



# University-Business Cooperation: EU-level initiatives & on-the-ground implementation

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# 1. Introduction

Over the past decades, increasing cooperation between higher education institutions and the wider economy has been a central goal of European as well as national policy makers alike. The potential benefits of such cooperation are manifold and can materialise in a variety of interconnected areas. Universities are at the heart of **the ‘knowledge triangle’ of research, innovation and education, and business and universities can mutually benefit from cooperation in each of these areas**<sup>1</sup>.

Through the advancement of research frontiers and the production of knowledge, universities can spark new innovative ideas in businesses, and businesses in turn can point research to potential applications of research findings in practice. At the same time, universities can provide key skills for businesses that are necessary for generating innovation and entrepreneurship, while businesses can in turn inform universities of the skills required by firms in the wide labour market.

In the areas of research and innovation, as well as education, a multitude of **strategic objectives** have been set by the European Union. For example, the **New European Innovation Agenda (NEIA)** emphasises the importance of university-industry collaboration in the production, valorisation and diffusion of new knowledge<sup>2</sup>. It defines fostering, attracting, and retaining deep tech talents as one of the key flagship actions to grow the talent pool in Europe, and to support innovation for competitiveness and inclusive growth.

The **European Skills Agenda** emphasises the importance of higher education institutions in the face of the twin digital and green transition, including cooperation between HEI institutions and HEI and businesses<sup>3</sup>. The **European Strategy for Universities** highlights cooperation between businesses and industry as central for creating breakthrough knowledge and translating it into practical application<sup>4</sup>.

Other relevant neighbouring strategies touching aspects of University-Business Cooperation include the **European Education Area strategic framework, the European Industrial Strategy, the Green Deal and the Green Deal Industrial Plan**.

Following on from these strategic objectives, **multiple policy initiatives have been launched by European as well as by national stakeholders**. This includes, among manifold others, the following initiatives, that will be discussed in this reflection paper:

- The Pact for Skills
- The European University Initiative
- The Blueprints for Sectoral Cooperation on Skills
- The activities of the European Institute of Innovation and Technology

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<sup>1</sup> Unger, M., Marsan, G.A., Meissner, D. et al. New challenges for universities in the knowledge triangle. *J Technol Transf* 45, 806–819 (2020). <https://doi.org/10.1007/s10961-018-9699-8>

<sup>2</sup> European Commission. 2022. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A new European Innovation Agenda. Com(2022) 332 final.

<sup>3</sup> European Commission. 2020 [European Skills Agenda](#). Brussels: European Commission.

<sup>4</sup> European Commission. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a European Strategy for Universities. COM(2022) 16 final

University-Business Cooperation is not the sole focus of these initiatives but is emphasised as an important aspect and priority in all of them. **This report attempts to make visible the contributions of these distinctive, but interrelated EU and national-level initiatives in the fields of innovation, research, and education that all deepen and foster cooperation between universities and business.**

Through making the complementarities of these initiatives visible, we hope to create synergies and provide an expanded set of best-practice examples for deepening University-Business Cooperation - both on a policy level as well as in the form of detailed instances of on-the-ground implementation. **Therefore, this report provides an overview of the selected EU-level initiatives, and additionally presents selected best-practice examples of how specific actions are taken on-the-ground by the initiatives' partners in the member states.**

The report will look at this dynamic and provide an overview of both of these essential levels of facilitating University-Business Cooperation. The remainder of the report is structured as follows:

- **Chapter 2** presents an overview of the selected EU-level initiatives, with an emphasis on aspects that facilitate cooperation between universities and businesses.
- **Chapter 3** provides an in-depth look at specific actions of partners of the abovementioned EU-level initiatives in the respective member states, therefore providing a detailed illustration of how University-Business cooperation can be achieved on the ground.
- **Chapter 4** examines two additional selected best-practice examples provide inspiration for University-Business Cooperation: one not directly related to abovementioned EU-level initiatives (HE apprenticeships at the Politecnico di Torino, Italy) and one supported by EU-funds, but located outside the EU (MINE career centre at the Lebanese University).
- **Chapter 5** concludes and reflects on the lessons learnt from the best-practice examples as well as the possible way forward in the context of challenges facing the EU and the member states.

## **2. EU level initiatives as facilitators of University- Business Cooperation**



## 2.1. Pact for Skills

The European Commission identified skills as a key element for today's challenges such as the green and digital transformation but also the COVID-19 recovery and unemployment in general. To tackle some challenges that involve also skills shortages and mismatched skills the **Pact for Skills**<sup>5</sup> was launched in November 2020 as one of the flagship initiatives under the European Skills Agenda for sustainable competitiveness, social fairness and resilience<sup>6</sup> presented on 1 July 2020.

The overall goal is to **increase the impact and effectiveness of skills investment by bringing together the key players** from different backgrounds and sectors to take concrete action to upskill and reskill people. **These key players can be public and private organisations, thereby also businesses and education and research organisations as well as universities play a key role under the Pact**<sup>7</sup>.

Its four key principles are:

1. Promoting a culture of lifelong learning for all;
2. Building strong skills partnerships;
3. Monitoring skills supply/demand and anticipating skills needs;
4. Working against discrimination and for gender equality and equal opportunities.

After signing up to the Charter, members will have access to individually composed support for their up- and reskilling efforts via a range of dedicated services. These services can be divided into three hubs:

- **Networking Hub:** finding, setting up, and reinforcing partnerships for up- and re-skilling efforts; linking members with existing EU tools such as Europass, Skills Panorama, EURES and European Network of Public Employment Services; and promoting their activities.
- **Guidance Hub:** technical expertise and assistance to undertake joint up- and re-skilling efforts are the focal points of this hub. Potential support therefore includes facilitating access to information on EU funding, guidance to identify financial possibilities, and exchange between the members and different authorities.
- **Knowledge Hub:** to have access to good practices and other interesting projects, updates on EU policies and instruments, knowledge-sharing activities (e.g., webinars, seminars, peer-learning activities).

Members are encouraged to make concrete commitments for up- and reskilling and thereby launch their own initiatives. These can take the form of large-scale partnerships in all European skills ecosystems that reach across multiple member states, regional partnerships or individual initiatives under the Pact.

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<sup>5</sup> European Commission. Pact for Skills. [https://pact-for-skills.ec.europa.eu/index\\_en](https://pact-for-skills.ec.europa.eu/index_en) [Accessed: 17.03.2023].

<sup>6</sup> Commission presents European Skills Agenda for sustainable competitiveness, social fairness and resilience Commission presents European Skills Agenda for sustainable competitiveness, social fairness and resilience - Employment, Social Affairs & Inclusion - European Commission (europa.eu) [Accessed: 17.03.2023].

<sup>7</sup> Other involved stakeholders include national, regional and local authorities, social partners, other education and training providers, employment services, and also cross-industry and sectoral organisations and workers.

The **Pact's large-scale partnerships (LSPs)** are strategic multi-stakeholder collaborations in the industrial ecosystems identified in the European Industrial Strategy<sup>8</sup> and can encompass multiple existing skills partnerships created on the national, regional and local level. In its two years of existence, the Pact has mobilised 1,000 individual members<sup>9</sup> and 12 large-scale-partnerships that committed to up- and reskill close to six million people and is further growing.



**The Pact for Skills will gather and inspire different commitments from companies large and small, employment agencies, social partners, VET providers and other partners to create large-scale industrial partnerships.**

Commissioner Nicolas Schmit, 2020<sup>10</sup>

These large-scale partnerships receive direct support from the Pact for Skills support services that is tailored to their needs in order to help them achieve their commitments. These support areas can include, for example, the provision of advice and guidance in the development of their work programmes, support in outreach activities, the engagement of partnership members and the creation of active communities of practice, or support in the development of regional partnerships.

**LSPs could be a facilitator of University-Business Cooperation.** They attempt to create partnerships in order to encourage exchange about skills needs, further develop skills and thereby foster innovation in Europe, develop new technologies and create new markets and highlight the benefits of cooperation and exchange between and among companies, universities, and other stakeholders.<sup>11</sup>

Furthermore, universities can be key in distributing new technologies for learning into other educational sectors, for example the use of digital tools and virtual reality in vocational education and training. In most existing LSPs, not only businesses but also universities play an important role, and certain LSPs are in fact led and coordinated by universities. How exactly such a collaboration between companies and universities in the context of the Pact's LSPs could look like is illustrated with three examples below.



**European talent is at the heart of our industrial resilience and will be the engine for the recovery from the pandemic. As the twin green and digital transitions are gathering speed, we want to equip all Europeans with the right skills.**

<sup>8</sup> European Commission. European industrial strategy. [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy_en) [Accessed: 17.03.2023].

<sup>9</sup> Pact for Skills expands to 1000 members as it marks its second anniversary. <https://ec.europa.eu/social/main.jsp?langId=en&catId=89&newsId=10450&furtherNews=yes> [Accessed: 17.03.2023].

<sup>10</sup> European Commission. The Pact for Skills: mobilising all partners to invest in skills. [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_2059](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2059) [Accessed: 22.03.2023]

<sup>11</sup> Pact for Skills and Charter. <https://ec.europa.eu/social/BlobServlet?docId=23158&langId=en> [Accessed: 17.03.2023].

The first of these examples of how the Pact for Skills can support areas involving Business and Higher Education is the **LSP for Shipbuilding and Maritime**<sup>13</sup>. The European Shipbuilding and Maritime Technology sector is composed of 300 shipyards and more than 22,000 equipment suppliers and service companies. Together, they provide 576,000 direct and 500,000 indirect jobs across Europe.

The Pact for Skills in this sector was set up in February 2022 by the main industry social partners SEA Europe and IndustriAll Europe. It has currently 29 members – under them **10 sectoral companies**, a research centre, five regional administration and regional clusters and **seven education providers, including higher educational ones, such as Turku University of Applied Sciences, Basque Country University and the University of Genova**.

The aim of the partners is to jointly support the upskilling and reskilling of people in key companies and across their supply chains, focusing not only on digital and 4.0 skills but also on green, transversal and technical skills. All in all, their aim is to up- and reskill over 200,000 workers in the next five years and attract 230,000 new workers in the next 10 years.

### Main Pillars of the Shipbuilding and Maritime LSP

The LSP for Shipbuilding and Maritime is developing and implementing concrete solutions based on four pillars. While the first pillar includes **Skills Analytics** to gather data that will forecast future skills needs, the second pillar targets on **developing and pilot common training by using new technologies**.

In this context, the LSP develops MOOCs open to workers in several companies and countries, promotes and facilitates company and intercompany training and identifies further ways to promote and facilitate training from big companies to SMEs.

The focus is to support the up- and reskilling of workers across the entire supply chain by using new technologies, such as robotics, advanced manufacturing, 3D and 4D printing, embedded sensors and connectivity (IoT), Big Data, cyber technologies, AR/VR, advanced energy generation, storage and distribution technologies, etc.

The third pillar focuses on attracting talent to the sector by **promoting and facilitating apprenticeships** in the industry, while the last pillar aims to improve **sectoral education and training offer** through the development of a sectoral EU Qualifications Framework, a European network of sectoral VET centres and specific **Master and specialisation programmes** and modules.

In this context, 25 professional profiles were reviewed with education providers and updated with technical, green and digital, but also soft skills. These and new ones should be further developed and used to design and deliver **innovative courses** for the current and new workforce in the sector.

<sup>12</sup> European Cluster Collaboration Platform. European Commission launches Pact for Skills. <https://clustercollaboration.eu/news/european-commission-launches-pact-skills> [Accessed: 22.03.2023]

<sup>13</sup> The Shipbuilding Pact for Skills: Upskilling Shipbuilding and Maritime Technology Workers in Europe. Summary of the EU Social Partners' Proposal (March 2021) [https://www.seaeurope.eu/images/content/INFO\\_PACT\\_FOR\\_SKILLS\\_Shipbuilding\\_and\\_Maritime\\_Tech\\_Summary.pdf](https://www.seaeurope.eu/images/content/INFO_PACT_FOR_SKILLS_Shipbuilding_and_Maritime_Tech_Summary.pdf) [Accessed: 17.03.2023].

Another example is the LSP for the **Offshore Renewable Energies (ORE)**<sup>14</sup> sector, which accounts for approximately 80,000 jobs. In addition to this, the EU has ambitious targets for increasing renewable energy production until 2050. It is expected to generate up to 54,000 new vacancies in the next five years across Europe. To make sure that the sector can meet the growing market demand, the LSP was established in March 2021.

The LSP brings together **15 organisations across eight European countries, including industry associations, trade unions, the University of A Coruña, research organisations, the network of peripheral maritime regions and others**. Since then, the membership of the Partnership further expanded. Together, they aim to up- and reskill between 20,000 and 54,000 workers in the next five years. The core objective will be the promotion of a long-lasting partnership across Europe that will promote ORE skills within the Pact for Skills.

The overall strategy will be complemented with a Sea-Basin approach, to adapt the actions to the needs in different geographic areas, which should lead to at least five Sea Basins in the first five years. Hence, the Pact for Skills will be implemented with a bottom-up approach adapting to the different geographical needs.

### Main Clusters of Action of the Offshore Renewable Energy LSP

The LSP Offshore Renewable Energy has created a plan that consists of four “Clusters of Action” – each steered by a Working Group. The first cluster aims to design and develop an observatory on training needs and offers in the sector.

The second one is concerned with the promotion of Life-long Learning for all. This should be achieved by increasing the number of **VET and university courses and specific curricula** tailored to the needs of the sector. They create separate modules for the upgrading of existing skills, promote and support company and intercompany training and allocate specific “training time” for workers to be able to access up and reskilling courses. Other measures include specific life-long learning offer to increase specialisation for specific positions, the use of VR, mobile simulators and offshore test sites for training purposes, or adapted training offer to new emerging processes and technology deployment – all realised through the involvement of different groups of stakeholders.

The third cluster is about the promotion of careers in the sector by raising awareness and visibility of opportunities and designing **apprenticeship schemes in cooperation with industry and training providers**, in particular targeting youth and women. One activity is to raise awareness of careers at secondary school level and collect and apply best practices for matchmaking employers and jobseekers.

The objective of the last cluster is to build strong skills partnerships in the sector by developing a regional “Sea-Basin” approach, which include pilot actions at regional level to adapt the training materials and needs to the different sea basins in Europe, and to extend that knowledge to the rest of Europe.

Europe is shifting towards a green and digital transition. While one highly relevant example for facing an acute skills challenge caused by this is the renewable energy sector, another one is electronics. Therefore, the third example of how the Pact for Skills is connected to University-Business Cooperation is the large-scale partnership in the **Microelectronics** sector.

<sup>14</sup> Position Paper: Towards a Pact for skills in the ORE.  
<https://ec.europa.eu/social/BlobServlet?docId=24824&langId=en> [Accessed: 17.03.2023]

The respective LSP was established in November 2020 to improve skills intelligence and prepare for the future of work via pan-European partnerships. The Partnership aims to provide upskilling and reskilling opportunities in the microelectronics sector for more than 250.000 people over five years.

The Pact for Skills partnership is driven by its Executive Board that **consists of eight representatives including industry associations, companies, and the Graz University of Technology** (see Section 3.1 for their national-level activities). The Pact will be implemented with a bottom-up approach with pilot projects in Europe's electronics clusters. Through collaborations with different universities and training centres, research centres and training partners, regional clusters and industry partners and other stakeholders, they aim to “close the gap of skilled people needed to achieve goals set by the **European Chips Act** and support the European ambitions on microelectronics design and manufacturing to double Europe's market share by 2030.”<sup>15</sup>

The Pact for Skills programme plays a crucial role in supporting the EU Chips Act<sup>16</sup> by creating a **European Microelectronics Industry University Network** to attract talent into Europe as the place to be in Semiconductor research, development, and manufacturing. This should be done by using a digital education and learning platform while having a clear focus on Diversity, Equality and Inclusion.

In the end, the Pact for Skills programme should connect training competence centres, universities, schools, and industries, on a regional and national level with the aim to create effective and widely accessible (online as well as vocational) learning platforms for upskilling and reskilling on microelectronics in Europe.

### The European Chips Skills 2030 Academy of the Microelectronics LSP

The main objective in the LSP for Microelectronics vision paper is the establishment of the European Chips Skills 2030 Academy. This is basically an **industry university network** that aims to provide scholarships, apprenticeships, facilitate laboratory access, and vocational as well as online training.

Through this, **tailored microelectronics up- and reskilling programs** with accreditation for Technician, BSc and MSc levels, potentially also PhD levels, endorsed by the European Industries, Research Centres, Universities and Training Centres, should be provided. Another activity is the support of **national competence centres** in engaging vocational education and training on regional, national and European scale.

In general, the network will be stakeholder and especially industry driven. SMEs can join or develop networks to exchange on skills needs and further develop intercompany training centres in cooperation with large companies, while educational providers can develop training programmes in cooperation with regional authorities. Another activity is the offering of an **International University-Technology Partnership Programme** with internships and international work secondments or exchanges for employees, students and professionals.

<sup>15</sup> SEMI Europe. European Chips Skills 2030 Academy. Full plan. <https://www.semi.org/sites/semi.org/files/2022-09/European%20Chips%20Skills%202030%20Academy%2021-06-2022.pdf> [Accessed: 16.03.2023]

<sup>16</sup> SEMI Europe. EU Chips Act. <https://semi.org/eu/pact-for-skills-eu-chips-act> [Accessed: 16.03.2023]

It will also guide international collaborations on dedicated “technology-based innovation” curricula for start-up support, best practices for tech & IP management and specifically focused “entrepreneurship training” for people with a STEM-training background.

The activities will further include raising of interest for the sector by a European wide image campaign and a clear focus on Diversity, Equality, and Inclusion in all programmes, and will include an online learning platform, matchmaking and job offers of all partners and should ultimately lead to educate 500.000 microelectronics experts in the coming decade.

## 2.2. European University Initiative

The European Universities Initiative (EUI)<sup>17</sup> is introduced and mainly funded by the European Union through the Erasmus+ programme. It aims to strengthen the strategic partnerships of European universities and increase the international competitiveness of European higher education. It is a flagship initiative of the European strategy for universities<sup>18</sup> that aims to support 60 European Universities and involve more than 500 higher education institutions by mid-2024.

To achieve this, the initiative is offering opportunities to support diverse cooperation models for European Universities through the Erasmus+ calls for proposals. **Among the main features of European Universities, also outreach of universities towards society and economy is highlighted, fostering an entrepreneurial mindset and collaboration with businesses, regional actors, and civil society actors<sup>19</sup>.**

By partnering with around 1,300 associated partners, including businesses, non-governmental organisations (NGOs), local and regional authorities, the European Universities have the potential to substantially increase the quality and scope of higher education in Europe. In combination with other EU and national instruments such as Horizon Europe or Digital Europe, it supports ambitious transnational alliances of higher education institutions to develop and share a common long-term structural, sustainable and systemic cooperation on education, research and innovation.

European interuniversity campuses should derive from this, meaning that students, staff and researchers from all over Europe can enjoy mobility and create new knowledge together, across countries and disciplines.

According to a 2020 survey by the European University Association (EUA)<sup>20</sup>, through the initiative, universities expect to improve the quality of teaching and learning, increase the attractiveness, visibility and international positioning of the university, promote student and staff mobility, strengthen links between different university missions, develop a more strategic

<sup>17</sup> European Commission. European Universities initiative. <https://education.ec.europa.eu/education-levels/higher-education/european-universities-initiative> [Accessed: 16.03.2023]

<sup>18</sup> Commission Communication on a European strategy for universities. <https://education.ec.europa.eu/sites/default/files/2022-01/communication-european-strategy-for-universities.pdf> [Accessed: 17.03.2023]

<sup>19</sup> European Commission (2020). Erasmus+ Programme Guide 2020.

<sup>20</sup> Claeys-Kulik, Anna-Lena et al. 2022. The European Universities Initiative and system level reforms. European University Association. [https://eua.eu/downloads/publications/briefing\\_eui%20impact%20on%20system%20level%20reforms.pdf](https://eua.eu/downloads/publications/briefing_eui%20impact%20on%20system%20level%20reforms.pdf) [Accessed: 17.03.2023]



approach to international cooperation, and contribute to building Europe and promoting European integration and cohesion. Currently, there are 44 European University Alliances, comprising around 340 higher education institutions in 31 countries.

A recent study requested by the European Parliament emphasises that the EUI is a unique opportunity for the European Commission and the member states to create more favourable conditions for European collaboration and foresees further growth in the number of collaborations and alliances due to the possible benefits for HEIs<sup>21</sup>.



**European Universities will equip their students, staff and researchers with the skills they need to navigate the twin green and digital transition of our society. They are a key building block not only for the European Education Area, but also for the future of Europe.**

Commissioner Mariya Gabriel, 2020<sup>22</sup>

To support the further rollout of the European Universities Initiative, the 2023 Erasmus+ call<sup>23</sup> for proposals has been launched, including a record total budget of €387.2 million to support systemic, structural, and sustainable transnational cooperation among higher education institutions across Europe, covering education, research, innovation and service to society. The next call will be probably announced in autumn 2023.

One of the 44 European University Alliances is the **E<sup>3</sup>UDRES<sup>2</sup> Alliance<sup>24</sup>**. E<sup>3</sup>UDRES<sup>2</sup> stands for Engaged - European - Entrepreneurial University as a Driver for European Smart and Sustainable Regions. It is a **network of higher education institutions that collaborate closely with other stakeholders, including businesses, to have a substantial impact in higher education.**

The idea was launched in the autumn of 2019, with the aim “to create an engaged, European, entrepreneurial University as a driver for smart and sustainable regions.” The Alliance is comprised of nine institutions - a combination of scientific universities and universities of applied sciences (UAS) and brings together various partnerships - individual representatives as well as institutions from science, research and innovation, businesses, administration and politics, art and culture at the regional, national, European and international levels.

As a joint effort of the individual institutions, E<sup>3</sup>UDRES<sup>2</sup> is able to actively shape and further develop its individual institutions as well as the regions they are located in, as it promotes the development of small and medium-sized cities and their rural environments into smart and sustainable regions. Therefore, E<sup>3</sup>UDRES<sup>2</sup> is a best-practice example of an engaged and entrepreneurial European university that responds to current social, environmental, and economic challenges.

<sup>21</sup> European Parliament 2023. The European Universities Initiative: first lessons, main challenges and perspectives.

<sup>22</sup> European Commission. European Universities initiative. <https://education.ec.europa.eu/education-levels/higher-education/european-universities-initiative> [Accessed: 28.03.2023]

<sup>23</sup> Opening of 2023 Erasmus+ European Universities call comes with record budget. Opening of 2023 Erasmus+ European Universities call comes with record budget | Erasmus+ (europa.eu) [Accessed: 17.03.2023]

<sup>24</sup> Engaged and Entrepreneurial European University as Driver for European Smart and Sustainable Regions | E<sup>3</sup>UDRES<sup>2</sup> (eudres.eu) [Accessed: 17.03.2023]

The initiative develops innovative content for higher education leading to shared modules and joint study programmes that focus on cross-disciplinary and cross-sectoral skills, while considering regional needs. It acts within regionally anchored, globally connected ecosystems, develops human-centred and regional anchored solutions, and supports experimental, engaged, challenge-based, research-focused learning.

It organises I-Living Labs (see Chapter 3.2 for a national-level implementation at the Polytechnic Institute of Setúbal, Portugal), common educational models for students, open educational resources and shared modules, I-Research Networks and I-Cubators and other activities to promote Europe-wide knowledge exchange between universities, businesses, and other stakeholders.

### Selected projects of the E<sup>3</sup>UDRES<sup>2</sup> Alliance

The E<sup>3</sup>UDRES<sup>2</sup> Alliance has so far established two projects to further specialise on topics such as innovation and entrepreneurship. The **Entrepreneurship and Innovation Network for Smart and Sustainable European Regions (E.I.N.S.)**<sup>25</sup> aims to develop new pathways for entrepreneurial universities, foster the development of entrepreneurial education, create extended support for innovation and business creation, and enhance collaboration.

Its focus is on teaching students and staff entrepreneurial skills. In this context, a central role is played by the management of the involved higher education institutions, the intensive interaction with various partners in regional innovation ecosystems, and their Europe-wide networking as well as the promotion of start-ups and spin-offs. The network cooperates closely with business agencies, incubators, venture capital funds, start-up communities, and other stakeholders that promote digital and green innovation.

Another project is **ENT-R-E-NOVATORS**<sup>26</sup> that aims to bridge the gap between entrepreneurs, researchers, educators, and innovators and to foster a strong connection between education, research, innovation, and entrepreneurship. The project addresses the needs of regions and uses the exchange for a multitude of approaches: future workshops, hackathons, I Living Labs, and Citizen Science projects.

At the centre, so-called “Ent-r-e-novators” act as both entrepreneurs and innovators: They intend to bridge the divide between theory and practice and thereby move from a culture of “I” towards a culture of “we”. An essential target of the project is the development and implementation of a joint research and innovation strategy for the European University E<sup>3</sup>UDRES<sup>2</sup>.<sup>27</sup>

<sup>25</sup> E.I.N.S. | E<sup>3</sup>UDRES<sup>2</sup> (eudres.eu) [Accessed: 17.03.2023]

<sup>26</sup> Entrenovators | E<sup>3</sup>UDRES<sup>2</sup> (eudres.eu) [Accessed: 17.03.2023]

<sup>27</sup> FH St. Pölten. International Projects at the St. Pölten UAS — St. Pölten University of Applied Sciences (fhstp.ac.at) [Accessed: 17.03.2023]



## 2.3. Blueprints for Sectoral Cooperation on Skills

The **Blueprints for sectoral cooperation on skills**<sup>28</sup> were first introduced by the Skills Agenda for Europe<sup>29</sup> in 2016 and represent a flagship EU initiative to support skills development, upskilling and reskilling. Since then, 28 projects were selected under the Erasmus+ programme. These projects are implementing the Blueprint by gathering different stakeholders to develop and implement strategies to address skills gaps in specific industrial ecosystems.

Thereby, **businesses as well as universities can be important partners within Blueprints**, alongside trade unions; chambers of commerce, industry or labour; research, training institutions; public authorities, and other professional associations.

The European Skills Agenda 2020<sup>30</sup> has confirmed that the Blueprints are key to create new strategic approaches and cooperation for concrete skills development solutions. The framework provides a platform for cooperation specifically for the following targets<sup>31</sup>:

- Set out a sectoral skills strategy to deliver the skills needed to deploy renewable and smart green technologies in the electricity, heating/cooling and transport sectors for the next stage of renewable development (post-2020);
- Identify skills and qualification needs, assess skills shortages (basic, job specific, key and soft skills) and re-evaluate occupational profiles;
- Identify occupational profiles, which may benefit from re-skilling or top-up training (e.g. among lower skilled, unemployed or displaced workers);
- Identify skills and occupational requirements that allow continuous innovation in products and services;
- Develop new training curricula/modules and apprenticeship programmes (and delivery methods) for young and adult learners;
- Develop new qualification and training schemes plus training for trainers and quality controllers;
- Identify and establish EU and national funding to help rollout education, training and apprenticeship programmes.

<sup>28</sup> European Commission. Blueprint for sectoral cooperation on skills. [Blueprint for sectoral cooperation on skills - Employment, Social Affairs & Inclusion - European Commission \(europa.eu\)](#) [Accessed: 17.03.2023]

<sup>29</sup> COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS. A NEW SKILLS AGENDA FOR EUROPE. Working together to strengthen human capital, employability and competitiveness. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016DC0381> [Accessed: 20.03.2023]

<sup>30</sup> European Commission. European Skills Agenda. [European Skills Agenda - Employment, Social Affairs & Inclusion - European Commission \(europa.eu\)](#) [Accessed: 20.03.2023]

<sup>31</sup> European Commission. A blueprint for sectoral cooperation on skills (Wave II): green technology and renewable energy. <https://data.europa.eu/doi/10.2767/129925> [Accessed: 22.03.2023]

Concrete solutions can include creating and updating curricula and qualifications and are ultimately implemented at national or regional levels<sup>32</sup>. Thus, partners gather and analyse evidence of skills shortages and trends in their sectors, develop sectoral skills strategies, design **industry-led, long-term action plans for transnational education and training activities in their sectors**, and guide the adaptation of the workforce and drive innovation and growth in their sectors. This does not only include ‘conventional’ sectors, but also a range of sectors with substantial expected growth potential in the future. Most recently, for example, the **GreenSkills4H2 – European Hydrogen Skills Alliance** has been kicked off, with partners ranging from industry to universities<sup>33</sup>.

Looking at already running blueprint projects provides us with a wide range of interesting best-practice examples. For example, in order to bridge the skills gap in the space/geospatial sector, the **Sector Skills Alliance EO4GEO**<sup>34</sup> was formed. By creating a strong alliance of players from the sector, it reinforced the existing EO/GI training and education ecosystem and fostered the adoption and integration of space/geospatial data and services in end-user applications. It became a collaboration of **25 partners from 13 countries from the academic field and the private and public sector** that are active in education and training in the mentioned field and was supported by over 50 associated partners.

Even though the project ended in 2022, the EO4GEO Alliance as a network of stakeholders and experts from academia, private and public sectors was formed to maintain, improve and further develop the results and engages its members in new initiatives and projects.

The Alliance responded to the needs of students, professionals and business representatives and developed innovative multi- and interdisciplinary solutions for education and training to maximise the integration of Copernicus data in services for government, businesses and citizens. The aim was to foster the growth of the European EO/GI sector ensuring a workforce with the right skills, in the right place, at the right time and to ensure the strategic cooperation among stakeholders on skills development in the sector.<sup>35</sup>

### Selected actions of EO4GEO

**EO4GEO** supports teachers and students of the sector with a dynamic collaborative platform including a complete **opensource and user-friendly tool** based on the Body of Knowledge. This tool, comprising of 1,000 relevant concepts, knowledge resources and skills, can be used by training and educational providers as well as companies, and other stakeholders for various activities, such as defining occupational profiles, or describing job offers.

In addition, the integrated EO4GEO curricula design tool can be used to create structured learning content and the additional extensive training catalogue with **lectures, webinars, videos, tutorials and courses** further allows educators and instructors to access relevant material.

One aspect of their work includes mobility through a mechanism of **internships and on-the-job training** for students and young professionals. During the project lifetime, over

<sup>32</sup> European Commission. Blueprint for sectoral cooperation on skills: in a nutshell. <https://data.europa.eu/doi/10.2767/205347> [Accessed: 20.03.2023]

<sup>33</sup> <https://greenskillsforhydrogen.eu/>

<sup>34</sup> EO4GEO. <http://www.eo4geo.eu/> [Accessed: 20.03.2023]

<sup>35</sup> European Commission. A blueprint for sectoral cooperation on skills (Wave II): green technology and renewable energy. <https://data.europa.eu/doi/10.2767/129925> [Accessed: 22.03.2023]

1,400 people from 50 countries participated in a variety of training actions.<sup>36</sup> These actions were structured in the three domains Integrated Applications, Smart Cities, and Climate Change and were covering many “real-world” topics and problems to fit the needs of different stakeholders.

Through this **case-based approach**, knowledge and skills were transferred, leading to close the gap of supply and demand within the sector. Thanks to this innovative approach using tools, materials and knowledge structures, existing education providers can improve their curricula efficiently and new ones, such as companies in the sector that want to develop and offer training in the field, have methodology and tools at hand when entering the VET market.<sup>37</sup>

Another sector worth highlighting in this context is the Automotive industry. It accounts for almost 7% of EU’s GDP and 5.6% of total EU employment<sup>38</sup>. In order to deliver sector-specific skills solutions, the “**Development and Research on Innovative Vocational Educational Skills project**” (DRIVES)<sup>39</sup> as part of the Blueprint for Sectorial Cooperation on Skills was established in 2018.

The aim was to gather stakeholders from across Europe and provide the sector’s vision on the needs for upskilling and reskilling of current and future workforce across all levels of the value chain (vehicle production, automotive suppliers, automotive sales and aftermarket services). In the end, its aim is to build a sustainable ecosystem for continuous cooperation.

Coordinated by VŠB Technical University of Ostrava (CZ), it brings together 24 stakeholders from 11 EU partner countries, involving **players from industry and multiple universities** (such as the University of Twente, see Chapter 3.3 for their national-level activities). Through the partners’ network and the EU-wide dissemination of the outcomes, the project aims at bringing together more than 270,450 companies of all sizes, representing more than seven million workers.

The overall goals of the Alliance are to:

- analyse key trends in the sector
- define the skills and job roles needed in the future
- analyse the training offer side currently available
- identify skills gaps for foreseen changes
- ensure mutual recognition of the skills and job roles across the EU

<sup>36</sup> EO4GEO. The EO4GEO Alliance of skills and education for tomorrow’s needs. <https://eo4geo.medium.com/the-eo4geo-alliance-of-skills-and-education-for-tomorrows-needs-9bd8efa5d5f5> [Accessed: 20.03.2023]

<sup>37</sup> Pact for Skills. Bridging Projects and Policy: Blueprints for Sectorial Cooperation on Skills. Pact for Skills report. [https://pact-for-skills.ec.europa.eu/system/files/2023-03/PfS\\_ST1.1.2\\_Blueprints%20paper\\_final%20update.pdf](https://pact-for-skills.ec.europa.eu/system/files/2023-03/PfS_ST1.1.2_Blueprints%20paper_final%20update.pdf) [Accessed: 20.03.2023]

<sup>38</sup> European Commission. Blueprint for Sectorial Cooperation on Skills: Automotive. Responding to skills mismatches at sectoral level. A key action of the New Skills Agenda for Europe. <https://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=7975&furtherPubs=yes> [Accessed: 27.03.2023]

<sup>39</sup> DRIVES. <https://www.project-drives.eu/en/home> [Accessed: 27.03.2023]

- create an EU-wide framework that can be used throughout the EU and implemented in the EU regions
- create training for selected skills and job roles in the automotive sector
- pilot 1,100 learners across the EU and across the education and training institutions, and
- provide clear guidance for the education and training providers on skills needs of the automotive industry.<sup>40</sup>

### Selected actions of the Automotive Skills Sector Alliance DRIVES

The DRIVES partnership has developed a **learning platform**<sup>41</sup> to offer free courses and training materials for the automotive sector work force. The teaching that results from the up- and reskilling needs that were identified through the project and its partnerships is made available via **multi-lingual Massive Open Online Courses (MOOC)**.

The courses can be divided into four categories: Engineering Research & Development, General, Production and Maintenance. The platform can be easily accessed by a simple registration process and is open and free for all.

Concerning **apprenticeships for all levels, including higher education**, the project established the DRIVES Automotive Apprenticeship Network (DAAN) on LinkedIn<sup>42</sup> to foster engagement between stakeholders and share ideas and approaches relating to the topic. It has collected good examples of innovative practice in a Good Practice Resource Tool<sup>43</sup>.

The partners involved also produced an interactive **“Hiring an apprenticeship Guide”** to support companies and specifically SMEs in this process. In addition, an EU-wide **apprenticeship recruitment tool**<sup>44</sup> was established.

## 2.4. European Institute of Innovation & Technology

The European Institute of Innovation & Technology (EIT) is an independent body of the European Union set up in 2008 that supports a pan-European community of innovators from business, research and education. It is integrated in Pillar 3 of the Horizon Europe programme<sup>45</sup>, which focusses on strengthening sustainable innovation ecosystems across

<sup>40</sup> DRIVES. Automotive Skills Agenda Strategy & Roadmap. [https://www.project-drives.eu/Media/Publications/214/Publications\\_214\\_20220110\\_12501.pdf](https://www.project-drives.eu/Media/Publications/214/Publications_214_20220110_12501.pdf) [Accessed: 27.03.2023]

<sup>41</sup> ASA Learning Platform. <https://learn.skills-framework.eu/> [Accessed: 27.03.2023]

<sup>42</sup> LinkedIn. <https://www.linkedin.com/groups/8814397/> [Accessed: 27.03.2023]

<sup>43</sup> Skills Framework. [https://skills-framework.eu/good-practice-resource?\\_jsfBridgeRedirect=true](https://skills-framework.eu/good-practice-resource?_jsfBridgeRedirect=true) [Accessed: 27.03.2023]

<sup>44</sup> Skills Framework. [https://drives-compass.eu/act?\\_jsfBridgeRedirect=true](https://drives-compass.eu/act?_jsfBridgeRedirect=true) [Accessed: 27.03.2023]

<sup>45</sup> European Commission. Horizon Europe, pillar III - Innovative Europe: supporting and connecting innovators across Europe. <https://data.europa.eu/doi/10.2777/90204> [Accessed: 22.03.2023]

Europe, **fostering the development of entrepreneurial and innovation skills in a lifelong learning perspective and support the entrepreneurial transformation of EU universities**, and bringing new solutions to global societal challenges.

The EIT is centred on the formation of dynamic cross-border partnerships between the so-called **Knowledge and Innovation Communities (KICs)**. Each is dedicated to finding solutions to a specific global challenge. EIT Communities develop innovative products and services, start new companies, and train a new generation of entrepreneurs. Today the EIT is Europe's largest innovation ecosystem with more than 3,400 partners.

**KICs Communities are partnerships that bring together businesses (including SMEs), research organisations and higher education institutions.** These partnerships harness European innovation and entrepreneurship to find solutions to societal challenges in areas with high innovation potential and thereby create jobs and growth.

Currently, there are nine Communities, focussing on different societal challenges: Climate, Digital, Food, Health, InnoEnergy, Manufacturing, Raw Materials, Urban Mobility, and Culture & Creativity. They carry out activities that cover the entire innovation chain: from training and education programmes and in general reinforcing the journey from research to the market, to innovation projects, business incubators and accelerators.



**Since its creation in 2008, the EIT has proven its worth in strengthening innovation ecosystems across the EU. With this improved legal framework and its new strategic agenda, coupled with an increased budget to match its ambitions, the EIT will be able to deliver on the main EU priorities in the field of education, innovation and research and thus contribute to the recovery of Europe's economy and society.**

Commissioner Mariya Gabriel, 2021<sup>46</sup>

Within the EIT, businesses can find opportunities to access talent, new curricula, innovation know-how and new market opportunities in **Europe's largest innovation community**. By integrating with such a network, especially SMEs can profit from the opportunity to work with different research centres, large companies and universities. Together, they offer double degrees, international and cross-sectorial mobility experiences, as well as applied innovation and entrepreneurship education with the aim to educate the next generation of entrepreneurs by integrating traditional science and technology programmes with entrepreneurial education.

Thus, the EIT's Innovation Communities have developed their own **education programmes** that have a very strong focus on the delivery of entrepreneurship and innovation skills and are more **tailored to the needs of the European innovation system**. EIT-labelled educational programmes at Master and PhD levels encourage students to become more creative, innovative and entrepreneurs.

Today, the **EIT Community comprises of more than 200 universities**, delivers more than 60 Masters programmes, besides several doctoral schools and has seen almost 2,500 students graduating from these programmes. In addition, every year several hundred students

<sup>46</sup> European Commission. European Institute of Innovation and Technology: Commission welcomes political agreement on strategy for 2021-2027. [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_21\\_207](https://ec.europa.eu/commission/presscorner/detail/en/ip_21_207) [Accessed: 22.03.2023]

attend summer schools and more than 100,000 learners have participated in their online education activities.<sup>47</sup>

### EIT Urban Mobility

EIT Urban Mobility<sup>48</sup> is a Knowledge and Innovation Community of the European Institute of Innovation and Technology. Since January 2019, it has been working towards fostering innovation and transformation, in order to improve people's quality of life, decarbonise mobility and make Europe's economy more competitive. This partnership is about inspiring and enabling the move towards more liveable urban spaces, dedicated entrepreneurial talent and competitive mobility businesses.

As the leading **European community for urban mobility**, it is made up of more than 300 organisations in 33 countries across Europe, including cities, national governments, NGOs, EU institutions, universities, students, and industry (including large enterprises, SMEs and start-ups). The partnership aims to **meet future challenges** in this area through the activities of the City Club, Academy, Innovation, Business Creation and Factory, including Living Labs (see Chapter 3.4 for national-level implementation in Romania).

This should be achieved by a four-step approach: enabling change, building capacities, creating options and delivering solutions. First, the partnership aims to address the challenges by creating a **platform and network** of high-ranking European and global cities for collaboration, best practice sharing as well as up-scaling and deployment of solutions. Second, it trains the next generation of urban mobility practitioners through various formats, aiming to overcome fragmentation in the education system.

Third, it leverages and upgrades ideas for deployment through **innovation projects**, which are challenge-driven, market-based and solution-oriented. Fourth, it aims at developing a **start-up friendly environment**, which gives access to customers, partners, and infrastructure.

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<sup>47</sup> EIT education: Educating the next generation of entrepreneurs: [https://eit.europa.eu/sites/default/files/education\\_2\\_pager\\_-\\_update\\_0.pdf](https://eit.europa.eu/sites/default/files/education_2_pager_-_update_0.pdf) [Accessed: 20.03.2023]

<sup>48</sup> EIT Urban Mobility. Home - EIT Urban mobility [Accessed: 20.03.2023]

### **3. Implementing University- Business Cooperation in the Member States**



### 3.1. Institute of Electronics, Graz University of Technology (Austria)

The Institute of Electronics (IFE)<sup>49</sup> at the Graz University of Technology in Austria is an example of how Higher Education can be linked to the surrounding industry. It is a member of the Executive Board of the **Pact for Skills Large-Scale Partnership for Microelectronics**, mentioned as an EU-level example in Chapter 2.1.

The Institute is one of the oldest academic research and educational laboratories in the country that is focussing on semiconductor devices, integrated circuits, automotive electronics and electromagnetic compatibility at the IC- and System-level. It is part of the Faculty of Electrical and Information Engineering, interacts with many institutes and research organisations and is strongly linked to the **surrounding semiconductor and automotive industry, the so-called “Silicon Valley of Austria”**.



**There is a shortage of skilled Information and Technology (ICT) graduates in Europe, and a growing skills gap and supply/demand mismatch, particularly in the microelectronics industry. Our Institute is therefore working with its industrial partners to overcome this skills mismatch.**

The Institute of Electronics (IFE)<sup>50</sup>

This close cooperation has been fostered over time and involves stakeholders such as austriamicrosystems, Infineon Technologies AG, Anton Paar GmbH, AVL, Joanneum Research and many others. In 2007, a **Master’s education programme** specialising in "Analog Chip Design" was established. The local microelectronics industry not only contributed financially to this but also started taking an active role as external lecturers. Today, 23 courses are offered in this field.

Over the years, the Institute continued to expand in two main areas: electronic systems with an emphasis in high precision instrumentation and automotive systems, as well as analogue and mixed signal chip design with an **emphasis on the needs of the local industry** in the field (e.g. ams, Dialog Semiconductors, Infineon Technologies, Micronas, NXP, National Semiconductors, Texas Instruments).

This close interaction with the industry also made it possible to acquire a large number of nationally or internationally funded third-party projects and led to interesting research activities and numerous topics for Ph.D. theses. Through these cooperations, practice-relevant technical tasks could be worked on with the necessary scientific depth.

The institute was also one of the first to focus on communication in social media and to post information from research and teaching in digital form. Beside their **free MOOC courses** on amplifiers and electromagnetic compatibility, they offer **tutorials on various subjects** on their YouTube Channel, which are used by thousands of learners.

<sup>49</sup> IFE Institute of Electronics. TU Graz. <https://www.tugraz.at/institute/ife/home> [Accessed: 17.03.2023]

<sup>50</sup> TU Graz. Institute of Electronics. [https://www.unserebroschuere.at/ife\\_tugraz/WebView/](https://www.unserebroschuere.at/ife_tugraz/WebView/) [Accessed: 28.03.2023]



The institute has also taken on a pioneering role in the transfer of knowledge from the field of teaching. For example, in the so-called Inno-EBS (Interdisciplinary knowledge transfer in Electronic Based Systems) project, further education measures are offered for people from industry. Together with several other industrial and university partners in Europe, the Institute is also working to combat the shortage of skilled workers in the field of microelectronics through the **Blueprint project METIS** and is involved in establishing the abovementioned **European Chips Skills 2030 Academy**.

### The Silicon Valley of Austria

One of the annual highlights is the information event "The Silicon Valley of Austria"<sup>51</sup>, where representatives of the surrounding semiconductor manufacturers introduce themselves to the students and are available to answer questions about starting a career. This event was first organised in 2014 and connects students from the Institute with the surrounding industry to talk about jobs and career opportunities in microelectronics, opportunities to study microelectronics, future perspectives in the industry, summer jobs/internships, and bachelor- / Master- / PhD programmes.

## 3.2. I Living Lab, Polytechnic Institute of Setúbal (Portugal)

The I Living Lab<sup>52</sup> (the "I" stands for inspiring, innovative, intercultural, international, interdisciplinary, intersectoral, inclusive, and intense) from the Polytechnic Institute of Setúbal (Portugal) is a subproject of the E<sup>3</sup>UDRES<sup>2</sup> **European University Initiative**, mentioned as an EU-level example in Chapter 2.2<sup>53</sup>. It supports the development of smart and sustainable regions by engaging with local community and industry to provide solutions to local challenges. It does so by developing interactive workshops on interdisciplinary fields, with an entrepreneurship component and carried out in collaboration with socio-economic partners.

The concept of an "I Living Lab" establishes and encourages interaction between universities, students and the near-by stakeholders that are challenged to **find innovative smart and sustainable solutions to local challenges**. A stakeholder in this context is the owner of the challenge and can be anyone from regional society: a business owner or business community, a local authority, a civilian, a student, an organisation, or any other regional player, that discovered a specific problem and is looking to find a solution.

<sup>51</sup> IFE Institute of Electronics. TU Graz. <https://www.tugraz.at/institute/ife/institute/silicon-valley-of-austria-2023> [Accessed: 17.03.2023]

<sup>52</sup> E<sup>3</sup>UDRES<sup>2</sup>. I Living Labs. <https://eudres.eu/i-living-labs> [Accessed: 17.03.2023]

<sup>53</sup> I Living Labs have been also implemented in other regions of the project partners, which are St. Pölten UAS (Austria), Polytechnic Institute of Setúbal (Portugal), Hungarian University of Agriculture and Life Sciences (Hungary), UC Leuven-Limburg UAS (Belgium), Politehnica University Timisoara (Romania), and Vidzeme University of Applied Sciences (Latvia).



On the one hand, the ILLs enable students to deal with socially relevant challenges and to find innovations and solutions based on the design thinking process. On the other hand, they also develop future skills through the learning process they experience. The ILLs are characterised by finding interdisciplinary solutions and learning from each other as well as by intercultural communication, open discussions, and individual development goals based on future skills.

Hirut Grossberger, 2022<sup>54</sup>

An I Living Lab is a good example to show how an international team of students can tackle real-life challenges, for which a solution can have a positive impact on the region they are located in. The teams, that consist of various students from different institutions, countries and disciplines, meet regularly over the course of several weeks in order to find solutions to the challenge they are working on. They will be supervised and coached by so-called “**Educational Entrepreneurs**”, who will guide them in their co-creative design-thinking process and stimulate them to develop their future skills.

Together with the owner of the challenge (e.g., the local agro-industry in Setúbal, see box), they work towards a smart and sustainable solution for the challenge presented in the “I Living Lab”. Collaborating with international students in these **challenge-based learning** settings brings in new perspectives for solving local problems. It is also mentioned as a method to embed the university in the local context by making linkages to **regional industries** and other stakeholders.<sup>55</sup>

Students and other stakeholders benefit from the novel learning experience in “understanding existing challenges in their respective areas, finding solutions based on the design thinking process and also developing future skills while working in an international environment”.<sup>56</sup>

### I Living Lab challenge with the local agro-industry

One “I Living Lab” challenge<sup>57</sup> from 2022 was introduced by professionals from the wine making industry and microalgae cultivation in Portugal. The local agro-industry was looking for a solution to valorise their sub-products that remain after the production process and have to be discarded or sold at a lower value. The use of these sub-products in microalgae cultivation, an emergent biotechnological activity with the potential to achieve a high-value final product, needed developments for optimal monitoring and the idea was that robotics can help with the automation of repetitive tasks.

The lab on how Microalgae and Robotics help with agro-valorisation was coordinated by the Polytechnic Institute of Setúbal, Portugal together with the Politehnica University

<sup>54</sup> E<sup>3</sup>UDRES<sup>2</sup>. <https://eudres.eu/interview-i-living-labs-2022> [Accessed: 28.03.2023]

<sup>55</sup> Craciun, Kaiser, Kottman and Van der Meulen. 2023. The European Universities Initiative: first lessons, main challenges and perspectives. [https://www.europarl.europa.eu/RegData/etudes/STUD/2023/733105/IPOL\\_STU\(2023\)733105\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2023/733105/IPOL_STU(2023)733105_EN.pdf) [Accessed: 17.03.2023]

<sup>56</sup> Andone, D. et al. 2022. International Innovative Labs – I-Living-Labs. International Innovative Labs – I-Living-Labs. <https://ieeexplore.ieee.org/abstract/document/9766823> [Accessed: 17.03.2023]

<sup>57</sup> E<sup>3</sup>UDRES<sup>2</sup>. I Living Labs. <https://eudres.eu/i-living-labs-fall-22> [Accessed: 17.03.2023]

Timisoara in Romania. The international student teams were able to offer two solutions for monitoring and optimising the microalgae growth process, both in a laboratory environment and as extended industrial use.

It is not only an example of how “I Living Labs” will have a positive impact on the agro-industry but also in general **sustainable food/feed resources in the region**. In the end, the solutions from the various challenges across Europe are presented in the form of short videos.<sup>58</sup>

### 3.3. University of Twente (Netherlands)

The University of Twente<sup>59</sup> (Netherlands) is partner of the **Blueprint project DRIVES** (presented as an EU-level example in Chapter 2.3) and well-known for its close cooperation with the corporate sector. In 2020, it was voted the ‘most enterprising university’ in the Netherlands for the fourth time, as the Dutch university with the best record of putting scientific knowledge to social and economic use.



**All of our research and education is aimed at making a difference in today’s society, while setting up the next generation for the future. In this pursuit, the entrepreneurial mind-set and global awareness of our many talented scientists, educators and students lead us to move beyond differences, disciplines, borders.**<sup>60</sup>

The University of Twente is one of four universities in the Netherlands that has formed the national **4TU Federation**<sup>61</sup>. The 4TU Impact Plan<sup>62</sup> is designed to stimulate and upscale the development of the knowledge economy, building on existing (valorisation) programmes and cooperation. It should do so by keeping scientific research maintain a high level, further developing the collaboration with industry in applied research, training young ambitious people, providing opportunities for entrepreneurship and, above all, providing “labour force” that matches the needs of the business community.

In detail, it consists of four modules: the impulse model that focuses **on research in cooperation with businesses** that is used to create 1,000 junior research positions; the living labs that aim at the joint development and implementation of **innovative projects** that will produce concrete services and products in collaboration with SMEs; the **Business Development & Entrepreneurship** that converts research results into societal value, and

<sup>58</sup> ILL 07 How robotics can help the microalgae cultivation in bio-waste recycling. <https://www.youtube.com/watch?v=WyIz8a108bo> [Accessed: 15.03.2023]

<sup>59</sup> University of Twente. <https://www.utwente.nl/en/> [Accessed: 15.03.2023]

<sup>60</sup> University of Twente. About UT | About us | Organisation (utwente.nl) [Accessed: 28.03.2023]

<sup>61</sup> 4TU Federation. <https://www.4tu.nl/en> [Accessed: 15.03.2023]

<sup>62</sup> 4TU Federation. Impact Plan. <https://www.4tu.nl/en/knowledge-valorisation/4tu-impactplan-20180620.pdf> [Accessed: 15.03.2023]

**Start-up financing.** Through supervised funding processes ranging from pre-seed to seed-funding, new business ideas are promoted with nearly €100 million funding.<sup>63</sup>

Hence, with support from the University, the **region has turned into an innovative ecosystem** supporting large numbers of both new and experienced high-tech companies. Initiatives such as the Kennispark Twente innovation campus<sup>64</sup> have delivered numerous innovative technologies, materials and techniques in fields such as robotics, photonics, mechatronics, medical tech, microfluids, and many more.

The area's products, which include nanotechnologies and drone technologies, have found national and international markets. Every year, about 10% of the fastest-growing technology companies in the Netherlands come from Twente<sup>65</sup>. Over 1,000 start-ups launched from the University, including world-famous companies such as Booking.com or Takeaway.com.<sup>66</sup>

With over 400 companies, Kennispark Twente is now the country's largest innovation campus. This was achieved through the **close interaction between Twente's higher education institutions and the region**, which can be divided into various activities: alignment of curricula with the demand, student internships, work-based learning, staff mobility, field trips by staff, supporting graduate entrepreneurs, continuous professional education and design and development activity by UPEs.<sup>67</sup>

### Networking events between businesses and university students

University of Twente attaches great importance to establishing and encouraging contact between the surrounding businesses and their students. Through a variety of activities, companies can introduce themselves to the 12,000 students of different fields. One activity is the biannual organisation of **world's largest student think-tank Create Tomorrow**.<sup>68</sup>

About 1,250 students come together and work in teams to find solutions for cases submitted by the corporate sector. To further promote contact between students, graduates and potential employers, the University of Twente organises a series of various activities in this context, such as inspirational speakers and workshops.

Another event, organised by the University, is the **Business Days Twente**,<sup>69</sup> which is **Netherlands' biggest career event**, where 2,500 students and graduates get in touch with approximately 160 companies. During these days, around 50 activities, including the career fair, a variety of workshops to develop personal skills and other activities chosen by the organising companies, can be attended by the participants without charge. Other activities

<sup>63</sup> HEInnovate. Leadership and Governance at the University of Twente. <https://heinnovate.eu/en/heinnovate-resources/resources/leadership-and-governance-university-twente> [Accessed: 15.03.2023]

<sup>64</sup> Kennispark Twente. <https://kennispark.nl/nl/> [Accessed: 15.03.2023]

<sup>65</sup> UB Cooperation. University of Twente: The entrepreneurial university of the Netherlands through hi-tech and human touch. [https://www.ub-cooperation.eu/pdf/cases/W\\_Case\\_Study\\_Twente.pdf](https://www.ub-cooperation.eu/pdf/cases/W_Case_Study_Twente.pdf) [Accessed: 15.03.2023]

<sup>66</sup> University of Twente. <https://www.utwente.nl/en/> [Accessed: 15.03.2023]

<sup>67</sup> Sijgers, Irene et. al. Supporting the contribution of Higher Education Institutes to regional development. Self-Evaluation Report of Twente. <https://www.oecd.org/netherlands/35883426.pdf> [Accessed: 15.03.2023]

<sup>68</sup> Create Tomorrow. <https://createtomorrow.nl/> [Accessed: 15.03.2023]

<sup>69</sup> Business Days Twente. <https://www.businessdaystwente.nl/> [Accessed: 15.03.2023]

that strengthen the interaction between students and regional companies include traineeships and mentor programmes.

### 3.4. Transilvania Living Lab (Romania)

The Transilvania Living Lab is a subproject of one of the Knowledge and Innovation Communities (KICs) of the **European Institute of Innovation and Technology**, namely the EIT Urban Mobility that was mentioned as an EU-level example in Chapter 2.4.

The main aim of the Transilvania Living Lab (as for EIT Urban Mobility living labs in general<sup>70</sup>) is to test, demonstrate and pilot new solutions, thereby helping cities, regions and businesses to roll out and trial new products and services in real environments together with potential end-users<sup>71</sup>.

There are several key elements<sup>72</sup> involved in this approach. The tests of the Transilvania Living Lab take place in a real-life environment, meaning that it involves the daily environment of their end-users, such as a street, a neighbourhood or a city. It engages different stakeholders such as public authorities, industry, academia and civil society. The citizens as the end-users are seen as direct contributors and co-creators of the pilot in all its stages.

The Transilvania Living Lab<sup>73</sup> consequently comprises of **key players from private and public sector, academic and research institutions in the North-west of Transylvania** and **engages users** and other interested parties to play an active part in the innovation process. And, the living lab aims to enhance the involvement of multidisciplinary competences, bringing together a combination of different skills, people, equipment, companies, settings, and so on.



**Transilvania Living Lab strives to put communities and their needs at the heart of innovation developing and experimenting with projects and services that involve smart approaches. The main key is to explore a project or an idea from as many angles and perspectives as possible and in order to do this, we involve in the designing phase the private and public sector, academia, users and other interested parties that will have a direct interaction with it.**

Transilvania Living Lab<sup>74</sup>

Therefore, the Transilvania Living Lab aims to foster close cooperation between different stakeholders from the ecosystem on a local level, including businesses and universities, and

<sup>70</sup> EIT Urban Mobility living labs and test beds. <https://livinglabs.eitum.eu> [Accessed: 22.03.2023]

<sup>71</sup> These living labs consequently differ substantially to the I Living Labs of the European University Initiative that bring together business and students in order to brainstorm about new solutions to an identified real-life challenge.

<sup>72</sup> EIT Urban Mobility. [EIT Urban Mobility living labs - EIT Urban mobility](#) [Accessed: 22.03.2023]

<sup>73</sup> Transilvania Living Lab. <https://transilvaniadih.ro/transilvania-living-lab/> [Accessed: 27.03.2023]

<sup>74</sup> Transilvania Living Lab. <https://transilvaniadih.ro/transilvania-living-lab/> [Accessed: 28.03.2023]

increase the uptake of innovative solutions and services that focuses on the end-user including their needs, requirements, acceptances, etc.

The Transilvania Living Lab implements this through a bottom-up dialogue including **multi-stakeholder co-creative workshops, educational programmes, public speeches and debates that include all social classes in order to translate ideas into sustainable products and services and to achieve significant societal impact**. The foundations were laid at the Open Innovation 2.0 conference in 2016, which was attended by approximately 480 people and over 70 speakers.<sup>75</sup>

### Implementing a Smart City Strategy for Cluj-Napoca

One project the Transilvania Living Lab is involved in is the development and implementation of the 2017 initiated Smart City Strategy of Cluj-Napoca to explore the needs of the community and to improve the city in a sustainable and innovative way to increase the quality of life, products and services and eventually become Romania's most technological city. Measures involved include eGovernance, Open Mobility, eHealth, Sharing Economy, eEducation, Industry 4.0, digitalisation, renewable energy, and safety and risk management.

Cluj-Napoca became an international example of how strengthening the connection between citizens, the public sector, academia and business can help **foster innovation and result in substantial benefits to the region and its people**. It even led to the city being one of only five finalists – and the only city in Eastern Europe – in the “European Capital of Innovation 2020” competition.

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<sup>75</sup> ARIES Transilvania. Transilvania Living Labs, a new step taken by Cluj-Napoca towards the title of European Capital of Innovation. Aries Transilvania » Transilvania Living Labs, a new step taken by Cluj-Napoca towards the title of European Capital of Innovation (aries-transilvania.ro) [Accessed: 27.03.2023]

## **4. Other national-level approaches in the EU and beyond**



## 4.1. Higher Education Apprenticeship at Politecnico di Torino (Italy)

In Italy, the apprenticeship system was introduced in 1955 and was reformed several times until it took on its current form in 2003 with the following three types: Type 1 apprenticeships leading to a professional diploma, Type 2 occupation-based apprenticeships, and **Type 3 apprenticeships in higher education and research**<sup>76</sup>.

The Type 3 apprenticeship is intended for young people aged between 18 and 29, to achieve **university degrees and/or be in higher education, including PhDs**, for **research activities**, as well as apprenticeships to access chartered professions. This type allows companies to benefit from highly specialised skills and provides young people with the opportunity to improve their skills and their employability in the job market.

The teaching structure of apprenticeship training courses is divided into periods of internal and external training that are agreed upon by the training institution and the employer. These are related to the training and professional needs of the company and the technical and professional skills related to the academic knowledge that can be acquired within the company. It applies to all sectors of activity and programmes that are offered in the two subtypes. Another possibility is to use this type of apprenticeship to access chartered professions such as lawyers, notaries etc.

Between 20-50% of the overall duration of the apprenticeship, which can be between six months and four years, should be **on-the-job-training**. The costs of on-the job training, including the apprentices' wages, are covered by employers. However, the employers may benefit from different tax incentives<sup>77</sup>.

Overall, the extent to which Higher Education Apprenticeships are implemented on the ground in regions and through education providers varies substantially<sup>78</sup>. A particularly interesting best practice example is the "Master's programme in Manufacturing 4.0" at the Politecnico di Torino. The programme can be adapted yearly to take needs of companies, the changing technological context, and feedback of students into account.



**This adaptability facilitates the consolidation of synergies between universities and companies and the professional integration of both students and new technologies in traditional business production processes.**

Simona Rizzari, 2019<sup>79</sup>

<sup>76</sup> Euradria. Apprenticeship and Traineeship within the Euradria region. Apprenticeship and Traineeship within the EURADRIA region – Euradria [Accessed: 16.03.2023]

<sup>77</sup> CEDEFOP. Higher education and research apprenticeship (Type 3) | CEDEFOP (europa.eu) [Accessed: 16.03.2023]

<sup>78</sup> Michele Tiraboschi (2015). Higher-Level Apprenticeships in Italy. In: Labour Law and Industrial Relations in Recessionary Times: The Italian Labour Relations in a Global Economy.

<sup>79</sup> Rizzari, Simona. Best Practices on Higher Education Apprenticeship (HEA). ApprEnt – Refining HE Apprenticeships with Enterprises in Europe. [https://apprent.eucen.eu/wp-content/uploads/2019/07/P07.2IT\\_ready-1.pdf](https://apprent.eucen.eu/wp-content/uploads/2019/07/P07.2IT_ready-1.pdf) [Accessed: 31.03.2023]



Linked to this, a main strength of this programme is its overall impact on the participants' employability. Success rates of apprenticeships are high (95%) and in almost all cases apprentices are subsequently hired by their training provider on a permanent basis. This depends on the **active participation of both the university and the partner companies in the region, which jointly** establish training programmes that match the academic curricula with the employer's needs. Moreover, educational institutions play an important role in promoting these opportunities amongst students and enterprises. Another strength is the flexibility of the programme, as it can be modified and **adjusted to the needs of companies** and to the changes in technological trajectories.<sup>80</sup>

#### Master's programme in Manufacturing 4.0

The Master's programme in **Manufacturing 4.0**<sup>81</sup> is an example of such a cooperation, which combines educational activities at the **Politecnico di Torino** and **on-the-job training** at the company's premises. It is intended for graduates under the age of 30 that are awarded with a full degree in Engineering. It consists of 400 hours of training activities at the university (classroom, laboratory, lecture, business case), 800 hours of training activities with the employer's company and approximately 300 hours of self-learning activities at the employer's premises.

Through this, selected candidates are hired by the companies and attain a second level Specialising Master's diploma. The classroom training is in English and entrusted to the professors of the University and other professionals in the industry. As part of the company training, a project work is developed that has to be defended during the final examination.

During the on-the-job activities, the apprentices are joined by a **company tutor** and supervised by a **tutor of the University**. Key elements of this programme are the close relations between the university and the company for defining the content of the course, the methods and timing of the activities, the support of regional policymakers and the establishment of networks between local companies (e.g., Unione Industriale di Torino).

## 4.2. Centre MINE at the Lebanese University (Lebanon)

Centre MINE is the **Careers, Innovation and Entrepreneurship Centre of the Lebanese University**. It was established in December 2018 with the support of the EU-funded Erasmus+ project RESUME, which aims to promote cooperation between members on the theme of entrepreneurship and employability. Currently, Centre MINE is working under the UNIMED (Mediterranean Universities Union) SubNetwork on Employability coordinated by the Lebanese University as a supporting unit for advising, training and capacity building.<sup>82</sup> Centre

<sup>80</sup> Rizzari, Simona. Best Practices on Higher Education Apprenticeship (HEA). ApprEnt – Refining HE Apprenticeships with Enterprises in Europe. [https://apprent.eucen.eu/wp-content/uploads/2019/07/P07.2IT\\_ready-1.pdf](https://apprent.eucen.eu/wp-content/uploads/2019/07/P07.2IT_ready-1.pdf) [Accessed: 16.03.2023]

<sup>81</sup> Rizzari, Simona. Best Practices on Higher Education Apprenticeship (HEA). ApprEnt – Refining HE Apprenticeships with Enterprises in Europe. [https://apprent.eucen.eu/wp-content/uploads/2019/07/P07.2IT\\_ready-1.pdf](https://apprent.eucen.eu/wp-content/uploads/2019/07/P07.2IT_ready-1.pdf) [Accessed: 16.03.2023]

<sup>82</sup> UNIMED is an association of Higher Education Institutions focused on academic cooperation throughout the Mediterranean, made up of 150 associated Universities coming from 24 countries

MINE was presented by UNIMED at the 2022 University-Business Thematic Forum held in Italy and hosted by the Italian Ministry of University and Research and by the Agenzia Italiana per la Coesione Territoriale (Italian National Governmental Agency for Territorial Cohesion), with the support of the European Commission (DG EAC and DG REGIO). A key focus of the event was University-Business Cooperation in the Mediterranean area linking Europe, Africa, and the Middle East. The area is characterised by high levels of youth unemployment, which University Business Cooperation can help alleviate by offering more opportunities at the local level.

Centre MINE aims to provide such opportunities by offering **career development services, fostering innovation, and promoting entrepreneurship** among university students and graduates and all citizens. Through a range of programmes and services, including career counselling, skills training, and networking opportunities, Centre MINE helps to equip students with the knowledge, skills, and experience needed to succeed in today's job market. Additionally, the centre supports the development of **innovative and entrepreneurial ideas** among students, helping them to transform their ideas into successful ventures.

Overall, Centre MINE plays a crucial role in supporting the career aspirations and entrepreneurial ambitions of Lebanese University students and graduates, contributing to the growth and development of the wider Lebanese economy. The Centre also uses popular social media channels for outreach.

The overall aims of the centre are to:

- Reduce the gap between the University and the world of business,
- Improve the employability of students and their professional integration,
- Develop the ability of innovation and creativity,
- Spread the entrepreneurship culture at the university,
- Create and activate the Lebanese University unit for behavioural enticement and guidance (Nudge),
- Create and activate a business incubator for innovative projects,
- Meet the United Nations Sustainable Development Goals (SDGs).

To achieve this, **Centre MINE has established partnerships and funding agreements with a wide range of leading corporations and organisations in the private sector**, including consulting firms. This enables the centre to provide students and graduates with access to valuable resources and expertise including different services and programmes, such as **mentorship, networking, and financial support for students and entrepreneurs**.

These partnerships have also helped to foster a culture of innovation within the university, encouraging students to develop entrepreneurial ideas and take risks in pursuing their career aspirations. It is also through partnerships with local and international organisations that national and international competitions and accelerator programmes for SMEs are made possible.

Despite the fact that Centre MINE is facing challenges in finding sustainable funding and is therefore based on the volunteering of its staff made up of professors, coaches, employees and students, it has achieved significant milestones in promoting career development, innovation, and entrepreneurship at the Lebanese University. In 2022 alone, the centre

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within the Euro-Mediterranean area. UNIMED's aim is to develop university research and education, in order to contribute to scientific, cultural, social and economic cooperation.

provided services free of charge to over 76,952 beneficiaries, including academic staff, administrative staff, students, alumni, and the public.

The centre shared over 3,038 job vacancies from 1,866 recruiters/employers, resulting in 2,407 successful job applications. Additionally, 283 workshops and trainings were delivered by 145 national and international professionals, covering 242 topics, to help candidates acquire new skills and improve their professional development. The centre has also implemented a feedback and evaluation process to monitor the effectiveness of its programmes and services. Centre MINE understands that collaboration, innovation and focussing on the needs of its stakeholders are the key to achieving its mission.

### **MINE's services for students**

Centre MINE offers a wide range of services and programmes to support the career development and entrepreneurial ambitions of students and graduates of the Lebanese University. One of the key activities that are supported by a team of professionals with expertise in career counselling, business development, innovation and Entrepreneurship, is sharing **job vacancies** from a variety of sectors and industries on a daily basis.

Centre MINE also organises **free certified webinars, courses, and workshops** covering the most needed skills in today's job market. These events are only made possible through partnerships with industry experts and other organisations.

The centre's job and career readiness programmes are supported by a team of career counsellors who provide **one-on-one counselling** sessions to help students and graduates identify their strengths, interests, and career goals. The innovation and entrepreneurship programmes are supported by experienced mentors who provide guidance and support to students and graduates looking to launch their own ventures.

## **5. Conclusion**

The topic of University-Business Cooperation is already entrenched in a variety of EU-level initiatives in the areas of innovation, education and research. Businesses can inform universities of the skills required by firms in the wider labour market, and at the same time, universities can provide key skills for businesses that are necessary for generating innovation and entrepreneurship.

We have explored initiatives that aim to improve **sectoral education** offers through the development of **specific Master's and specialisation programmes** and modules, such as the Large-Scale Partnership (LSP) for Shipbuilding and Maritime as part of the Pact for Skills. In general, designing new and improving existing curricula through collaborations between universities and businesses is a key activity in the different large-scale partnerships that we examined in this paper.

Other examples in the Pact for Skills included the LSP for Offshore Renewable Energy that also designs apprenticeship schemes in cooperation with industry and training providers, targeting in particular women and youth, and the LSP for Microelectronics that establishes an **industry university network including international University-Technology Partnership Programmes** through their European Chips Skills 2030 Academy.

How this approach can be situated on a national and regional level was shown through the example of the Institute of Electronics at the Graz University of Technology that emphasises on the needs of the local industry. Through this, **higher education and industry are closely linked through specialised education programmes and projects and open events** such as the Silicon Valley of Austria where industry has the opportunity to access students and vice versa.

A similar rationale lies behind the Higher Education Apprenticeship at **Politecnico di Torino** that enables students to improve their skills and employability by on-the-job training. An example outside of the EU, but supported by EU-funding, is the Centre MINE at the Lebanese University that supports students through various services including mentoring and networking activities and in this way reduces the gap between the University and the world of business.

Businesses can also point research to potential applications of research findings in practice, and through the advancement of research frontiers and the production of knowledge, universities can spark new innovative ideas in businesses. The E<sup>3</sup>UDRES<sup>2</sup> Alliance as part of the European University Initiative is one example that aims at creating a network of higher education institutions that collaborate closely with businesses. Its I Living Labs enable companies to work closely with **university students in order to find sustainable solutions to real-life problems** that have an effect in the regions where they are situated.

Through the illustrated case study in Portugal, we could see how such an interdisciplinary solution-oriented collaboration between universities and surrounding businesses can achieve **innovative results for the local industry**. Similarly, through the example of the EIT Urban Mobility we could see how players from higher education and industry can be brought together to meet future challenges in the sector via activities such as the **creation of platforms and networks for collaboration and start-up friendly environments and challenge-driven innovation projects**.

The Dutch University of Twente, part of the Blueprint project DRIVES, has a specific approach to integrate industrial needs into their educational activities. Their activities that range from **research collaborations to start-up financing to internships** had an enormous impact on the region through the formation of the Kennispark Twente innovation campus. Other activities are large **networking events** where students can get in touch with the surrounding businesses through the world's largest student think-tank or career events.

All these initiatives illustrate the central role that University-Business Cooperation has to play when looking at the further development of our education, research and innovation policies and practices, be that as the sole focus or as one of their priorities. In the face of megatrends like technological change (e.g., the digital and green “twin transitions”), the impact of the Covid-19 pandemic, as well as the economic turmoil connected to Russia’s war of aggression in Ukraine, cooperation between universities and businesses is indispensable for strengthening the knowledge triangle between innovation, education, and research.

Such cooperation can facilitate a further advancement of research frontiers at universities, practical applications of knowledge and new innovative ideas in businesses, as well as the development of relevant skills among individuals that are highly demanded in the labour market and/or can further spark entrepreneurship among the population. Thereby, University-Business Cooperation can contribute to enhancing Europe’s sustainable competitiveness, social innovation and fairness, resilience to crisis, and ultimately more inclusive societies.

While all of the observed approaches show that the benefits resulting from University-Business Cooperation have become widely acknowledged by policy makers, the examples also illustrate that fostering cooperation as a permanent feature is demanding and depends on the actions of specific stakeholders on-the-ground.

By observing such facilitators of University-Business Cooperation both at the EU as well as national level, we hope to show potential for synergies between different initiatives and provide the UBC community with an expanded range of best-practice cases that can fertilise the further development of University-Business Cooperation in the years to come.

