STARS EU

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Research and innovation skills for STARS EU Curricula

Milestone MS10

Milestone number 10 – Developed compiled list of prior research and innovation skills to be implemented through STARS EU curricula

Work package 4 – Challenge Lab

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Introduction

Purpose of the report

The MS10 *Developed compiled list of prior research and innovation skills to be implemented through STARS EU Curricula* report intends to list and describe best practices of prior research and innovation skills development through learning and teaching existing at STARS EU higher education institutions. The report also aims to formulate recommendations on how to improve towards the creation of innovative and economically flourishing regions, which would benefit from a European mindset on research and innovation.

This report consists of the first step of task T4.2, which aims to instill a research and innovation approach in the STARS EU Curricula to prepare future graduates to actively contribute to knowledge development. This task is important for both Work Package 4 (WP4) – Challenge Lab, which oversees the research element of STARS EU and Work Package 3 (WP3) – Curriculum Lab, which oversees the educational training element of the alliance, as it sits at the intersection of both Work Packages.

The findings of this report will feed the Curriculum Lab, especially task T3.2 which oversees the STARS EU Joint Curricula Catalogue, as it will give the task material on improving training in research and innovation alliance wide. This report will also prepare the second step of task T4.2 in the Challenge Lab, which aims to foster the entrepreneurial mindset of the STARS EU community, particularly of students.

Research and innovation, Higher education institutions and European university alliances

The New European Innovation Agenda (NEIA) and the Draghi report on EU competitiveness both underline the central place of research and innovation in the shaping of Europe's future. The NEIA focuses on the necessity of enabling, accelerating and strengthening innovation, of addressing the innovation divide within Europe and of fostering deep tech talents. The Draghi report places innovation at the heart of its strategy and of its recommendations, underlining the necessity of accelerating European innovation and upskilling European talent pools.

Higher education institutions are the cradle of fostering and upskilling talents, as they are responsible for training the future of the European workforce. Higher education institutions investing in research and innovation play a transformative role in society, as they advance knowledge and academic excellence, enhance teaching and learning, and

drive economic and social impact. Transforming regions is a mission which is at the heart of the STARS EU higher education institutions, which have privileged relations with their external regional stakeholders and their internal community.

European university alliances play a role in fostering research and innovation beyond national borders. They enhance collaborative research through joint, often interdisciplinary and multi-disciplinary, research projects and promote research accessibility through actions leading to the sharing of research and innovation infrastructures. STARS EU's Challenge Lab oversees the implementation of a shared research agenda and of research mentoring programmes. Moreover, STARS EU developed nine Thematic Interest Groups composed of professors and researchers from different disciplines which work on the alliance's Priority areas, which themselves emanate from the identified synergies and needs in the RIS3 of the STARS EU higher education institutions' regions. European university alliances often promote cross-sectoral collaborations: STARS EU's Work Package 2 (WP2) – Regional Transition Accelerator is dedicated to strengthening higher education institutions' link to their external regional stakeholders, thus creating strong regional ecosystems which can work interregionally on tackling innovation challenges.

It is thus evident that higher education institutions and European university alliances are a driving force in promoting and democratizing research and innovation. This constatation underlines the importance of the purpose of this report, which is to promote the best practices in research and innovation training within STARS EU higher education institutions, and to propose recommendations on how to improve.

Methodology

A questionnaire, comporting three sections which align with the three steps of the STARS EU Workplan for task T4.2 was designed and sent to the task team. The first section of the questionnaire pertained to the research and innovation capacity of the STARS EU higher education institutions. The second section focused on the fostering of researchers' entrepreneurial mindsets, and the third section pertained to collaboration and usage of EIC/EIT calls. An additional section listed questions related to innovation and patent offices at each institution, and framework related questions related to spin out/spin off companies and research agendas.

This report focuses on the best practices and needs in research and innovation training. For this reason, only the first section of the questionnaire is used (see Annex I). The questions are as follows:

1. Do you already propose courses/teaching dedicated to research and innovation? If yes, name and list the corresponding courses and their framework (level, related diploma, number of students, duration, formation, contact person).

2. Do you know similar courses/teachings in another university (outside of the STARS EU consortium)?

3. Instead of already running such courses, have you identified needs for them?

The first question led to the compilation of a list of training (courses and degrees) in research and innovation proposed by the STARS EU higher education institutions. The complete list is in the first Annex of this report. Upon analysis of received answers to this question, it appeared that many STARS EU higher education institutions had included courses partly or fully given by external regional stakeholders. However, it was important for the answers to this question to only include courses provided by the STARS EU higher education institutions, as they could be subject to academic exchanges and mutualization.

The second question was not fruitful, and the analysis of answers was inconclusive: many STARS EU higher education institutions answered that they had no knowledge of similar courses being given by universities outside of STARS EU. However, the inconclusive analysis of the answers to this question, combined with the listing of research and innovation training given by external regional stakeholders in the first question, led to the formulation of an extra question which was given to the T4.2 members. The members were asked to list training on research and innovation given by external regional stakeholders in their region. As STARS EU aims to foster privileged relations with its regional community, it appeared relevant to compile such courses and, in a second phase, determine their accessibility to the STARS EU community.

The third question in the questionnaire led to the compilation of a list of needs in research and innovation training, which is in the third Annex of this report.

The structure of the present report is divided in two distinct sections. The first section contains a list of best practices related to training in research and innovation given by STARS EU higher education institutions. The second section contains recommendations on how to improve training in research and innovation, and thus the skills linked to it, within the alliance. Both sections are based on the answers to the aforementionned T4.2 questionnaire.

Best practices for developing research and innovation skills

Best practice 1: General training on research and innovation

Description and example

STARS EU higher education institutions propose general courses and degrees on research and innovation designed to equip the entire university community, including but not limited to students and lifelong learners, with essential skills and knowledge related to conducting research and fostering innovation.

In the first part of the survey, the nine STARS EU higher education institutions listed 60 general training courses and/or degrees on research and innovation. Out of the 60 listed items, 49 are course units, and 11 are complete degrees. It is important to note that the list of general training on research and innovation compiled by T4.2 team, and attached in Annex II is not exhaustive.

While these training courses are identified as general, and can thus be attended by non-specialized students, they are still part of academic tracks. 32 of the general courses and/or degrees on research and innovation are part of academic tracks related to Business, Management, Administration and Organizations, 15 of which also have a focus on entrepreneurship. 14 of the general training items are part of academic tracks related to Innovation, 13 of which also have a focus on entrepreneurship. 6 of the listed items are courses and/or degrees providing general training on Ethics, Communication, Strategic career planning, Sustainable development goals, and Access to information. Finally, 8 out of the 60 listed items are general training courses on research and innovation dedicated to PhD students, and thus part of doctoral training. 43% of the listed general training in research and innovation are given at a B.A. level, while 33% are given at M.A. level. This early initiation of students to research and innovation constitutes a Best practice and will be addressed in this report.

45% of the general training on research and innovation at the STARS EU higher education institutions is given fully or partly in English (27 courses and/or degrees), while 55% (33 courses and/or degrees) is given in the university's native language. These languages include Czech, German, Spanish and French.

As an example of general training on research and innovation, Hochschule Bremen City University of Applied Sciences proposes a course on "Managing Projects, Change and

Innovation". This course is partly in English. Bragança Polytechnic University proposes a Master's degree, also partly given in English, entitled "Innovation of Products and Processes". The degree trains students to generate opportunities in process and product development and enables them to turn such opportunities into innovative solutions. The Master's aims to facilitate entrepreneurs and intrapreneurs to create new business and cultural solutions in collaboration with interdisciplinary partners in higher education, as well as with regional stakeholders.

Apart from the general training courses and degrees in research and innovation listed by the STARS EU higher education institutions, it is important to note that such general training is already facilitated by the Thematic Interest Group (TIG) on Entrepreneurship and Innovation. One of the key activities of this TIG is the development and delivery of educational initiatives which would bridge academic and industry knowledge and broaden students' innovation, entrepreneurial and social responsibility skills.

Benefits

It is important to note that the listed general training courses and/or degrees in research and innovation cover all academic levels, from B.A. to Ph.D., making these items broadly accessible to students at any given time during their academic journey.

An additional benefit of general training courses and/or degrees in research and innovation is that they can be opened to students from all academic fields. Broadening the accessibility of this training would maximize the possibility of a student attending these courses/degrees and thus of acquiring skills and competences in research and innovation. It is important to note that for the time being, most general training courses and/or degrees are not accessible to all the student body of a STARS EU higher education institution, but rather to the students of the related academic degree.

General training courses and/or degrees on research and innovation help students acquire transferable skills by exposing them to diverse methodologies and interdisciplinary collaboration. These skills can then be applied across various academic, professional and industry settings. The transferable skills that can be acquired through the general training courses and/or degrees on research and innovation listed by STARS EU higher education institutions include critical thinking, problem-solving, communication, team collaboration, information literacy and project management.

The STARS EU Curriculum Lab developed a Competence catalogue which serves as a foundation for the identification, cataloging, and dissemination of core and specific thematic competences that are essential for students. The Competence catalogue is divided per STARS EU Priority Area and has a Core competences section. The

Competence catalogue aims to align the educational ambitions of the STARS EU alliance with the practical demands of the STARS EU Priority areas.

As can be seen in the table below, which is an excerpt from the STARS EU Competence catalogue, the transferrable skills present in the general research and innovation training of STARS EU higher education institutions are in line with the Core competences of the catalogue, principally in the areas of Research competences and Sustainable Future Design competences.

Competency Name	Competency Description	Main Competencies / Skills in the Area
Research competences	Research competences cover a range of skills, knowledge and attributes that enable individuals to conduct research ethically and effectively, analyze results and contribute to advancing knowledge in their field.	*1. Research Design* *2. Literature Review* *3. Data Collection and Analysis* *4. Critical Thinking and Information Literacy* *5. Problem Solving and Adaptability* *6. Ethical Conduct and Integrity* *7. Collaboration and Research Project Management* *8. Communication and Dissemination*
Sustainable Future Design Competences = STARS-EU Competence	The set of skills, knowledge and attitudes enables individuals to successfully tackle new challenges and create solutions that promote the transition of a region and its interregional partners towards a more sustainable, resilient, and inclusive future. These skills foster the ability to face current challenges with confidence, openness to change, and a forward-looking, sustainability-oriented approach. This involves envisioning new, unexplored scenarios for existing contexts and approaching them with a creative mindset in order to navigate the complexities of policy development and implementation across diverse geographic areas, while promoting effective and equitable outcomes for all regions involved	*1. Trans-disciplinarity / Interdisciplinary Collaboration* *2. Regional and Interregional Community Development / Stakeholder /Community Engagement and Co-Creation* *3. Global Awareness and Regional Understanding* *4. Strategic Planning and Visioning* *5. Systems-thinking* *6. Sustainability Competence / Ethical and Sustainable Thinking* *7 Interregional Policy Literacy and Governance Development*

Figure 1: Excerpt from STARS EU Competence catalogue, section on Core competences

It can also be noted that the transferrable research and innovation skills to be acquired in the general training of STARS EU higher education institutions are largely in line with the European Competence Framework for Researchers. The training allows students to acquire foundational (or higher) competences in many of the Framework's categories, including and not limited to: Doing research; Managing research; Working with others; Cognitive abilities; and Self-management.

It is important to note that many activities and actions conducted or planned by the STARS EU alliance aim to help students acquire skills. One notable action is the Future Lab, a yearly training event during which challenges are given by regional stakeholders to student groups. The students tackle the challenge by working together during an entire

semester and come up with innovative and creative solutions. Another activity led by the STARS EU alliance is the Student competition in Entrepreneurship and Innovation, which will empower students to tackle related challenges and acquire skills that are crucial for an entrepreneurial path.

Best practice 2: Field-specific training on research and innovation

Description and example

In the survey, the STARS EU higher education institutions listed 53 field-specific training courses and/or degrees on research and innovation. Of these 53 items, 25 are courses, 27 are degrees, and one is a module. 86% of these field-specific training courses and degrees are given at M.A. level, and only 9% are given at B.A. level. It is important to note that the list of field-specific training on research and innovation compiled by T4.2 team, and attached in Annex II, is not exhaustive.

Since these items are field-specific, it is important to mention the academic field in which they are embedded: 7 are in Arts and Performing arts, 6 are in Health sciences, 6 are in Informatics, Digital technology and Computer science, 6 are in Social work, 6 are in Engineering and Architecture, 5 are in Biology, Biotechnology and Life sciences, 4 are in Tourism, 3 are in Physics and Chemistry, 3 are in Sport sciences, 3 are in Energy, 2 are in Economics, and 2 are in Law and Diversity.

Field-specific training on research and innovation focuses on specialized methodologies and content relevant to a particular discipline, allowing the adaptation of the training to the demands of research and innovation in the field.

The absence of field-specific training on research and innovation in human and social sciences must however be noted. The TIGs Arts and Creative Industries and Inclusion and Social Justice are spaces for research and innovation in social sciences within the STARS EU alliance. The questions addressed by these TIGs are in line with the policy focuses on social sciences and humanities research and innovation of the European Commission, such as cultural and creative industries, and gender equality, global justice and stability.

Hochschule Bremen City University of Applied Sciences proposes a course on “Innovative design, management and development of institutions and organizations of social work". This course, occurring on Master's level and given in German, includes notions of organizational innovation, change management and entrepreneurship, among other topics. It is a good example of a field-specific training on research and innovation as it allows students to acquire necessary skills pertaining to the field of Social work. Another example of field-specific research and innovation training is HSB’s Aerospace

Technologies Master's degree. This deep-tech-oriented degree includes interdisciplinary project-modules related to more in-depth research and application of the degree contents.

Another STARS EU higher education institution, Cracow University of Technology, proposes yet another deep-tech-oriented, field-specific degree which trains students in research and innovation. This degree is a Bachelor of Engineering in Biotechnology and includes courses on "Basic law protection of intellectual and industrial property" and "Company development strategy".

Benefits

Benefits of field-specific training on research and innovation include the acquisition of a deeper domain-specific expertise. Students gain an in-depth understanding of research methodologies and best practices of their field, and familiarize themselves with specialized techniques, software and equipment. Field-specific research training also allows students to data analysis and interpretation methods that are relevant to their academic field. In turn, field-specific innovation training empowers students towards novel and higher quality innovation, which can be directly applied to specific industries.

Field-specific training on research and innovation is particularly important for the development of talent and skill in European deep tech talent pools. The NEIA prioritizes deep tech to bridge the innovation gap between different European regions, and to increase Europe's strategic autonomy and competitiveness. Providing field-specific research and innovation training ensures that Europe and STARS EU cultivate the next generation of scientists, engineers and entrepreneurs who can lead the deep tech revolution.

Best practice 3: Initiation of students to research and innovation early in academic programmes

Description and example

Early exposure to research and innovation, whether it is general or field-specific, is advantageous to all students, especially those who wish to pursue an academic or industrial career path. 27,4% of the research and innovation training courses and/or degrees listed in the answers to the survey are given at a Bachelor's level within the STARS EU higher education institutions. As is mentioned in the recommendations of this report, it is important to increase this proportion of early initiation to research and innovation to empower STARS EU students to continue their academic towards research M.A.s and Ph.D.'s.

HSB proposes a course on “Innovation management and business development” at a Bachelor’s level, while Silesian University in Opava proposes Bachelor’s level courses such as “Innovative entrepreneurship”, “Creative thinking”, and “Project management”. Other STARS EU higher education institutions propose field-specific Bachelor’s courses on research and innovation, such as University Marie and Louis Pasteur with its “Introduction to research” course in Informatics, and its “Research and Development” course in Engineering. University West also proposes field-specific Bachelor’s training such as the “Technical Innovation and Entrepreneurship” course in Mechanical engineering.

Benefits

Hathaway, Nagda and Gregerman show that early initiation of students to research training has a positive benefit on students’ higher education pursuit. Proposing research and innovation training to Bachelor’s students gives them more time to hone their acquired skills during their undergraduate academic programme, and allows them to put them directly in practice should they continue their academic journey into a Master’s, a Ph.D., and a post-doc. The European Competence Framework for Researchers lists a certain number of competences and defines each competence into levels of appropriation. The early initiation of students to research and innovation training could lead to a faster appropriation of higher competence levels.

Moreover, undergraduate research and innovation training enhances students’ graduate admission prospects as it expands the students set of skills and develops their hands-on experience. Overall, it encourages students’ contribution to innovation and thus to societal change.

Best practice 4: Non-traditional training in research and innovation

Description and example

Higher education institutions are a pillar in providing traditional training to students, such as courses and degrees. However, novel and non-traditional training such as MOOCs, Lifelong learning diplomas/courses and BIPs are on the rise.

A MOOC, which stands for Massive Open Online Course, is a type of online course that is accessible to many learners. MOOCs are typically offered by stakeholders having experience in education and research, such as universities and other types of organizations. STARS EU higher education institution University of La Laguna proposes a MOOC on research and innovation to their students, entitled “Development of proposals linked to the SDGs”. This MOOC aims to train students to identify social and

environmental challenges and bring co-creation, impactful solutions to them using innovative and inclusive methodologies.

Another type of non-traditional training is Lifelong learning diplomas. One example of a Lifelong learning diploma oriented towards research and innovation is the Entrepreneurship and Innovation University diploma (Diplôme d'Université - DU) attributed by University Marie and Louis Pasteur. University diplomas are delivered by French higher education institutions but are not part of the national diplomas recognized by the Ministry of Higher Education and Research, as they do not have a national framework. However, this lack of framework allows for great flexibility in the programmes of the University diplomas: each university can create their own diploma according to their needs and expertise.

Professionals and lifelong learners are at the heart of the STARS EU mission. STARS EU aims to empower students and professionals to fully contribute to the social, economic and cultural improvement of the European environment. This is reflected in the objectives of STARS EU's Curriculum Lab, which aims to train the future generation of talents, including lifelong learners, with future-proof competences and skills. Task T3.5 on fostering STARS EU flexible learning opportunities in micro-credentials particularly focuses on this target group. As the name of the task suggests, it aims to offer flexible learning opportunities and alternative learning pathways to learners at all stages of life, and across all disciplines and sectors. This training will be given as micro-credentials, which will be created as a solution to the needs of regional stakeholders. Such needs can stem from gaps in research and innovation.

Blended Intensive Programmes, or BIPs, are non-traditional, pedagogically innovative ways of learning in higher education institutions. They are a hybrid learning experience combining an online component of virtual learning, and a physical component where the participants briefly meet in-person at the welcoming partner institutions. BIPs are part of the Erasmus+ programme and hold a great importance in making student mobility more accessible, as they reduce the need for long-term mobility. BIPs are particularly valuable for non-traditional learners such as working professionals and lifelong learners, as they are typically shorter than traditional courses, as they are interdisciplinary, often intersectoral, and always international. The Curriculum Lab is currently elaborating the STARS EU Joint Curricula Catalogue, which contains a wide array of BIPs, many of them focusing on deep tech topics and pertaining to research and innovation. One notable example of a STARS EU BIP on deep tech is the BIP Smart Grids which aims to train learners on smart grid fundamentals, technologies, communication and control. Another example of BIP which trains students to acquire and apply general research and

innovation skills is the BIP Start-up simulation game, during which groups of learners work on a comprehensive and concrete entrepreneurship project.

Benefits

MOOCs are fully online and allow students to follow any type of training virtually, in a self-directed way of learning. MOOCs typically use videos, texts, surveys and practical exercises, making them accessible to many students and lifelong learners. MOOCs do not follow a strict weekly schedule the way traditional university courses do, and learners with challenging schedules are able to plan around their other obligations to continue acquiring skills and competences. MOOCs also give the opportunity for the students to acquire ECTS that count towards the validation of their degree. It is however up to each institution to make sure that the ECTS given by a MOOC are fully integrated in students' degrees and transcripts.

French University diplomas such as the Entrepreneurship and innovation University diploma from UFC are specialized training created to answer specific professional needs. They are accessible to a broad audience of lifelong learners, such as students and working professionals aiming to change their field of work or to acquire new skills and competences.

Overall, non-traditional training is typically shorter and more flexible than traditional training, making them suitable for both academic students and lifelong learning students. They allow students with full academic schedules as well as lifelong learners with professional schedules to continue gaining competence and skills on research and innovation.

Recommendations for further improvement

Recommendation 1: Mutualize existing courses on research and innovation

The Curriculum Lab, and especially task T3.2, oversees the STARS EU Joint Curricula Catalogue and is thus in charge of proposing course units, BIPs and degrees to be mutualized alliance wide. This Catalogue is currently being produced and is not yet finalized, however many courses and degrees listed in the draft Catalogue pertain to research and innovation training.

Enterprise Theory; Corporate Social Responsibility; International Trade Operations; Digital marketing communication strategy; Corporate communication consultant; Strategic brand management; Business management; Research skills, methods and tools (in environmental engineering); Entrepreneurship and Innovation; Research method; Academic writing; Business English; Applied business Intelligence; Professional and Managerial skills; All course units of the Bachelor programme in International Business Management; Performance measurement KPIs; Big data Business Intelligence

List of courses pertaining to research and innovation in the STARS EU Joint Curricula draft

Bachelor's in International Business Management; Master's in Innovative International Entrepreneurship; Master's in Product and Process Innovation

List of degrees pertaining to research and innovation in the STARS EU Joint Curricula draft

Game of International supply chain for efficient logistics; Strategic Career Planning via Work-Integrated Learning; Sustainability and ESG for Business; Challenge-Based Innovation; Business Simulation and Financial Analysis; Future Lab Camp for Connecting International Students with Local Stakeholders; Work-integrated learning and career development in Ph.D. education; Start-up Simulation Game; Circular Economy Innovation Bootcamp; Entrepreneurship and Sustainable Development in a Global Context

List of BIPs pertaining to research and innovation in the STARS EU Joint Curricula draft

It is important to note that some items, such as the course on Entrepreneurship and Innovation, the Master's degree in Product and Process Innovation, and the BIPs on Work-integrated learning and on the Start-up Simulation Game are listed in both the STARS EU Joint Curricula Catalogue and in the list of research and innovation training compiled by members of T4.2.

However, not all the training items on research and innovation listed by members of T4.2 (Annex II) are shown in the STARS EU Joint Curricula Catalogue draft. To democratize research and innovation training in the STARS EU community, and especially for STARS EU students, it would be highly beneficial to mutualize, alliance-wide, all the research and innovation courses and degrees listed in the second Annex of this report.

A preliminary step would be to dispense the existing research and innovation training items in English, seeing as many of them are in the native language of the STARS EU higher education institution. Another step forward in this process of democratization of research and innovation training would be to make the general training courses and degrees accessible to STARS EU students from all disciplines. Seeing as these courses are not field-specific, they might not require a certain background in a certain field to be taken. In this case, opening them to all disciplines would be highly beneficial for the higher education institution's student community, as well as the alliance's.

Moreover, it would be especially beneficial for the STARS EU alliance to aim for the mutualization of field-specific research and innovation training, especially at Bachelor's level. As was previously mentioned, B.A. field-specific training makes up only 9% of the proposed courses on research and innovation. The STARS EU higher education institutions each have different areas of specialization and are therefore able to provide field-specific training at B.A. level to each other's students.

Mutualizing courses is beneficial as it is a way of building on already existing courses at STARS EU higher education institutions, and as it prevents the doubling of the workload for the teachers involved. It also allows STARS EU partners to share their best practices in research and innovation training with the entire consortium.

Recommendation 2: Develop new courses to fill STARS EU partner HEIs needs in research and innovation

The survey sent to members of T4.2 contained a section on the needs in research and innovation skills of each STARS EU higher education institution. The entire list of said skills can be found in the third Annex and is categorized per institution.

Some of the expressed needs are more general and pertain to specific target groups. Cracow University of Technology, University West, University Marie and Louis Pasteur and

Bragança Polytechnic University all express needs surrounding the creation of additional training on research and innovation for Bachelor's, Master's and Ph.D. students. University Marie and Louis Pasteur expresses a need for general training in research and innovation, which would lead to the acquisition of transferrable skills. University Marie and Louis Pasteur also expresses the need for research and innovation courses specifically aimed for Bachelor's students, to empower them towards the continuation of their studies in research Master's or Ph.D's.

The needs expressed by University of La Laguna and Silesian University in Opava are specific and can be concretely translated into training items, such as courses dedicated to technology transfer, to intellectual property rights, and to patenting. A need was also expressed surrounding courses dedicated to Ph.D.'s and post-docs on application preparation for European calls for projects, such as FP10-type calls. The new courses to be developed must consider and further align with the European Competence Framework for Researchers.

Another element appearing in this report is the need for new non-traditional training on research and innovation, such as BIPs, lifelong learning diplomas and courses, and MOOCs. As was discussed in Best Practice 4, such training is highly beneficial for working professionals with busy schedules and allows STARS EU to fulfil its mission towards lifelong learners. However, creating such new research and innovation training will be beneficial to the entire STARS EU student community, at all academic levels and in all disciplines.

Recommendation 3: Involve external regional stakeholders in research and innovation training

Upon analysis of the received answers to the T4.2 questionnaire, it appeared that many STARS EU higher education institutions had listed course units on research and innovation that are given partly or fully by external regional stakeholders. This finding is interesting for STARS EU as one of the main objectives of the alliance is strengthening the relation between higher education institutions and regional stakeholders. A follow-up data collection was then done, during which T4.2 members were asked to list courses on research and innovation given by external regional stakeholders (Annex IV). There is a limitation to this collection, as members cannot be aware of all such courses. However, this list can and should be updated by T4.2 members in collaboration with the Regional Transition Accelerator, who oversees the collaboration of the alliance with regional stakeholders.

A prolongation of the collaboration between T4.2 and the Regional Transition Accelerator would be to determine the access of the STARS EU community, especially students, to the courses on research and innovation dispensed by external regional stakeholders. This would be beneficial for STARS EU as it would give the community access to a wider catalogue of already existing courses on research and innovation, given by serious regional stakeholders. In the case that accessibility is not possible, transferability should then be studied.

Another way of democratizing research and innovation training in STARS EU while involving external regional stakeholders would be to include more challenge-based learning components into all university courses when applicable. For example, external regional stakeholders (such as local businesses, authorities and entrepreneurs) can be invited to deliver real-life challenges for students to work on. This is already done in STARS EU with the Future Lab, which occurs once per year during an entire semester. However, a year-long format can be envisaged, and is already in preparation in STARS EU: the STARS EU Student competition in Entrepreneurship and Innovation. This will be highly beneficial for all involved stakeholders: students will get hands-on experience, external regional stakeholders will benefit from the skills and competences from new talents, and the STARS EU alliance will strengthen its links with its community supporting innovation and entrepreneurship.

As was already mentioned, the objective of the STARS EU alliance is to promote regional transitions. One way of doing so is by equipping future generations of European workers with vital competences needed in regions: these competences are listed in the STARS EU Competence catalogue and are acquired through the STARS EU Joint Curricula. The Regional Transition Accelerator confirmed that the STARS EU Competence catalogue answered the needs in research and innovation of external regional stakeholders. It would be interesting for the RTA, and especially task T2.1, to periodically re-assess the competences needed by stakeholders, to ensure that the STARS EU Competences and Joint Curricula are relevant in the context of regional challenges and transformations.

Another way of involving external regional stakeholders in the research and innovation training of STARS EU students is by including them in the upcoming STARS EU Traineeship programme. By taking part in the Traineeship programme and welcoming trainees within their organization, external regional stakeholders would participate in the upskilling of STARS EU students by allowing them to put their competences into practice and have a formative professional experience, which would allow them to validate their academic degree.

Recommendation 4: Promote interdisciplinary and cross-sectoral courses on research and innovation in STARS EU

A need which emerged from T4.2 team discussions was the need for interdisciplinary research and innovation courses in STARS EU higher education institutions. This need is in line with the recommendations of the Draghi report on EU competitiveness, which underlines the necessity of laying the foundations of a new European skills policy and in particular the necessity of revising curricula by including interdisciplinary approaches which integrate STEM with other disciplines. However, interdisciplinarity should not only figure in STEM fields but also in social sciences and humanities: according to the European Commission, social sciences and humanities are "indispensable for better understanding and navigating societal needs and opportunities for societal benefits". Moreover, the European Commission qualified social sciences and humanities as "an important requirement for fostering better science and increased societal and economic impact of research and innovation".

Apart from interdisciplinarity, a need was also expressed for cross-sectoral courses on research and innovation. Field-specific research and innovation courses, which are the subject of Best Practice 2 of this report, and which are listed in the second Annex, should facilitate partnerships with the regional industry sector. Cross-sectoral training is beneficial for both academia and industry, as it allows for better communication between the two sectors, and for a better comprehension of the needs, and challenges faced, by both sectors. Bringing academia and industry together around research and innovation will promote the finding of common grounds for potential cross-sectoral projects.

Many European calls promote interdisciplinary and cross-sectoral elements. A notable one are Marie Skłodowska-Curie Actions (MSCA) which support excellence in research and innovation. MSCA Cofunds and MSCA Staff exchanges are both excellence funding programmes open to interdisciplinary and cross-sectoral incentives. It would be highly beneficial for the STARS EU alliance to prepare its community to such calls by democratizing interdisciplinary and cross-sectoral research and innovation courses.

Conclusion

This report, drafted in the context of T4.2 which is dedicated to fostering the STARS EU research and innovation capacity, listed a series of best practices of actions already undertaken within STARS EU higher education institutions and formulated some recommendations on how to further improve.

The STARS EU higher education institutions are promoting and democratizing research and innovation training by providing their student community with both general and field-specific courses and degrees which allow them to upskill their transferrable and thematic research and innovation skills. Such skills are not only in line with the STARS EU Competence catalogue but also with the European Competence Framework for Researcher proposed by the European Commission. Another listed best practice is the initiation of students to research and innovation early during their academic journey, especially during their Bachelor's, which allows them to hone their research and innovation skills before entering graduate school or the industry sector. The final identified best practice is the presence of non-traditional training, such as BIPs, MOOCs and lifelong learning courses and diplomas in the STARS EU higher education institutions course catalogues.

The recommendations were formulated based on the expressed needs in research and innovation of the STARS EU higher education institutions. While the STARS EU alliance has already started doing so, it is important to continue mutualizing existing courses on research and innovation; in some cases, this involves translating existing courses from native languages to English, and to make general training courses available to students from all disciplines. STARS EU should continue developing new training in research and innovation that might not exist yet, such as training in technology transfer, intellectual property rights, patenting, and European project proposals. The creation of new training in research and innovation should not only be based on traditional training material but should also include non-traditional learning methods such as MOOCs, BIPs, and lifelong learning diplomas and courses. Another recommendation, which is fully within the scope of the STARS EU alliance, is to involve external regional stakeholders more in the research and innovation training provided. This recommendation introduces the last one, which is about promoting interdisciplinary and cross-sectoral research and innovation training within the higher education institutions of STARS EU.

The finality of this report is to provide a list of best practices in research and innovation already conducted within STARS EU, and a list of recommendations for research and

innovation training to be implemented. This report will feed the Curriculum Lab, who after careful review, can use it towards the design of the STARS EU Joint Curricula Catalogue.

Annexes

Annex I: First part of Survey for T4.2

Introduction of the survey

Survey on STARS-EU Research & Innovation capacity, initial status in the Alliance.

Objective of the survey: Build a clear view on

- what is already available within the alliance on this topic of "Research & Innovation" training capacity,
- Identify needs for research and innovation-oriented trainings

The analysis of the survey will help to build a concrete action plan for the Task 4.2, "Foster STARS EU research and innovation capacity", with the aim to decide on research and innovation-skills to be jointly implemented through STARS EU curricula. The expected outcome of this action is to foster researchers' entrepreneurial mindsets, as well as STARS-EU activities oriented toward innovation project to be supported by the Mobility program "Reach for the STARS" (WP6) on one side, and develop cooperation programs through opportunities offered by the EIT (calls, network, etc.).

The survey (first implementation on Google Form, https://forms.gle/p2r25wY3FiSX2SzNA) is organized along the 3 points that are foreseen in the STARS-EU proposal concerning task4.2:

1. **Training & courses on innovation skills for student**
2. **Raise awareness among researchers about the culture of innovation**
3. **Experience, opportunities & wishes about collaborative innovation projects**

Start of survey…

1. Research and innovation capacity, status in the STARS-EU Alliance

1. Do you already propose courses/teaching dedicated to research & innovation ?
   A) Yes
   B) No

if Yes : Name and list (one answer box per course) the corresponding courses and their framework (level, related diploma, number of students, duration, format, contact person ; Any specific information characterizing the course)

Course No.1

(a) Level
(b) Bachelor
(c) Master
(d) Doctorate
(e) After PhD (e.g. incubator environment)

Title of the related diploma [Character box]

(a) Title

Number of students

(a) X<5
(b) 5<=X<10
(c) X>=10

Duration in hours with lecturers (courses + exercises + lab) [numeric box]

(a) Number

Contact person for the course if possible

(a) [Name & email]

Course No.2

(a) Level
(f) Bachelor
(g) Master
(h) Doctorate
(i) After PhD (e.g. incubator environment)

Title of the related diploma [Character box]

(a) Title

Number of students

(a) X<5
(b) 5<=X<10
(c) X>=10

Duration in hours with lecturers (courses + exercises + lab) [numeric box]

(a) Number

Contact person for the course if possible

(a) [name & email]

1. Do you know similar course/teaching in another university (out of STARS-EU)?
   (a) Yes
   (b) No

If Yes, provide details: [free characters] HEI of concern, training level, related diploma, number of students, duration, format, contact person ; Any specific information characterizing the course) ?

(a) [Details]

1. Instead of already running such courses, have you identified needs for them ?
   A) Yes
   B) No

If Yes, provide details about the identified needs: [free characters]

(a) Training level
(b) Number of students potentially concerned
(c) Contact person, if existing (having the need)
(d) Other specific information you would consider as relevant

[…]

Annex II: List of existing courses on research and innovation in STARS EU partner universities

University	Title	Type	Language	Level	Title of related diploma	General or field-specific training?	Number of students	Duration in hours	Contact Person
HSB	Entrepreneurial Mindset and Communication Skills	Course	EN/DE	Master	Sustainable Business & Entrepreneurship M.A.	General	X>=10	180h	Prof. Dr. Schemmann
HSB	Entrepreneurship and Sustainable Development in a Global Context	Course	EN	Master	Sustainable Business & Entrepreneurship M.A.	General	X>=10	180h	Prof. Dr. Schemmann
HSB	Innovating and Transforming Business	Course	EN/DE	Master	Sustainable Business & Entrepreneurship M.A.	General	X>=10	180h	Prof. Dr. Schemmann
HSB	Development of sustainability-oriented business models (with Innovation & Entrepreneurship Lab II) (Modul 2.1)	Course	DE	Master	Sustainable Business & Entrepreneurship M.A.	General	X>=10	180h	Prof. Dr. Schemmann
HSB	Change Management (Modul 3.2)	Course	EN/DE	Master	Business Management M.A.	General	X>=10	180h	Prof. Dr. Kuron
HSB	Transformation processes (Modul 2.4)	Course	EN/DE	Master	Business Management M.A.	General	X>=10	180h	Prof. Dr. Kuron
HSB	Company foundation (Modul 2.2)	Course	EN/DE	Master	Business Management M.A.	General	X>=10	180h	Prof. Dr. Kuron
HSB	Managing Projects, Change and Innovation	Course	EN/DE	Bachelor	European Degree Programme in Business and Public Administration B.A.	General	X>=10	180h	Prof. Dr. Lisowski
HSB	Innovation Management and Business Development (WPM 7.8)	Course	EN/DE	Bachelor	European Degree Programme in Business and Public Administration B.A.	General	X>=10	180h	Prof. Dr. Lisowski
HSB	WirtschaftsEnglish IV: Entrepreneurship and Business Management (Modul 6.4)	Course	EN	Bachelor	Business Administration/Internationales Management	General	X>=10	180h	Prof. Dr. Malony
HSB	Entrepreneurship (Modul 7.2)	Course	DE	Bachelor	International Degree Programme in Global Management B.A.	General	X>=10		Prof. Dr. Schrooten
HSB	Business model development and innovation in digital competition	Course	EN	Master	Management - Digitalization & Transformation M.A. The Master's degree is not a consecutive qualification but rather a postgraduate degree and is subject to a fee.	General	X>=10	180h	Prof. Dr. de Hesselle
HSB	Innovative design, management and development of institutions and organizations of social work	Course	DE	Master	Practice Research and Innovation in Social Work M.A.	Field-specific	X>=10	180h	Prof. Dr. Spatscheck / Prof. Dr. Klug
HSB	Concepts and processes of innovation in social work (Modul 1.4)	Course	DE	Master	Practice Research and Innovation in Social Work M.A.	Field-specific	X>=10	180h	Prof. Dr. Spatscheck / Prof. Dr. Klug
HSB	Practical research I: Research workshop - conception and development of a project in practice (Modul 1.5)	Course	DE	Master	Practice Research and Innovation in Social Work M.A.	Field-specific	X>=10	180h	Prof. Dr. Spatscheck / Prof. Dr. Klug
HSB	Practical research II: Research workshop - implementation and evaluation of a project in practice (Modul 2.5)	Course	DE	Master	Practice Research and Innovation in Social Work M.A.	Field-specific	X>=10	180h	Prof. Dr. Spatscheck / Prof. Dr. Klug

HSB	Current discourses on innovation in social work (Modul 2.2)	Course	DE	Master	Practice Research and Innovation in Social Work M.A.	Field-specific	X>=10	180h	Prof. Dr. Spatscheck / Prof. Dr. Klug
HSB	Applied research in palliative care (Modul 2.2)	Course	EN/DE	Master	International Degree Programme Palliative Care M.Sc.	Field-specific	X>=10	180 h	Prof. Dr. Stanze
HSB	Sustainable business practices (Modul 1.3)	Course	EN/DE	Master	Interdisciplinary Sustainability Management M.Sc.	General	X>=10	180h	Prof. Dr. Zimpelmann/ Prof. Dr. Osthorst
HSB	Research methods for leisure and tourism (Modul 1.2)	Course	EN/DE	Master	International Degree Programme Sustainable Leisure and Tourism Development M.A.	Field-specific	X>=10	180h	Prof. Dr. Hartmann
HSB	Global trends and trend research (Modul 1.3)	Course	EN/DE	Master	International Degree Programme Sustainable Leisure and Tourism Development M.A.	Field-specific	X>=10	180h	Prof. Dr. Hartmann
HSB	Sustainability assessment in tourism (Modul 1.4)	Course	EN/DE	Master	International Degree Programme Sustainable Leisure and Tourism Development M.A.	Field-specific	X>=10	180 h	Prof. Dr. Hartmann
HSB	Interdisciplinary Project I (Modul 1.5) (Research project)	Course	DE	Master	Aerospace Technologies M.Sc. / Mechanical Engineering M.Eng. / Energy Engineering M.Eng.	Field-specific	X>=10	180h	Prof. Dr. Apel / Prof. Dr. Gläbe / Prof. Dr. Mehler
HSB	Interdisciplinary Project II (Modul 2.5) (Research project)	Course	EN	Master	Aerospace Technologies M.Sc. / Mechanical Engineering M.Eng. / Energy Engineering M.Eng.	Field-specific	X>=10	180h	Prof. Dr. Apel / Prof. Dr. Gläbe / Prof. Dr. Mehler
HSB	Blue Sciences – Sustainability *(Wahlpflichtmodul 1.17)*	Course	EN/DE	Master	International Degree Programme Industrial and Environmental Biology M.Sc.	Field-specific	X>=10	180h	Prof. Dr. Klefoth
HSB	Project I: Topic and planning (2.1), Project II: Method selection and validation (2.2), Project III: Implementation (2.3), Project module IV: Data analysis and presentation (2.4).)	Course	EN/DE	Master	International Degree Programme Industrial and Environmental Biology M.Sc.	Field-specific	X>=10	180 h x 4	Prof. Dr. Klefoth
HUAS	Research Portfolio	Course	EN/ NL	Bachelor	Bachelor of Entrepreneurship & Retail Management; Bachelor of Science	General	X>=10	140	Jeroen Loef j.loef@pl.hanze.nl
HUAS	Business Planning	Course	EN/ NL	Bachelor	Bachelor of Entrepreneurship & Retail Management; Bachelor of Science	General	X>=10	140	Jeroen Loef j.loef@pl.hanze.nl
HUAS	Sustainable Entrepreneurship	Course	EN/ NL	Bachelor	Bachelor of Entrepreneurship & Retail Management; Bachelor of Science	General	X>=10	140	Jeroen Loef j.loef@pl.hanze.nl
HUAS	Entrepreneurial Mindset Development	Course	EN/ NL	Bachelor	Bachelor of Entrepreneurship & Retail Management; Bachelor of Science	General	X>=10	140	Jeroen Loef j.loef@pl.hanze.nl
HUAS	Financial Planning	Course	EN/ NL	Bachelor	Bachelor of Entrepreneurship & Retail Management; Bachelor of Science	General	X>=10	140	Jeroen Loef j.loef@pl.hanze.nl
HUAS	Interdisciplinary Business Professional	Degree	EN	Master	Master Interdisciplinary Business Professional; Master of Science	General	X>=10	3360	Duarte de Almeida PM, Patricia <p.m.duarte.de.almeida@pl.hanze.nl>

HUAS	Healthy Aging Professional	Degree	EN/ NL	Master	Master Healthy Ageing Professional; Master of Science	Field-specific	X>=10	3360	masterhealthyageing@org.hanze.nl
HUAS	Customer Journey Mapping	Course	EN/ NL	Bachelor	Bachelor of Entrepreneurship & Retail Management; Bachelor of Science	General	X>=10	140	Various programs at Hanze; Jeroen Loef; j.loef@pl.hanze.nl
HUAS	Innovation Management	Course	EN/ NL	Bachelor	Bachelor of Entrepreneurship & Retail Management; Bachelor of Science	General	X>=10	140	Various programs at Hanze; Jeroen Loef; j.loef@pl.hanze.nl
HUAS	Field Research	Course	EN/ NL	Bachelor	Bachelor of Entrepreneurship & Retail Management; Bachelor of Science	General	X>=10	140	Various programs at Hanze; Jeroen Loef; j.loef@pl.hanze.nl
HUAS	Desk Research	Course	EN/ NL	Bachelor	Bachelor of Entrepreneurship & Retail Management; Bachelor of Science	General	X>=10	140	Various programs at Hanze; Jeroen Loef; j.loef@pl.hanze.nl
HUAS	Scientific Writing	Course	EN/ NL	Bachelor	Bachelor of Entrepreneurship & Retail Management; Bachelor of Science	General	X>=10	140	Various programs at Hanze; Jeroen Loef; j.loef@pl.hanze.nl
HUAS	Advanced Nursing Practice	Degree	EN/ NL	Master	Master Advanced Nursing Practice; Master of Science	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Architecture	Degree	EN/ NL	Master	Master of Architecture; Master of Science	Field-specific	X>=10	5040	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Data Science for Life Sciences	Degree	EN/ NL	Master	Master of Data Science for Life Sciences; Master of Science	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Digital Technology	Degree	EN/ NL	Master	Master Digital Technology; Master of Science	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Teacher Arts & Design	Degree	EN/ NL	Master	Master Teacher Arts & Design; Master of Arts	Field-specific	X>=10	5040	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Sustainable & Healthy Food	Degree	EN/ NL	Master	Master in Sustainable & Healthy Food; Master of Science	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Energy for Society	Degree	EN/ NL	Master	Master Energy for Society; Master of Science	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur

HUAS	International Business & Management	Degree	EN/ NL	Master	Master of Business Administration	General	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	International Communication	Degree	EN/ NL	Master	Master International Communication; Master of Arts	General	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Interrelational Art Practices	Degree	EN/ NL	Master	Master of Interrelational Art Practices; Master of Arts	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Arts Education	Degree	EN/ NL	Master	Master of Arts Education; Master of Arts	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Master of Music	Degree	EN/ NL	Master	Master of Music; Master of Arts	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Materials in Artistic Practice & Technology	Degree	EN/ NL	Master	Master of Materials in Artistic Practice & Technology; Master of Arts	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Operational Leadership in Performing Arts	Degree	EN/ NL	Master	Master of Operational Leadership in Performing Arts; Master of Arts	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Painting	Degree	EN/ NL	Master	Master of Painting; Master of Arts	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Physician Assistant	Degree	EN/ NL	Master	Master of Physician Assistant; Master of Science	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Renewable Energy	Degree	EN/ NL	Master	Master of Renewable Energy; Master of Science	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Smart Systems Engineering	Degree	EN/ NL	Master	Master of Smart Systems Engineering; Master of Science	Field-specific	X>=10	1680	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur

HUAS	Social Work	Degree	EN/ NL	Master	Master of Social Work; Master of Arts	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Social-Spatial Transition Management	Degree	EN/ NL	Master	Master Social-Spatial Transition Management; Master of Science	General	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Sport- and Movement Education	Degree	EN/ NL	Master	Master of Sport and Movement Education; Master of Science	Field-specific	X>=10	3360	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Sustainable Energy System Management	Degree	EN/ NL	Master	Master of Sustainable Energy System Management; Master of Science	Field-specific	X>=10	1680	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Talent Development & Diversity	Degree	EN/ NL	Master	Master of Talent Development & Diversity; Master of Arts	Field-specific	X>=10	1680	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HUAS	Applied Law	Degree	EN/ NL	Master	Master of Applied Law; Master of Science	Field-specific	X>=10	1680	https://www.hanze.nl/nl/studeren/jouw-studiekeuze/masterspreekuur
HV	Strategic Career Planning in Postgraduate Education through Work-Integrated Learning	Degree	EN/SE	Doctorate	Strategic Career Planning in Postgraduate Education through Work-Integrated Learning	General	X>=10		
HV	Business Administration with a focus on Marketing and Entrepreneurship (BA)	Degree	EN/SE	Bachelor	Business Administration with a focus on Marketing and Entrepreneurship	General	X>=10		
HV	Technical Innovation and Enterpreunership	Course	EN	Bachelor	Mechanical Engineering	Field-specific	N/A		https://www.hv.se/en/education/degree-programmes/bachelor-in-international-mechanical-engineering/
HV	Master in Leadership in Digitalised Organisations (2 years)	Degree	EN	Master	Leadership in Digitalised Organisations	General	20	2400	https://www.hv.se/en/education/degree-programmes/master-in-leadership-in-digitalised-organisations/

IPB	Master in Entrepreneurship and Innovation (including an Entrepreneurship course; Innovation and technology course; Entrepreneurship report: and project)	Degree	EN	Master	Entrepreneurship and innovation	General	X>=10	2430 hours	José Carlos Lopes jlopes@ipb.pt
IPB	Master in Innovation of Products and Processes (including Personal and business development course; Entrepreneurship course; Transfer of technology course; Dissertarion/Project/internship	Degree	PT/EN	Master	Innovation of Products and Processes	General	X>=10	2430 hours	Ana Isabel Pinheiro Nunes Pereira (apereira@ipb.pt)
PK	Master in Computer science with specialization in Data science (including courses in Managerial Economics; Labour psychology and sociology; Psychology of motivation, emotions and coping with stress; Organizational change management)	Degree		Master	Computer Science	Field-specific	X>=10	1632	Dr. Eng. Wojciech Książek wojciech.ksiazek@pk.edu.pl
PK	Bachelor of Engineering in Biotechnology (including courses on Basic law protection of intellectual and industrial property; Ecological hazards, occupational safety and ergonomics; Economy; Fundamentals of quality management; Company development strategy; Management and marketing; Effective time management)	Degree		Bachelor	Biotechnology	Field-specific	X>=10	2535	Katarzyna Gorazda katarzyna.gorazda@pk.edu.pl
PK	Sustainable Innovation in Engineering Practice	Course		Master	Biotechnology	Field-specific	X>=10	30	Katarzyna Matras-Postolek k.matras@pk.edu.pl Piotr Beńko piotr.benko@pk.edu.pl
PK	Communication and Negotioation Techniques	course	EN	Master, Bechelor and PhD		General	at least 7	15	Marek Pyka marek.pyka@pk.edu.pl
PK	Ethics	Course	EN	Master and Bechelor		General	at least 7	15	Marek Pyka marek.pyka@pk.edu.pl
PK	Managerial Economics	course	EN	Master	Managerial Economics	Field-specific	at least 7	15	Viktor Shevchuk vshevchuk@pk.edu.pl

SUO	Busines	Course	CZ	Bachelor	Innovative entrepreneurship	General	X>=10	39	Jarmila Duháček Šebestová sebestova@opf.slu.cz
SUO	Creative thinking	Course	CZ	Bachelor	Innovative entrepreneurship	General	X>=10	26	Martin Klepek klepek@opf.slu.cz
SUO	Management	Course	CZ	Bachelor	Innovative entrepreneurship	General	X>=10	39	Šárka Zapletalová zapletalova@opf.slu.cz
SUO	Finance in business	Course	CZ	Bachelor	Innovative entrepreneurship	General	X>=10	39	Iveta Palečková paleckova@opf.slu.cz
SUO	Setting up a company	Course	CZ	Bachelor	Innovative entrepreneurship	General	X>=10	39	Pavel Adámek adamek@opf.slu.cz
SUO	Project Management	Course	CZ	Bachelor	Innovative entrepreneurship	General	X>=10	52	Pavel Adámek adamek@opf.slu.cz
SUO	Innovative entrepreneurship	Course	CZ	Bachelor	Innovative entrepreneurship	General	X>=10	39	Žaneta Rylková rylkova@opf.slu.cz
SUO	Business Models	Course	CZ	Bachelor	Innovative entrepreneurship	General	X>=10	39	Pavel Adámek adamek@opf.slu.cz
SUO	Digitalization of the company	Course	CZ	Bachelor	Innovative entrepreneurship	General	X>=10	39	Roman Šperka sperka@opf.slu.cz
SUO	International business financing	Course	CZ	Bachelor	Innovative entrepreneurship	General	X>=10	39	Jana Šimáková simakova@opf.slu.cz
SUO	Doing business on the Internet	Course	CZ/EN	Bachelor	Economics and Management	General	X>=10	39	Petr Suchánek suchanek@opf.slu.cz
SUO	Business environment	Course	CZ/EN	Master	Economics and Management	General	X>=10	26	Šárka Zapletalová zapletalova@opf.slu.cz
SUO	Innovation management	Course	CZ/EN	Master	Economics and Management	General	X>=11	39	Jarmila Duháček Šebestová sebestova@opf.slu.cz
UAMD	Research methods	Course	EN/AL	Master	Business Management	General	X>=10	60	https://uamd.edu.al/en/fakulteti-i-biznesit/
UFC	Entrepreneuriat/ Entrepreneurship	Course	FR	Bachelor	Physics and Chemistry	Field-specific	X>=10	18	Laurent Guyard laurent.guyard@univ-fcomte.fr
UFC	Introduction recherche/ Introduction to research	Course	FR	Bachelor	Informatics	Field-specific	X>=10	27	Julien Bernard julien.bernard@univ-fcomte.fr
UFC	Projet R&D/ Research and Development (project course)	Course	FR	Bachelor	Engineering (CMI)	Field-specific	X>=10	18	Sophie Denimal sophie.denimal@univ-fcomte.fr Emile Carry emile.carry@univ-fcomte.fr
UFC	Initiation recherche/ Introduction to research	Course	FR	Master	Informatics	Field-specific	X>=10	27	Jean-François Couchot jean-francois.couchot@univ-fcomte.fr
UFC	Projet d'initiation à la recherche/ Introduction to research (project course)	Course	FR	Master	Informatics	Field-specific	X>=10		Jean-François Couchot jean-francois.couchot@univ-fcomte.fr

UFC	Initiation à la recherche en Laboratoire/ Introduction to research in a Laboratory	Course	FR	Master	Informatics	Field-specific	X>=10		Jean-François Couchot jean-francois.couchot@univ-fcomte.fr
UFC	Administration des entreprises - Innovation et entreprenariat/ Business Administration - Innovation and entrepreneurship	Degree	FR	Master	Management, Entrepreneurship and Innovation	General	X>=10	318	Pascale Brenet, pascale.brenet@univ-fcomte.fr
UFC	Entrepreneuriat et innovation (DU)/ Entrepreneurship and innovation for Lifelong learners	Degree	FR	University Diploma	Management, Entrepreneurship and Innovation	General	X>=10	170	Pascale Brenet, pascale.brenet@univ-fcomte.fr
UFC	Behavioral and Digital Economics for Effective Management	Degree	FR/EN	Master	Behavioral and Digital Economics for Effective Management	Field-specific	X>=10	717	Karine Brisset, karine.brisset@univ-fcomte.fr
UFC	Activité Physique Adaptée Santé/ Physical Activity for Health	Degree	FR	Master	Physical Activity for Health	Field-specific	X>=10	34	Fabienne Mougin-Guillaume <fabienne.mougin-guillaume@univ-fcomte.fr>
UFC	Entrainement et Optimisation de la Performance Sportive/ Training and Optimization of Sports' Performance	Degree	FR	Master	Training and Optimization of Sports' Performance	Field-specific	X>=10	20	Sidney Grosprêtre <sidney.grospretre@univ-fcomte.fr>
UFC	Machine learning, signal processing and statistics	Module	EN	Master	e-Phot, physics	Field-specific	X>=10	54	Nadèje Courjal nadèje.courjal@univ-fcomte.fr
UFC	Artificial intelligence and applications	Course	EN	Master	e-Phot, physics	Field-specific	X>=10	27	Nadèje Courjal nadèje.courjal@univ-fcomte.fr
ULL	Innovation in the promotion and communication of tourist destinations at the municipal level	Course	ES	Doctorate	PhD training	Field-specific	X>=10	25	doctorado@ull.es
ULL	Workshop: Emotional regulation, stress coping and intrusive thinking	Course	ES	Doctorate	PhD training	General	30	8 hours	doctorado@ull.es
ULL	Introduction to LaTeX	Course	ES	Doctorate	PhD training	General	30	25 hours	doctorado@ull.es
ULL	Library course: Information resources for Ph.D. students	Course	ES	Doctorate	PhD training	General	30	25 hours	doctorado@ull.es
ULL	ULLRTOOLBOX course: data analysis tool in social and health sciences	Course	ES	Doctorate	PhD training	Field-specific	30	30 hours	doctorado@ull.es
ULL	Advanced academic English for research students: presentations and conferences	Course	EN	Doctorate	PhD training	General	30	40 hours	doctorado@ull.es
ULL	Advanced academic English for research students: writing	Course	EN	Doctorate	PhD training	General	30	40 hours	doctorado@ull.es

ULL	Lectures: Ethics, intellectual property and data protection during doctoral thesis writing	Course	ES	Doctorate	PhD training	General	30	4 hours	doctorado@ull.es
ULL	Seminar: Approach to Citizen Science: Definition, challenges and applications	Course	ES	Doctorate	PhD training	General	30	7 hours	doctorado@ull.es
ULL	Introduction to Python Programming	Course	ES	Doctorate	PhD training	General	30	30 hours	doctorado@ull.es
ULL	MOOC “Desarrollo de propuestas vinculadas a los ODS” / MOOC ‘Development of proposals linked to the SDGs’.	Course	ES	Graduate		General	111	28	ingenia@fg.ull.es
ULL	Acceso y búsqueda de información científica/ Access and search for scientific information	Course	ES	Graduate		General	18	30+45	Adelia De Miguel Negredo

Annex III: List of needs in research and innovation skills in STARS EU partner universities

University	Expressed need
PK	Need for courses on research and innovation for Ph.D. students
HV	Need for courses on research and innovation for Master's and Ph.D. students
ULL	Need for support programmes for applications to excellence European programmes; Need for training on valorization and transfer of knowledge; Need for training on research project management
UFC	Need for courses on transferrable skills for research and innovation for Master's and Ph.D. students; Need for intersectoral research and innovation courses mixing academia with industry
UFC	Need to empower B.A. students to continue their studies in research M.A.s and in Ph.D.s
SUO	Need for courses on technology transfer and commercialization of research results; Need for courses on intellectual property protection (patents and licences); Need for practical examples and case studies of successful innovations; Need for courses on teamwork and interdisciplinary approaches
IPB	Need for courses on research and innovation for Bachelor's students
HUAS	Need for training and supervision for Ph.D. students
HUAS	Need for protocols and support for post-doctoral students

Annex IV: List of existing courses on research and innovation in STARS EU regional stakeholders

Region	Stakeholder name	Title	Language	Level (if applicable)	Field (if applicable)	Duration in hours	Contact Person
Bourgogne-Franche-Comté	DECA BFC	LAUNCHING A START-UP BY PROMOTING ITS RESEARCH: fundamentals and feedback	French	Doctoral and postdoctoral level	A programme to promote research and raise awareness of the issues involved in setting up a start-up. This master-class focuses on the essential pillars of a start-up, with feedback from experienced start-up entrepreneurs, and is dedicated to doctoral students, with a view to providing them with personalised support from their thesis supervisors and/or supervisors.	11	Sophie Magniez - DECA BFC
Bourgogne-Franche-Comté	PEPITE	PEPITE designs, leads and coordinates a range of initiatives aimed at encouraging entrepreneurship and innovation among students.	French	Master and doctoral students	Raising awareness of entrepreneurship, demonstrating the issues involved in setting up and taking over a business, giving students ideas and a desire to become entrepreneurs, enabling them to meet and talk to entrepreneurs, using innovative teaching methods, encouraging team and project work, offering business games and simulations, running themed creativity workshops	Several actions (Lectures, conferences, workshops, retreats...) all year around	Pascale BRENET - Director PEPITE BFC
Västra Götaland	Science Park	Innovatum Pre-Incubation Program	Swedish	All	Program to learn about sustainable business development from value proposition and market, to how to pitch idea to investors. Lectures and workshops interspersed with personal tasks and group work	12 weeks	fredrik.christensson@hv.se

Canary Islands	ACIISI	Diginnova	ES	All	Diginnova is a programme of the Canary Islands Agency for Research, Innovation and the Information Society, funded by the Regional Ministry of Universities, Science and Innovation and Culture of the Canary Islands Government and the European Social Fund Plus, managed by the General Foundation of the University of La Laguna in collaboration with the University Foundation of Las Palmas. Its main objective is the incorporation of talent into companies and research centres in the Canary Islands to promote employability, as well as the ecological and digital transition in organisations, through an innovative dual training programme that combines theoretical training and internships in companies.	11 months	diginnova@fg.ull.es
Bremen	BRIDGE NETWORK	Different Formats: Startup Preschool, Connecting Female Entrepreneurs with Students,	German & English	All	The network was jointly founded by all Bremen universities to promote a start-up culture and to foster entrepreneurial thinking in students at all stages and in all programmes in Bremen. Some of the contents are in English, most in German.	depends	lisa.heindl@hs-bremen.de
Canary Islands	Technological Institute of Canary Island	INES (Innovation, Negotiation, Strategy and Sustainability)	Spanish	All	R&D&I programme. The aim is to provide support to entrepreneurs, to increase the survival of their business initiatives in the first years of activity, work on their consolidation and favor the maintenance and creation of new jobs, reinforcing their commercial strategy focused on the client.	6 months	https://ines.itccanarias.org/

Noord Nederland	Centre of Expertise Energy	Energy Transition Centre	Dutch/ English	All	ENTRANCE - Centre of Expertise Energy contributes to a robust, resilient and sustainable energy supply by being a learning, practice-based, knowledge community. Through high-quality applied research and education, we encourage sustainable innovations, together with citizens, businesses, students, social organisations and governments. Based on the principle of 'people in power', we strive to engage in the energy transition to realise a more sustainable society.	Dependent on support needed	https://www.hanze.nl/nl/onderzoeken/centers/entrance-centre-of-expertise-energy
Noord Nederland	Centre of Expertise Entrepreneurship	Hanze Ondernemen	Dutch/ English	All	The Centre of Expertise Entrepreneurship of Hanze University of Applied Sciences focuses on multidisciplinary research, developing entrepreneurial talent and stimulating young entrepreneurship. When it comes to entrepreneurship, we are the knowledge partner for small and medium-sized enterprises and ensure more and better entrepreneurs in the region and beyond.	Dependent on support needed	https://www.hanze.nl/nl/onderzoeken/centers/marian-van-os-centre-of-expertise-ondernemen
Noord Nederland	Centre of Expertise Healthy Aging		Dutch/ English	All	The Centre of Expertise Healthy Ageing contributes to more healthy years for the inhabitants of the northern region by working on equality of opportunity and participation, vulnerability and appropriate care, and a healthy lifestyle and living environment. Through applied research, we develop knowledge that we transfer to students and professionals through education and learning networks.	Dependent on support needed	https://www.hanze.nl/en/research/centres/centre-of-expertise-healthy-ageing