to recognition and investment from the tech sector**,[72] and expansion into related projects in Padova, Amsterdam, Antwerp and Morocco.

The project has a 93% exit rate success, has helped 200 young people to 'graduate' with skills and competences for the tech labour market, and the graduates have established 35 start-up companies.

[63] See https://www.globalsummerschool.org
[64] See https://www.f-lane.com/programme/
[65] See https://sike-eu.org/
[66] See https://www.linkedin.com/company/inkubator-starter and http://inkubatorstarter.pl/
[67] See http://inkubatorstarter.pl/starterdlamam/
[68] See http://inkubatorstarter.pl/#oferujemy
[69] See https://cor.europa.eu/en/news/Pages/European-Entrepreneurial-Region-Award-2020.aspx
[70] See https://molengeek.com/
[71] The Google 'Penguin' award for failure was noted as a positive approach to learning through failure https://blueprintcreativeinc.com/why-google-rewards-its-employees-for-failing/
[72] See https://wsbuzz.com/world-news/google-samsung-eu-invest-in-belgiums-molengeek/

In the subsequent discussion participants considered how universities could move to a stronger focus on social value, and what indicators could be used. The key messages emerging form the discussion are:

- **Social innovation clearly relates to impact**, but the social return on investment is a difficult concept to measure.

- **Government funding should stimulate R&D with a strong focus on social innovation**. This can support a change in organisational behaviour and encourage the development of new business models, especially for SMEs who need to communicate their social innovation experience more widely.

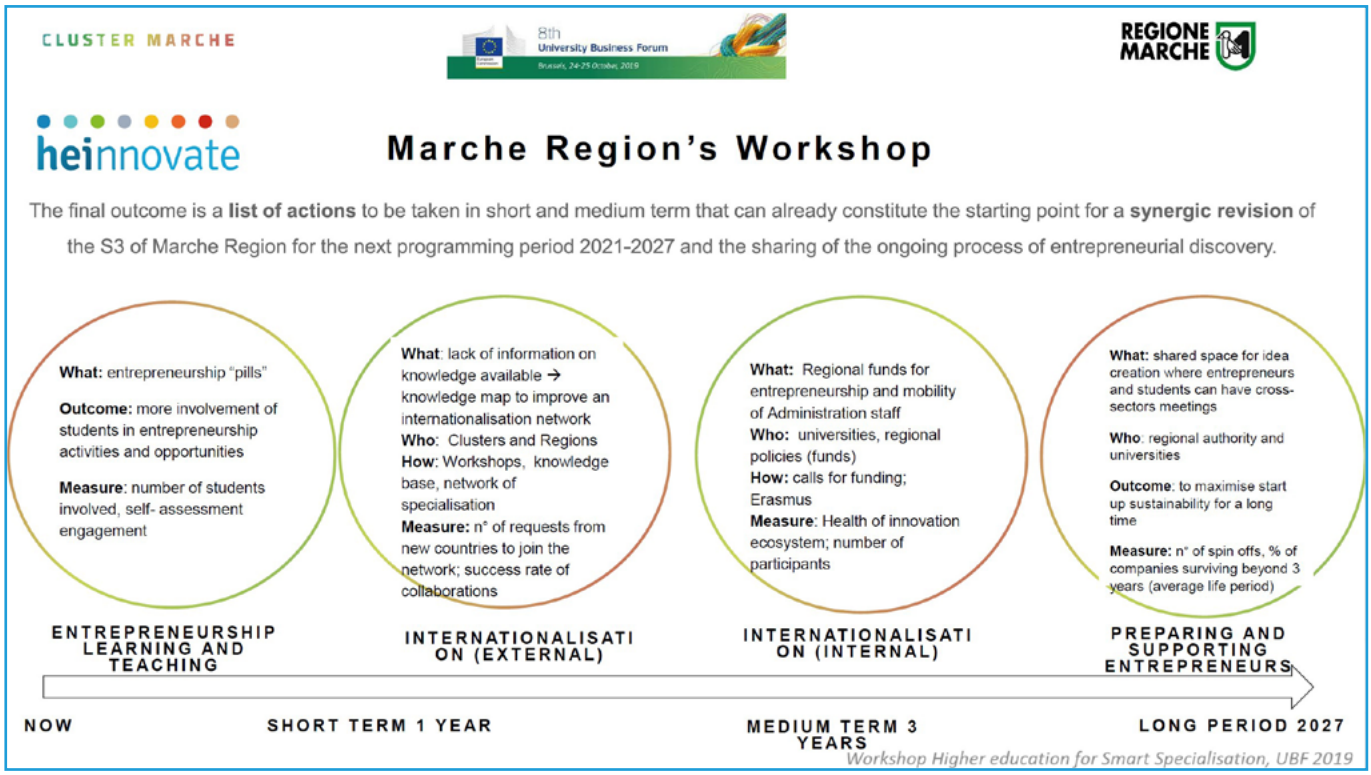
- **Defining social innovation remains challenging**, especially to the extent it is clearly different from entrepreneurship, and whether the focus should be minimalist (develop students) or maximalist (change the system), and whether it is also different to social movements.

- **Employment of unqualified yet highly skilled people**. The Molengeek example asks the question about how businesses can hire young people who have no academic history, but who have new skills. Big companies are attracted to this process because of the skills shortage, and the slow rate of development in a classic curriculum. People can now self-learn, and rapidly acquire skills through support activities. These people show how they can quickly acquire skills and be very flexible. They do not come with a pre-existing assumption that they are widely qualified.

3.3.2 WORKSHOP 3.2 Higher Education for Smart Specialisation

In this workshop, participants learned about collaboration between higher education institutions and local actors in support of local and regional eco-systems – particularly with regards to the design and implementation of Smart Specialisation Strategies (S3). The workshop was moderated by Marek Przeor (DG REGIO Unit G1- Smart and Sustainable Growth, European Commission), who noted that universities can be both very supportive, but at times very conservative in their approaches to UBC. He noted the potential for a stronger focus on smart specialisation in the next EU financial perspective, emphasising four pillars: (1) build capacity of research and technology transfer; (2) digitisation and industry 4.0; (3) SME scale-ups and (4) start-ups; and, skills. Universities have a role to play in all four pillars.

A group of student artists were present at the Forum and their work is documented in this report. See page 77 for more details.



The first presenter was Maria Farano (Fondazione Cluster Marche, Italy). She detailed **the use of the HEInnovate self-assessment tool within the Regione Marche, where Foundation Cluster Marche** (FCM) provided support to carry out the workshop. FCM is a public-private partnership with universities, research centres, and local large and SME companies. Its mission is to increase local competitiveness through synergies and knowledge transfer. It involves 130 companies, 10 research centres (including universities), and 19 associate partners. S3 is core to their activities which cover areas such as mechatronics, ambient intelligence and home automation, health and wellbeing, and sustainable manufacturing. They operate an online platform for knowledge sharing and building an innovation culture.

Marche Region has been identified by the European Commission as a challenging territory where a debate between universities and local actors through the HEInnovate platform could be tested. According to this, last 30th September Marche Region held a workshop to encourage such debate, by linking together the regional S3, the entrepreneurial discovery process and HEInnovate tool. The main goal was to foster a structured discussion to identify strengths and common areas for actions for the regional authorities. The four universities of the region participated to the workshop along with research centres and companies. A list of actions emerged for them to focus on up to 2027 for the short, medium and long term, including: entrepreneurship learning and teaching, internationalisation (external, then internal) and preparing and supporting entrepreneurs. Its use enabled an open and honest exchange between all the stakeholders.

Anne Delouis (Vice-President, University of Orléans, expert in Smart Specialisation Strategies, Val de Loire Region, France) then detailed **the role of S3 in the region with a population of 2.6 million, with 60,000 employees in higher education, a focus on tourism and a particular strength in the cosmetics industry** (involving Cosmetic Valley France[73]). S3 is particular important in biotechnology and applied services for health and cosmetics, with the Cosmetosciences platform[74] providing an important focus. Le Studium[75] (the Loire Valley Regional Institute for Advanced Studies[76]) coordinates conferences, public lectures, and welcome 15 international research fellows each year for 12-18 month residency (in universities and public research bodies). Two fellowships are for the cosmetic science programme, and it supports dual education through a bachelor degree in cosmetic science and formulation design.

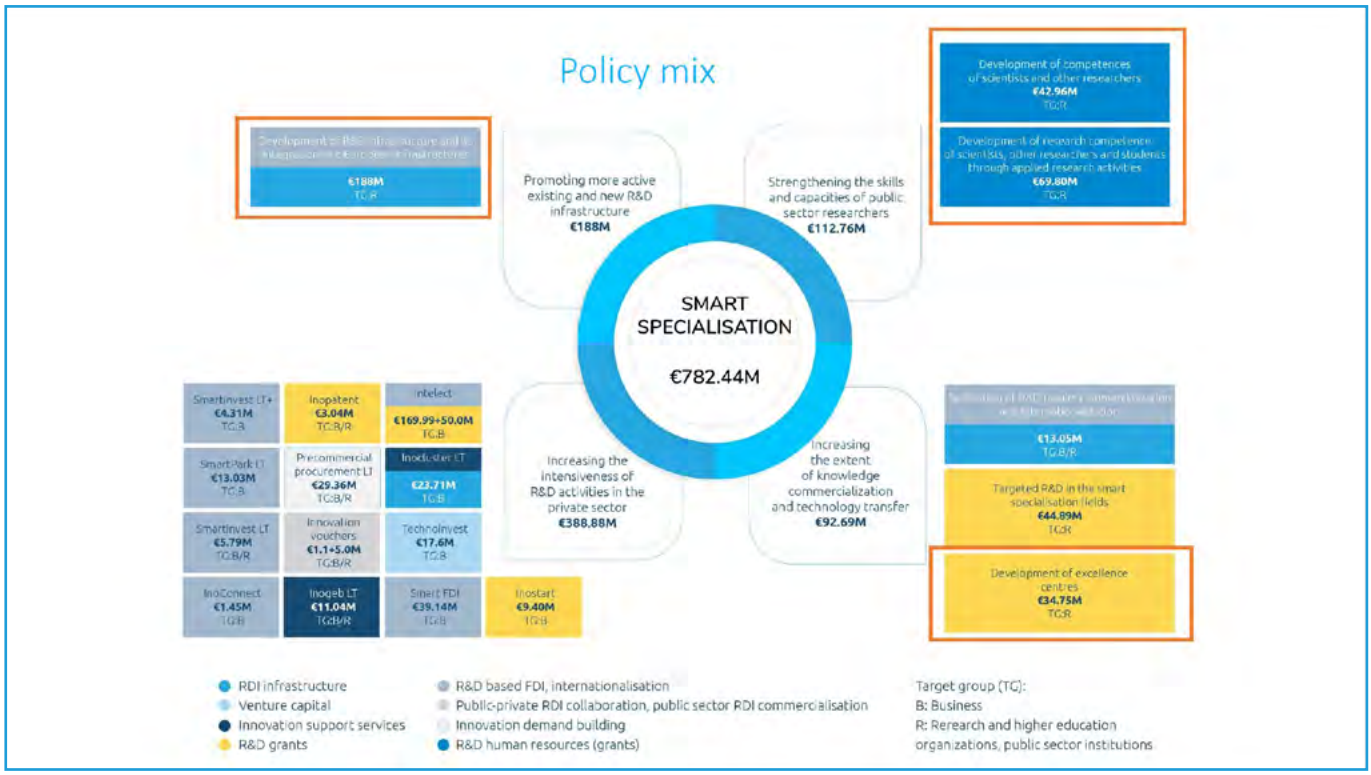
[73] See https://www.cosmetic-valley.com/
[74] See http://cosmetosciences.org/
[75] See http://www.lestudium-ias.com/
[76] I.e. a Marie Sklodowska-Curie Co-Fund initiative

WeLab Cosmetic Laboratory at the University of Orleans[77] is focused on graduate students. They develop and test cosmetic products, and start-up companies have emerged. The laboratory can be used by local SMEs and anyone with a convincing project. It provides marketing advice and networking support, resulting in 30 projects and 3 start-up companies so far.

The Institute for Advanced Studies has been appreciated by higher education, since fundamental research occurs there, as well as the more commercial SSS linkage to the region. WeLab binds together technology support, marketing and networking into a coherent service to support innovators from the individual to the corporate level.

Ramojus Reimeris (Head of Innovation and Policy Analysis Unit, STRATA,[78] Lithuania) looked at **the S3 strategy for Lithuania**, which is currently a single region. STRATA is the Government Strategic Analysis Centre (formerly known as MOSTA). The S3 strategy **aims to increase added-value, knowledge intensive, highly qualified and labour-intensive economic activities**. In developing the strategy there was good involvement of the Joint Research Centre, universities and research institutes. Challenges identified included a declining number of students both in and applying to technology programmes. The higher education sectors experiences difficulties in recruiting and maintaining academic staff. The government's response involves a systemic effort to increase quality across the higher education sector, diversification to research and a clear third mission.

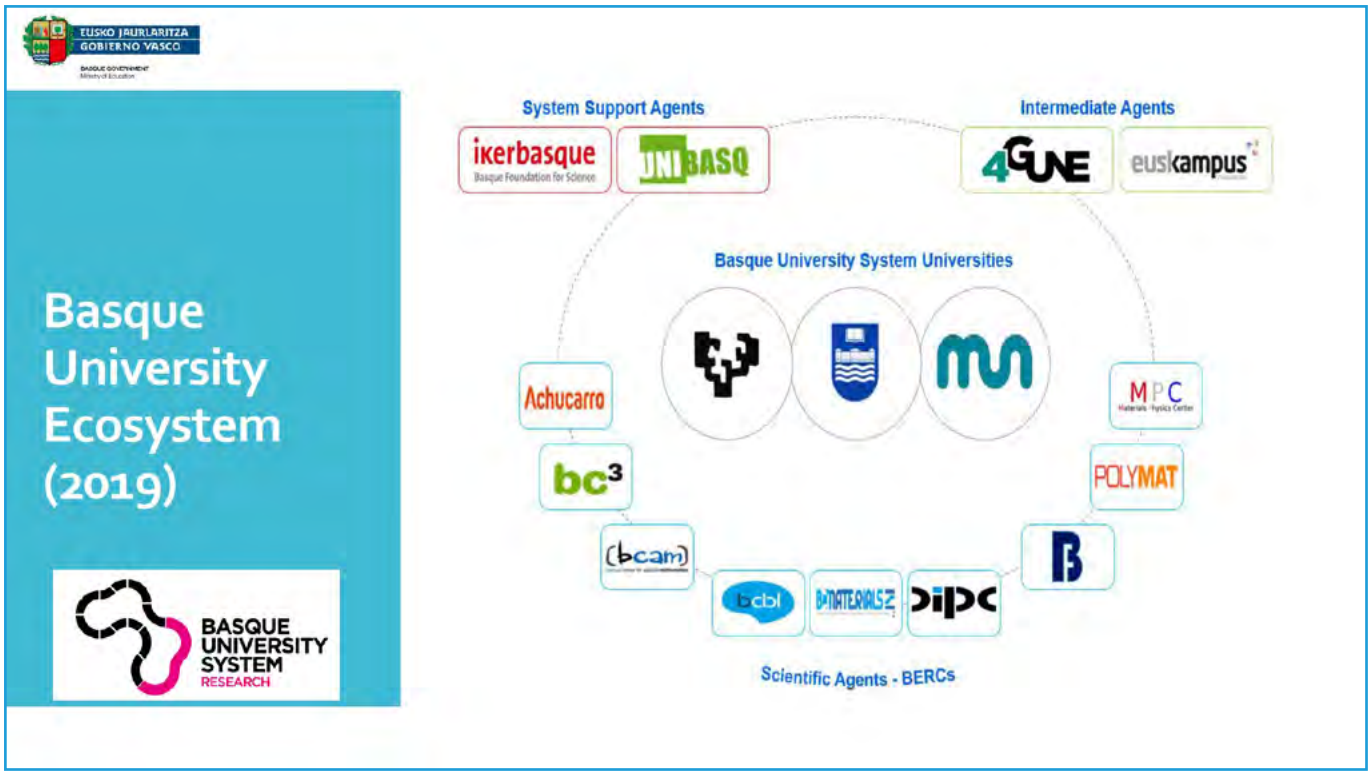
[77] See http://cosmetosciences.org/we-lab-cosmetic/
[78] See https://strata.gov.lt/en/



They found that **S3 did not have a significant impact on decision making regarding student studies**. Universities have tended to focus on existing capacities, focus on demand by the labour market. They realised that colleges were not well involved (they mostly do not undertake research). What is needed is long-term investment involving also trust and stability of priorities. Furthermore, there is a worrying time lag, since the first cohorts of undergraduates (who often go on to Master) will enter labour market after 6-7 years, which is the lifetime of the S3 programme. Furthermore, research is underfunded, volatile, fragmented, short duration, and Lithuania lacks skilled researchers with a limited participation in Horizon 2020 and similar framework programmes.

Adolfo Morais Ezquerro (Deputy Minister for Higher Education and Research, Basque Government, Spain) presented **the S3 strategy for the Basque Region**[79] (2.2 million inhabitants), which is characterised by "Auzolanean" – a science & technology ecosystem that is locally anchored, and which aims to promote internal cohesion, external collaboration and excellence. There have been three universities in the region: 1 public, 1 linked to the church and 1 linked to an industrial group, with 56,000 students and 6,800 staff in 34 faculties. There is now **a move to a more singular Basque University System**, linked through nine research centres, and connected to different stakeholders.

[79] See https://s3platform.jrc.ec.europa.eu/regions/ES21/tags/ES21 and https://www.spri.eus/euskadinnova/es/innovacion-tecnologica/ambitos-actuacion/pcti-euskadi-2020/163.aspx



4GUNE[80] is the key UBC connector for universities. There is the Basque Research and Technology Alliance[81] involving 16 science and technology departments, with 3,700 researchers, and a budget of €300 million (22% of Basque R&D expenditure), and which has helped to generate 100 patents and 1,300 indexed publications.

A further focus is on **sound and sustainable policies, supported by strategic and dynamic planning**. The Basque University System Plan 2019-2022[82] includes a financing plan, and has moved the policy focus away from universities deciding what to do, to a third stage where strategic planning is a joint effort between government and universities to achieve the objectives of both stakeholders. €750 million will be invested by the universities and the government into an agreed focus on biosciences and health, energy, advanced manufacturing. Ikerbasque – Basque Foundation for Science[83] – is a pillar of the strategy, focused on attracting new top-level researchers to sustain the strengthening of the Basque University System.

There will be strong cross-stakeholder innovation, taking on new specific approaches and a European perspective. 4GUNE helps this through building a new cluster of knowledge, linking faculties across universities where capacities have been mapped, and collaborative mixed degrees have been created. There will be clear accountability through robust monitoring, evaluation, and transparent metrics.

The Basque University System Plan will involve a single joint scoreboard, and the government focus is on the evolution of the whole university system. As a consequent, the co-creation at all levels, and across all stakeholders, of policies and research strategies is very important. Overall, the strategy is about effecting organisational change and moving universities to a different structure for the future.

[80] See http://4gune.eus/en/quienes-somos/
[81] See https://www.bizkaiatalent.eus/en/brta/
[82] See http://www.elperiodicouniversitario.com/en/news/signing-of-the-contracts-program-between-the-department-of-education-and-the-university-of-the-basque-country-the-university-of-deusto-and-mondragon-university
[83] See https://www.ikerbasque.net/en

3.4 BREAKOUT SESSION 4: Working together to tackle societal challenges and build societal trust

This block focused on activities involving higher education institutions, business, research community and social organisations to address societal challenges and issues, and how these activities can enrich the learning experience of students. It also discussed how higher education and business can cooperate to overcome challenges in areas, such as artificial intelligence, big data and automation.

3.4.1 WORKSHOP 1: A driver to implement the Sustainable Development Goals

This workshop was moderated by **Sieglinde Gruber**, DG RTD, Head of Unit, Healthy Oceans and Seas (European Commission). Ms Gruber introduced the workshop by referring to the EU's recently adopted (May 2018) Council Recommendation on key competences for lifelong learning. As one of the eight key competences described, **citizenship competence** is defined as "*the ability to act as responsible citizens and to fully participate in civic and social life, based on understanding of social, economic, legal and political concepts and structures, as well as global developments and sustainability*".[84]

Reference is made explicitly to the UN Sustainable Development Agenda 2030,[85] saying that EU Member States should "*mainstream the ambitions of the UN Sustainable Development Goals (SDG), in particular within the SDG4.7, into education, training and learning, including by fostering the acquisition of knowledge about limiting the multifaceted nature of climate change and using natural resources in a sustainable way*".[86]

She then continued by saying that, in the field of higher education, Times Higher Education in 2019 released a **pioneering new University Impact Ranking**, attempting to document evidence of universities' impact on society, rather than just research and teaching performance.[87] This first edition of the ranking includes more than 450 universities from 76 countries globally, and assesses universities on metrics that are based on 11 of the 17 UN SDGs. By putting forward societal impact as a new indicator of excellence, the ranking aims to not only raise awareness on the changing role of universities, but to also impact on teaching and learning and increase the accountability of universities.

She then presented some **key figures from a study conducted by PwC (2015)**. 90% of citizens surveyed indicated it was important for businesses to engage with the SDGs. 71% of businesses surveyed said they already knew how they would engage with the SDGs, but only 41% said they would implement the SDGs into their company strategy and in the way they conduct business within the next five years, and only 13% indicated they had the tools to assess their impact against the SDGs.[88]

The first speaker was **Prof Angelo Riccaboni**, University of Siena and Coordinator of the PRIMA project (Italy). Prof Riccaboni advised that we **should look at the SDGs as 'transformations'**, which is different from thinking about them as targets to be achieved or 'boxes' to be ticked. He also felt that many people do not really understand the intricacies of the individual SDGs, and how they are interlinked.

He then presented on the EU-funded **PRIMA project**,[89] which brings together 19 countries, launching calls for projects for an amount of approximately €500 million in three areas: (1) water management, (2) farming systems, and (3) the agro-food value chain. PRIMA stands for Partnership for Research and Innovation in the Mediterranean Area. Through a first call in 2018, 16 projects were funded. Lessons learnt from the projects funded so far on the role of business to achieve the SDGs are that: (1) the project has managed to align businesses in the food sector in terms of how they approach the SDGs; (2) monitoring and reporting standards need improvement; and (3) scientists need to collaborate more amongst each other, and to reach out the world to disseminate project results and ensure the projects' sustainability and transferability.

Dr Stijn Donders, Research Project Manager, Siemens Industry Software NV (Belgium) provided an overview of the different activities in which Siemens is involved, which actively contribute to reducing carbon emissions, e.g.: the electrification of wind mills, ships and e-buses, the automation of metros, and digitisation, for example projects on remote control of wind power and smart grids for virtual power plants. Dr Donders also mentioned that **Siemens plans to be entirely CO2-neutral by 2030**.

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[84] COUNCIL. 2018. Council Recommendation of 22 May 2018 on key competences for lifelong learning. Council of The European Union. Published May 22. Available: https://europa.eu/!fB67yH. [Accessed June 3 2018].

[85] UN. 2015. Transforming our World: The 2030 Agenda for Sustainable Development. United Nations. Published August. Available: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf. [Accessed January 6 2016].

[86] Ibid.

[87] See: https://www.timeshighereducation.com/rankings/impact/2019/overall#!/page/0/length/25/sort_by/rank/sort_order/asc/cols/undefined

[88] PWC. 2015. Make it your business: Engaging with the Sustainable Development Goals. PricewaterhouseCoopers. Available at: https://www.pwc.com/gx/en/sustainability/SDG/SDG%20Research_FINAL.pdf. [Accessed June 4 2018].

[89] See http://prima-med.org/about-us/prima-in-brief/

A group of student artists were present at the Forum and their work is documented in this report. See page 77 for more details.

He then continued by explaining how Siemens is working on a range of **projects to help companies make safer and greener products**. To ensure the products Siemens develops are as innovative and impactful as possible, Dr Donders highlighted the importance of building strong partnerships with university research centres. This is important as it ensures the company to:

- **Use the best methods**. As part of the collaboration with the university, these methods are developed up to the level of industrial application.

- **Secure the best people for the job**. In order to do this, Dr Donders explained that their own R&D staff often visit top universities, to contribute to classes, give presentations and meet students and PhD researchers.

- **Share risks, competences and costs**.

Dr Donders then continued by explaining that **Siemens has a long track record of hosting PhD researchers** (for example Marie Sklodowska-Curie fellows) **and students**. Siemens hosts these researchers in an industrial environment, and has them working on industrial problems, industrially supervised by Siemens and also supervised by an academic from a strategic university. Many students and PhD researchers also stay working for the company afterwards. This means that, **in addition to being good for innovation, hosting researchers is a good HR instrument**.

Next, **Line Gry Knudsen**, Education Director of the EIT KIC on Raw Materials, explained that her KIC focused on climate change. The 12 issues the KIC focuses on are all related to UNESCO's SDGs. She then highlighted two key lessons on how businesses and universities could integrate the SDGs in their activities:

(1) **Understand the interconnectedness of the SDGs**. Ms Knudsen underlined the importance of not seeing the SDG's as 'standalone topics or areas'. It is important for both universities and businesses to understand that each SDG cuts across a wide range of different challenges. In order to contribute to building sustainable and resilient societies, it is important to understand the 'systems they are sitting in', and how they are linked with one another.

(2) **Promote 'challenge-based learning'**. The Climate KIC has set up a number of educational programmes (e.g. Summer Schools, 'Climathon'[90]) through which students are empowered to work on real-life challenges with companies and start-ups in the field of climate change. She argued that this type of educational programmes can really change the system bottom-up, but there is a need to reflect on how to upscale these initiatives.

Next, **Ashild Aaro**, Head of Startup Lab, presented how she developed a university module on Sustainable Innovation[91] at the University of Bergen (Norway). The course is an interdisciplinary course at Bachelor level, and has been available to students across the whole university as an optional module since Spring 2019. The **course was developed by students**, for students, and includes a practical and theoretical toolkit for sustainability and innovation. To do so, the course includes guest speakers from academia, the non-profit and business sectors, as well as giving the students practical experience to actively work on the SDGs through collaborating with actors in the Municipality of Bergen.

[90] See https://climathon.climate-kic.org/en/
[91] See https://www.uib.no/en/course/CET201

The discussion following the presentation focused primarily on how to upscale innovative practices, and how to increase funding and improve data on the impact of university-business cooperation in the field of the SDGs. The key messages emerging from the discussion are:

- **Improve impact measurement of SDG-focused initiatives and incentivise SDG research**. Since the SDGs are cross-cutting and often tackle a range of challenges, it is hard to measure impact of the SDGs one by one. However, it is important to be able to demonstrate the impact of the SDGs effectively in order to impact on future funding decisions. Participants mentioned that government actors should provide additional funding and incentives for SDG-focused research.

- **Empower students, citizens and grassroots initiatives to drive system change**. Students, small-scale projects, and society at large need to be given more autonomy, resources and a platform to voice their concerns and to scale the many inspiring initiatives in the field of tackling the SDGs in order to drive systemic change. Universities can contribute to providing such a platform through teaching and organising debates for students and the workforce on the SDGs. It was also mentioned that, through our consumption decisions as citizens, impact will be made.

- **Citizens' consumption decisions have an impact on policy and practice**. Although the participants mentioned there was a need for citizens to be given more opportunities to impact on decision-making processes, it was also mentioned that, through their consumption decisions, citizens can already make a big impact on policy and funding decisions.

- **Although there are limits to growth, we cannot achieve the SDGs without business and innovation**. In addition to public investments, private companies are making a big contribution through a range of innovations to global sustainability.

- **A need to critically review (EU) funding programmes** related to agriculture and fishing to assess their potential negative impact on the SDGs, e.g. subsidies meant to support agriculture and fishing which are in fact harmful for the environment.

3.4.2 WORKSHOP 2: Artificial Intelligence and automation – opportunities and threats

This workshop was moderated by **Fabrizia Benini** , Head of Unit F4 - Digital Economy and Skills, DG CNECT (European Commission). The presentations in this workshop at the opportunities and threats for universities and businesses, caused by the developments of in the fields of automation, AI and big data.

The first speaker was **Colin de la Higuera** of the University of Nantes (France). Mr de la Higuera gave an overview of a report published on 22 July 2019 upon request of UNESCO on **the implications of AI on education, and which skills teachers should acquire**.[92] He highlighted:

(1) **Data is inconsistent**. The quality and functioning of AI is dependent on the quality of the data it gets fed. Data is never perfect, always contains contradictions and has a certain degree of uncertainty. This is important to keep in mind when relying on information provided by AI.

(2) **Randomness**. "*The world is becoming more and more deterministic through better controlling randomness*". In the world of data, however, nothing is every 100% certain, and it is important to understand the impact of randomness in AI. He gave the examples of studying for an examination: it is not because you study for an exam, that you will necessarily pass the exam.

(3) **Coding and computational thinking**. It is impossible to teach AI without teaching coding. To be able to code means, to be skilled at problem-solving, using and testing data and ideas.

(4) **(Computer-assisted) critical thinking)**. In a world where the borders between true and false have become increasingly blurred, it has become increasingly important to understand how computers work in order to distinguish truth from fiction. For example, it becomes very hard to distinguish 'man-made' from 'computer-made' products.

(5) **Post AI humanism**. AI has had an impact on our understanding of the world, and four notions in particular:

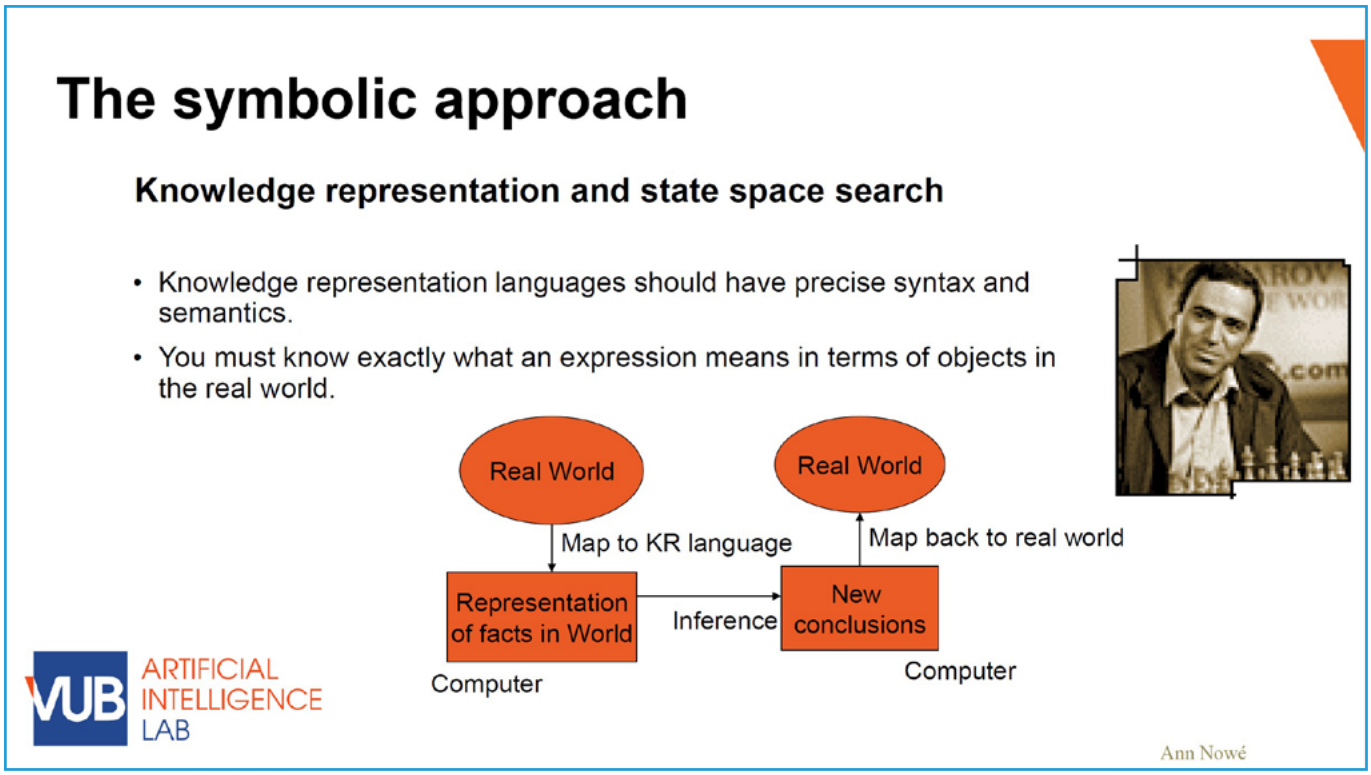
- Intelligence: AI is modifying our understanding of intelligence: for example, it is no longer necessarily the ability to process large amounts of data, but rather the ability to think critically and other 'soft' skills.
- Experience: 'real' experiences are disappearing and changing, becoming more digital or artificial in nature.
- Creativity: this is no longer a human feature alone. Certain AI systems can also create art or write fully-fledged stories.
- Truth: is becoming increasingly blurred, as AI has the potential of taking on previously felt to be only 'human-like' abilities such as bluffing, lying and deceiving.

The second speaker was **Markus Lippus**, Co-founder of MindTitan[93] (Estonia). His presentation focused on the work of MindTitan, as well as the data skill sets that are needed from an entrepreneurial perspective. MindTitan is a development agency working with a number of industries across a range of countries, providing them with AI and machine learning solutions.

He argued that **the job of a data scientist is not much more than problem-solving with a certain set of tools**. A data scientist needs to be able to formulate solutions for data problems into a language that will make the software understand how to solve them. He then extrapolated this to scientists and researchers in general. He argued that what makes a good scientist is not the specific IT or subject-specific skills, but rather the transversal skills such as critical thinking, creativity and problem-solving.

[92] De la Higuera, C. A Report about Education, Training Teachers and Learning Artificial Intelligence: Overview of key issues. UNESCO and University of Nantes. Available at: http://cdlh7.free.fr/UNESCO/Teaching_AI-cdlh.pdf

[93] See https://www.mindtitan.com/



Next, **Prof Ann Nowé** of the AI Lab at the Vrije Universiteit Brussel (Belgium) gave an overview of the different kinds of projects her research centre was working on. She started her presentation by saying that, back in 1965, when AI first entered the scientific discourse, AI related to modelling knowledge and research processes so that machines could stimulate, emulate or replicate tasks which were typically associated with human activities.

She then went on to explain the difference between the 'symbolic' and 'hybrid' approaches to AI. In the **symbolic approach**, the idea is that one tries to understand the exact logic and 'syntax' of an expert's language of reasoning, and then tries to translate this into a language for the AI system to copy. In the **hybrid AI approach**, by contrast, one also tries to look at the sub-symbolic level. This is important if we are to build transparent, explainable and responsible AI systems which follow certain ethical and moral codes.[94]

Ultimately, Prof Nowé argued, the decision to automate certain processes will be based on humans' decision on whether or not this is ethical or not, and which kinds of AI errors we are ok to allow. She finished her intervention by arguing that, **at present, our education systems teach History, Biology, Chemistry, Geography, etc to teach us about the world. This should, however, also include more on the digital world**.

The last speaker was **Ilkka Tuomi**, Chief Scientist and Founder of Meaning Processing Ltd (Finland). Mr Tuomi presented on **the future of skills and jobs for data-driven computing**, linking AI to learning theories and competence models.

[94] N.B. On 8 April 2019, the European Commission's High-Level Group on AI presented 'Ethics Guidelines for Trustworthy Artificial Intelligence'. According to these guidelines, AI should be lawful (i.e. respecting all applicable laws and regulations), ethical (i.e. respecting ethical principles and values) and robust (both from a technical perspective while taking into account its social environment). See https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai

He started his presentation by proposing **'data-driven adaptive computing' as an alternative term for AI**, as it comes down to the ability to derive statistical regularities from very large amounts of data. He then started his comparison of human learning and AI by first looking at the nature of human activity, expanding on his report 'The Impact of Artificial Intelligence on Learning, Teaching and Education', prepared for the European Commission in 2018.[95] According to Mr Tuomi, **all human activity can be described at three levels** that cannot be reduced to each other:

(1) **Cultural level**: this is the level where humans engage in socially and culturally meaningful activity. This is also the level where social explanations of *why* we do something are relevant. For example, a teacher can say that she or he is trying to teach students. Such an explanation becomes meaningful in a broader social context, where education and learning are parts of inter-generational transfer of cultural knowledge, acquisition or productive skills, and, more broadly, human development.

(2) **Cognitive level**: this is the level where we can ask *what* a person is doing in a given concrete situation and social context. For example, a teacher can say that she or he is giving a lecture.

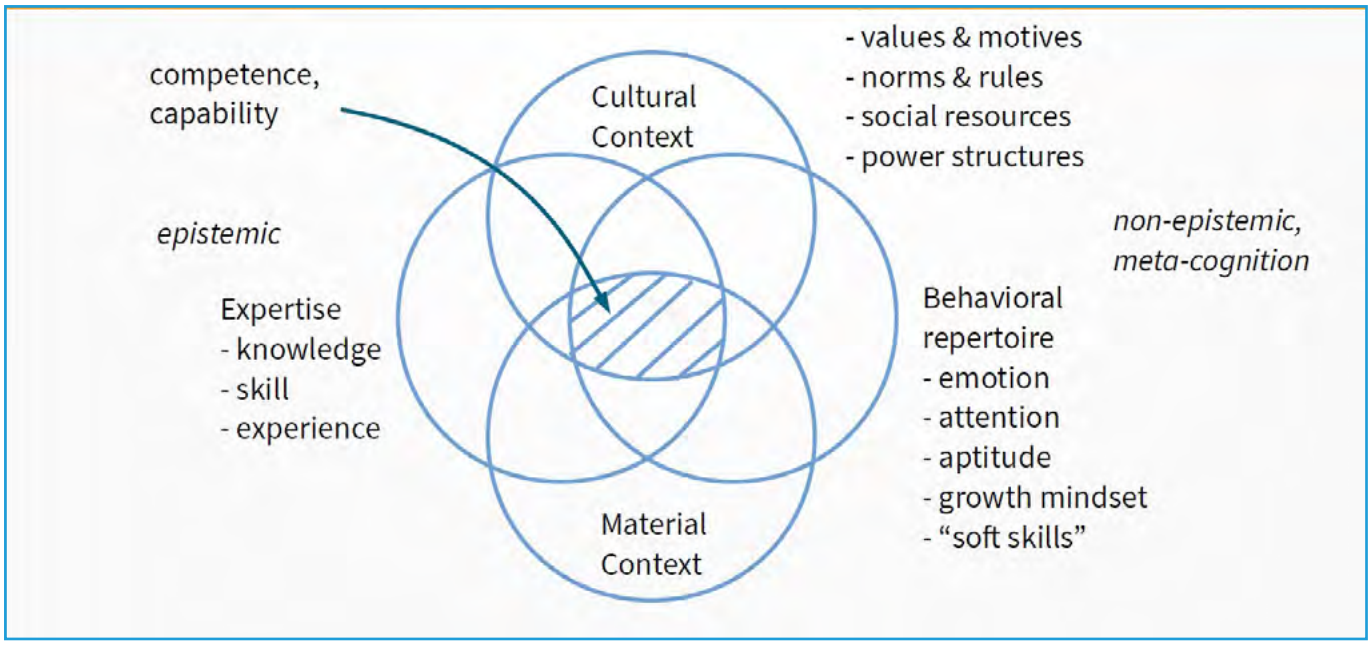
(3) **Behavioural level**: this is the level where acts become observable and implemented using the tools available. At this level, we can ask *how* something is done. For example, a teacher can say that she or he is showing a presentation using a computer.

An important point to note is that **these three levels cannot be reduced to each other**. Just by observing action, we cannot know what a person is doing. As in language, we cannot derive the structure of words from the characteristics of letters, and we cannot know the meaning of sentences and utterances by concatenating dictionary definitions.

Mr Tuomi explained that if cultural and cognitive level activities are more social in nature, cognitive and behavioural level activities are more physiological. **AI then, he argued, is able to operate at the bottom and middle levels of human activity**, i.e. activities at the 'reflex' or 'behavioural' level which take less than one second of thinking; and activities at a more 'cognitive' and 'symbol' processing level. At the top level, he said, there is currently no AI. This top level is highly important for policy, as it is the level where innovation, knowledge creation and social learning happens.

Next, Mr Tuomi expanded on **the complexity of competence**, which according to Tuomi comprises four overlapping dimensions. He argued that epistemic and non-epistemic elements of competence are influenced by the cultural and material context in which they are embedded. Traditionally, schools focused on epistemic knowledge, i.e.: the transfer of knowledge, skills and experience, and this was important in the industrial age. In the recent decades, changes in the technological environments and cultural contexts have shifted the focus towards non-epistemic components of competence, including behavioural characteristics such as creativity, critical thinking, and self-regulation.

[95] Tuomi, I. (2018). The Impact of AI on Learning, Teaching and Education: Policies for the future. Luxembourg: Publications Office of the European Union. Available at: https://ec.europa.eu/jrc/en/publication/impact-artificial-intelligence-learning-teaching-and-education



He then underlined that **AI automation is data biased**. Whereas most recent studies on the future of work have used task-biased models that assume that routine tasks can be automated, a more accurate view would be that the availability of training data determines whether data-driven AI can replace human effort. Almost all data used to develop AI systems now comes from intelligent humans. On the other hand, the vast amounts of data generated by humans also means that data-driven computing is now not only possible but also necessary. One important consequence of the ongoing innovation dynamics is that there is an inherent need to automate global production processes so that they can operate in real time. This means **we need to rethink education** also. To this end, Mr Tuomi referred to his publication prepared for the JRC on 'The Impact of AI on Learning, Teaching and Education'.[96] He also mentioned that he is at present working with the JRC on an "AI Handbook with and for Teachers'", co-designed with teachers and educational AI experts.

After the presentations the participants were able to ask questions to the presenters on different issues relating to the threats and opportunities of AI, big data and automation for the future of education and business. The key messages emerging from the discussions are:

- **There is a need to upskill teachers on AI and computational thinking**. At the moment, there is still a lot of resistance in the teacher community to learn about AI and computational thinking. It is important to change their mind-sets and make them understand that it is about learning about problem-solving in a slightly different way. A lot of efforts are being made in this respect in the UK, France and some Federal States in Germany.
- **Learning to code and learning about AI develops a broad set of skills**. By teaching how to code and better understand AI in general, people gain a broader set of analytical, problem-solving and transversal skills, which can be applied across a range of other disciplines. It is also important to make people understand that machines are not necessarily something to be afraid of. As an example, one participant said that "*many machines still struggle to recognise cats*".
- **The 'danger' of automation, and its impact on values and norms**. Developments in big data and AI technology have changed society's perceptions on the categorisation of 'human' and 'computer' activities. At the same time, despite the increasing creativity and autonomy of algorithms, it is important to remember that AI can be controlled, and there is no reason to fear technology.
- **We need to rethink the way we teach and learn**. Finally, the workshop participants all agreed that rethinking education is more than rethinking curricula alone. It is about rethinking the way we learn, and integrating digital technologies and AI in teaching and learning. In this context, participants highlighted the importance of 'starting early'. Teaching children to acquire non-epistemic knowledge or meta-cognition and the 'learning to learn' in conjunction with digital skills needs to happen at an early age. Many children from disadvantaged backgrounds, however, do not have access to such resources, and this raises further questions on education and inclusiveness.

[96] Ibid.

3.5 BREAKOUT SESSION 5: Developing an entrepreneurial culture

The workshops in this block focused on examples of university-business cooperation supporting the development of entrepreneurial attitudes at the organisational and individual level.

3.5.1 WORKSHOP 1: Developing entrepreneurial organisations

The aim of the workshop was to discuss initiatives to support innovation and entrepreneurship in higher education institutions and systems. The workshop was moderated by Begona Arana, Head of Unit C1 - Innovation and EIT, DG EAC, European Commission. She introduced the session by indicating that the focus was to take the experiences in the morning sessions a step further by discussing ways to operationalise them in universities.

The first two speakers were Rebecca Allinson and Zsuzsa Javorka from Technopolis, who are supporting institutional change in higher education through HEInnovate.[97] **HEInnovate supports institutional change in higher education institutions (HEIs) that strive to become more entrepreneurial**. It is a flexible online and free self-assessment tool that helps institutions explore their entrepreneurial potential and identify their strengths and weaknesses. It takes the viewpoint that there is no single definition of an entrepreneurial university. A university that is entrepreneurial will have the capacity to deal with the challenges in its environment and take advantage of new opportunities that emerge. HEInnovate invites HEIs to take action across the eight areas of the tool: leadership and governance, organisational capacity (funding, people and incentives), entrepreneurial teaching and learning, preparing and supporting entrepreneurs, digital transformation and capability, knowledge exchange and collaboration, internationalisation and measuring impact.

Academics are increasingly eager to engage in entrepreneurial activities. However, many universities do not have the mechanisms or incentives in place to support a different type of engagement and desired academic career trajectories. Instead, academics are still incentivised too much to publish to advance their academic career.

HEInnovate also supports HEIs to work with a range of stakeholders in their region to contribute to economic growth. It does so, among others in the context of the Smart Specialisation Strategy[98] for their region, or through their participation in the KICs (Knowledge and innovation Communities)[99] of the European Institute of Innovation and Technology[100]. As one of the HEInnovate case studies, **the University of Aveiro**[101] has used the tool at departmental level to drive changes on the profiling of its academic staff, to set up a new research group and to work with some 100 external stakeholders. This has led to significant changes in the way academics interact with students in the classroom. Through HEInnovate, the university has learnt about the importance of dialogue and commitment with multiple internal and external stakeholders to move from ideas to action.

The next speaker was Slavica Singer from the J.J. Strossmayer University of Osijek in Croatia. She highlighted that university-business cooperation is often challenging, given that universities and businesses speak different languages, operate with different timescales and have different drivers. She then reminded the participants of a key message from the morning sessions, which is that students are not only interested in the relevance of their studies for immediate employment in the labour market. Today, students have different values and require a curriculum that will give them the knowledge and skills to act as responsible citizens in society.

At the University of Osijek this is translated in a curriculum that helps students start their own business, address the different values that they have today, and produce graduates who will be responsible citizens in society and contribute to sustainable developments. The university strives to profile itself as a modern, knowledge-based institution that plays a dynamic collaborative role in the triple[102] and quadruple helix[103] model of linkages between governments, academia, industry and civil society.

Stefan Drews of the German Ministry of Economics and Energy presented the **EXIST programme**. The EXIST programme[104] was launched in 1998 by the Ministry of Economics and Energy in Germany **to improve the entrepreneurial environment in universities and research institutes**, and increase the success rates of high-tech start-ups, for the transfer of research results with high economic potential.

[97] HEInnovate is the self-assessment tool developed by the EU and OECD for Higher Education Institutions to explore their innovative potential; See https://heinnovate.eu/en

[98] The Smart Specialisation Strategies (S3) are place-based approaches characterised by the identification of strategic areas for intervention. These are based on an analysis of strengths, economic potential and on an Entrepreneurial Discovery Process (EDP) with wide stakeholder involvement. See https://s3platform.jrc.ec.europa.eu/what-is-smart-specialisation-

[99] https://eit.europa.eu/our-communities/eit-innovation-communities

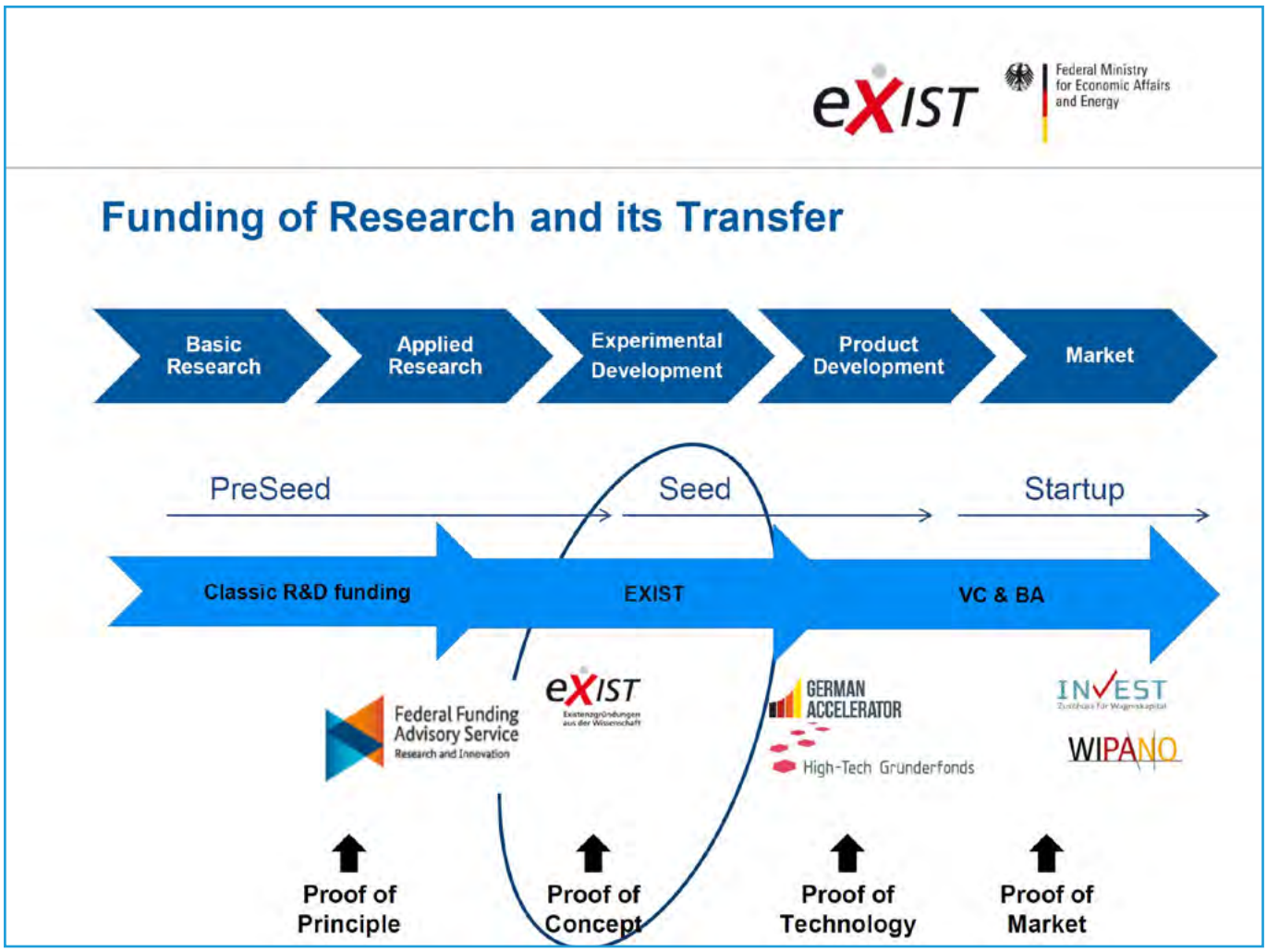
[100] https://eit.europa.eu/

[101] https://heinnovate.eu/sites/default/files/heinnovate_user_story_university_of_aveiro.pdf

[102] https://triplehelix.stanford.edu/3helix_concept

[103] Holm-Nielsen, L., et al. (2013), "Talent development as a university mission: the quadruple helix", Higher Education Management and Policy, vol. 24/2, https://doi.org/10.1787/hemp-24-5k3w5pdwdzjg

[104] EXIST, the University-based Business Startups, German Ministry of Economics and Energy; See https://www.exist.de/EN/Programme/About-EXIST/content.html



EXIST has been operating with a stable administration in the Ministry. From a single entrepreneurship chair in Germany back in 1998, there are now 130 chairs, and the environment for entrepreneurship has significantly improved.

EXIST supports start-ups in the early phases of their developments. It offers three specific action lines:

(1) **Building a culture of entrepreneurship**, which supports HEIs in formulating and implementing a comprehensive university-wide strategy to increase entrepreneurship.

(2) **Business start-ups grants** for students, graduates and scientific work on innovative technology and knowledge based start-up projects.

(3) **Research transfer funds** to support the technical feasibility of start-up ideas and for business launch preparations.

Finally, Katarina Pramatari, of the Athens University of Economics and Business (AUEB), emphasised that the spirit of entrepreneurship can only flourish in environments that support the free experimentation of new ideas. She observed this was not common in many HEIs in Greece, where entrepreneurial approaches are still limited.

Through its centre for entrepreneurship and innovation ACEin,[105] the Athens University of Economics and Business fosters the incubation of new ideas to **support researchers and young entrepreneurs** to develop innovative business ideas and bring them to the market. ACEin tailors its approach to every new business idea, since each idea requires a different multi-layered approach to services, mentoring, support and networking activities in the process of business development and maturation of business forms.

Beyond the support to start-ups, ACEin also offers **open innovation programmes** (to help accelerate business activities become self-sustainable), **education activities** (lectures, workshops, entrepreneurship summer schools, case studies), **networking, consulting and competitions**.

[105] https://acein.aueb.gr/en/the-center/

Once sustainable, the **next milestone for ACEin will be to start a fund for start-ups and spinoffs around Greek research centres**, as an independent body. A first fund created a lot of momentum leading to 20 investments. ACEin believes there is enormous potential, yet a lot more funding is needed and it also still lacks of a proof of concept for funding similar to what exists in other countries. In the future ACEin would also like to create structures and centres in every university to support an entrepreneurial ecosystem in Greece. The HEInnovate workshop held in Greece in April 2019[106] confirmed that there was a lot of potential that needed to be nurtured.

The discussion with participants focused on university policies and structures, as well as on frameworks to foster entrepreneurial mind-sets. Key messages from the discussion were:

- **Adopt a broad definition of entrepreneurship**. Entrepreneurship is not only about supporting start-ups. Entrepreneurship is also about inspiring entrepreneurial behaviours inside (large) organisations to foster the development of innovative ideas (referred to as intrapreneurship[107]), or taking an active role in society. Therefore, the definition should include business and financial literacy (key to support any innovative idea whatever the context), gaining a sense of responsibility to make own choices, and citizenship. All of this should be embedded within HE curricula.

[106] https://www.eventora.com/en/Events/heinnovate_workshop
[107] https://en.wikipedia.org/wiki/Intrapreneurship

- **Universities should empower students to act as 'change makers', both at university and in society**. Universities should prepare and empower students to graduate as 'change makers' through a gradual process of growth, turning them into young adults who can take an active role in society. Bringing the spirit of dynamic alumni in the classroom, who have engaged in entrepreneurial activities, was said to have a highly positive effect on students. The participants also felt that universities do not involve students sufficiently in decision-making processes within the institution. Organising hackathons[108] to produce ideas for new ways in which universities could become more entrepreneurial, for example, could be an excellent way generate innovative approaches from the student perspective.

- **Universities should support academics who wish to engage in entrepreneurial activities**. Providing incentives to researchers and teachers who want to support the development of these activities is essential to upscale HEIs' entrepreneurial agenda.

- **Improve measurement of graduate outcomes**. Universities insufficiently measure students' progress throughout their studies, and whether the skills developed at university are used in the workplace. Improving knowledge around this could help universities to adapt their study programmes to labour market needs.

- **Link HEInnovate to the Global Entrepreneurship Monitor (GEM)**.[109] Participants felt that increasing synergies between the GEM and HEInnovate could support entrepreneurship.

- **Develop an overall culture of entrepreneurship in universities**. Entrepreneurship centres in universities often limit their services to supporting start-ups and entrepreneurs. They should, however, do more by supporting an overall culture of entrepreneurship in the institution.

3.5.2 WORKSHOP 2: Nurturing entrepreneurial individuals

The aim of this workshop was to discuss examples of higher education institutions' capacity to provide supportive learning environments for students and academics, and to thereby help them to develop entrepreneurial skills and mind-sets. The workshop was moderated by **Koen Jonkers**, Deputy Head of Unit - Knowledge for Finance, Innovation and Growth, DG JRC (European Commission).

Fátima São Simão, UPTEC,[110] Science and technology park of the University of Porto (Portugal), described how **UPTEC has been working on providing a unique physical space in the city to support start-ups an create a collaborative ecosystem**. In doing so, it supported the university in its mission to engage with society, building on its first and second missions of education and research.

In its first years of operation, UPTEC supported start-ups and entrepreneurs with their growth. It is now hosting several clusters of technology businesses, biotech companies and the creative industry, contributing to a dynamic environment around the University of Porto. The support science and technology-based businesses takes place through incubation and accelerator programmes. The interaction between different types of companies and professionals from engineers to architects and business people in a single place contributes to synergies and the emergence of new business. This collaboration has also led to the development of new courses.

Paula Caroll, Programme Manager at Enterprise Ireland, presented the New Frontiers Programme. Enterprise Ireland is a government organisation that helps companies with exports and business growth worldwide. It helps early stage companies to build upscale and expand their geographical reach. The **New Frontiers Programme**[111] is a national and systematic initiative to help develop high potential entrepreneurs (not students) with new business ideas, based on evidence of market potential. The programme is delivered by 16 centres in the Institutes of Technology that provide regional ecosystems across Ireland.

[108] https://en.wikipedia.org/wiki/Hackathon
[109] GEM is a consortium of national country teams mainly associated to academic institutions. It carries out survey-based research on entrepreneurship around the world. See https://www.gemconsortium.org/
[110] https://uptec.up.pt/
[111] https://www.newfrontiers.ie/about

Aiming to **accelerate the development of sustainable start-ups with high growth potential**, support is offered in three phases:

(1) The first phase consists of a **part-time evening/week-end programme** for people still at work or unemployed, to explore whether their business idea might be realistic.

(2) In the second, participants are asked to give up their full-time employment to take part in a **six-month full-time programme at one of the Institutes of Technology**, where they are also physically located. They receive a physical working space as well as one-to-one mentoring.

(3) In the third, participants **implement their business plan** over a period of three months.

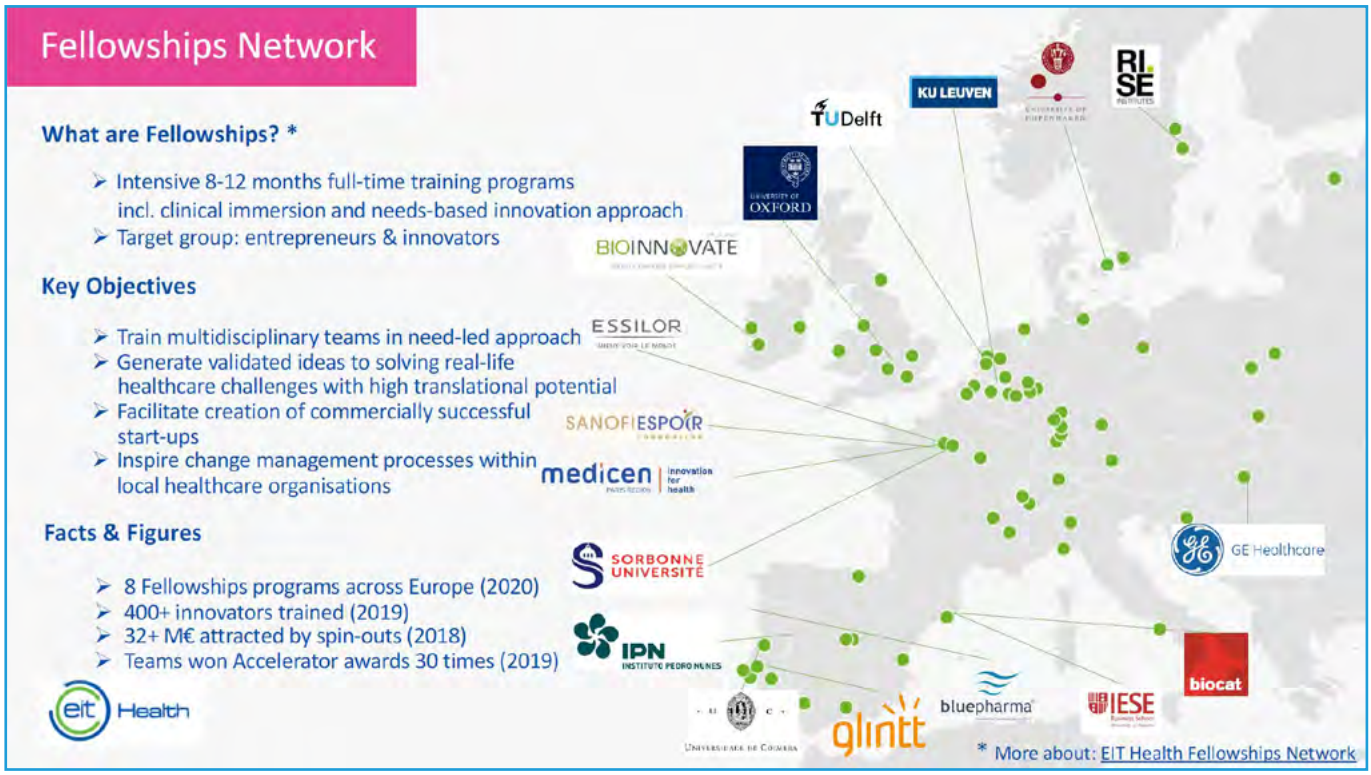
Next, **Ursula Muhle**, Education Director of the EIT Health KIC,[112] presented on the activities under the EIT's health portfolio. Ms Muhle explained that the Health KIC sees itself as an education incubator as far as its education mission is concerned. EIT Health encourages start-up creation and clinical innovation fellowships. Its Summer School programme encourages the exchange of ideas between health specialists and entrepreneurs and promotes network development.

The EIT Health **Training on Entrepreneurship and Innovation** has evolved over the years to add components on data skills and technology in responses to changes in the health sector. Future health provision will focus a lot more on prevention, in addition to the current main focus on care, with the use of digital tools. This requires a different training and skill sets for students and the retraining of health professionals. Universities have a key role to play to adapt their teaching and learning approaches and reshape the curriculum in response to needs for different types of knowledge and skills and response to future job developments,[113] among others in the health sector due to digital transformations.

Through its developmental journey, the EIT Health has learnt innovative ways to develop interactive teaching and learning though work across sectors.

By combining entrepreneurship with digital learning, it aims to contribute to digital transformations in Europe along the lines advocated in the EU Digital Competence Framework 2.0.[114]

[112] https://www.eithealth.eu/about
[113] A McKinsey report is looking into the implications of automation for the future of work. See https://www.mckinsey.com/featured-insights/future-of-work
[114] https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework



Thomas Lans from Wageningen University (the Netherlands) had three key messages on how move the discourse on entrepreneurship from start-ups to wider models and discussions on entrepreneurial mind-sets:

(1) **Entrepreneurs should be seen as change agents** who are connected to sustainable developments and demonstrating entrepreneurial competences such as those advocated in the sustainable entrepreneurship pyramid.[115]

(2) **Entrepreneurs should be seen as decision makers and problem-solvers**. Wageningen University has developed an App in the context of an Erasmus+ project to monitor students on both the challenges they are facing, as well as how they handle them. Regular monitoring is carried out per discipline and discussed with the students.

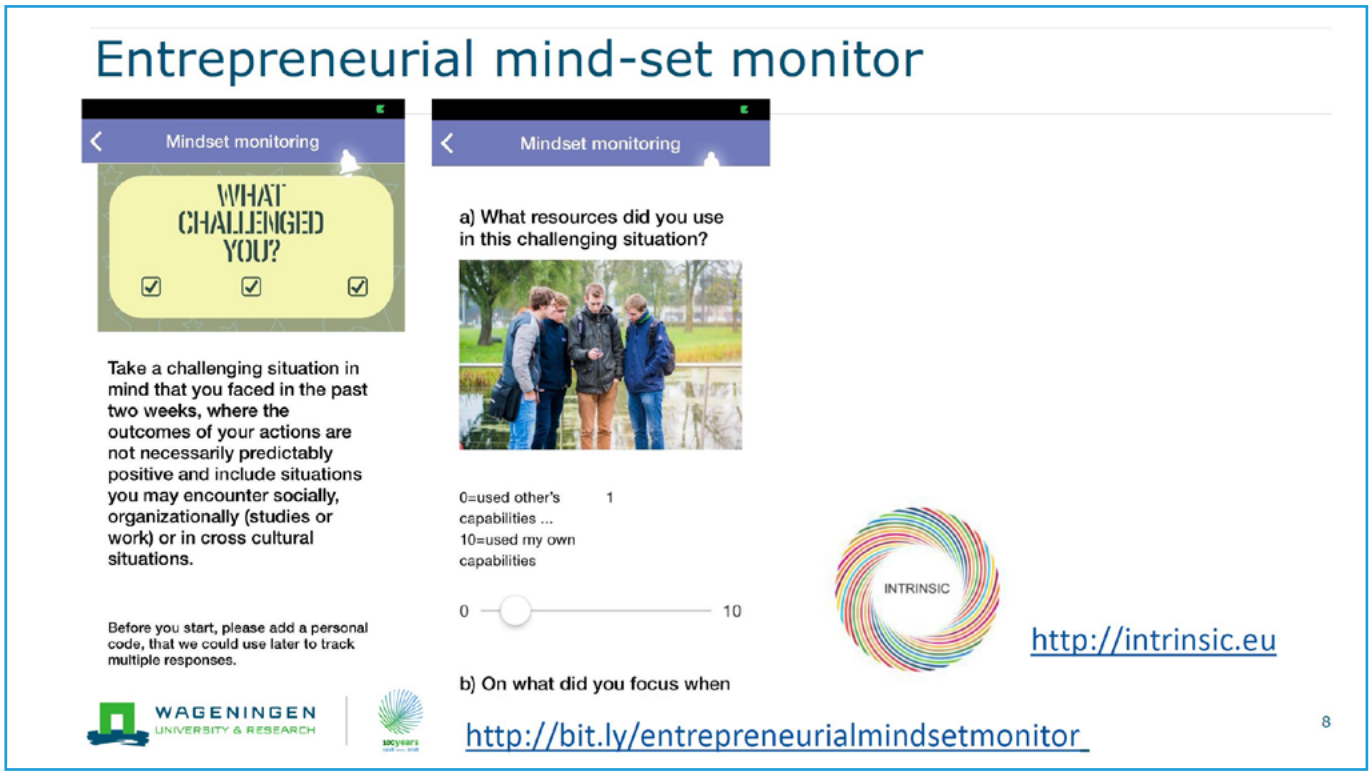
(3) **More alignment is needed between what is taught and how it is taught, and around which underlying concepts**. Key is to link curriculum aims to teaching methods and assignments which are not always the case in universities.

Mr Lans referred to **11 additional characteristics of entrepreneurship education**[116] which may vary across programmes: method, autonomy level for the value-creation process, context/environment case complexity, nature of the value-creation process, knowledge creation process, impact of the result, cooperation, role of external stakeholders, room to manoeuvre and role models.

Gabi Kaffka, Ecorys, and Christina Weber, SCE GmbH, EPIC, spoke about assessing the impact of entrepreneurship education. The EU-funded **EEEPHEIC project**[117] (pronounced EPIC) **provides a toolkit to assess the impact of entrepreneurship programmes in HEIs and in companies**. It helps educators understand what they aim for with entrepreneurship education (EE), what type of assessment they want and how it can be carried out. The EPIC tool offers five areas for the assessment of entrepreneurship education: entrepreneurial competences, entrepreneurial intentions and attitudes, mind-sets and behaviours, scenarios (strategy preferences of students) and educational effects.

The tool was designed on the basis of: (1) a literature review about methods and matrixes to measure entrepreneurship education, (2) a survey to EE educators and students, (3) a series of workshops and (4) desk research into on a number of EE programmes in the EU.

[115] Ploum, L., Blok, V., Lans, T. & Omta, O. (2018); Towards a validated competence framework for sustainable entrepreneurship. Organisation & Environment, 31(2), 113-132
[116] According to Baggen, Lans & Gulikers, 2019
[117] https://epic.ecorys.com/



The discussion following the presentations focused on different entrepreneurship education models for universities and businesses. The key messages emerging from the discussions were:

- **Co-working spaced and creative hubs** were said to be attractive places for students from a range of different disciplines to experiment with innovative ideas in a safe environment. They are important as they provide places for routine, interaction and physical structures stimulating the creative process.
- **The promotion of entrepreneurship should go beyond higher education**. In addition to businesses, the EPIC tool could for example also be used to stimulate entrepreneurship at lower education levels, in primary and secondary education.
- To **promote entrepreneurship in academic disciplines where entrepreneurships is traditionally low**, participants mentioned Summer Schools or entrepreneurship modules as elements which could be brought into curricula.

4.0 DAY 2: Plenary Session

Mr Robeet opened and moderated the second day of the UB Forum, which included five main activities:

- Presentation and discussion of conclusions of parallel sessions.
- Sustainability in action – start-ups engaged in sustainable development.
- A keynote address on the upcoming Croatian Presidency of the EU Council of Ministers by Rumyana Antičić, State Secretary for Science and EU Funds.
- A panel discussion about 'Barriers and solutions to strengthening university-business partnerships.
- Closing remarks by Themis Christopidou, Director General for Education, Culture, Youth and Sport (European Commission.

4.1 PRESENTATION AND DISCUSSION OF CONCLUSIONS OF PARALLEL SESSIONS

For each breakout session, the rapporteurs were asked to highlight key challenges, opportunities and next steps for university-business cooperation.

4.1.1 BREAKOUT SESSION 1: Tackling the skills mismatch

The rapporteur for the first breakout session was Gigliola Paviotti.

For the **first workshop on 'attracting students to disciplines for jobs where shortages exist'**, Ms Paviotti mentioned three key challenges and related opportunities:

(1) **Increasing the attractiveness of STEM** degrees and careers remains a challenge for many universities and businesses across the EU. To do so, she said it was important to change mind-sets and stereotypes around STEM. It is important to show how STEM contributes to tackling key societal challenges, which was mentioned by many participants as something about which young people are particularly concerned.

(2) **Ensuring permeability of teaching and learning approaches** from primary all the way up to higher education remains challenging. Ms Paviotti mentioned the need for a concerted approach across all levels of education to innovate pedagogical approaches.

(3) **People are lacking key skills** such as creativity, critical thinking and communicative skills. In order to equip our graduates with these skills, we do not need to reflect on what we teach, but on how we teach.

For the **second workshop on 'providing meaningful learning experiences that provide students with the knowledge, skills and attitudes they need'**, Ms Paviotti mentioned that **how we understand key skills** as the key challenge. Key skills are different for students, teachers and businesses, and it is important to improve communication and cooperation between all these stakeholders in order to make learning approaches meaningful and relevant for all of them. To tackle this key challenge there are two key opportunities:

(1) **Dialogue**. If dialogue between students, teachers, institutional leadership and businesses is improved, we can better map and understand the common skills needs.

(2) **Interdisciplinarity**. Insights from different disciplines are needed to find innovative solutions for the challenges our world is facing. In addition to having students work in multidisciplinary teams throughout their degree, the added value of the social sciences should be recognition.

4.1.2 BREAKOUT SESSION 2: Supporting the workforce to adapt to the future

The rapporteur for the second breakout session was Victoria Galan Muros.

She reported on both workshops combined, which covered the topics of **'preparing and supporting graduates as lifelong learners'** and **'supporting up- and re-skilling'**, by presenting ten key challenges and opportunities. The challenges identified are:

(1) **Definition of LLL**. There is a different understanding across stakeholders in both the university and business sectors on the meaning of lifelong learning.

(2) **Consideration for LLL**. Policy makers, HEIs and businesses lack recognition for their efforts in LLL.

(3) **Funding** overall is lacking for LLL.

(4) **Learning is not formal per se**. There is still a tendency to see learning as something which happens in formal contexts only. It is important to recognise, however, that learning can happen anywhere and anytime, also in non-formal and informal settings.

(5) **Knowledge is temporary**. There is a need for society at large to recognise more strongly that skills degrade and can even become obsolete over time if they are not invested in. Technical skills, for example, have a life span of approximately two years.

(6) **Importance of transversal skills**. Less 'time bound' are transversal skills such as creativity, problem-solving and critical thinking, which equip people for inevitable changes which are part of work and life. People should be taught transversal skills at each level of education, and it should start as early as in ECEC.

(7) **Inflexibility of the education and training system**. Educational institutions today are still not flexible enough to accommodate to the LLL need.

(8) **HEIs play a limited role in LLL, which is in favour of private providers**. There are three reasons why HEIs have such a limited LLL offer: (1) they are still too elitist, (2) not aware enough of labour market needs, and (3) academic staff \re insufficiently trained to teach adults.

(9) **Recognition of prior learning**. One of the speakers from the workshop had said that "*to address the skills gap, we also need to address the recognition gap*".

(10) **No 'one size fits all'**. At present, the learning offer at HEIs is not flexible and tailored enough to cater for the needs of an increasingly diverse group of learners.

She then turned to opportunities to overcome these challenges, including:

(1) **Increase collaboration for funding and implementation between HEIs and business**. Ms Galan Muros also mentioned the idea of a 'learning account' with a certain amount of credits which people are free to use for up- or re-skilling.

(2) **Increase support for SMEs**. SME support to develop internal LLL opportunities can be a way to retain staff, as evidence shows that the main reason people leave a company is because they seek new learning opportunities.

(3) **Use big data and AI** for evidence-based policy-making and to increase the LLL offer.

(4) **Universities need to adopt new learning pathways**. Increased modularisation can make it easier for the adult population to enrol in universities and update their learning.

(5) **Universities need to adopt teaching methodologies for adult learners**, whereby the teachers take up the role of facilitators, and the learners the role of experts.

(6) **Increase UBC for curriculum design and delivery**.

(7) **Make the most of the opportunities offered by digitalisation to provide LLL** (e.g. MOOCs).

(8) **Promote the use of micro-credentials**, on which there is a good EU initiative.

(9) **Facilitate experiential learning**, combining theory and practice in order to develop students' transversal skills.

(10) **Less talking, more acting**.

4.1.3 BREAKOUT SESSION 3: Building local and regional eco-systems

The rapporteur for the third breakout session was Eskarne Arregui Pabollet.

For the first workshop on 'supporting social innovation', Ms Arregui Pabollet identified three key challenges:

(1) **Measuring social innovation is challenging**. HE systems are still heavily focused on rankings and number of publications, as well as using technological transfer as a way to measure innovation.

(2) **Training people who do not have same learning experience**.

There are three opportunities:

(1) **Many good small-scale initiatives exist** which contribute to skills development and social innovation. We should learn from these and see how they can be scaled up.

(2) **Make failure a part of learning**. The try-fail-learn method is insufficiently introduced at present in our formal education and training systems.

(3) **Social innovation should be integrated in the mission of higher education**, without attaching too much value to economic impact or viability, especially in the first stages of initiatives focused on social innovation.

For the **second workshop on 'higher education for Smart Specialisation'**, Ms Arregui Pabollet identified the challenges:

(1) **Brain drain**. The local integration of skills and human capital remains challenging for many countries and regions.

(2) **Regional connections and integration of HEIs** is challenging for many governments.

(3) **University rankings** are focused heavily on scientific productivity of universities, rather than regional embeddedness and development.

In terms of opportunities regarding Smart Specialisation, she highlighted:

(1) **HEInnovate and other tools can support HEIs** as a basis to start discussions with actors in their region to improve their local integration and connectedness.

(2) **Smart Specialisation**, as a bottom-up collaborative process between HEIs and other local actors, is a **good way to address regional challenges and explore with new governance models**.

(3) **Partnerships with regional authorities** could benefit from increased support through, for example, the future Horizon Europe programme.

4.1.4 BREAKOUT SESSION 4: Working together to address societal challenges and build societal trust

The rapporteur for the fourth workshop was Keith Herrmann.

For the **first workshop on 'implementing the Sustainable Development Goals'**, he identified five key challenges:

(1) **Lack of in-depth understanding of the interconnectedness of the Sustainable Development Goals (SDGs)**. The key performance indicators (KPIs) for measuring impact need to be more interlinked. There is a need for people to better understand this to ensure the transformational impact needed to achieve the SDGs as systemic impact versus single point impact of each individual SDG.

(2) **Lack of funding and resources** to achieve the deep, transformational and meaningful societal change that is needed.

(3) **Measuring systemic change is difficult**. Each SDG addresses a range of different challenges. In addition to this, there is often insufficient funding to mainstream promising smaller-scale initiatives to achieve deep systemic change.

(4) **Raising awareness and capacity of business to address the SDGs**. Mr Herrmann referred to a study by PwC:[118] which reports that 71% of businesses say they already knew how they would engage with the SDGs, but only 41% say they would implement the SDGs into their company strategy and in the way they conduct business within the next five years. Moreover, only 13% indicate they have the tools to assess their impact against the SDGs.

(5) **Structural barriers to address the SDGs**. As one participant mentioned it, as governments and citizens, "we are actively supporting programmes that are killing us". If this does not change, then efforts may be in vain.

For the **second workshop on 'AI and automation'**, Mr Herrmann identified three key challenges:

(1) **We need to rethink our education systems**. Our current education system is still very heavily focused on knowledge. The acquisition of knowledge today has, however, become much more based on self-study, e.g. learning about AI and coding is available online, not in the conventional classroom. The question therefore poses itself how education can survive, or how it should develop in a world of AI and big data.

(2) **Data is inconsistent, and AI systems are dependent on the quality of data it is being fed**. There is insufficient recognition of the data bias, and thus a need to also train people in computational thinking, critical analysis and data interpretation, as well as the 'softer skills' to complement the technical skills needed.

(3) **Ethics and AI**. There are ethical concerns surrounding the use of data which need more serious consideration. Our societal values are and will be heavily impacted by how we see, understand and use data and AI.

AI and automation also present opportunities for universities and businesses:

(1) **Upskilling the population on coding**. Teaching people how to code, or at least giving them a basic understanding of what it entails, will make them (as well as leadership) understand the added value and benefits of AI and automation.

(2) **Make people see coding as a critical thinking and problem-solving skill**. Coding is in fact just another way of analysing data in a critical way. By making people understand coding in this way, it will be possible to change their mind-set and perception of it.

(3) **Keep humans in the loop**. Regarding ethics and AI, the workshop participants highlighted the importance of maintaining human agency and oversight within each AI process.

(4) "***Data-driven computing is not only possible, but it is also necessary***". Quoting Mr Tuomi, Mr Herrmann underlined that, due to the large amounts of data available today, we can track and improve global production processes and human activities.

(5) **The inclusion potential of AI and automation**. The digital innovations produced by AI have the potential of making our education systems more inclusive and effective. There are important opportunities which should not remain unexplored.

[118] PWC. 2015. Make it your business: Engaging with the Sustainable Development Goals. PricewaterhouseCoopers. Available at: https://www.pwc.com/gx/en/sustainability/SDG/SDG%20Research_FINAL.pdf. [Accessed June 4 2018].

4.1.5 BREAKOUT SESSION 5: Developing an entrepreneurial culture

The rapporteur for the fifth workshop was Maria Sobron Bernal.

Ms Sobron Bernal reported on both workshops combined, which covered the topics of '**developing entrepreneurial organisations**' and '**developing entrepreneurial individuals**'. She distilled five key challenges from the workshops:

(1) **Need to rethink our definition of entrepreneurial education**. Entrepreneurship education is not only about helping students to set up their own businesses. It is also about teaching them key soft skills, such as critical thinking, creativity, entrepreneurial thinking, problem-solving and activing as responsible citizens in society.

(2) **How to teach transversal skills** remains challenging for many universities.

(3) Attracting students from '**traditionally less entrepreneurial degrees**' (e.g. humanities and social sciences) to become entrepreneurs is challenging.

(4) **University engagement with businesses remains challenging**. Ms Bernal phrased the issue as follows: "*if businesses speak the language of profit, universities speak the language of promotion*". The difference in mind-set between both actors remains a barrier for collaboration between both.

(5) **Internal fragmentation within universities, as well as insufficient time and incentives for academic staff to engage in entrepreneurial activities**, have a negative impact on the development of entrepreneurial education in higher education.

Finally, she mentioned six opportunities to support entrepreneurship education:

(1) **Increase incentives for entrepreneurship with university leadership**, so they can act as drivers of change within their institutions.

(2) **Increase incentives for entrepreneurship with academic staff**, for example by reducing the importance of research outputs and by providing training on entrepreneurship education, as well as how staff themselves can engage in entrepreneurial activities.

(3) **Promote the concept of 'entrepreneurship as citizenship'**. This can support students across all disciplines, including the arts and humanities, to develop entrepreneurial skills in the sense of 'responsible citizens who will take initiative to make a positive contribution to society.

(4) **Support the development of incubators that are well connected with their ecosystem** to offer the opportunity for students to 'test their ideas' and interact with external stakeholders. Networking is a fundamental asset to entrepreneurs. At the same, cross-disciplinary incubators that offer support to students with different academic backgrounds create great opportunities for synergies.

(5) **Create entrepreneurship teaching-tailored modules for students from non-STEM disciplines**.

(6) **More systematically and closely monitor entrepreneurial mind-set/behaviour in work- and learning environments**.

4.2 SUSTAINABILITY IN ACTION: Start-ups engaged in sustainable development

The reports from the breakout sessions on day 1 was followed by five short pitches by start-ups and projects within sustainable development.

First **Elzelinde van Doleweerd** presented her venture **Upprinting Food** (NL)[119]. The business idea takes as the point of departure that 1/3 of food is wasted globally. The total value of food wasted in the Netherlands amounts to more than €10,000 a week, she said. As a student of industrial design, her vision is to **reduce food waste using 3D printing**. Concretely, scraps of food, like banana peels, are mashed into purees, which can subsequently be 3D-printed and dried, turning it into edible and tasty food. She has tested the product with several people, for example, by organising dinners, which were a success.

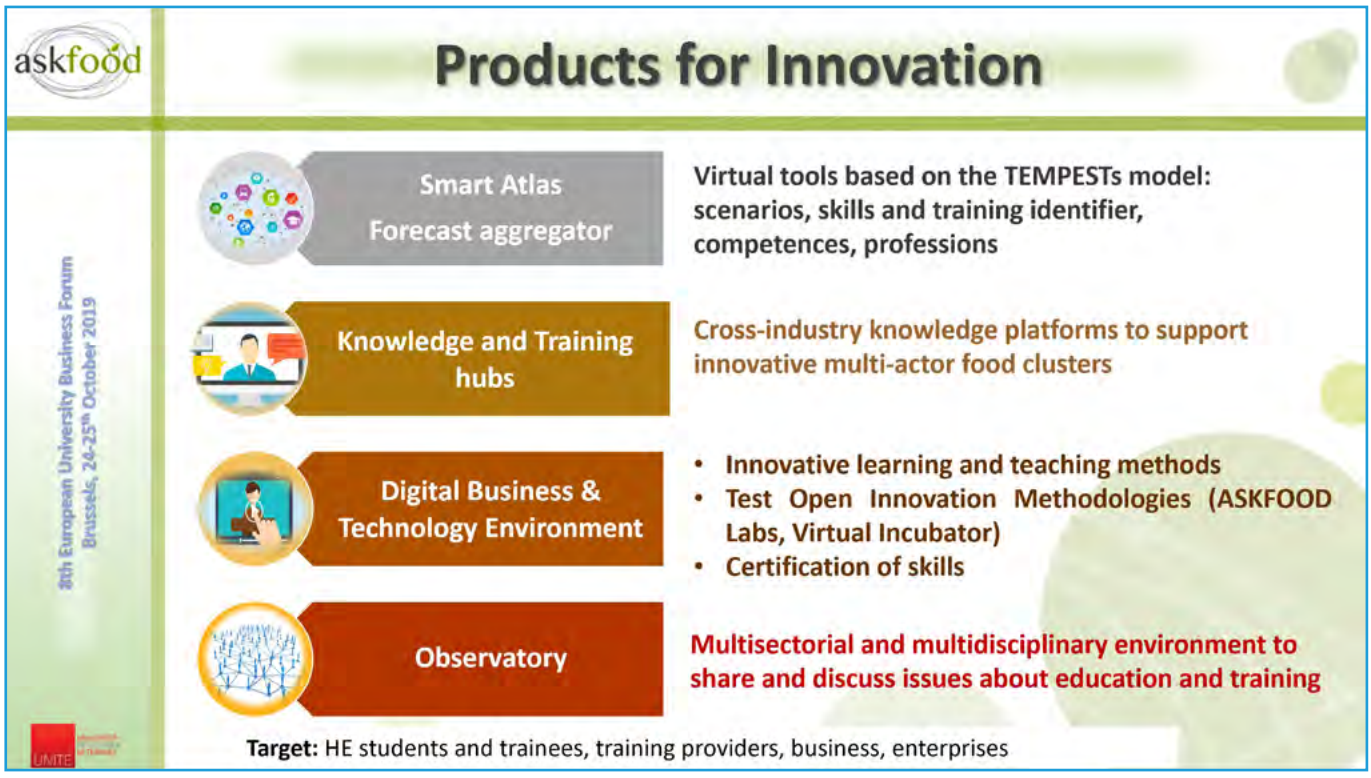
The University of Eindhoven (the Netherlands) has offered her to combine the enterprise with the Masters' study. The venture has grown, so they are now five people. They are moving into high-end restaurants, who want to install 3D printers, but require design service so that chefs can print food from the restaurant's own food waste.

Next, **Atanas Enev** and **Vanya Milanova** presented **Biomyc**,[120] a start-up which uses agricultural residue and recycled paper to create **sustainable packaging**. They presented a product line which uses agricultural residue and the root structure of mushrooms as a binder to create packaging material that can replace Styrofoam in packaging.

[119] See https://www.upprintingfood.com/
[120] See https://biomyc.eu/

The foam is fully compostable. They presented a use case, a fully recyclable 'Bio pack beer cooler' which saves 780 kg CO2 per 1,000 boxes. They are working with one of the top-ten automotive producers worldwide. They are looking for more pilot customers and trade partners.

Prof Paola Pittia of the University of Teramo (Italy) presented the **ASKFOOD project**,[121] an Erasmus+ Knowledge Alliance. The food industry is hungry for new professions such as data analyst and food bloggers, so one of the strands of activity within the Knowledge Alliance is **support for modernising training and educational methodologies in the food sector**. They developed a forecast methodology, the 'Forcast aggregator' and identified twelve 'transformative forces' expected to deliver significant impact to food systems by 2030 (TEMPESTS model). They also developed a 'Smart Atlas',[122] showing sources of food-related knowledge and training activities in Europe.



[121] See https://www.askfood.eu/
[122] See https://www.askfood.eu/tools/smart-atlas/maps/

They are developing an interactive gap identifier for competence gaps, and their website presents innovative teaching tools, including a 'Reverse incubator' approach.[123]

Next, Martin A Petersen, Innovator in green European start-ups (Denmark), presented the work of his company '**BUILD solutions**' (Building Urban Intelligent Living Design Solutions),[124] a consortium which **aims to bring intelligent living solutions for cities to the market**, investigating biological systems, creating prototypes based on information technology and digital manufacturing, business plans and working with accelerators. They have mapped 85 European green start-ups in the building and construction sector to be able to assess the impact of sustainable building materials and technologies.

Mr Petersen mentioned he noticed that students in the sector are increasingly motivated for sustainable innovation because the leaders in the sector are inactive in this field. They look for motivated students who can be brought to understand how to design, build, scale, and create value.

Finally, Vijoleta Sulciene Architect at the VIA University College (Denmark), presented the Erasmus+ Knowledge Alliance '**KnoWood**', the aim of which is it to **promote the building of middle-high and tall wooden buildings**. 11 partners participate in the alliance. Since concrete and steel are not very sustainable building materials, there is a scope for investigating new ways of using wood as building material. Existing wooden buildings today are usually less than 4 floors high, but there are now new designs for up to 30 floors. This is, however, not without challenges: wooden buildings need to be protected against fire, and they also have stability issues. There are technical solutions to these challenges, but there is a general lack of technical knowhow in the sector. The new technologies for building with wood are not taught in universities and technical schools. Also, building regulations and norms need to be reformed. The alliance is tackling the awareness issues by preparing new modules for bachelors, Masters' and VET programmes in construction.

[123] See https://www.askfood.eu/reversed-incubator
[124] See https://www.build-solutions.org/activities/

4.3 KEYNOTE ADDRESS: Looking ahead

Tome Antičić, State Secretary for Science and EU Funds, Republic of Croatia. In his speech, he outlined the priorities in the field of education, training and research for the upcoming EU Presidency, which will be taken over by Croatia for the first time since it joined the EU in 2013.

Mr Antičić started by saying that education must play a more prominent role in Croatia, and other European countries also, in order to address the challenges society is facing today. He put forward four **political priorities for the EU policy agenda**:

(1) **Training European teachers for the future**. As a first priority, Croatia will look into initiatives to improve the quality of teachers in Europe, as they play a crucial role in preparing people for future jobs. In light of technological and social disruptions, they need to be given new skills to improve their pedagogical approaches.

(2) **Post-2020 framework for cooperation in education and training**. A second priority will be the new policy priorities for the post ET 2020 cooperation framework.

(3) **Mobility and brain circulation**. A third priority will be to ensure balanced mobility to for cohesion in Europe. Mr Antičić highlighted the importance of the European Universities Initiative in this respect, which may need some additional political steering. The future Horizon Europe and Erasmus programmes also need to be looked at in detail in order to ensure mobility and brain circulation.

(4) **Future skills and jobs**. Finally, the Croatian Presidency will also initiate discussions on the impact of technological revolutions, and AI in particular, on the future of skills needs and jobs.

Next, he presented a couple of **key education reforms in Croatia**. He referred to key reforms of the primary and secondary education system in Croatia, as well as in VET to increase the offer of dual learning tracks. In the field of higher education, the government was looking into a new performance-based funding model, taking into account how well HEIs take into account business needs in their education and research activities. Furthermore, the Ministry is finalising a New Act of Higher Education and Science, which will soon be implemented and focus on increasing mobility, excellence, cooperation with industry and the pay of academic staff at the entry levels. It will also have a more specific focus on promoting the mobility of post-doctoral students and on increasing cooperation of polytechnics and universities with business.

4.4 PANEL DISCUSSION: What' next?

The final panel discussion, moderated by **Mr Christophe Robeet**, focused on new ways for universities and businesses to cooperate for innovation and sustainability.

Snježana Prijić-Samaržija, Rector of the University of Rijeka (Croatia), opened the panel by looking at pan-European trends and challenges of universities. She stated that in order to unlock the potential for innovation we must look to research and development investments. Statistics show that: **North and West European countries invest far more in R&D than the rest of Europe, especially compared with Eastern Europe**. When looking at scientific production (i.e. article production) there is a big difference between the EU15 and EU13, with the EU15 outnumbering the EU13.

Ms Prijić-Samaržija concluded that **there is a correlation between investments in R&D and research outputs on the one hand, and innovation and UBC on the other hand**. She found that one of the main challenges for the EU is the lack of investment in R&D, and the lack of flexibility in academic careers. She sees this as a symptom of the divide between researchers and entrepreneurs/companies in Europe. The solution is to provide better conditions for innovation and UBC, and to create a centre of new EU ecosystems.

Next, **Alexandre Affre**, Director for Industrial Affairs at **Business Europe**, observed that is **difficult to have sustainable development without innovation**. The challenges our society is facing require a variety of innovations, including technical innovation, social innovation and innovation in the way we produce and use product and services. Business Europe have been looking into how private investment in research and development can be improved through a company survey. This revealed that companies found existing funding regulations very limiting to investments in R&D. This inhibits highly needed UBC and interdisciplinary cooperation, which is necessary if we are to find sustainable solutions to the challenges posed by digitalisation and AI, which he identified as the main drivers of change of societal today.

Natacha Lopes, Vice-President of JADE – the European Confederation of Junior Enterprises –, started by explaining that the JADE network comprises around 30,000 students. The network's goal is to **foster entrepreneurship and interdisciplinarity among students** by providing them with strong problem-solving skills and by involving sustainability in everything they do at university. She called for a sustainable approach to go through all aspects of education that can help students form their own opinion on sustainable subjects.

The First Vice-President of the European Committee of the Regions, **Markku Markkula**, underlined the **importance of investments in education and R&D in order to drive sustainable societal change**. He said that Finland today is still benefitting from investments in the education system and R&D made back in the 60ies. Next, he pointed to the **need for more frontrunner cities** where not just the local administration, but also citizens, universities and start-ups work together to take on a leading role in developing sustainable solutions to change society. He argued for universities to be regionally anchored ecosystems which work on changing people's mind-sets. He also encouraged all participants to find out more about the Smart Specialisation website.[125]

Lastly, **Ana Trbović**, Member of the EIT Governing Board (and Co-Founder and COO of Grid Singularity) mentioned the need for all three angles of the knowledge triangle (education, research and business) to be represented in the innovation process. She pointed to the difference between HEIs in the US and Europe, and found universities in Europe should become better at attracting investments from the private sector.

The discussion between the panellists focused on the balance European universities ought to be seeking between attracting more funding from private sources, following the example of universities in the US such as Stanford of Harvard, and relying on public funding. While the panellists agreed that **European universities need to get better at attracting private investments**, thereby strengthening university-business cooperation, they also **warned against repeating the US model in Europe**. The **institutional autonomy of universities in Europe**, which dates back centuries, guarantees academic freedom, high-quality research and education, which is imperative to ensure the quality of our higher education system in Europe.

[125] See https://ec.europa.eu/jrc/en/research-topic/smart-specialisation

4.5 CLOSING REMARKS

The Forum was closed by **Ms Themis Christophidou**, Director General for Education, Youth Sport and Culture (European Commission). She praised the UB Forum model for having broken down barriers between universities and businesses. She then continued by saying that, in order to face the challenges posed by society, we need innovative solutions. **Investing in innovation means investing in people, and Europe cannot overcome challenges without a collaborative mind-set**.

She then expanded on the specific **challenge of climate change**. She underlined the importance of supporting research of the highest quality in this field, and for universities and businesses to collaborate in order for skilled entrepreneurs to put ideas into practice and change society, especially in the field of green transport. She believed the exchanges at the forum will have made an important contribution to this theme as well as the implementation of the Sustainable Development Goals in general, and that the different initiatives presented during the forum truly have the potential of supporting systemic change.

She concluded her speech by saying the **EU will strengthen support for**:

- **Knowledge Alliances and Strategic Partnerships** under the post-2020 Erasmus+ programme to support innovation.
- **Digitalisation in education**: it will do so in particular by updating its Digital Education Action Plan of 2018 to increase EU citizen's basic digital competences, and to allow for more and better up- and re-skilling opportunities.
- **Innovative and sustainability-oriented research and innovation** through Horizon2020 and the European Institute for Innovation and Technology.

A tradition of the UBF has been to invite a number of students from art schools to make a visual record of the event, thus underlining the important collaboration between innovation and the arts. This year we would like to thank the following students for their participation:

- Michela Tabaton-Osbourne of the Accademia Belle Arti Carrara (IT);
- Camilla Fassina of the Accademia di Belle Arti di Venezia (IT);
- Wei Bingxi of l'école supérieur d'art du Nord-Pas-de-Calais /Dunkerque (FR);
- Uygar Sahinoglu of L'Institut Supérieur des Beaux-Arts de Besançon (ISBA) (FR);
- Kenza Merouchi of l'Ecole supérieure d'art d'Aix-en-Provence (FR);
- Alice Olausson of l'Ecole Supérieure des Beaux-Arts Montpellier Contemporain (FR);
- Adriana Yankova of the National Academy of Arts (Bulgaria);
- Femija Miljković of the National Academy of Arts (Bulgaria);
- Bozhidar Kolev of the National Academy of Arts (Bulgaria);
- Fionn van der Noll of the CIT Crawford College of Art & Design (Ireland);
- Clarisse Thomas of ESA-St. Luc Liège (Belgium)
- Alexandre Grave of ESA-St. Luc Liège (Belgium).

A number of their drawings and paintings are presented in this report.

5.0 UNIVERSITY-BUSINESS FORUM – EXHIBITION

The University Business Forum also hosted an exhibition to provide additional opportunities for knowledge sharing and mutual learning. It included some institutional stands to learn more about: the Erasmus+ programme (Erasmus+), Marie Sklodowska Curie Actions (MSCA), the European Institute of Innovation and Technology (EIT), the Digital Education Action Plan (DEAP), and the HEInnovate initiative.

An important part of the exhibition was dedicated to the Knowledge Alliances, which are Erasmus+ funded projects that bring together higher education and business. Interestingly, Knowledge Alliances are a "spinn-off" of the University-Business Forum.

27 Erasmus+ funded Knowledge Alliances showcased their work in the exhibition area throughout the event. Among these, 13 projects were presented to the participants in the pitch corner.[126]

Knowledge Alliance for Additive Manufacturing (ADMIRE) - he knowledge Alliance for aDditive Manufacturing between Industry and univeRsitiEs/ADMIRE project, under the Manufacturing sector, intends to establish a solid relationship among enterprises working in the Additive Manufacturing (AM) supply chain, potential end-users of AM products, research centres, and universities.[127]

Arts & Humanities Entrepreneurship Hubs (AHEH) – this project aims to improve the entrepreneurial capacity of A&H students. – Jointly research, design, test and disseminate an innovative programme of entrepreneurial training for A&H staff/ students aligned with the EntreComp Competence Framework.[128]

Alliance for Skills and Knowledge to Widen Food Sector-related Open Innovation, Optimization and Devleopment (ASKFOOD) – amongst others, this project is developing cross-industry knowledge platforms to support innovative multi-actor food clusters in EU; an Open Innovation framework to modernise higher education in Food studies; and an interactive repository of emerging skills and professional profiles to forecast future skill needs in the food sector.[129]

Boosting Innovation and Entrepreneurial Processes in the BIOHEALTH Sector (BIO-ALL) – BIO-ALL's ambition is to accelerate knowledge and competences to boost efficient innovation and entrepreneurial processes in the BIOHEALTH sector, fostering co-creation and collaborative dynamics between and within relevant actors of the ecosystem.[130]

BUILD Solutions (BUILD) - BUILD Solutions applies the convergence of buitechnology and information technology to landscape and urban design to develop resource-smart architecture that can generate energy, clean water, digest waste and purify air.[131]

Conservation of Art in Public Spaces (CAPUS) - CAPUS aims to contribute to the dissemination of knowledge in the field of public art conservation. Through the close cooperation of researchers, educators and business people, specific **treatment protocols** will be formulated. Furthermore, a dynamic and market-oriented academic programme will be created: an **innovative training module** for higher education institutions will be introduced, as well as an e-learning module. A constant dissemination and targeted activity will be carried out with the help of institutions and the general public alike, in an effort to raise awareness.[132]

Knowledge Alliance for Audience Development (CONNECT) - CONNECT is a Knowledge Alliance for Audience Development that promotes innovative cooperation between universities, institutions and enterprises in the cultural sector across Europe.[133]

Corporate Enrepreneurship (CORSHIP) - the CORSHIP project seeks to develop concrete tools to facilitate communication and collaboration between corporates, startups and universities. The project is working on the development of: a micro-credential on corporate entrepreneurship to be piloted with 30 selected entrepreneurs, managers and students; a MOOC on corporate entrepreneurs; and a unique corporate enrepreneurship toolbox, with guidelines to facilitate the collaboration between corporates, startups and universities.[134]

Knowledge Alliance for Blockchain and Distributed Ledger Technologies (DLT4ALL) – The purpose behind the DLT4All project is to address effectively the lack of European entrepreneurs' and SMEs', students', investors' and incubator managers' understanding of Blockchain and Distributed Ledger Technologies (DLT) and their applications.[135]

[126] ADMIRE; AHEH; BIO-ALL; CONNECT; DLT4ALL; FLIP2G; Food-STA; HEIBus; IoTLabs; L2A; PREFER; SPARKLE; SPRING.
[127] See https://admireproject.eu/summary.html
[128] See https://www.artshumanitieshub.eu/
[129] See https://www.askfood.eu/
[130] See http://bioall.eu/
[131] See https://www.build-solutions.org/about-us/
[132] See http://www.capusproject.eu/project-description/
[133] See http://connectingaudiences.eu/about
[134] See https://www.corship.eu/project/
[135] See https://dlt4all.eu/about/

European MOOC Consortium (EMC-LM) - through EMC-LM, employment services, MOOC platforms and course providers, are creating the framework for this structural collaboration by building expertise in the delivery of MOOCS to job-seekers as well as those employed in different sectors.[136]

Enhancing Education through Data-Driven Adaptable Games in Classrooms (FLIP2G) - The **Flip2G project** aims to establish a Knowledge Alliance between higher education institutions, schools and private free plagiarism companies that will boost classroom practices through data-driven adaptable games in flipped classrooms.[137]

Food Studies and Training Alliance (Food-STA) - will establish an independent "***EuFooD-STA Center***", a platform with local hubs in different regions, as an organisational frame for international and sustainable collaaborations between industry and academia in the food sector. Involved are 7 universities, 3 food companies and 11 multiplier organisations and training providers based in Austria, Belgium, France, Germany, Greece, Italy, Netherlands, Portugal, Spain, Switzerland and UK.[138]

Creating a Univeristy-Enterprise Alliance for a Spatially Enabled Society (giCASES) - the hiCASES project seeks to enable and strengthen innovation in GI (Geographic Information) education and industry and to facilitate the collaborative creation, management and sharing of knowledge. These objectives are addressed by developing new, innovative and multidisciplinary approaches to teaching and learning within the GI sector, and facilitating the exchange, flow and co-creation of knowledge.[139]

Smart HEI-Business Collaboration for Skills and Competitiveness (HEIBus) – The HEIBus project focuses on strengthening the collaboration between Higher Education Institutions (HEIs) and companies by creating new innovative cooperation models. These models will facilitate the involvement of students and staffs from HEIs in international Research & Development & Innovation (R&D&I) projects proposed by companies.[140]

Integrating Work-Based Learning and Entrepreneurship in Higher Education (IE-WEXHE) – the WEXHE project responds to the concerns expressed by stakeholders on the shortcomings in the labour market orientation of HE, focusing on the balance between practical and theoretical learning in HE and to mismatches between the skills sets of graduates and the skills they require during early careers. The project team will generate 84 case studies of good practice including all four types of study areas (hard-pure, e.g. natural sciences; soft-pure, e.g. humanities and social sciences; hard-applied, e.g. medicine and soft-applied, e.g. social work, covering internships/work placements, traineeships and entrepreneurships.[141]

Internet of Things Rapid-Proto-Labs (IoTLabs) – The project aims to develop a multidisciplinary curriculum integrating ICT, Design and Electrical Engineering. This aim will be achieved in cooperation between HEI's, enterprises and research institutions.[142]

Learn to Analyse Educational Data (L2A) – The project aims to develop an Academia-Industry Knowledge Alliance for designing, developing and evaluating (a) two new competence profiles (extending existing frameworks) and (b) one competence-based European MOOC addressed at cultivating these innovative instructional designers' and e-trainers' competences for exploiting educational data analytics in online professional workplace development.[143]

O-CITY – O-City is an Erasmus+ project involving 13 partners around the world. The project aims to discover and promote the natural and cultural heritage of cities. It wishes to stimulate the orange economy within them. It also seeks to modernise the universities in these cities through the application of innovative learning methodologies such as, among others PBL, CDIO and SCRUM for teamwork.[144]

PhD Hub – the PhD Hub is an online portal for business-driven research. It centralises research and funding opportunities from the public and private sectorsand increases the transferability of the PhD results in the industry and society at large.[145]

[136] See https://emc.eadtu.eu/emc-lm/moocs-for-lm
[137] See https://flip2g-project.eu
[138] See https://www.food-sta.eu/about
[139] See http://www.gicases.eu/
[140] See http://heibus.eu/about-project/
[141] See https://wexhe.eu/
[142] See https://www.haaga-helia.fi/en/IoT%20Rapid-Proto%20Labs
[143] See http://learn2analyse.eu/proj/about/
[144] See http://o-city.webs.upv.es/
[145] See https://phdhub.eu/

Professional Roles and Employability of Future Engineers (PREFER) – The Prefer project aims to reduce skills mismatch in the field of engineering. Young engineering graduates often display a lack of self-awareness of who they are as an engineer. The PREFER project aims to help engineering students/graduates with identifying their strengths and weaknesses. Additionally, the project wants to provide them with opportunities and to actively explore the wide variety of engineering roles in the labour market.[146]

Promoting and Validating Key Competences in Mobility and Traineeships in Europe (PROMOTE) – PROMOTE aims at setting up holistic, needs driven and competence oriented open learning environments to promote and validate key competences at the interface of academic education and learning in practice business contexts. The project focuses on three competences (based on the EU's Key Competence Framework of 2006), which are relevant in student's mobility and traineeships, and the continuous professional development of employees: (1) social and civic competences; (2) sense of initiative and entrepreneurship; and (3) learn to learn.[147]

Social Innovation through Knowledge Exchange (SIKE) – This Knowledge Alliance project seeks to support social innovation through knowledge exchange by: forging alliances between the stakeholders of the social innovation ecosystem, from business, local government, civil society organisations and community groups and develop SIKE Units that will specifically develop and adapt knowledge exchange tools and processes to the needs of social innovators. In addition to this, it seeks to stimulate social entrepreneurial skills within the University and the regional community by: offering facilities for social innovation incubation and hot-desking facilities; linking services for connecting social entrepreneurs and community groups with the knowledge base of the university; offering resources, processes and expertise to evaluate and demonstrate the value of social innovation to policymakers.[148]

Succession Planning and Regeneration in Family Businesses (SPARKLE) – one of the main goals of the project is creating a new training program for agricultural students, in the form of e-learning course, in order¬¬ to enhance their business-oriented skills and entrepreneurial activity in a smart environment.[149]

Succession Planning and Regeneration in Family Businesses (SPRING) - SPRING, aims to help EU family businesses to fulfil their potential, by offering them a complete package with the necessary training, mentoring, support and guidance in the areas of: a) Smooth succession and business continuity, accounting for multi-dimensional factors (leadership, management, governance ownership, legal issues), through failed and successful cases; b) Strategy for growth and internationalisation, built on innovation and regeneration; c) Development of entrepreneurship, intrapreneurship and interpreneurship across generations, converging the entrepreneurship and family business training content, promoting a start-up culture and innovation-based growth mindset within family businesses, while considering other strategies besides succession (exit strategies, external investors coming in, etc.); d) Inclusive and responsible family business acts to ensure they adopt not only CSR practices but the full cycle, to maximise value creation for all involved stakeholders, promoting inclusive entrepreneurship among the next generation members and female leaders.[150]

Supporting Researchers to Create Innovation-Driven Enterprises (STARTED) – The STARTED Project aims to lead to key changes in teaching and learning approaches to entrepreneurship for researchers and build strong and durable bridges between HEIs and businesses. It does so by helping researchers to discover customer needs in different sectors; to develop a more professional, complete and 'real-life condition' approach; and analysing and addressing the skills needs of R&D organisations.[151]

The Wine Lab – This project provides for the development of, among other: hubs (clusters) as groups of interest and learning communities, involving wine producers, researchers, higher education students, public and private stakeholders in the wine sector; opportunities for higher education students to develop entrepreneurial and intrapreneurial mindset, through traineeship and internship; mechanisms for structured sharing of knowledge between research and business.[152]

Video-Supported Education Alliance (ViSuAL) – Video-Supported Education Alliance (ViSuAL) is an Alliance of 6 HEIs-Teacher Education (HEIs-TE) and 6 Educational Technology Designers (ETDs) co-creating an evidence-based pedagogical model for Video-Supported Collaborative Learning. The developed solution develops students' critical thinking and problem solving skills that are important for navigating the increasingly turbulent, knowledge-intensive and entrepreneurial work-life.[153]

[146] See http://www.preferproject.eu/
[147] See https://promote-eu.org/about-promote/rationale/
[148] See https://sike-eu.org/
[149] See http://sparkle-project.eu/about-us/
[150] See https://www.euspring.eu/about-the-project
[151] See http://startedproject.eu/
[152] See https://www.thewinelab.eu/en/
[153] See http://visualproject.eu/

Annex 1 – Programme

Day 1: 24 October 2019	
08:30 - 09:30	Registration
09:30 - 13:00	Opening session Moderator: **Christophe Robeet**, Journalist Opening speeches 09:35 **Tibor Navracsics**, European Commissioner for Education, Culture, Youth and Sport **Sabine Verheyen**, Member of the European Parliament, Chair of CULT Committee (Plenary Session in Strasbourg – Video statement)
10:20 - 11:00	Keynote speeches **Matías Rodríguez Inciarte**, President of Santander Universities **Borhene Chakroun**, Director of Policies and Lifelong Learning Systems division, UNESCO
11:00 - 11:30	Coffee break - Knowledge Alliance pitches 11:05 - 11:15 **Macarena Cuenca** and **Antonia Silvaggi** CONNECT - Knowledge Alliance for Audience Development 11:15 - 11:25 **Rainer Svacinka** FooD-STA - FooD-Studies and Training Alliance

Day 1: 24 October 2019	
11:30 - 12:45	Panel Discussion - Partnerships for sustainable development: Challenges and opportunities Panel members **Taru Pilvi**, Innovation Director, Tampere University **Pascal Métivier**, Senior Executive Vice-President, Science and Technology Director, Solvay Group **Theun Baller**, Dean, Technical University of Delft **Monika Skadborg**, Member of Executive Committee, European Student Union
12:45 - 13:00	Digital Education Hackathon - Global Award Finalists **Themis Christophidou**, Director-General for Education, Youth, Sport and Culture
13:00 - 14:30	Lunch - Knowledge Alliance pitches 13:10 - 13:20 **Greet Langie** PREFER - Professional Roles and Employability of Future EngineeRs 13:20 - 13:30 **Francisco Sousa Barros** ADMIRE - Knowledge Alliance for AdDitive Manufacturing 13:40 - 13:50 **Celia Hadjichristodoulou** SPRING - Succession Planning and Regeneration in Family Businesses 13:50 - 14:00 **Elias Iosif** DLT4ALL - Knowledge Alliance for Blockchain and Distributed Ledger Technologies 14:00 - 14:10 **Muriel Algayres** FLIP2G - Enhancing Education through data-driven adaptable games in classrooms 14:10 - 14:20 **Anneli Kakko** HEIBus - Smart HEI-Business Collaboration for Skills and Competitiveness

Day 1: 24 October 2019	
14:30 - 18:00	Parallel sessions Block 1: Tackling the skills mismatch **Room 201 AB** Addressing Europe's skills mismatch requires action. More students need to be attracted to fields of study that prepare them for jobs where shortages exist or are emerging. In many EU Member States, there is unmet demand for graduates in science, technology, engineering, (arts) and maths - STE(A)M) fields -, as well as medical professions and teaching. Second, all students in higher education, irrespective of their field of study, need to acquire relevant transversal skills and key competences that will allow them to succeed. In particular, digital and entrepreneurial competences are becoming increasingly important. Rapporteur: **Gigliola Paviotti**
	14:30 - 16:00 **WORKSHOP 1.1 Attracting students to disciplines that prepare them for jobs where shortages exist or are emerging** Many Member States still face significant youth unemployment rates. However, at the same time, countries face shortages for graduates in science, technology, engineering, (arts) and maths - STE(A)M) fields -, as well as in the medical professions and teaching. This workshop will present a number of initiatives aiming to address these challenges. Moderator: **Vanessa Debiais-Sainton**, Head of Unit B1 - Higher Education, DG EAC Speakers: **Geert Asselsberg**, EU STEM Coalition Network **Rima Dapous**, Education Director, EIT KIC Raw Materials **Tamás Kerszanski**, Obuda University, Hungarian STEM Platform **Jan Lundell**, Chairman of the Board, Luma Centre Finland

Day 1: 24 October 2019	
	16:30 - 18:00 **WORKSHOP 1.2 Providing learning experiences that enable students to acquire the right mix of knowledge, skills and competences.** This workshop session will look at different examples of how to bridge the gap between higher education and the labour market, with a focus on developing approaches that develop the skills and competences students will require in their future private and professional lives. Moderator: **Julie Fionda**, Deputy Head of Unit E2 - Skills and Qualification, DG EMPL, European Commission Speakers: **Christoph Meng**, University of Maastricht, coordinator of Eurograduate consortium **Barbara Gabriel**, Department of Mechanical Engineering, University of Aveiro **Gregor Cerinsek**, University of Ljubljana and **Sara Arko**, Metronik, Slovenia, Knowledge Alliance project: 'People-centred developed approaches in practical and learning environments' **Inese Podgaiska**, Secretary-General, Association of Nordic Engineers, ANE
14:30 - 18:00	**Parallel sessions** **Block 2: Supporting the workforce to adapt to the future** **Room 211-212** This stream will discuss how higher education institutions and businesses can work together to make lifelong learning a reality. New trends in the labour market and new technologies will continue to increase demands on higher education graduates in coming decades. Individuals must constantly upgrade their knowledge, skills and competences, particularly in light of demographic developments in Europe. Rapporteur: **Victoria Galan Muros**

Day 1: 24 October 2019	
	14:30 - 16:00 **WORKSHOP 2.1 Preparing and supporting students and graduates as future lifelong learners.** This workshop will look at strategies and concrete examples of how to support students and graduates to become lifelong learners. Moderator: **Denis Crowley**, Head of Unit A2 - Country Analysis, DG EAC, European Commission Speakers: **Brikena Xhomaqi**, Director, Lifelong Learning Platform, active in the field of civil society **Dieter Dohmen**, Managing Director, FiBS Research Institute for the Economics of Education and Social Affairs **Hanne Smidt**, Senior Advisor, European University Association **Henrik Runnemalm**, Director, Research and Technology, GKN Aerospace Engine Systems, Sweden
	16:30 - 18:00 **WORKSHOP 2.2 Supporting up-skilling and re-skilling.** This workshop will present and discuss concrete examples of how higher education and business can support up-skilling and re-skilling of both staff and potential job-seekers. Moderator: **Martina Ni Cheallaigh**, DG EMPL Unit E3 - VET, Apprenticeships and Adult Learning, European Commission Speakers: **Eva Cendon**, Fernuniversität Hagen and Vice-President, European Universities Continuing Education Network (EUCEN) **Chad Pasha**, Coursera **Bert Jehoul**, Representative, Open Recognition, Belgium, and **Dries Vanacker** , Artevelde University and Open Recognition Belgium **Catherine Guyonnet**, Director, Ocapiat, France, and **George Ubachs**, Managing Director, European Association of Distance Teaching Universities (EADTU)

Day 1: 24 October 2019	
14:30 - 18:00	Parallel sessions Block 3: Building local and regional eco-systems **Room 213-215** This block will present and discuss how higher education institutions, businesses and other stakeholders can work together to support economic and social innovation at local or regional level. The session will also explore how higher education institutions and local actors can collaborate to design and implement study programmes that ensure graduates acquire the skills and competences needed at both the local and regional level. Rapporteur: **Eskarne Arregui Pabollet**
	14:30 - 16:00 **WORKSHOP 3.1 Supporting social innovation.** This workshop will present and discuss examples of collaboration between higher education institutions, business and other stakeholders in support of social innovation. It will also look at strategies and concrete examples of how to support students and graduates to become lifelong learners. Moderator: **Ulla Engelmann**, Head of Unit F2 - Clusters, Social Economy and Entrepreneurship, DG GROW, European Commission Speakers: **Kristina Notz**, CEO, Social Entrepreneurship Academy, Munich, Germany **Mark Majewsky Anderson**, Director, Research and Innovation, Glasgow Caledonian University **Javier Finez**, Director, Business Innovation Brokers - RealiZe **Tomasz Szymczak**, CEO of Gdańsk Entrepreneurial Foundation, Poland **Ibrahim Ouassari**, Founder at the start-up incubator 'Molengeek', Belgium

Day 1: 24 October 2019	
	16:30 - 18:00 **WORKSHOP 3.2 Higher education for Smart Specialisation.** In this workshop, participants will learn about collaboration between higher education institutions and local actors in support of local and regional eco-systems – particularly with regard to the design and implementation of Smart Specialisation Strategies. Moderator: **Marek Przeor**, DG REGIO Unit G1- Smart and Sustainable Growth, European Commission Speakers: **Maria Farano**, Fondazione Cluster Marche, Italy **Anne Delouis**, Vice-President, University of Orléans, expert in Smart Specialisation Strategies, Val de Loire Region, France **Ramojus Reimeris**, Head of Innovation and Policy Analysis Unit, MOSTA, Lithuania **Adolfo Morais Ezquerro**, Deputy Minister for Higher Education and Research, Basque Government, Spain
14:30 - 18:00	Parallel sessions Block 4: Working together to address societal challenges and build societal trust **Room 214-216** This session will discuss projects involving higher education institutions, business, research community and social organisations to address societal challenges and issues, and how these activities can enrich the learning experience of students. It will also discuss how higher education and business can cooperate to overcome challenges in areas, such as Artificial Intelligence, big data and automisation. Rapporteur: **Keith Hermann**
	14:30 - 16:00 **WORKSHOP 4.1 A driver to implement the Sustainable Development Goals.** This workshop will discuss collaborations between higher education, business and research in support of the implementation of the United Nations' (UN) Sustainable Development Goals (SDGs). Moderator: **Sieglinde Gruber**, Head of Unit C4 - Healthy Oceans and Seas, DG RTD, European Commission Speakers: **Angelo Riccaboni**, University of Siena, Coordinator of PRIMA project, Italy **Line Gry Knudsen**, Education Director, Climate KIC **Stijn Donders**, Research Project Manager, Siemens Industry Software NV, Belgium **Åshild Aarø**, Head of Startup Lab and coordinator of course on Sustainable Innovation, University of Bergen, Norway

Day 1: 24 October 2019	
	16:30 - 18:00 **WORKSHOP 4.2 Artificial intelligence and automisation – opportunities and threats.** This workshop will discuss the opportunities and threats for higher education, triggered by the developments and use of artificial intelligence and automisation. Moderator: **Fabrizia Benini**, Head of Unit F4 - Digital Economy and Skills, DG CNECT, European Commission Speakers: **Colin de la Higuera**, Nantes University, France **Markus Lippus**, Co-founder, MindTitan, Estonia **Ann Nowé**, Vrije University of Brussels, Belgium **Ilkka Tuomi**, Meaning Processing Ltd., Finland
14:30 - 18:00	Parallel sessions Block 5: Developing an entrepreneurial culture **Room 204** Europe needs entrepreneurial graduates. This session will investigate the development of entrepreneurial attitudes at the organisational and individual level. Rapporteur: **Maria Sobron Bernal**
	14:30 - 16:00 **WORKSHOP 5.1 Developing entrepreneurial organisations.** This workshop will discuss initiatives to support innovation and entrepreneurship in higher education institutions and systems. Moderator: **Begoña Arano**, Head of Unit C1 - Innovation and EIT, DG EAC, European Commission Speakers: **Rebecca Allinson** and **Zsuzsa Javorka**, Technopolis, HEInnovate - supporting institutional change **Slavica Singer**, J.J. Strossmayer University of Osijek, Croatia **Stefan Drews**, Ministry of Economics, Exist Initiative, Germany **Katarina Pramatari**, Athens University of Economics and Business, Greece

Day 1: 24 October 2019	
	16:30 - 18:00 **WORKSHOP 5.2 Nurturing entrepreneurial individuals.** This session will discuss examples of higher education institutions' capacity to provide supportive learning environments -, thereby, allowing professors, researchers and students to develop entrepreneurial skills and mindsets. Moderator: **Koen Jonkers**, Deputy Head of Unit - Knowledge for Finance, Innovation and Growth, DG JRC, European Commission Speakers: **Fátima São Simão**, UPTEC, Science and technology park of the University of Porto, Portugal **Paula Caroll**, New Frontiers Programme, Programme Manager, Enterprise Ireland **Ursula Mühle**, Director of Education, EIT Health, KIC **Thomas Lans**, Wageningen University, The Netherlands **Gabi Kaffka**, Ecorys, and **Christina Weber**, SCE GmbH, EPIC - Assessing the Impact of Entrepreneurship Education
18:30 - 21:00	Networking reception in exhibition area Welcoming remarks: **Antoaneta Angelova-Krasteva**, Director for Innovation, International Cooperation and Sport, DG EAC, European Commission Pitches by Knowledge Alliances 18:45 - 18:55 **Amanda Roberts** AHEH - Arts and Humanity Entrepreneurship Hub 18:55 - 19:05 **Robert Wagenaar and Arno Meerman** IE-WEXHE - Integrating Entrepreneurship and Work Experience into Higher Education 19:05 - 19:15 **Gerard Danford** IoTLabs - Internet of Things Rapid-Proto Labs Musical entertainment: **Jaaad Quintet (by students of the Koninklijk Conservatorium Brussel)** Alexandre Jadoul: **guitar**, Thomas Latouche: **saxophone**, Arthur Possing: **piano**, José Buc Chavez: **bass**, Maxime Aznar: **drums**

Day 2: 25 October 2019	
09:00 - 09:50	**Presentation and discussion of conclusions of parallel sessions** Moderator: **Christophe Robeet**, Journalist **Gigliola Paviotti**, rapporteur for block 1 workshops: 'University-Business Cooperation - Tackling the skills mismatch' **Victoria Galan Muros**, rapporteur for block 2 workshops: 'University-Business Cooperation - Supporting the workforce to adapt to the future' **Eskarne Arregui Pabollet**, rapporteur for block 3 workshops: 'University-Business Cooperation - Building local and regional eco-systems' **Keith Hermann**, rapporteur for block 4 workshops: 'University-Business Cooperation - Working together to address societal challenges and building societal trust' **Maria Sobron Bernal**, rapporteur for block 5 workshops: 'University-Business Cooperation - Developing an entrepreneurial culture'
09:50 - 10:30	**Sustainability in action - start-ups engaged in sustainable development** Speakers: **Elzelinde van Doleweerd** and **Vita Broeken**, Upprinting Food, The Netherlands **Atanas Enev** and **Vanya Milanova**, 'BIOMYC', Bulgaria **Paola Pittia**, Askfood - creation of a new 'educational' eco-system for the innovation and sustainability of the food system **Martin A. Petersen**, BUILDS - Building Urban Intelligent Living Design Solutions **Vijoleta Sulciene**, KnoWood - Sustainable Mid-Rise and Tall Wooden Buildings
10:30 - 11:10	**Coffee break - Knowledge Alliance pitches** 10:35 - 10:45 **Demetrios Sampson** L2A - Learn to Analyze (Educational Data) 10:45 - 10:55 **Dina Pereira** BIO-ALL - boosting innovation and entrepreneurial processes in the BIOHEALTH sector 10:55 - 11:05 **Marco Vieri** SPARKLE - Sustainable Precision Agriculture: Research and Knowledge for Learning how to be an agri-Entrepreneur
11:10 - 11:30	**Keynote address 'Looking Ahead'** **Tome Antičić**, State Secretary for Science and EU Funds, Republic of Croatia (incoming EU Presidency)

Day 2: 25 October 2019	
11:30 - 12:50	**Panel discussion** Panel members **Ana Trbović**, Member of the EIT Governing Board **Markku Markkula**, First Vice-President of the European Committee of the Regions (CoR) **Snježana Prijić-Samaržija**, Rector, University of Rijeka, Croatia **Alexandre Affre**, Director for Industrial Affairs, BUSINESSEUROPE **Natacha Lopes**, Vice-President, JADE - European Confederation of Junior Enterprises
12:50 - 13:00	**Closing remarks** **Themis Christophidou**, Director-General for Education, Youth, Sport and Culture, European Commission
13:00 - 14:30	**Lunch and conference end**

Annex 2 – Input Paper

8th European University Business Forum

Brussels, Belgium

24-25 October 2019

Input Paper

Prepared by:
Mike Blakemore, François Staring,
Kristine Nedergaard Larsen, Tine Andersen and Nadine Burquel

Contents

1 Introduction

The European Commission provides support to higher education institutions (HEIs) and businesses by strengthening the knowledge triangle (education-research-innovation) through actions and initiatives relating to University-Business Cooperation (UBC).[3]

One of the key initiatives is the University-Business Forum (UB Forum), which for more than ten years now has brought together HEIs, businesses and other key stakeholders, with the aim of:

- Encouraging the sharing of knowledge and experience, support mutual learning;
- Creating long-term partnerships and opportunities;
- Driving innovation, entrepreneurship and creativity.

Since 2008, 23 UB Forums have been organised, with 7 European UB Forums in Brussels and 16 Thematic Forums in the Member States (the most recent ones took place in Bulgaria and Portugal). This meeting is the 8th high-level European University-Business Forum, which takes place every two years in Brussels

The UB Forum events help disseminate good practices in university-business cooperation and are an opportunity to exchange experience, to network and to develop new partnerships between HEIs and businesses. The events have generated many new ideas, some of which have been translated into European policy tools. These include the Knowledge Alliances under Erasmus+ and HEInnovate,[4] which is a guiding framework for HEIs and HE systems to assess and develop their innovative and entrepreneurial capabilities.

The focus of this Forum is **'University-Business Cooperation – A Crucial Partnership for Innovation and Sustainable Development'**. The Forum will offer an opportunity for policy makers, higher education and business representatives to discuss challenges, opportunities and mechanisms for effective university-business cooperation supporting innovation and sustainable development.

The Forum will consist of high-level panel discussions, keynote speeches and five parallel streams. In each stream (each consisting of two workshops), a range of inspiring examples of cooperation will be presented to allow participants to engage in lively discussions. Each of these five themes will be briefly introduced in this paper:

- The first stream addresses **tackling the skills mismatch**. Here, the Forum will examine initiatives aimed at addressing mismatches in STE(A)M fields, and which learning experiences can provide students with the best set of skills for private and professional life;
- The second theme is **supporting the workforce to adapt to the future**. Areas covered will be: preparing students as 'lifelong learners', and the up- and re-skilling of staff and job-seekers;
- The third theme is **building local and regional ecosystems**. The two sessions here will look at examples of collaborations on social innovation and Smart Specialisation Strategies;
- The sessions under the fourth theme will look at **addressing societal challenges and building societal trust** in relation to the Sustainable Development Goals, as well as the threats and opportunities posed by Artificial Intelligence and automation;
- The fifth theme is **developing an entrepreneurial culture**. Here, the Forum will discuss initiatives supporting innovation and entrepreneurship in HEIs, and how HEIs can best support professors, teachers and students to develop entrepreneurial skills and mindsets.

[3] See http://ec.europa.eu/education/tools/university-business_en.htm

[4] See https://heinnovate.eu/

2 Tackling the Skills Mismatch

2.1 The focus of the UB Forum

This session will discuss how higher education institutions and businesses can work together to address skills mismatches. According to Skills Panorama data, across the EU there are **shortages of graduates in science, technology, engineering, (arts) and mathematics (STEAM), teaching and medical professions**. In particular, software and applications developers as well as analysts are in short supply, and so are professionals in the healthcare sector.[5]

There are different types of skills mismatch: **skill shortages** (i.e. the inability of employers to attract candidates with the right skillset); **skill gaps** (i.e. the skills required are unavailable in the workforce); and **over- or under-qualification and over- or under-skilling** (i.e. mismatches where the skills and qualifications of the employees do not match the requirements of jobs[6]). 43% of higher educated employees report that their skills are under-utilised at work.[7]

Addressing Europe's skills mismatch requires action from all stakeholders involved. For example, skills shortages and skill gaps should be tackled by attracting more students to fields of study that prepare them for jobs in demand in the digital economy. At the same time, to tackle horizontal and vertical mismatches, students should be guided to the jobs that fit their competences and skills, and teaching should also be better attuned to deliver the transversal skills needed to live and work in a rapidly changing world and contribute to societal challenges. In this respect, digital and entrepreneurial competences as well as the understanding of sustainability issues are increasingly important.

2.2 Attracting students to disciplines that prepare them for jobs where shortages exist or are emerging

The recent economic crisis worsened the employment situation across Europe, affecting students and young people particularly hard. Despite a growing number of job seekers in Europe, some sectors and employers still report skill shortages in STE(A)M fields, medical professions and teaching.[8]

According to the World Economic Forum (2018), the skills required to perform most jobs will have shifted significantly over the next five years. The global average skills stability (i.e. the proportion of core skills required to perform a job that will remain the same) is expected to be about 58%, meaning **an average shift of 42% in required workforce skills over the 2018–2022 period**.[9] Some established profiles, such as data analysts and scientists, software and applications developers, and ecommerce and social media specialists (which are based on technology), are forecast to be in increased demand up to 2022.

[5] Skills Panorama: https://skillspanorama.cedefop.europa.eu/en/analytical_highlights/skills-challenges-europe-2016#_skill_shortages

[6] CEDEFOP. 2015a. *Matching skills and jobs in Europe: Insights from Cedefop's European skills and jobs survey*. European Centre for the Development of Vocational Training. Published October. Available: https://www.cedefop.europa.eu/en/publications-and-resources/publications/8088. [Accessed June 3 2017].

[7] Skills Panorama: https://skillspanorama.cedefop.europa.eu/en/indicators/skills-under-utilisation

[8] https://skillspanorama.cedefop.europa.eu/en/content/cedefop-skills-forecast

[9] WEF. 2018. *The Future of Jobs Report 2018*. World Economic Forum. Published September 17. Available: https://www.weforum.org/reports/the-future-of-jobs-report-2018. [Accessed Sepember 18 2018].

New profiles expected to increase in demand are a variety of specialist profiles related to emerging technologies: AI and machine learning specialists, big data specialists, process automation experts, information security analysts and user experience and human-machine interaction specialists, to name ut a few.[10] **The skills to work with technology and data will be an import skill across all fields**, and HEIs will have to prepare students for the demand of the labour market. As well as for a job market where shifts in skills demand is only expected to become more rapid.

Education and training have an important role to play in combatting skill shortages. They can do so by better guiding students to professions with skill needs, by reforming qualification standards, and by adapting curricula in cooperation with employers or their representatives.[11] Other effective measures include: increasing dialogue between schools, students and social partners, matching curricula with labour market needs, offering students personal counselling to enable them to take informed career choices, and increasing HEIs' use of feedback from the business environment and adapting their teachings to the skill need of the local/regional labour market.

2.3 PROVIDING LEARNING EXPERIENCES THAT ENABLE STUDENTS TO ACQUIRE THE RIGHT MIX OF KNOWLEDGE, SKILLS AND COMPETENCES

People need a broad set of skills to fulfil their potential both at work and in society. Employment policies have often focused more on getting people into work. However, research shows that short-term policies focusing only on getting people in employment is insufficient – it fills jobs with people (which is good for official statistics about unemployment reductions), but it does not directly address the skills mismatch problems. Policies focused on quickly finding employment for young people may therefore backfire in the near future if people are not placed in properly matched jobs, or in jobs that fail to make use of and develop their full potential.[12] The quality and relevance of what people learn is now centre-stage. University Business Cooperation supports this agenda by looking into the state of UBC, finding and disseminating good practices and helping initiate new partnerships.[13]

The nature of work is constantly changing, and beyond occupation-specific skills **employers are increasingly looking for employees who also have a broad set of transferable skills**, such as the ability to work in a team, creative thinking and problem solving.[14] This mix of formal, informal and non-formal skills is also essential for people considering starting their own business. Yet, too little emphasis is usually placed on such skills in curricula, and they are rarely formally assessed by Member States. Interdisciplinary profiles – i.e. people with the ability to combine work across different fields, and who in order to do so therefore often have a broad set of transferable skills – are increasingly valued by employers, as finding the right solutions to today's challenges often requires the ability to combine insights from different disciplines. These profiles are, however, in short supply on the labour market.

[10] I*bid.*

[11] CEDEFOP. 2015b. *Tackling unemployment while addressing skill mismatch*. European Centre for the Development of Vocational Training. Available: http://bookshop.europa.eu/en/tackling-unemployment-while-addressing-skill-mismatch-pbTIBC15005/?CatalogCategoryID=iEKep2Ix3hEAAAEud3kBgSLq. [Accessed February 8 2016].

[12] I*bid.*

[13] DAVEY, T., MEERMAN, A., GALAN MUROS, V., et al. 2018. *The State of University-Business Cooperation in Europe*. European Commission. Available: https://www.ub-cooperation.eu/pdf/final_report2017.pdf [Accessed January 3 2019].

[14] BAKHSHI, H., DOWNING, J. M., OSBORNE, M. A., et al. 2017. *The Future of Skills: Employment in 2030*. Pearson and NESTA. Available: https://futureskills.pearson.com/research/assets/pdfs/technical-report.pdf. [Accessed October 3 2018].

2.4 EU ACTION

Skills was placed high on the EU's political agenda when the Commission adopted the **new Skills Agenda for Europe** on 10 June 2016,[15] which launched 10 actions, centred around three key strands:

(1) Improving the quality and relevance of skills formation;

(2) Making skills and qualifications more visible and comparable; and

(3) Improving skills intelligence and information for better career choices.

Strand 2 relates directly also to the European Education Area (going back to the Lisbon Recognition Convention of 1997[17] and the Bologna Process) and the need for higher education qualifications to be more readily recognised in other countries.

Action at EU level alone is not enough, though. Success depends on commitment of many actors: national governments, regional and local authorities, businesses and employers, workers, and civil society. Through the European Social Fund (ESF), European Employment Services (EURES), specific studies, and skill needs analyses, the European Commission and its agencies support Member States in acquiring knowledge to address the issue of skills mismatches. Some key examples follow below.

The **EU Skills Panorama** website was launched in 2012.[18] It presents quantitative and qualitative information on short- and medium-term skills needs, skills supply and skills mismatches in the European Union. Since January 2014, Cedefop coordinates the Panorama's development, in cooperation with the European Commission's Directorate-General for Employment, Social Affairs and Inclusion (DG EMPL).

Among the actions launched under the new Skills Agenda for Europe is the **new Recommendation on Key Competences for Lifelong Learning**, which was adopted in May 2018.[19] The Recommendation encourages Member States to better prepare people for changing labour markets and active citizenship in more diverse, mobile, digital and global societies.

In 2019, Eurofound and Cedefop joined forces to carry out the fourth **European Company Survey** (ECS).[20] The ECS 2019 collects data from over 20,000 companies on workplace practices with regards to work organisation, human resource management, skills use, skills strategies, digitalisation, direct employee participation and social dialogue. The report for the ECS 2019 will be ready in autumn 2020.

As part of the New Skills Agenda, the **Digital Skills and Jobs Coalition** was launched in 2016. The Coalition mobilises companies, non-for-profit organisations, education providers, social partners and Member States who work together to tackle the lack of digital skills in Europe. Actions under the coalition include: informing stakeholders on European funding possibilities, promoting best practices, and inviting Member States to develop and implement comprehensive national digital skills strategies, with the purpose of strengthening digital skills across Europe to better fit the skills needs of the future.[22]

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[15] COMMISSION. 2016. *Working together to strengthen human capital, employability and competitiveness. COM/2016/0381 final*. European Commission. Published June 10. Available: Working together to strengthen. [Accessed July 3 2016].

[17] See http://www.ehea.info/page-recognition

[18] See https://skillspanorama.cedefop.europa.eu/en/

[19] COUNCIL. 2018. *Council Recommendation of 22 May 2018 on key competences for lifelong learning*. Council of The European Union. Published May 22. Available: https://europa.eu/!fB67yH. [Accessed June 3 2018].

[20] Eurofound European Company Survey 2019 https://www.eurofound.europa.eu/surveys/2019/european-company-survey-2019

[22] The Digital Skills and Jobs Coalition https://ec.europa.eu/digital-single-market/digital-skills-jobs-coalition

Participants are invited to reflect on the following questions:

- How can UBC be translated into direct incentives that encourage students to choose fields of study where their skills are needed in the future?
- How could HEIs allow and incentivise non-STEAM students to study STEAM-subjects concurrently with their chosen field of study?
- To which extent and by which means can and should HEIs help develop students' transversal skills? What does this mean for the ways in which HEIs currently formulate their curricula?
- Are there any specific transversal and interdisciplinary skills that HEIs should take the lead on when it comes to preparing students with the right mix of knowledge, skills and competences?
- How can UBC stakeholders (education, industry/business, regional policy makers etc.) better inform European-level programmes to successfully address the 'skills mismatch'? Is it possible to identify common success factors of such programmes?

3 Supporting the Workforce to Adapt to the Future

3.1 The Focus of the UB Forum

This session will discuss how higher education institutions and businesses can better work together to make lifelong learning a reality. More specifically, it will look at how we can prepare and support students to become lifelong learners, and how university-business cooperation can best support the workforce to up- and reskill throughout their careers.

The ever-changing nature of work and the increasingly diverse social make-up of society require the European workforce to develop and renew their skills throughout their career and life. Europe's labour force is ageing, and hence, skills obsolescence is a growing challenge. In 2014, **48.3% of European adults expected that some of their skills would be outdated in the next five years**.[23]

From a different perspective, a 2018 forecast[24] of the task composition of jobs until 2030 indicates that for those with the highest wages (including academics and professionals), the content of jobs is expected to change significantly. In addition to physical tasks taking up less of the daily job, also literacy with respect to technical issues and the humanities are expected to decrease, as are teaching and teamwork-related tasks.[25]

Tasks that are expected to grow in importance include business literacy, numeracy, sale, tasks requiring autonomy, and ICT-related tasks. One driving force behind these changes is the disruptive effects of technological change, in particular digitalisation and the (big) data economy.[26] This not only challenges existing business models, but just as importantly requires new and more advanced skills of the workforce. According to a 2017 study by The McKinsey Global Institute, **39% of work in the professional, scientific, and services sectors has the potential to be automated**, meaning that the content of jobs will change significantly.[27] McKinsey also foresees that workers of the future will spend more time on activities that are difficult to automate, such as management and communication, and less time on automatable activities such as collecting and processing data.[28]

[23] Skills Panorama (2014). *Skills obsolescence*. https://skillspanorama.cedefop.europa.eu/en/indicators/skills-obsolescence (Data from the European Skills and Jobs Survey, which has not been repeated since 2014

[24] STORRIE, D. & ANTÓN, J. I. 2018. *Labour market change: Wage and task profiles of employment in Europe in 2030.* European Foundation for the Improvement of Living and Working Conditions. Published December 17. Available: https://www.eurofound.europa.eu/publications/customised-report/2018/wage-and-task-profiles-of-employment-in-europe-in-2030. [Accessed January 3 2019].

[25] The projected decrease in teamwork tasks is contrary to what is expected in most literature. However, since this is a statistical projection, no attempt at explanation is offered in the report.

[26] OPHER, A., CHOU, A., ONDA, A., et al. 2016. *The Rise of the Data Economy: Driving Value through Internet of Things Data Monetization*. IBM. Available: https://www.ibm.com/downloads/cas/4JROLDQ7. [Accessed June 3 2019].

[27] McKinsey Global Institute (2017). *Where machines could replace humans — and where they can't (yet).* https://public.tableau.com/profile/mckinsey.analytics#!/vizhome/InternationalAutomation/WhereMachinesCanReplaceHumans

[28] MANYIKA, J., LUND, S., CHUI, M., et al. 2017. *Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages* McKinsey & Company. Published November. Available: https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages#part4. [Accessed June 3 2019].

3.2 Preparing and supporting students and graduates as lifelong learners

The changes outlined above present significant challenges for education policy makers and HEIs, who are facing a growing call to ensure students' knowledge and skills match the needs of labour market and the society at large, which are expected to continue to change at a high pace. While universities – and university-business cooperation projects – for decades had a strong focus on equipping students for current labour market requirements,[29] it is increasingly clear that the employability skills of new graduates will not suffice for their entire career, but need to be updated continuously to match new challenges and requirements. In addition to increased focus on skills currently required in the labour market, educational institutions at all levels need to focus on developing knowledge, skills and attitudes that can prepare students for lifelong learning (LLL). LLL implies that learning takes place throughout life. **LLL therefore does not only include formal learning in schools, training institutions, colleges and universities, but also non-formal learning outside the formal education system**.

Whenever HEIs and businesses are successful in involving students in their cooperation, or even making students the centre of cooperation, it clearly contributes to preparing the participating students (and educators) better for LLL. In these collaborative exercises, participants are exposed to unknown and unfamiliar situations and modes of problem solving, and they develop the ability to focus on and deal with complexity, to critically reflect and make decisions, to overcome prejudices and to compromise. All of these are skills and attitudes which are the heart of the capacity for LLL.[30]

However, *all* students, not only those currently involved in collaborative work with industry or other stakeholder or entrepreneurial experiences, need to be prepared for LLL. Therefore, HEIs should consider how to systematically integrate the development of these competences, as well as the way to assess and present them, into the curricula.

For example, **the University System of Georgia (USG) is developing modes of learning designed to foster what they call 'essential skills'**,[31] which are in part similar to the knowledge, skills and attitudes described in the European Key Competence framework.[30] The USG has developed a series of recommendations on pedagogical approaches that can contribute to fostering essential skills for LLL. These include: collaboration and communication skills. Students should, for example, be given opportunities to work in trans-disciplinary groups, "*to bring the lens of their discipline and training to a group of voices, and collaborate effectively as part of a diverse team.*"[32] Also, methods utilising digital technologies and case-based studies will enhance these essential skills, as will undergraduate research opportunities, internships, mentorships and mobility. In addition to pedagogical approaches, the USG initiative considers that the assessment and documentation of students' learning experiences is pivotal. The recommendation is to develop *"a portfolio of learning assets that not only list courses taken but also representations of what the learner actually has gained from the experience"*.[33]

[29] The short-term focus on employability is visible through the QS rankings: QS. 2019. *Graduate Employability Rankings 2020*. QS Enrolment Solutions. Published September. Available: https://www.topuniversities.com/university-rankings/employability-rankings/2020. [Accessed September 19 2019].

[30] COUNCIL. 2018. *Council Recommendation of 22 May 2018 on key competences for lifelong learning*. Council of The European Union. Published May 22. Available: https://europa.eu/!fB67yH. [Accessed June 3 2018].

[31] University System of Georgia (2019). *Essential Skills. Workforce, Talent Development, Economic Development, Critical Thinking, Integration.* https://www.usg.edu/college2025/executive_summary/essential_skills. In addition to the recommendations themselves, the website lists a number of interesting case studies of concrete implementation.

[32] https://www.usg.edu/college2025/executive_summary/essential_skills

[33] *Ibid.*

3.3 SUPPORTING UP- AND RE-SKILLING

Even if university graduates enter the labour market with 21st-century skills and attitudes, possibly complemented by employment-related skills, changes requiring new skills will continue throughout their working life. Some skill demands will be triggered by technological developments, others by societal changes. For example, the current policy emphasis on sustainability will only increase in the future,[34] calling on companies and individuals to change their way of doing business and individual behaviour. This raises the question of **the extent to which universities should be involved in the up-skilling and re-skilling for the businesses in their regional ecosystem**. How can HEIs best balance their focus on being players in the global HE market, and also being locally and regionally embedded?

From a LLL perspective, the need to strengthen the upskilling of the labour force concerns not only university graduates, but in equal measure employees whose skills are obtained through education at lower levels, combined with informal and non-formal learning on the job. Universities, in collaboration with local or regional businesses and their associations, may play a distinct role in offering research-based, but tailored, learning opportunities for employees in businesses. These opportunities may involve a wide variety of learning modes and learning venues, from MOOCs to blended learning, to wholly classroom-based learning.

Developing learning opportunities for a wider audience will however **require HEIs to open their doors for non-traditional learners** without imposing strong access requirements.[35] Indeed, cases presented in earlier UBFs illustrate that universities in all corners of Europe have ventured into this new role with success. The validation of prior learning is an instrument which may prove its value in this respect.

In Singapore, a number of approaches to the provision of LLL exist. The Singapore University of Social Sciences (CCPE) provides graduates with a 'Lifelong Learning Credit (L2C)' of SGD 500 that can be used to pay for any course or workshop organised by CCPE regardless of the level of the course or workshop.[36] The School for Continuing and Lifelong Education at the National University of Singapore (NUS) offers two streams of LLL opportunities, one ('L^3') for NUS alumni, and one ('NUS CET500') for the general public. The L^3 programme comprises technical skills and competences, such as 'Digital Marketing' or 'Machine Learning', as well as generic skills and competences, including 'Asking Questions', 'Leading and Motivating Difficult Employees', or 'Quantitative Reasoning'.[37]

Universities aiming to offer relevant additional learning opportunities that are tailored to the needs of the workforce and of society are faced with two very different challenges. One is to **ensure the learning provided is indeed relevant to the labour market and society**. The other is to **adapt teaching strategies and teaching activities to the needs of a different student audience**, namely adults that usually must reconcile studies with work and often also with family obligations. The relation between teachers and students needs to take on a new character, acknowledging that both parties contribute expertise to the learning situation.[38]

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[34] STRIETSKA-ILINA, O. 2019. *A sustainable greener future needs green employment skills*. International Labour Organization. Published June 5. Available: https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_709084/lang--en/index.htm. [Accessed July 25 2019].

[35] SMIDT, H. 2018. *Lifelong learning is more relevant than ever before*. University World News. Published March 30. Available: https://www.universityworldnews.com/post.php?story=20180327112443137. [Accessed June 5 2018].

[36] https://www.suss.edu.sg/courses/schemes/lifelong-learning-credit

[37] https://scale.nus.edu.sg/programmes/lifelong-learning/alumni

[38] CENDON, E. 2018. *Lifelong Learning at Universities: Future Perspectives for Teaching and Learning*. New Approaches in Educational Research, 7. Available: https://naerjournal.ua.es/article/view/v7n2-1.

With regards to the first challenge, the current speed of change calls for modes of gathering intelligence about skill needs that go beyond traditional uses of labour market information provided by employment services, or skills surveys of alumni. A close collaboration, involving co-creation with other stakeholders will allow universities to be knowledge hubs in a more agile fashion.[39] The second challenge may call for a differentiation of roles of teachers, whereby university teachers and professionals engage in a structured process of collaborative learning. Finally, the increased use of online or blended learning presents its own technical and pedagogic challenges, and mutual learning between universities can serve to avoid the situation whereby each institution has to gather its own experience.

3.4 EU ACTION

Lifelong learning (LLL) has been high on the EU's political agenda since 2001.The **Communication "Making a European Area for Lifelong Learning a reality"** of 2001 was followed by a Council Resolution in 2002. In Education and Training 2020 (ET 2020), the EU's strategic framework for cooperation in the fields of education and training, the first objective reads: *"Make lifelong learning and mobility a reality"*. Within this framework, seven benchmarks were set for 2020, of which two have direct relevance for higher education and for continuing education throughout working life:

- At least 40% of people aged 30-34 should have completed some form of higher education; and
- At least 15% of adults should participate in learning.

A range of policies, programmes and initiatives have been put in place with a view to support Member States as well as national, regional and local stakeholders to reach these benchmarks. Directly related to the framework are the **ET 2020 Working Groups on Education and Training**, under which:

- The **ET 2020 Working Group on Higher Education** discusses how to maximise the provision of quality higher education and how to prepare graduates for changing labour markets and changing societies. The main priorities of this group include skills, inclusive and connected HE systems, and innovation. The potential of UBC has not been discussed explicitly yet by the WG;
- The **ET 2020 Working Group on Adult Learning** discusses policy options for developing modern adult learning systems that support the continuous up- and re-skilling of individuals necessary to thrive on today's labour market and in society. Its main priority areas are: empowering individuals to undertake up- and/or re-skilling; and supporting the development of a culture of continuous learning in the workplace (both private and public). Like the WG on HE, this group has not addressed the potentials of UBC explicitly.

In 2017, a **Renewed EU agenda for higher education** was adopted by the Commission. This agenda identifies four key areas for increased European cooperation in higher education, of which the first is particularly pertinent to this session on lifelong learning:

1. Tackling future skills mismatches and promoting excellence in skills development;
2. Building inclusive and connected higher education systems;
3. Ensuring higher education institutions contribute to innovation;
4. Supporting effective and efficient higher education systems.

[39] REICHERT, S. 2019. *The Role of Universities in Regional Innovation Ecosystems*. European University Association. Published March. Available: https://www.eua.eu/downloads/publications/eua%20innovation%20ecosystem%20report_final_digital.pdf. [Accessed March 14 2019].

A suite of actions at EU-level underpin these goals; the **Bologna Process**, designed to promote the internationalisation of higher education in Europe through more mobility, easier recognition of qualifications and streamlined quality assurance mechanisms; and, the development and use of **mobility and recognition tools**, such as the **ECTS** system and the **Diploma Supplement**, to increase transparency and facility exchanges in Europe. These actions are primarily supported by different strands of the **Erasmus+ and Horizon 2020** programmes.

More recently, in the context of the European Education Area, the European Commission has taken a number of further initiatives that directly or indirectly contribute to a more flexible and skilled workforce across the single market, and which can also contribute to the upskilling and reskilling of regional innovation ecosystems. The proposed **Council recommendation on automatic mutual recognition of higher education and school-leaving diplomas**[40] helps the people with the appropriate skills to 'flow' across the Single Market and meet the needs of the job. This acknowledges that UBC within a region cannot be expected to provide all the reskilling and upskilling needs of its businesses;

The **European Key Competence Framework** is relevant in this context, since the overall aim of the Framework is to underpin lifelong learning. The framework defines eight key competences which are considered equally important. According to the Framework, the **'learning to learn' competence** requires, among other things *"knowledge of the components of a healthy mind, body and lifestyle, knowing one's preferred learning strategies and competence development needs, knowing various ways to develop competences and search for learning opportunities; the ability to learn and work both collaboratively and autonomously and to organise and persevere with one's learning; and having a positive and problem-solving attitude combined with curiosity"*.[41]

Participants are invited to reflect on the following questions:

- What are the most important skills that will enable students to continue to learn throughout their working lives?
- How can universities support students in acquiring these skills?
- How can universities work with businesses and other relevant national, regional or local stakeholders to gain insights into the reskilling and upskilling needs of the workforce (employees as well as unemployed graduates)?
- How can these insights be translated into the delivery of knowledge and skills in the provision of university qualifications at Bachelor, Master and PhD levels?
- How can universities and businesses work together to tailor the provision of continuing education to suit the preferences of companies as well as the workforce with respect to modes of delivery, duration, venues, assessment, certification and recognition etc.?

[40] https://ec.europa.eu/education/education-in-the-eu/proposal-for-a-council-recommendation-on-the-automatic-mutual-recognition-of-diplomas-and-learning-periods-abroad_en

[41] COMMISSION. 2019c. *Key competences for lifelong learning* European Commission. Published July. Available: https://publications.europa.eu/en/publication-detail/-/publication/297a33c8-a1f3-11e9-9d01-01aa75ed71a1/language-en. [Accessed August 3 2019].

4 Building Local and Regional Ecosystems

4.1 The focus of the UB Forum

This stream will present and discuss how higher education institutions (HEIs), businesses and other stakeholders can work together to support economic and social innovation at local and regional level. The sessions will explore how higher education institutions and local actors can collaborate with local and regional stakeholders, and design and implement study programmes that ensure graduates will acquire the skills and competences to make an impact at the local and regional levels.

Collaboration with a focus on **developing a sustainable regional innovation ecosystem is at the core of these activities**, with HEIs being strongly embedded in partnerships, and in particular bringing to the region the knowledge and research capacity of research and teaching institutions that have a focus ranging from the local to regional, and to global.

The first part of this Forum theme will look at how HEIs can partner with a range of actors (including businesses, government, third sector and community organisations) in **social innovation** - "*developing new ideas, services and models to better address social issues*".[42] For example, HEIs can bring their learning and research capacity to help local communities that are at risk of extremism or economic and social exclusion, and help to develop entrepreneurship, building business capacity in communities that previously had low economic prospects. In other situations, HEIs can provide training capacity, or function as intermediaries that bring together social actors.

The second part of this theme explores how HEIs can harness a bottom-up approach to develop '**smart specialisation'**,[43] providing the human capital and expertise that will help their regions (and localities within their regions) become more **innovative and sustainable**. Approaches here can involve public-private partnerships to secure investment, networking and partnership building activities where actors are brought together to create new synergies, providing a cooperative environment to facilitate rapid technology transfer between actors, and working with policy makers to ensure that their strategic planning effectively supports smart specialisation. At the national level there also is a strong role for governments to commission independent research and policy evaluation to ensure that smart specialisation strategies are driven by evidence-based public policy decisions.

Both of these themes contribute to the building of **resilience in regional innovation ecosystems** as their economies face the challenges of automation, artificial intelligence, rapid shifts in job types, and fast-moving needs for training and re-training of the workforce.[44] A recent report for the European Commission's Bureau of European Policy Advisers warned that resilience is needed to counter the threats where regions experience a surplus of low-skilled people who need to move into new jobs with new skills, and where a "s*hortage of medium- and high-skilled workers is projected over the next few*

[42] https://ec.europa.eu/social/main.jsp?catId=1022&langId=en

[43] Such a bottom-up approach "*brings together local authorities, academia, business spheres and the civil society, working for the implementation of long-term growth strategies supported by EU funds*" https://ec.europa.eu/regional_policy/sources/docgener/guides/smart_spec/strength_innov_regions_en.pdf

[44] Smart specialisation and social innovation have been important policy research areas for the Joint Research Centre https://s3platform.jrc.ec.europa.eu/ https://ec.europa.eu/jrc/en/iesi

decades".[45] The report emphasises the importance of working to overcome a polarisation in the labour market between those with and without jobs or careers. Consequently, there needs to be a very strong 'social' aspect to any agenda that builds sustainable regional innovation ecosystems.

4.2 SUPPORTING SOCIAL INNOVATION

A Joint Research Centre report[46] has identified a range of UBC examples supporting social innovation, including:

- TIRESIA[47] - Politecnico Milano: "*the International Research Center promoted by the School of Management of Politecnico di Milano pursuing scientific excellence in the field of Social and Impact Innovation*". Projects involve voluntary organisations, healthcare organisations, families, microcredit companies, and support structures for vulnerable people[48];
- A project involving criminal justice actors, the Polytechnic of Milan, the University of Perugia, KPMG and others, in a project to re-integrate criminals back into society and the labour market, on a pay-by-results basis;

Such projects can only develop if the conditions are conducive to taking a social focus. In a review for the Commission of "*A European ecosystem for social innovation*", Professor Luke Georghiou identified critical enabling factors.

He first emphasised that **for many universities social innovation is already a strategic priority**: "*their raison d'être is education focused on precisely the generations most committed to the goals of social innovation, along with the production of knowledge which normally encompasses many of the major objects of social innovation, or at least the underpinning knowledge that is necessary*".[49] They are often globally networked, bringing new knowledge and knowledge workers into their regional ecosystem, and they provide an experimental base for businesses and organisations to explore disruptive models of working.

Despite this, Professor Georghiou observes that **universities should do more to promote social innovation as a discipline**, by constructing curricula that develop it, and staffing it with excellent researchers and teachers. Social innovation needs to become a criterion for promotion along with research publishing. Universities, as regional institutions, need to be more effective at building trust, cooperation and dialogue with companies active in social innovation. They need to implement channels that enable a dialogue to be built between citizens, students, university staff and others "*to form opinions, give ideas, make contributions and take rational and informed decisions on scientific and technical issues of social importance*".[50]

[45] KOBZAR, S., GRAF, M., GUERIN, B., et al. 2019. *Europe's societal challenges: An analysis of global societal trends to 2030 and their impact on the EU*. European Political Strategy Centre. Published August. Available: https://publications.europa.eu/en/publication-detail/-/publication/ac83e8a6-cae8-11e9-992f-01aa75ed71a1/language-en/format-PDF/source-103790891#. [Accessed September 3 2019].

[46] MADURO, M., MISURACA, G. & PASI, G. 2018. *Social impact investment in the EU: Financing strategies and outcomes oriented approaches for social policy innovation : narratives, experiences, and recommendations*. Joint Research Centre (European Commission). Published December. Available: https://publications.europa.eu/en/publication-detail/-/publication/048b21ea-ff55-11e8-a96d-01aa75ed71a1/language-en/format-PDF/source-83411366. [Accessed December 19 2018].

[47] http://www.tiresia.polimi.it/

[48] http://www.tiresia.polimi.it/wp-content/uploads/2017/03/Measurement-Project_2017_3_29_external.pdf

[49] GEORGHIOU, L. 2018. *A European ecosystem for social innovation*. European Commission. Published April. Available: https://publications.europa.eu/en/publication-detail/-/publication/df7a8163-69fd-11e8-9483-01aa75ed71a1/language-en/format-PDF/source-71538714. [Accessed June 12 2018].

[50] I*bid.*

The challenge of achieving such goals, while respective university autonomy, was evident in the German Rector's Conference resolution in November 2017, relating to

> "*cooperation between higher education, industry and society … institutions warned against focusing research too much on projects promising short-term societal or economic benefits. Accordingly, higher education curricula ought to contain programmes calling for civil society engagement as a supplement to teaching students in terms of their subject and methodological skills*".[51]

4.3 HIGHER EDUCATION FOR SMART SPECIALISATION

The concept of 'smart specialisation' is not inherently new. Back in 2007 a document prepared for the EU observed that **to become 'smart' and innovative, Europe needed to overcome national lines of fragmentation, to allow excellence to flow across borders**, and for regions to avoid simply trying to "*emulate what successful regions or countries do, instead of trying to find an original area for expertise*"[52], and to undertake "*an entrepreneurial process of discovery that can reveal what a country or region does best in terms of science and technology*".[53]

The document also noted that going beyond the regional development of smart specialisation elsewhere in the world offers a potential "*multiplier impact on the EU by fostering learning and opening up avenues for inter-regional and international synergies, complementarities and collaboration*"[54], and this is where the global linkage of universities can make an important contribution.

There are many levels at which smart specialisation can develop, and multi-level governance (MLG) for smart specialisation brings together a full range of regional actors using formal and informal channels.[55] A recent Joint Research Centre study on MLG emphasised that smart specialisation and MLG is both place-based and is experimental, and the study identified four pillars for its development[56]:

- **Complexity**. This acknowledges that the governance is complex, and that "*there are multiple governments (national and regional governments, city councils, county administrations, etc.) which are autonomous but interdependent, and which might have different perspectives on what the problems of innovation*", but none of them has the power to direct the others. Universities therefore have the potential to 'broker' across the levels of governance;

[51] GARDNER, M. 2017. *Germany: Universities clarify cooperation with industry, society*. University World News. Published November 18. Available: http://www.universityworldnews.com/article.php?story=20171118070401117. [Accessed November 23 2017].

[52] FORAY, D. & VAN ARK, B. 2007. *Smart specialisation in a truly integrated research area is the key to attracting more R&D to Europe* European Commission. Published October. Available: http://ec.europa.eu/invest-in-research/pdf/download_en/policy_brief1.pdf. [Accessed January 4 2014].

[53] FORAY, D., DAVID, P. A. & HALL, B. 2009. *Smart Specialisation – The Concept*. European Commission. Published June. Available: http://ec.europa.eu/invest-in-research/pdf/download_en/kfg_policy_brief_no9.pdf. [Accessed January 5 2015].

[54] DEMBLANS, A., GÓMEZ PRIETO, J. & PALAZUELOS MARTÍNEZ, M. 2019. *Smart specialisation in the world, an EU policy approach helping to discover innovation globally: Outcomes, lessons and reflections from the first global workshop on smart specialisation* Joint Research Centre (European Commission). Published July 24. Available: https://publications.europa.eu/en/publication-detail/-/publication/cad0abc6-8e58-11e9-9369-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=677&WT.ria_f=4288&WT.ria_ev=search. [Accessed July 27 2019].

[55] LARREA, M., PERTOLDI, M. & ESTENSORO, M. 2019. *Multilevel governance for smart specialisation: Basic pillars for its construction* Joint Research Centre (European Commission). Published September. Available: https://publications.europa.eu/en/publication-detail/-/publication/2a1e1bbd-7786-11e9-9f05-01aa75ed71a1/language-en/format-PDF/source-103790873. [Accessed September 3 2019].

[56] *Ibid*.

- **Emergence**, where the strategies must be firmly based on "*learning and negotiation*";
- **Context specificity**, which acknowledges that each region is unique (and which reaffirms the need noted above to avoid simply emulating another strategy);
- **Reciprocity**: this requires every actor to respect the others. For example, just because a regional governance structure has more administrative power than a city structure, it does not mean that it 'knows' more about smart specialisation. Universities can have a strong role in providing knowledge and expertise to mediate across power structures that involve "*a horizontal integration of different types of entrepreneurial actors including representatives from firms, technology centres, universities and other organizations which produce potentially useful knowledge*".

These pillars link clearly to the views of the European Universities Association (EUA) in its recent review of the roles played by universities in developing regional innovation ecosystems. Where that is successful universities undergo what the EUA regards as 'systemic transformation' where "*new formats of producing and sharing knowledge, and of orchestrating multi-actor knowledge creation processes, are integrated with traditional roles of educating students and developing research*". Smart specialisation then becomes a process of co-creation with the other actors at multiple levels (including civil society and the quadruple helix).[57]

4.4 EU ACTION

During the current Commission programming period University Business Cooperation activities have both supported the building of linkages between higher education and business (such as the funding opportunities through Erasmus+ and Horizon 2020[58]), and have facilitated the exchange of experience and knowledge in building 'smart' regional innovation ecosystems (through the University Business Forums[59] in particular).

The social focus is clear in the **European Council Strategic Agenda 2019-2024**, which notes also that overcoming former economic exclusions must not simply create new ones:

> "*We must step up investment in people's skills and education, do more to foster entrepreneurship and innovation and increase research efforts, in particular by addressing the fragmentation of European research, development and innovation … territorial and educational divides are developing and new forms of exclusion emerging*".[60]

The **InvestEU Programme** for the next Commission has a specific 'social window' (one of 4): "*InvestEU places more emphasis on **social investment and skills**. The allocation for budgetary guarantees and financial instruments in the social sector under the current MFF amounts to €2.2 billion whereas*

[57] REICHERT, S. 2019. *The Role of Universities in Regional Innovation Ecosystems*. European University Association. Published March. Available: https://www.eua.eu/downloads/publications/eua%20innovation%20ecosystem%20report_final_digital.pdf. [Accessed March 14 2019].

[58] For example: https://ec.europa.eu/growth/industry/innovation/policy/social_en

[59] See https://ec.europa.eu/education/policies/innovation-in-education/university-business-cooperation_en

[60] COUNCIL. 2019. *A new strategic agenda 2019-2024*. Council of The European Union. Published June 20. Available: https://www.consilium.europa.eu/en/press/press-releases/2019/06/20/a-new-strategic-agenda-2019-2024/. [Accessed June 21 2019].

InvestEU allocates €4 billion of the EU guarantee to this policy area, almost doubling what is currently available."[61] In particular, the window will provide investment to projects that:

> "*will result in* ***more vibrant education and training systems*** *and markets, enabling* ***easier professional transitions for people and being responsive to the lifelong need for upskilling and reskilling****. For knowledge-intensive institutions (such as universities, research & innovation centres) the combined support under several of the InvestEU Fund windows may provide a welcome boost towards a knowledge-intensive society.*"[62]

The **Commission Cohesion Policy for 2020 and beyond** further emphasises that smart specialisation can only reach its full potential through "*more partnership and more ownership, especially in those regions that need to catch up the most*".[63] To support such developments, the Committee of the Regions has been facilitating this through a Knowledge Exchange Platform[64] (KEP) where two of the four priority areas for 2019 are Industry 4.0 and Social Innovation.

Participants are invited to reflect on the following questions:

- How can HEIs empower/enable their staff and students to collaborate with businesses in building social innovation that contributes both to the local/regional society and the economy?
- What 'disciplinary mix' would be best suited to provide coherent courses on social innovation in HEIs?
- What recognition and reward mechanisms should HEIs develop to stimulate social innovation among staff and students?
- A spatially coherent regional innovation ecosystem can exhibit strong integration of stakeholders. However, what are the best strategies for involving those actors who are on the margins/border areas of ecosystems?
- How can HEIs balance the varying demands of internationalisation, international research metrics, teaching and research, while also being regionally embedded?
- In a region with more than one HEI, what would be the best strategy to build a common focus for smart specialisation?

[61] COMMISSION. 2018d. *The InvestEU Programme: Questions and Answers*. European Commission. Published June 6. Available: http://europa.eu/rapid/press-release_MEMO-18-4010_en.htm. [Accessed December 12 2018].

[62] COMMISSION. 2018b. *COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT Accompanying the document Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing the InvestEU Programme*. European Commission. Published June 6. Available: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=SWD%3A2018%3A0314%3AFIN. [Accessed June 4 2019].

[63] COMMISSION. 2018a. *Cohesion Policy beyond 2020: Commission helps Europe's regions become more innovative*. European Commission. Published June 19. Available: http://europa.eu/rapid/press-release_IP-18-4184_en.htm. [Accessed June 19 2018].

[64] See https://cor.europa.eu/en/our-work/Documents/SEDEC/KEP-action-plan-2019-en.pdf

5 Addressing Societal Challenges and Building Societal Trust

5.1 The focus of the UB Forum

Over the centuries, **the role of universities has changed** significantly. At their inception, more than a thousand years ago, the primary responsibility of universities was the pursuit of independent intellectual inquiry by a small elite, and academic freedom and institutional autonomy remain critical to the missions of universities today. Indeed, by propagating critical thinking and independent research universities play a key role in upholding our core values of democracy and a healthy sense of criticism of society's construct.[65]

Instead of catering for a small elite only, universities have come under increased pressure to open their gates to a broader student population. This **'massification' of higher education** has led to an increased tertiary attainment rate. The recent Education and Training Monitor (2019) notes that the EU target of 40% participation has been achieved.[66] Ensuring higher education provides students with 'skills for jobs' instead of preparing them for a career in research alone has therefore become particularly important today, especially after the financial crisis of 2008. Indeed, delivering excellence in teaching is increasingly considered in the evaluation of universities next to excellent research.[67] The OECD work on the labour market relevance of higher education is relevant in this context.[68]

In addition to delivering at the individual (skills) and economy level, **universities are asked to perform at wider societal level**. And it is here that universities, particularly in Europe, need to step up their game. In addition to demographic, democratic and wider social challenges, amplified by the migration crisis of 2015, Brexit, rising populism, nationalism and public distrust in the (European) administration, global warming, soaring inequality and technological innovations are penetrating European citizens' everyday lives. In his pioneering work, *Open Innovation: The New Imperative for Creating and Profiting from Technology* (2003), Henry Chesbrough describes such changes as 'disruptive innovations'. They are innovations which *"change social practices – the way we live, work and learn"*.[69] They make it almost impossible to predict how our lives will change, and require collective action from all citizens and actors across the business, education and public sectors if we are to find answers to these societal challenges.

In this context, the European Commission recently emphasised the **importance for universities to *"develop … their profiles as 'civic universities'*** *… {who} too often are perceived as detached from*

[65] BLESSINGER, P. & DE WIT, H. 2018. *Academic freedom is essential to democracy*. University World News. Published April 6. Available: https://www.universityworldnews.com/post.php?story=20180404101811251. [Accessed June 4 2019].

[66] COMMISSION. 2019b. *Education and Training Monitor 2019*. European Commission. Published September 26. Available: https://ec.europa.eu/education/policy/strategic-framework/et-monitor_en. [Accessed September 26 2019].

[67] See for example England's *Teaching Excellence Framework*: https://www.officeforstudents.org.uk/advice-and-guidance/teaching/what-is-the-tef/

[68] Country review for Norway https://www.oecd.org/norway/higher-education-in-norway-9789264301757-en.htm and Mexico https://www.oecd-ilibrary.org/education/higher-education-in-mexico_9789264309432-en

[69] CHESBROUGH, H. 2003. *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston, Massachusetts: Harvard Business School Press. Available at: https://www.nmit.edu.my/wp-content/uploads/2017/10/Open-Innovation-the-New-Imperative-for-Creating-and-Profiting-from-Technology.pdf [Accessed October 17 2019].

the rest of society".[70] The local dissemination of academic research as well as education focused on developing students' social and civic skills are crucial if we are to foster citizens to take up their responsibility to make the changes our planet, species and current social constellation need in order to survive the disruptions society is facing today. Not only universities, but companies also need to reconsider the way they conduct business, and the way in which they engage in collaborative action with universities and wider civil society.

The workshops in this session will discuss how cooperation between HEIs, business, the research community and social organisations can address two specific sets of challenges. Firstly, how can higher education and university-business cooperation contribute to **addressing the UN's Sustainable Development Goals**, and how can such activities enrich the learning experience of students? Secondly, how can education and business cooperate to overcome **challenges in areas such as Artificial Intelligence (AI), big data and automation**?

5.2 A DRIVER TO REACH SUSTAINABLE DEVELOPMENT GOALS

In May 2018, the EU adopted its revised Council Recommendation on key competences for lifelong learning. As one of the eight key competences described, **citizenship competence** is defined as *"the ability to act as responsible citizens and to fully participate in civic and social life, based on understanding of social, economic, legal and political concepts and structures, as well as global developments and sustainability"*.[71] Reference is made explicitly to the UN Sustainable Development Agenda 2030,[72] saying that EU Member States should *"mainstream the ambitions of the UN Sustainable Development Goals (SDG), in particular within the SDG4.7, into education, training and learning, including by fostering the acquisition of knowledge about limiting the multifaceted nature of climate change and using natural resources in a sustainable way"*.[73]

In the field of higher education, the Times Higher Education in 2019 released a **pioneering new University Impact Ranking**, attempting to document evidence of universities' impact on society, rather than just research and teaching performance.[74] This first edition of the ranking includes more than 450 universities from 76 countries globally, and assesses universities on metrics that are based on 11 of the 17 UN SDGs. By putting forward societal impact as a new indicator of excellence, the ranking aims to not only raise awareness on the changing role of universities, but to also impact on teaching and learning practices and increase universities' accountability.

In similar vein, evidence shows the **UN's sustainability agenda is penetrating academic research** in the EU. A report of April 2019 analysing global research on the UN SDGs shows that European nations dominate SDG research, followed by North America and the Asia & Pacific region. The report

[70] COUNCIL. 2017. *Council Conclusions on a renewed EU agenda for higher education - Council Conclusions (20 November 2017)*. Council of The European Union. Published November 20. Available: http://data.consilium.europa.eu/doc/document/ST-14207-2017-INIT/en/pdf. [Accessed December 12 2017].

[71] COUNCIL. 2018. *Council Recommendation of 22 May 2018 on key competences for lifelong learning*. Council of The European Union. Published May 22. Available: https://europa.eu/!fB67yH. [Accessed June 3 2018].

[72] UN. 2015. *Transforming our World: The 2030 Agenda for Sustainable Development*. United Nations. Published August. Available: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf. [Accessed January 6 2016].

[73] *Ibid.*

[74] See https://www.timeshighereducation.com/rankings/impact/2019/overall#!/page/0/length/25/sort_by/rank/sort_order/asc/cols/undefined

cites geography, culture and EU funding schemes (such as Horizon 2020) as important facilitators for the increased amount of research on the SDGs compared with other regions in the world.[75]

Businesses also have a role to play in ensuring the success of the SDGs. In a study conducted by PwC (2015), 90% of citizens surveyed indicated it was important for businesses to engage with the SDGs. 71% of businesses surveyed said they already knew how they would engage with the SDGs, but only 41% said they would implement the SDGs into their company strategy and in the way they conduct business within the next five years, and only 13% indicated they had the tools to assess their impact against the SDGs.[76] The UN's Global Compact[77] provides a set of ten fundamental principles in the area of human rights, labour, environment and anti-corruption which businesses can follow to implement the SDGs.[78] Companies are furthermore incentivised to report on their progress against implementing the ten principles through submitting annual Communications on Progress (COP).[79]

Despite promising developments in the area of sustainable development (for example, countries are starting to adopt national plans and strategies and setting up coordinating structures to implement the SDGs) **a lot of work remains to be done**. The first Global Sustainable Development Report prepared by an Independent Group of Scientists appointed by the UN Secretary General (2019) points to four areas of the 2030 Agenda where we have *"not {even} been moving in the right direction: rising inequalities, climate change, biodiversity loss and increasing amounts of waste from human activity that are overwhelming capacities to process"*.[80] The question for this workshop in particular is what role university-business cooperation can play to help addressing these challenges.

5.3 Artificial Intelligence and automation – opportunities and threats

More than any of the other major technological innovations our world has known so far – e.g. the wheel, printing press or steam locomotive – **Artificial Intelligence (AI) has the potential of helping to solve some of the world's biggest challenges**. In its Communication of 25 April 2018, the Commission states the potential of AI ranges *"from treating chronic diseases or reducing fatality rates in traffic accidents to fighting climate change or anticipating cybersecurity threats"*.[81] Indeed, AI truly has the potential of positively impacting the way we work, live and learn.

At the same time though, the technological advances in **AI and big data are having a disruptive impact on the nature of work**. AI technology has made it possible for a larger percentage of (traditionally 'human') activities than ever before to be performed by robots. It was already estimated in 2016 that, by 2019, around 2.6 million industrial robots would be installed worldwide (a 1.4 million

[75] MASAFUMI, N., D. PENDLEBURY, J. SCHNELL and M. SZOMSZOR 2019. *Navigating the Structure of Research on Sustainable Development Goals*. Web of Science Group. Available at: https://clarivate.com/webofsciencegroup/campaigns/sustainable-development-goals/

[76] PWC. 2015. *Make it your business: Engaging with the Sustainable Development Goals*. PricewaterhouseCoopers. Available at: https://www.pwc.com/gx/en/sustainability/SDG/SDG%20Research_FINAL.pdf. [Accessed June 4 2018].

[77] See https://www.unglobalcompact.org/what-is-gc/mission/principles

[78] See https://www.unglobalcompact.org/what-is-gc/mission/principles

[79] See https://www.unglobalcompact.org/participation/report

[80] UN. 2019. *The Future is now: Science for achieving Sustainable Development*. United Nations. Published September. Available: https://sustainabledevelopment.un.org/content/documents/24797GSDR_report_2019.pdf. [Accessed October 1 2019].

[81] COMMISSION. 2019a. *Artificial Intelligence for Europe: {SWD(2018) 137 final}*. European Commission. Published April 25. Available: https://ec.europa.eu/digital-single-market/en/news/communication-artificial-intelligence-europe. [Accessed April 29 2019].

increase compared with 2016).[82] Furthermore, an important study by McKinsey (2017) shows that around 50% of jobs globally could be automated, and that 6 out of 10 occupations today have activities of which more than 30% could be automated.[83]

This will not exclusively affect manual labour, as was the case in most previous technological revolutions, but many 'white collar jobs' which have any form of routine are at risk of being automated as well. For example, some research suggests that in the USA chat robots and other IT automation could replace "*tens of millions of jobs – or, at least, the ones that people currently get paid for – will be performed by robots and digital networks*".[84] In terms of the countries most affected by the rise of technology, a 2016 report looking at the number of workers in industries with a high risk (>70%) of being automated across 21 high-income countries, shows that EU workers have the highest risk of being affected. Austria, Germany and Spain make up the top three.[85]

Although there are **fears that automation will lead to soaring job losses or 'technological unemployment'**, there are several reasons to believe the effects will not be that dramatic. Firstly, the IT and related sectors have created (and will probably continue to create) new jobs, compensating for automated jobs. Secondly, it is not because a certain activity can be automated that it necessarily will be. The political will and public opinion pay a big part in this. In healthcare, for example, although automation may be desirable because AI technology has the potential of ruling out human error during surgery, the 'human touch' is something which a robot will probably be unlikely to replace anytime soon for nursing or counselling.

Finally, even if the total number of jobs available for an ever growing population reduced, then the answer may well be instead to reduce the number of working hours per person, rather than reducing the number of employees per company,[86] or to move towards a model of universal basic income, as suggested by Martin Ford in his *The Rise of the Robots – Technology and the Threat of Mass Unemployment* (2015).[87] Such deep changes to our societal construct have the potential of significantly improving the lives of all citizens.

Soaring inequalities and widened skill and income gaps are another consequence of the technological revolution.[88] To make sure no one is left behind, and everyone can reap the benefits offered by the technological advances of today, governments need to invest more in developing people's digital skills. Eurostat data shows, for example, that in 2017 only 57% of the EU28 had basic or above basic digital skills, with Denmark (71%), the Netherlands (79%) and Luxembourg (85%) on

[82] IFR. 2016. *World Robotics Report 2016: European Union occupies top position in the global automation race*. International Federation of Robotics. Published September 29. Available: https://ifr.org/ifr-press-releases/news/world-robotics-report-2016. [Accessed June 4 2019].

[83] MANYIKA, J., LUND, S., CHUI, M., et al. 2017. *Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages* McKinsey & Company. Published November. Available: https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages#part4. [Accessed June 3 2019].

[84] TETT, G. 2019. *Fear, loathing and automation*. Financial Times (London). Published September 4. Available: https://www.ft.com/content/ab94fb30-cea2-11e9-b018-ca4456540ea6. [Accessed September 9 2019].

[85] ANTHES, E. 2017. *The shape of work to come*. Nature, 550, 7676. Available: https://www.nature.com/news/the-shape-of-work-to-come-1.22839.

[86] OECD. 2016. *Automation and Independent Work in a Digital Economy*. OECD. Published May. Available: http://www.oecd.org/employment/emp/Policy%20brief%20-%20Automation%20and%20Independent%20Work%20in%20a%20Digital%20Economy.pdf. [Accessed April 5 2017].

[87] https://www.amazon.co.uk/Rise-Robots-Technology-Threat-Unemployment/dp/1780748485

[88] ROBERTS, C., LAWRENCE, M. & KING, L. 2017. *Managing automation: Employment, inequality and ethics in the digital age*. Institute for Public Policy Research. Published December 28. Available: https://www.ippr.org/research/publications/managing-automation. [Accessed June 4 2019].

one end of the spectrum, and Romania (29%) and Bulgaria (29%) at the other end.[89] Educational institutions play a key role in ensuring citizens are equipped with the right set of digital skills.

Learning itself has also become more digital, though. Digital native students are expecting more flexibility and learning options, and the democratisation of higher education, along with changes in workforce demand and lifelong learning mean higher education must thoroughly reform its teaching and learning practices for the digital age. Through its Digital Education Action Plan, which was presented in 2018, which includes a set of 11 concrete actions, the European Commission is increasing its efforts to support EU Member States to make better use of digital technologies for teaching and learning, develop digital skills and improve education through better data analysis and foresight.[90] For HEIs in particular, the Higher Education Hub (Action 4) is meant to support institutions to improve the quality and relevance of teaching and learning, facilitate internationalisation and support better cooperation between HEIs across Europe.[91]

How, though, will **AI and machine learning impact on teaching, learning and education**? In a 2018 report prepared by the JRC, it is stated that although *"the impact of these technologies in practical educational settings has been relatively modest until now … AI could make some functions of education obsolete while emphasizing others"*.[92] Besides simplifying administration, AI has the potential to create personalised learning environments (PLE) through the productions of 'smart content', for example, digitised and AI-personalised textbooks to help students of all ages and grades progress, customise class assignments in line with students' abilities, or 'gamification' which has the potential to significantly increase motivation and learning gains. Another important application is data processing, supporting students in research projects to quickly scan large volumes of academic literature, or video processing, which can help teachers to assess students' emotions and engagement in 'real time' – this then raises ethical concerns related to privacy.

Further ethical concerns relate to the extent to which AI in education contributes to inequalities. AI and machine learning inevitably rely on 'historical' data. This means that AI learning algorithms can only see the world as a repetition of the past. When AI is therefore used to assess or support students, for example, cultural and historical biases may always be part of their activities. Finally, while the need for more social skills is widely recognized, the massification of higher education coupled with financial cuts and the increased pressure on academic staff to be excellent teachers, AI may be seen as an easy solution to return to 'old educational practices' of knowledge transfer and generic assessments.

[89] The Eurostat 'Digital Skills Indicator' is based on the Digital Competence Framework (developed by DG EAC and the JRC). https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework and http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_sk_dskl_i&lang=en

[90] COMMISSION. 2018c. *Communication on the Digital Education Action Plan COM(2018) 22 final*. European Commission. Published January 17. Available: https://ec.europa.eu/education/sites/education/files/digital-education-action-plan.pdf. [Accessed January 17 2018].

[91] https://ec.europa.eu/education/education-in-the-eu/european-education-area/digital-education-action-plan-action-4-higher-education-hub_en

[92] TUOMI, I. 2018. *The impact of Artificial Intelligence on learning, teaching, and education* Joint Research Centre (European Commission). Available: https://publications.europa.eu/en/publication-detail/-/publication/5cb8eee3-e888-11e8-b690-01aa75ed71a1/language-en?WT.mc_id=Selectedpublications&WT.ria_c=677&WT.ria_f=888&WT.ria_ev=search. [Accessed November 26 2018].

5.4 EU ACTION

On 30 January 2019, the European Commission published the following **reflection paper: Towards a Sustainable Europe by 2030**.[93] With this paper, the Commission launched a forward-looking debate on sustainable development, endorsing the SDGs at the highest EU political level and setting out a strategy to increase collaboration with and between Member States on achieving ambitious milestones by 2030. In Annex I to the paper the Commission monitors progress made against the 17 UN SDGs.[94] This shows significant progress in the areas of Health and Well-Being (SDG 3), Quality Education (SDG 4) and Affordable and Clean Energy (SDG 7), but a move away from Reduced Inequalities (SDG 10) and only moderate progress in the field of Innovation and Industry (SDG 9).

Under Horizon 2020, in 2018 €15.7 billion or 65% (target 60%) of all available funding was related to sustainability. A further 28% or €6.6 billion was related to climate change.[95] In addition, the EU Cohesion Policy has dedicated funding for innovation, SME's competitiveness, better and more sustainable transport and smart energy shifts.[96]

In terms of **climate targets for 2020**, the Commission wants to achieve:[97]

- A 40% cut in greenhouse gas emissions compared with 1990;
- 32% of total energy consumption to come from renewable energy;
- Increase 32.5% in energy efficiency.

To assess the impact of digitalisation on EU labour markets, the European Commission set up a **High-Level Expert Group on the Impact of the Digital Transformation on EU Labour Markets** in May 2018. One year later, the group published a study[98] which includes recommendations on: (1) a skilled workforce supporting digitalisation; (2) managing new labour relations; and (3) a new social contract.

Following up on its Communication of 25 April 2018 on Artificial Intelligence,[99] the Commission also set up a **High-Level Group on Artificial Intelligence** consisting of 52 experts from academia and civil society. So far, the group has produced a list of 7 key requirements that AI systems should meet in order to be trustworthy, as well as 33 policy and investment recommendations to guide AI towards sustainability, growth, competitiveness, and inclusion. The Commission furthermore foresees investing more than 20 billion EU annually to coordinate investments in AI research and innovation post-2020.[100]

[93] COMMISSION. 2019d. *Reflection Paper 'Towards a Sustainable Europe by 2030'*. European Commission. Published January 30. Available: https://ec.europa.eu/commission/sites/beta-political/files/rp_sustainable_europe_30-01_en_web.pdf. [Accessed April 5 2019].

[94] https://ec.europa.eu/commission/sites/beta-political/files/reflection_paper_sustainable_annexii_en.pdf

[95] COMMISSION 2018. *Horizon 2020 in Full Swing – Three Years On – Key Facts and Figures 2014-2016.* Luxembourg: Publications Office of the European Union. Available at: https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/h2020_threeyearson_a4_horizontal_2018_web.pdf

[96] See https://ec.europa.eu/sustainable-development/goal9_en

[97] See https://ec.europa.eu/clima/citizens/eu_en

[98] COMMISSION. 2019e. *Report of the high-level expert group on the impact of the digital transformation on EU labour markets*. European Commission. Published April. Available: https://publications.europa.eu/en/publication-detail/-/publication/d9574c3a-67fb-11e9-9f05-01aa75ed71a1/language-en/format-PDF/source-96472234. [Accessed May 13 2019].

[99] COMMISSION. 2019a. *Artificial Intelligence for Europe: {SWD(2018) 137 final}*. European Commission. Published April 25. Available: https://ec.europa.eu/digital-single-market/en/news/communication-artificial-intelligence-europe. [Accessed April 29 2019].

[100] https://ec.europa.eu/commission/news/artificial-intelligence-2018-dec-07_en

Participants are invited to reflect on the following questions:

- What form should university-business cooperation take in order to maximise its contribution to the UN's Sustainable Development Agenda 2030? How can UBC best contribute to inspire actors across civil society to collectively take up responsibility to scale disruptive innovation and make 'real change' happen?

- How are AI, big data and automation affecting university and business practice? More specifically, do you know of any successful (and less successful) examples of AI penetrating the way we conduct business and the way in which education is delivered? And which role should both actors play to support society in making the most of the benefits they have to offer?

- How can universities and businesses, together, ensure AI, big data and automation contribute to the implementation of the UN SDGs?

6 Developing an Entrepreneurial Culture

6.1 The focus of the UB Forum

This stream of the UB Forum will explore the extent to which Europe needs to produce graduates with an entrepreneurial mindset, whatever their discipline, and how it can do so by enhancing the development of entrepreneurial attitudes at the organisational and the individual level.

The European Commission strongly emphasises that Europe needs large numbers of graduates capable of generating innovation in the workplace, in the labour market, inside large or small organisations, or by themselves when creating new start-ups, and generating social and economic growth in the knowledge society.

To do so, **universities need to offer an environment within which individual students can nurture new ideas**. They must give the highest priority to entrepreneurship education, from top-level strategic commitment, to new policies for teaching and learning, resource allocation, new forms of learning, and innovative learning spaces that will help students acquire new entrepreneurial attitudes.

6.2 Developing entrepreneurial organisations

As is highlighted in the Babson Entrepreneurship Ecosystem Platform[101], **entrepreneurial universities can only thrive in dynamic regional and national ecosystems that support the innovation process**.[102] This requires a combination of favourable governmental policy, support structures and instruments that stimulate the close interaction with multiple stakeholders and the private sector to co-create new knowledge, products and services. For many years, the Global Entrepreneurship and Development Institute has been measuring how individual countries are performing to set up such favourable environments.[103]

To be productive players in their ecosystems and make a high-level impact, **universities need to develop entrepreneurship in their core mission and key strategic goals**, and to have the visible commitment of the senior leadership. Entrepreneurship needs to be at the core of the research and education strategy, being systematically embedded across the whole institution, and streamlined in every faculty, department, academic discipline, every study programme and at all levels of education.[105] Work is best carried out across disciplines, combining expertise from different fields to produce new knowledge and expertise, and supported by adequate policies and structures that favour interdisciplinary work.

The fully-fledged entrepreneurial university is **properly resourced in terms of professional expertise, people and structures** that support academic staff and students in the translation and commercialisation of research results, to bridge the gap between invention and market innovation.

[101] See http://entrepreneurial-revolution.com/

[102] See http://www.whysgbs.org/what-are-ecosystems

[103] See https://thegedi.org/global-entrepreneurship-and-development-index/

[105] LERU. 2019. *Student entrepreneurship at research-intensive universities: from a peripheral activity towards a new mainstream*. League of European Research Universities. Published April. Available: https://www.leru.org/files/AP25-StudentEntrepreneur_final.pdf. [Accessed June 5 2019].

There are many universities[106] that are transforming their activities and processes to support students, scientists and employees in developing their innovative ventures. An entrepreneurial culture is highly visible, "lived" daily, and supported by a favourable environment with the appropriate framework conditions that encourage the development of creative ideas. Technology platforms offer spaces to share ideas, knowledge and expertise. Business incubators help young entrepreneurs grow their ideas. Universities also offer support with patent registration, the incorporation of spin-off companies, access to finance, and legal advice.

Entrepreneurship education can take multiple forms, going far beyond the traditional classroom-based approach of teaching and learning, as is outlined in the guidance documents on enterprise and entrepreneurship education by the QAA in the UK,[107] or the guidelines on entrepreneurship education by the EQUAL network of quality agencies in Europe.[108] Beyond the acquisition of knowledge about entrepreneurship, entrepreneurship needs to be taught 'in practice', with students acquiring entrepreneurial skills through experiential and active learning, in (credit-bearing) curricular courses and activities, as well as (non-credit bearing) extra-curricular activities.

Purpose-built physical spaces exist for students to explore a career either as entrepreneurs (i.e. setting up their own business) or intrapreneurs (i.e. entrepreneurs within large organisations) and develop their practical competences in relation to innovation and entrepreneurship. Such hubs, innovation labs or entrepreneurship centres are typically located in a single place, offering prototyping facilities, advice, project support, meeting and social spaces.

6.3 NURTURING ENTREPRENEURIAL INDIVIDUALS

Through research, education and training universities can help to promote positive attitudes towards entrepreneurship, nurture staff and students' entrepreneurial intentions, help them engage in entrepreneurial activities and develop entrepreneurial mindsets, skills and behaviours. These range from strategic thinking, opportunity seeking and initiative-taking to creative problem-solving, risk-taking, negotiation skills or decision-making in the context of uncertainty.

Universities can provide risk-free environments for students to experiment with new ideas. When they connect students with entrepreneurs, they favour a deep understanding of the processes and mindsets that surround entrepreneurship, as well as the benefits and risks involved. An early focus on practical skills, real-life challenges, project or group work, work placements and internships helps students either start viable businesses or develop as future dynamic intrapreneurs leading innovation processes proactively within large public or private organisations.

The **EuroTech Universities Alliance** provides examples of the ways its members nurture tomorrow's entrepreneur.[109] The **Technical University Munich (TUM)** offers services to foster an entrepreneurial

[106] A Literature Review on Entrepreneurship Universities. Available at: https://www.researchgate.net/publication/22865731

[107] QAA. 2018. *Enterprise and Entrepreneurship Education: Guidance for UK Higher Education Providers*. Quality Assurance Agency (UK). Published January. Available: https://www.qaa.ac.uk/docs/qaas/enhancement-and-development/enterprise-and-entrpreneurship-education-2018.pdf?sfvrsn=15f1f981_8. [Accessed June 4 2019].

[108] AZANZA, G., GRAMA, S. & BONO, G. 2017. *Entrepreneurship Education in Business Schools: Best practices and recommendations*. EQUAL Network. Published September. Available: https://equal.network/wp-content/uploads/2018/10/1.-Entrepreneurship-Education-in-Business-Schools_Project-report-Spain.pdf. [Accessed June 4 2019].

[109] EUROTECH. 2015. *Nurturing The Entrepreneurs of Tomorrow – A Contribution of the EuroTech Universities Alliance*. EuroTech Universities Published June 30. Available: http://eurotech-universities.eu/nurturing-the-entrepreneurs-of-tomorrow-a-contribution-of-the-eurotech-universities-alliance-eurotech-universities-policy-paper/. [Accessed June 5 2019].

spirit under four main categories: entrepreneurship research, entrepreneurship network, entrepreneurship culture, and efficient spin-off processes. The **Centre for Innovation and Business Creation** offers an Executive MBA degree in Innovation and Business Creation, while the Centre for Digital Technology and Management has an interdisciplinary study programme in Technology Management. The two programmes have resulted in more than 130 start-ups. TUM also awards an annual Presidential Entrepreneurship Award to a team that develops a technology with highly scalable impact, and it is a member of various networks that help to ensure a strong position in the Bavarian and German eco-systems.

The **Ecole Polytechnique de Lausanne (EPFL)** offers another example of support to the start-up process. With its Innogrants Initiative[110], it has helped to create more than 50 start-ups since its creation in 2005. In addition, its Foundation for Technological Innovation (FIT) provides financial assistance at an early stage in the project feasibility study, and as such, helps to accelerate the project's commercial development.

The **Learning to Be Programme (L2B)**[111] of the University of Aveiro is an interesting example to connect students to entrepreneurs. The programme involves 60 students who take on a business challenge from one of the participating companies. In a first "*business empathy phase*", field visits, interactions with customers and company observations take place. In the second "*value create phase*" students engage in the generation of ideas, while during the last "*strategy test phase*", they discuss solutions and feasibility with company customers and employees. The discussion results are fed back into their proposed strategy in an iterative process. Once finalized the projects and proposed solutions are presented in an open stakeholders' event.[112]

Beyond tech entrepreneurs, Europe also needs civic entrepreneurs,[113] and for universities to nurture them. So-called 'civic universities'[114] are focusing on strong societal relevance and as such also promoting civic entrepreneurship. ENACTUS, a global network of business, academic and student leaders with a shared vision to create a more sustainable world, works with universities and corporate partners to establish education programmes on university campuses to help students practice social entrepreneurship. Faculty members can start an Enactus team in their HEI by contacting the network.[115]

Frameworks for staff activities that contribute to build competences and communities in innovation and entrepreneurship, help to grow an entrepreneurial culture in an organisation whereby entrepreneurship is not limited to a few enthusiasts, but grows on a wide scale throughout the entire institution. Staff gain a common understanding of innovation and entrepreneurship, and such frameworks can be used in research, teaching or project development.

Co-working spaces for new entrepreneurs on university campuses[116], innovation or entrepreneurship labs help them develop their professional networks through project work, meeting and learning peers and receiving support. Some universities have magazines that report on university start-ups, aspiring or successful entrepreneurs, raising awareness on entrepreneurship also as a possible professional trajectory for scientists.

[110] Ibid.
[111] https://www.eciu.org/case-study/learning-to-be-l2b-an-entrepreneurial-approach-to-teaching-entrepreneurship
[112] https://blog.uiin.org/2018/01/university-aveiro-unleashing-entrepreneurial-capacities-students/
[113] https://www.socialeurope.eu/why-europe-needs-civic-entrepreneurs
[114] https://www.eesc.europa.eu/resources/docs/what-do-we-mean-by-the-civic-university.pdf
[115] https://enactus.org/who-we-are/universities/
[116] https://www.gensler.com/research-insight/blog/the-rise-of-academic-incubators

What entrepreneurs most need are professional networks as well as access to finances and investment. All can be nurtured in the context of education and training which is a challenge as a recent report by NESTA[117] highlights, looking at the reasons why few start-ups are able to scale up, more from the point of view of entrepreneurs' motivations to grow and seek finances.

6.4 EU ACTION

EU action focuses on entrepreneurship at EU, national and institutional level, aiming to foster an ecosystem in which entrepreneurship is given the highest priority in relation to issues related to economic growth, employment, the EU skills agenda, the labour market and social issues. The EU is eager to help Member States and institutions with frameworks, guidelines and tools to promote entrepreneurship education, to move them up into translating their knowledge into assets for an inclusive knowledge society. Although some higher education institutions and countries are very entrepreneurial, others lag behind, and the EU is eager to move up all Member States on the path to entrepreneurship and innovation.

The **EU 2020 Entrepreneurship Action Plan**[118] has provided policy guidance and an overarching framework to stimulate entrepreneurship in Europe. Launched following the 2008 economic crisis, the Plan was timely to stimulate further entrepreneurship education in Europe as one of the responses to the crisis. It sought to bring back economic growth and foster new employment opportunities in the labour market, not only in large multinationals but also through self-employment, start-ups and in small and medium enterprises.

The Communication has three action pillars:

- The first pillar focuses on **enhancing entrepreneurial education and training** in support of growth and business creation;
- The second pillar focuses on the **creation of an environment where entrepreneurship can be stimulated effectively** (e.g. through better access to finances, lighter regulatory and administrative procedures and better support during the growth process);
- The third pillar focuses on **role models, success stories and reaching out to specific groups** such as women, seniors, migrants, the unemployed and young people.

The Communication builds on the previous policy initiatives on competences for lifelong learning, and it is aligned to the **Rethinking Education Communication**.[119] From 2013 onwards the role of entrepreneurship as an instrument to improve employability was also recognised in the Annual Growth Survey.[120]

The **New Skills for New Jobs Agenda** (see Section 2 for more detail) set out a joint plan for the EU, Member States and stakeholders to commit to improve the quality and relevance of skills formation to

[117] REYPENS, C., VAN BLITTERSWIJK, D. & HALEY, C. 2019. *Motivations to Scale: How European entrepreneurs think about growth and finance*. NESTA (National Endowment for Science, Technology and the Arts, UK). Published June 20. Available: https://www.nesta.org.uk/report/motivations-to-scale/. [Accessed September 5 2019].

[118] COMMISSION. 2013. *Communication: Entrepreneurship 2020 Action Plan: Reigniting the entrepreneurial spirit in Europe (COM/2012/0795 final)*. European Commission. Published January 9. Available: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52012DC0795. [Accessed June 4 2014].

[119] COMMISSION. 2012. *Rethinking Education: Investing in skills for better socio-economic outcomes*. European Commission. Published November 20. Available: http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1389776578033&uri=CELEX:52012DC0669. [Accessed November 21 2012].

[120] https://ec.europa.eu/info/publications/2019-european-semester-annual-growth-survey_en

tackle the skill mismatch in Europe. It refers to transferable skills such as problem-solving or creative skills, and therefore also directly to entrepreneurship. In addition, **the European Semester** of economic policy coordination now monitors policy reforms on education, training and skills in Member States, among others the way entrepreneurship is embedded in education, as one of the key transversal skills.

With regards to entrepreneurial education and training in higher education, the EU and the OECD have developed the **HEInnovate Tool**[121] as a self-assessment tool for HEIs to assess the entrepreneurial and innovation nature of their education environment, with 8 dimensions, each critical for universities to give the highest priority to entrepreneurship education and training, from leadership commitment and the top of the institution (and therefore the allocation of the sufficient resources to that purpose) to the organisation of entrepreneurship across the entire institution, with adequate funding, people and incentives (and not limited to a few disciplines).

The HEInnovate tool which has been used by over 1,000 HEIs around the world. Some countries have also engaged with a country review. Over 17,000 self-assessments have been completed across over 70 countries, there are more than 100 supporting resources, and more than 40 workshops have been undertaken.

For HEInnovate, embedding entrepreneurship implies 'revisiting education' by integrating new forms of practical and experiential learning models in curricula to stimulate entrepreneurial mindsets, as well as offering practical support to entrepreneurs. Key to the process is digital transformation (to understand the opportunities related to high technology enterprises and digitalisation), as well as wide knowledge exchange across disciplines in higher education institutions that must today operate at the international level and have the capacity to measure the 'institution-wide' impact of their initiatives to promote entrepreneurship education and how these can take these further.

Two case studies in Portugal show the benefits of HEInnovate. The University of Porto decided to establish a design factory. Unexpected outcomes from the journey with HEInnovate was that the university leadership understood that significant change could happen, and a new curriculum offer was designed, and a new importance was placed on short programmes and LLL. The university was re-structured. Students were more fully engaged in the processes, and student-centric approaches were prioritised. In the University of Aveiro it was understood that there was a lack of internal communication. Teaching staff need to be embedded in the process. Top down leadership and governance, balanced with bottom-up action needed to be in place, with a strong societal focus, and a better communication process.

The **EU Entrecomp framework**[122] is another reference tool to foster entrepreneurial competences. It is organised in three interrelated competence areas, i.e. ideas, resources and action. Each area has five competences that can be developed along an 8-level progression model and well as a list of 442 learning outcomes. Its aim is to raise consensus among stakeholders and to foster a better understanding between education and the labour market. The framework can be used by universities to map or develop their curricula and their learning activities for entrepreneurship skills, or to assess learners and citizens' competences.

[121] https://heinnovate.eu/en

[122] https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/entrecomp-entrepreneurship-competence-framework

The **European Institute of Innovation and Technology (EIT) Quality Assurance and Learning Enhancement (i.e. EITQale)**[123] is an EIT label of excellence awarded to educational programmes that have efficiently integrated innovation, entrepreneurship and creativity through business, education and research, the so-called knowledge training. The key criteria include the EIT overarching learning outcomes, robust entrepreneurship education, highly integrated leaning, cross-border mobility and robust outreach.

Erasmus+ Knowledge Alliance Projects have also focused significantly on entrepreneurship education. As an example, the WEXHE Project[124] analysed the current provision of work experience and entrepreneurship in seven countries, producing a set of 84 case studies of good practice across study areas, created 12 replicable models and providing guidance on learning outcomes, quality assurance and funding.

Finally, the **Knowledge Hub for Higher Education** of the Joint Research Centre (JRC) provides research into education policy[125], and on the success factors on European entrepreneurial universities[126] that will lead to a future repository of good practice.

When completed, the 2018-2019 European Commission **Evaluation of Entrepreneurship Education Programmes in Higher Education Institutions (EEEPHIEC)**[128] will deliver a new tool to assess entrepreneurship education.

Participants are invited to reflect on the following questions:

- How can entrepreneurship education be developed at scale in every university, for every student, in every discipline?
- What can organisations do to develop strong entrepreneurship cultures and ecosystems that will favour both staff and students?
- What practical teaching and learning approaches can help to nurture entrepreneurial skills (problem-solving, negotiation), entrepreneurial attributes (self-confidence, action-oriented approaches, perseverance, a focus on achievement) and behaviours (initiative taking, networking, risk-taking)?
- What are the different mechanisms needed to support entrepreneurship and intrapreneurship in specific disciplines where it is currently very low?
- How can the entrepreneurs of the future be better trained with the relevant entrepreneurial skills to develop not-for-profit companies, and other initiatives that help meet the aims of the Pillars of Social Rights (especially chapter 2[129])?

[123] EIT. 2016. *"Quality for learning": EIT Quality Assurance and Learning Enhancement Model*. European Institute of Innovation and Technology. Published February. Available: https://eit.europa.eu/sites/default/files/eit_label_handbook.pdf. [Accessed June 4 2016].

[124] https://wexhe.eu/

[125] https://ec.europa.eu/jrc/en/research-topic/education-and-lifelong-learning

[126] https://ec.europa.eu/jrc/sites/jrcsh/files/ii10.pdf

[128] https://epic.ecorys.com/

[129] https://ec.europa.eu/commission/priorities/deeper-and-fairer-economic-and-monetary-union/european-pillar-social-rights/european-pillar-social-rights-20-principles_en