Sustainable development of Blue economies through higher education and innovation in Western Balkan Countries – BLUEWBC

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Introduction

According to Blue Economy Concept Paper, at the core of the Blue Economy concept is the de-coupling of socioeconomic development from environmental degradation. To achieve this, the Blue Economy approach is founded upon the assessment and incorporation of the real value of the natural (blue) capital into all aspects of economic activity. Issues and problems bring with them challenges and opportunities and the Blue Economy offers a suite of opportunities for sustainable, clean, equitable blue growth in both traditional and emerging sectors, as in Shipping and Port Facilities or Tourism, which are both traditional, big global industries. A Blue Economy approach where ecosystem services are properly valued and incorporated into development planning will further advance the transition to lower impact activities, where the natural capital is maintained as an integral part of the process.

The concept of the "Blue Economy" has become increasingly popular. The Albanian Ionian Sea Region is far from a sustainable Blue Economy today. A sustainable Blue Economy needs adequate rules and economic incentives, truly integrated maritime policies, and maritime spatial planning that fully applies the ecosystem-based approach. The private sector should implement a circular economy along and across their value chains. Public and private investment needs to be oriented to support these objectives.

The Albanian Government focusing on establishing the policies and legal framework on "Blue Economy". Two Prime Minister Orders for setting up inter-institutional working groups to analyse the regulatory and incentive framework for "Blue Tourism" and "Blue Economy" are prepared.

Marine and Maritime activities with the biggest potential in Albania:

1. Marine aquaculture
2. Coastal tourism
3. Passenger ferry services
4. Fishing for human consumption

1.1. University of Vlore, Faculty of Technical Science.

One of the most important accelerator toward the blue Economy is not only the business sector in the area, but the Universities as well. Universities serves as a crucial element with regard to education and science, which serves as a background platform for all innovations in the market.

1.1.1. Current situation towards Blue Economy in structure and content of I&E courses

University of Vlora does not offer a diploma fully or relatively based on the principles of the Blue Economy, and Blue Economy relates issues are not widely addressed in specific classes. University of Vlora offers several diplomas, both in Bachelor and Master's Degree Levels, in fields related to these industries, such

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as, Navigation, Naval and Mechanical Engineering, Computer Sciences, Tourism Management. etc. In recent years effort have been made through various projects (MArED, AMICI) to increase the professional skills and the quality of research in marine sciences, governance and environmental protection, with the aim to create stable and attractive career pathways as well as skilled talents needed to support the expansion of marine and maritime sectors. There are some classes, which integrate aspects of sustainable use of maritime resources, such as sustainable shipping and maritime transport discussed in the class of Maritime Pollution or sustainable port management and operations discussed in the class of Port Management and Operations. However, a detailed class in Blue Economy does not exist at the University of Vlora.

Department of Business:

In University of Vlora, interdisciplinary study programs are still missing. An effort is underway to offer an MSc degree in Management of Intermodal Transport and Logistics, where two departments - the Department of Maritime Studies and the Department of Engineering and Marine Technology - from the University of Vlora and the Norwegian University of Science and Technology (NTNU, Norway) are involved. This interdisciplinary study program combines knowledge from three disciplines, specifically, air, land and sea transport and management. The knowledge and working methods of one discipline are applied to the other disciplines to provide a broader perspective and a deeper learning experience. Not all study programs offer I&E courses for those who would like to specialize.

1.1.2. Ecosystem involvement in I&E education

At the University of Vlora teaching is focused on theoretical based knowledge with little space for practicing and research. As in other universities in Albania, at the University of Vlora the approach of involving students in initiative taking is largely lacking. The lecturers are focused on theoretical aspects, analysing case studies and promoting group work among students. Usually, lectures are full time employees of the University, with the exception of few guest lecturers, which are also employed in some other university. Guest speakers coming from companies, business and industry are mostly absent, therefore missing the link between university and industry. The students are not supported financially in their projects; find no support from private actors and industry, therefore developing further their projects is very difficult. No collaboration between university and industry in development of I&E courses. Weak cooperation mainly based on lecturers and students' connection with ecosystem.

1.1.3. I&E environment at campus

Scientific Research Centre of the Faculty of Technical Sciences is responsible for research and I&E environment at the University of Vlora

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The Centre until now has conducted environmental studies, such as, environmental monitoring in relation to polluting gases, aromatic and polyromantic hydrocarbons, pesticides and bacteriological load, physical/chemical parameters, marine biology, etc. One of the main objectives of the Centre is to create a modern research infrastructure and enable the realization of scientific research near its premises for the students and the academic staff of the Faculty. In this aspect, the Centre has some problems regarding the equipment of laboratories in the Centre. Some of the equipment is complex and requires in turn for the staff to be trained in their use, therefore extra budget for training is required. In addition, Centre is located in the same building where other activities, such as, teaching and studying are accomplished. It would be appropriate for the Centre to have more dedicated spaces for its purposes at the University Campus.

1.2. University of Tirana, Faculty of Economy

1.2.1. Current situation towards Blue Economy in structure and content of I&E courses

Faculty of Economy (FE), University of Tirana (UT) is currently the most internationalized higher education institution in Albania within UT. This fact gives a possibility to FE to place a high importance to the fostering of the institutional participation on EU programs, networks and initiatives on internationalization of higher education and development cooperation. Recently, FE has participated in various and numerous international projects, and has a strategic importance for the Albanian economy and government, because it often undertakes market research for different agencies or ministries; is committed to prepare strategic plans, to undertake sector and industry analysis.

The Faculty of Economy, University of Tirana (FEUT) are being offered few subjects of "Entrepreneurship (Entrepreneurship and Management of SME)" and "Innovation" for the students of BSC Finance and BSC Business. There is Mandatory and Elective I&E course in all study programs. University of Tirana offering curricula on Entrepreneurship/ Innovation and or Business and financial subjects. However, Curricula on Blue Economy are rarely discussed.

1.2.2. Ecosystem involvement in I&E education

Cooperation among Industry and Universities remains low at country level. This level of collaboration is presented in the lack of trust that industry shows toward universities (source: Start- Up Gap Analysis, Albania – EU 4 Innovation Project). The Industry barely is referred to the academia for expertise and knowledge transfer. Students are hired by Industry but expertise and specialization is required outside universities, preferably outside Albania. Only few joint courses are established within FEUT in collaboration with private sector as Master's in accounting and finance, collaborating closely with Bank System, Consulting Companies and Auditing Consulting Firms.

There is no Alumni Database on students' destination. There is no data regarding the information on the number of students that run their own company or have tried to open their business related to blue economy concept

1.2.3. I&E Environment at campus

FEUT building is currently under reconstruction and new spaces are planned for students' extracurricular activities. Students have their own network within FEUT and on regular basis, the summer school and the winter school is organized. However, more focus on I&E should be addressed on these activities or dedicated ones should be organized. I&E mentorship/advice service at campus or university is not taking place. It is not established yet a University Seeds Funds. It is lacking a Centre for Entrepreneurship or Business Incubator to support the students. Trying their entrepreneurial skills in practice is barely applicable at faculty and not supported through financial or expertise means.

2. SWOT analysis: Albania

Strengths	Weaknesses
Study courses - There are some subjects with focus on I&E delivered both in Bachelor and Master study programs, especially in Faculty of Economy - Students are supported to idea generation and pitching their business plan at faculty level - Students, especially in master level, are encouraged to work in teams and to prepare course works with focus on practical topics - Study programs are based on similar curricula from international universities - Universities continuously work on the development of the modern infrastructure and improve their technological environment - There is some new infrastructure established, mainly based on international projects funding opportunities **Collaboration with business** - There are several partnerships between Universities and public and private institutions - Students have to undertake mandatory practices during their bachelor and master studies - In certain study courses there are guest lecturers invited to deliver certain topics	**Study courses** - Subjects related to I&E are lacking in Faculty of Technical Science or there are only some minor concepts included in some subjects. Study programs in I&E in blue economy are completely lacking. - I&E mentorship/ advice service at campus or university is not taking placeStudy programs are mostly focused on delivering theoretical knowledge, while practical cases are lacking in most of cases - Study programs are not updated constantly on annual basis **Equipment and premises** - Lacking a centre for entrepreneurship or business incubator to support students - New and advanced equipment require additional training and time to be properly adapted for staff and students research needs - Existing equipment is not sufficient to accommodate staff and students need especially with respect to develop I&E initiatives within University **Collaboration with business** - Business partners are not involved either in curricula development, renewal or in idea development (final theses, course works) - Guest lecturing is not involved in every study course - There are few initiatives or programs where lecturers / researchers can contribute directly to industry - Student practice is more theory based than experience based - There is no Technology Transfer Office at the university
Opportunities	**Threats**
University - New opportunities for joint learning programs and international partnerships will improve I&E environment within Universities and will help to constantly update the study programs	- The Industry barely is referred to the academia for expertise and knowledge transfer - The decisions are top down, which do not create flexibility but sometimes bureaucracy in management of investments and financial issues

- New opportunities for funding through national and international projects **Country** - I&E are elaborated and incorporated in national strategies and policies and are encouraged in all fields - An increased attention and awareness towards blue economy development in national level **Staff** - Updated study courses and newly established I&E centres encourage university staff to continuously improve their skills and competencies, contributes to attracting qualified new employees	- Lack of additional budget for staff training makes it difficult to adapt to changes in technological and I&E environment - Lack of funding for research demotivates research staff to carry out qualitative and business-oriented research - Youth demotivation caused by the decline of the prestige of the technical industry on one hand and lack of synchronization of graduates with the needs of labour markets on the other hand - Not enough support from governance on start-ups and newly established businesses or students' initiatives

3. Recommendations

In the face of a rapidly growing economy, it is needed to develop entrepreneurial, innovation and digital skills to stay competitive and be part of modern society. In all areas of life, we note the growing role of innovation and digitization. Digitalization is essential in combination with I&E in education within blue economy. The I&E centres that are planned to be developed during the project will provide a good foundation for developing these skills in collaboration with industry. However, digitalization is not a prior theme in the document and it is mentioned in the recommendations as important complementary factor for further increase of I&E competences and employment of IT centres (IT tools, handling of data, big data, ongoing simulation projects within these maritime education programs in Albania). Therefore, the competences related to entrepreneurship, innovation, business and data management and the creation and employment of appropriate IT tools are becoming very desirable.

In connection with the promotion of innovation and entrepreneurship (I&E) and development of digitization, we encounter the following problems affecting higher education institutions in Albania:

1. The study courses are still reflecting mainly on traditional education and specialization. The integration of awareness of I&E and Blue economy is presented to a lesser extent or fragmented.
2. The awareness on promising perspectives of Blue Economy with focus on specializations of young generation needs more efforts to be taken.
3. Even though there is an increased number of universities and programs with focus on business and market orientation, I&E, "Blue growth" should be highlighted more in curricula.
4. More initiatives need to be embedded for the employment of innovation into the market opportunities initiatives, especially that once which promotes utilization of I&E related infrastructure.
5. There are few opportunities to match the business operating in Blue economy with skilled and trained young people – training programs are not offered by academia.
6. There are few partnerships established among business and universities for internship.
7. Weak exploitation of international cooperation potential for learning, exchanging of experience, practice and know how in the field of I&E integration and application in study courses, as well as with the focus area of Blue Economy.

The guidelines are the base for improving I&E capacities and skillful handling of data (for improving digitization capacities which can contribute to the I&E competencies). The main goal of the guidelines is to help to increase capacities and favourable environment that will allow the current and future students, as well as the academic staff to employing their ideas into new innovative solutions. These guidelines will provide recommendations for Albania on upgrading and/or development of new courses in their HEIs, for promotion of I&E in Blue Economy, improve the ability of HEI education providers to understand and teach I&E related modules with the smart data and IT tools employment, practical implementation real business' problems, thus providing Students, early-stage entrepreneurs and businesses with more relevant, effective interdisciplinary training. Moreover, some insight will be provided for the promotion of university and business collaboration, international cooperation, mobility.

The strategic aim of HEIs should be to 'achieve the highest standards in research-led I&E related project for both undergraduates and postgraduates' in a learning community 'that empowers all to learn and develop to their full potential'.

To support it in achieving this aim, we propose that the HEIs would develop and modernize curricula in accordance with the following Principles:

Research-led I&E related project

All degree (BSc, MSc) courses have to include a major I&E related project will provide a 'capstone' to HEIs education that allows students to demonstrate their ability as independent learners, final thesis or equivalent (at undergraduate level typically 40 credits and at taught postgraduate level typically 60 credits) where students are able to demonstrate the development of their own research and practical (prototyping, piloting, demonstrating, employment of IT centre infrastructure, etc.) study skills, as well as their expertise in their chosen field of study. It is important that the I&E related project needs to include such a part as a complex work, implemented in collaboration with the businesses or at least in collaboration with another areas (other faculties, departments), in order to include the interdisciplinarity aspect.

Inter- and cross-disciplinarity

University of Vlora and University of Tirana have a lot of interdisciplinary study courses. Therefore we still would like to highlight the importance to support and promote the initiatives of inter- and/or cross-disciplinary courses, thematic and issues-based in nature (industry, society, economy), that will draw on staff across disciplines in ways that reflect the increasingly cross- and inter-disciplinary character of I&E related study courses' activity. This could also be supported by the summer schools, hackathons which could be implemented.

Employability (self-employability) and skills

Study courses should contribute to the development of a wide-range of 21st century skills [1] for students, with many of these skills being acquired through inquiry-led activities that develop various key attributes required by employers (by employability skills we mean to support students with employment opportunities, job search and career) and which prepare graduates for competitive business market (by self-employment skills we mean to support students who in the future will start working on their own account, from entrepreneurs and start-ups, freelancers and subcontractors). The skills developed through enquiry-led activities could be combined in all courses with the development of I&E skills, that will provide students with the competences to succeed in the labour market and the ability to manage their own intellectual and professional development into ability to develop their own innovative business.

Internationalization

Curricula is to be designed to provide students with the opportunity to develop as international citizens. All study courses should be internationally relevant (in ways that are appropriate to their subject area), so that

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[1] https://www.qcaa.qld.edu.au/senior/senior-subjects/general-subjects/21st-century-skills

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students could make a positive contribution to an increasingly globalized society. All undergraduate and integrated MSc courses shall normally offer the opportunity for students to transfer into the equivalent course with an additional year abroad, and subject to such a year abroad opportunity has to be available.

3.1. Innovation spaces

The idea of a university innovation space (I&E centre) is quite recent, with the first one dating back to Massachusetts Institute of Technology (MIT) makerspace around 2001 (Barrett et al., 2015). While innovation spaces are appearing in many universities and engineering schools across the countries, there is still very little empirical assessment of the spaces.

There can be many types of university innovation spaces according to management type, budget structure, theme:

- Management type: student run, faculty run, specific staff run.
- Scope of supervision: always supervised, partly supervised.
- Budget structure: funded by university, funded by university and business, funded by community.
- Theme: engineering and mechanics, engineering + multimedia, engineering + multimedia + entrepreneurship.
- Location: on campus / off campus.
- Membership: university access only, open to the community.

The innovation space is a collaborative work space inside a school, library or separate public/private facility for making, learning, exploring and sharing that uses high tech to no tech tools. These spaces are open to kids, adults, and entrepreneurs and have a variety of maker equipment including 3D printers, laser cutters, CNC machines, soldering irons and even sewing machines. It's more of the maker mindset of creating something out of nothing and exploring your own interests that's at the core of the innovation spaces. These spaces are also helping to prepare those who need the critical 21st century skills in the fields of science, technology, engineering, arts and math (STEAM). They provide hands on learning, help with critical thinking skills and even boost self-confidence. Some of the skills that are learned in the innovation spaces pertain to electronics, 3D printing, 3D modelling, coding, robotics and even wood-working. Innovation spaces are also fostering entrepreneurship and are being utilized as incubators and accelerators for business start-ups.

3.1.1. Establishment of I&E centres in Albania

According to the BLUEWBC project agreement, the Albania HEIs are planning to establish I&E centres by providing a new equipment and upgrading (integrating) it into the existing study courses for practical training. There will be provided new prototyping equipment for 2 I&E centres. Additionally, P3 will upgrade existing equipment, it will include:

- Albania (University of Vlora): 3x3D printer, 3D modelling software + virtual reality, 4 working stations, video projector for virtual reality, crane simulator; also upgrade for engine room with Power Management System (software)
- Albania (University of Tirana): Short beam projector with smart table; Laptop computers; Desktop all in one computers; 3D Printer; Tobii Pro Glasses 3 Live View 50; Software for eye-tracking glasses; Tobii Pro Lab - Analyzer Edition; Statistics Software.

It is important to emphasize, that all the established I&E centres must be accessible to students, teachers and all researchers. In order to make the spaces more appropriate to use – the possibility to access the centres needs to be organized and in the evening hours (after lectures and work).

These guidelines respond to the needs of the following future actors:

- I&E education providers (HEIs), who recognize I&E capacities as an important trend, but the
- practical implications are still missing therefore the practical employment and promotion of I&E skills is needed to be strengthen.
- Early-stage entrepreneurs and management studies students (future entrepreneurs) who need to know how to build technology and innovation development, how to properly employ digitization skills into their business plans from the start of their business in order to help capitalize on market opportunities.
- In a long-term perspective, SMEs managers (current entrepreneurs), who need to learn how to grow their business and innovation capacity even with limited resources.
- Improvement of digital competencies in general.

3.2. Recommendations specifically for Albania

Education and training in I&E in general, and within specific Blue economy fields such as maritime and coastal tourism and environment aspect are widely spread over the Albania HEIs.

After analysis of the WP1 State of Art DEV 1.2 **"Overview of educational programs for I&E in Montenegro and Albania"** report and interview with the Albania HEIs, stakeholders, business and students, the recommendations are the following.

According to the project BLUE WBC HEIs in Albania are planning to **revise and modernize the existing study courses related to I&E and/or in Blue economy:**

- UV 9 BSc courses (in English) to be revised in Navigation and Naval engineering
- UV 2 MSc courses (in English) to be revised in Maritime Advanced Study and Industrial and Naval Operations
- FE 4 BSc courses (in English)

- FE 7 MSc courses (in English).

3.2.1. Recommendations for the modernization of existing study courses

1. The revised courses should include practical components and methodology related to I&E. Learning I&E in an education setting is often divided into three categories; learning *about* I&E, learning *for* I&E and learning *through* I&E. Learning *about* I&E takes place in the classroom when focusing on theory about I&E. Learning *for* I&E could for example take place through business plan courses where students develop skills for I&E in future careers. These skills could be business basics, marketing, presentation skills etc. Learning *through* I&E occurs when students learn through actually performing I&E activities, such as developing a prototype, solving a real-life problem from industry or starting a student company. In the revised courses, ideally one should strive to have all three learning methods of I&E present, with an emphasis on the latter. There should be a theoretical component where students *learn about I&E*, a skill-developing component where student *learn for I&E* and a practical component where students *learn through doing I&E* themselves. There are several teaching methodologies that could be applied for achieving this, for example start-up development, design thinking and student projects on innovation challenges from industry. It is important that the focus of the new course components are focused on working with I&E opportunities within blue economy in Albania.

2. The upgraded study courses should include practical workshops in I&E centres. This will introduce students to the technology available at the I&E centres, such as 3D scanner and printers, video projector for virtual reality, crane simulator and lab software. The emphasize in the workshop should focus on the application of the available technology to create new business opportunities within blue economy. The workshops could for example be facilitated in collaboration with industry, municipality etc., who could suggest real life practical challenges for students to work on during the workshop.

3. The new study courses should include the practical disciplines, which are related to I&E, such as Economic engineering, Organizational management, Business management, Start-up development, Design thinking, etc. The course needs to include a practical discipline, which is focusing on preparing professionals, who are able to integrate and apply complexly the knowledge of economic theories, management of economical processes and engineering. Course has to enable to use integrally advanced achievements for the solution of economic problems, innovation and technology development and application, solving business and regional challenges, etc. The duration of the course has to be at least 1 semester. Also, this study course has to focus on:

   - training to work in the **Industry 4 and Disruptive Innovation environment**
   - suggesting opportunities to take **internship in national, international and foreign capital companies**
   - students' mobility – suggested internship according to **Erasmus+** program in EU

- as a long term goal it is highly recommended to achieve the rank among the world's **TOP** universities in **Economics and Econometrics by „QS World University Rankings by Subject"**.

4. Upgraded study courses should include the practical workshops in I&E centres. This could be implemented by integrating in a course for example a complex course projects, which includes the practical activities and/or workshops in a new established I&E centres. A complex course project means a cross-interdisciplinary project that is prepared an implemented by students from different departments (faculties), combining several subjects with the participation of several departments. The study course of the complex project is the responsibility of the department leading the project.

5. Continue proactively promote teachers and students to take part in mobility programs (for example **Erasmus+**), to be able to get an international experience. In order to encourage the mobility of students and teachers – the incentive system for mobility needs to be revised in the university. The informational seminars for teachers and students about mobility possibilities and advantages of it needs to be organized at least ones in a semester (before the call for mobility).

6. If it is possible and in power of UoM, we would recommend to simplification of Curriculum development and renewal, especially upgrading process in timing and requirements. This is valid and important for the attraction of lecturers from business side. On the other hand, the quality assurance on each curricula of the study course needs to be ensured and revised annually. This can be implemented by meeting and/or surveying a target groups: – students (students' association, the elders of the groups, the best students); - business partners; -alumnus; - teachers and researchers. The possibility to update the curricula, basing on the suggestions, needs to be ensured.

7. By a systematic review of the study courses, the basics of improving I&E capacities with the skilful handling of data (for improving digitization capacities which can contribute to the increase of I&E competencies). This could be done in collaboration with the business partners, involving the I&E centre infrastructure, IT tools, which are practically being used in the business sector.

3.2.2. Recommendations for new study courses

1. New study courses could be for example "Start-up development", "Product development", "Idea commercialization", "Sustainable innovation" and "Innovation project". New courses should have a practical component where students *learn by doing I&E* and have a focus on I&E opportunities within blue economy in Albania. Lectures for students should be given not only by the UoV and UoT teacher, but also by representatives of business partners, mentors, incubators, business angels, venture capitalist etc. The duration of a course would be at least 1 semester.

2. The new study courses should include practical workshops in I&E centres in the same manner as the revised courses. This will introduce students to the technology available at the I&E centres, such as 3D scanner and printers, video projector for virtual reality, crane simulator and lab software. The emphasize

in the workshop should focus on the application of the available technology to create new business opportunities within blue economy. The workshops could for example be facilitated in collaboration with industry, municipality etc., who could suggest real life practical challenges for students to work on during the workshop. Examples of these courses are in section 5.2., e.g. MAKEADEMY program, DEMOLA, etc.

3. New study courses (non-formal education element) like examples of "Start-up development" and "Start-up idea commercialization". Lectures for students has to be given not only by the HEIs teachers, but also by the representatives of the university's business partners, mentors, business angels, Venture capitalists, etc. The duration of each at least 1 semester. Also, the element or study field of Blue economy is appreciated in this course.

4. The same like for existing study once –for example a complex course projects, which includes the practical activities and/or workshops in a new established I&E centres. A complex course project means a cross-interdisciplinary project that is prepared an implemented by students from different departments (faculties), combining several subjects with the participation of several departments. The study course of the complex project is the responsibility of the department leading the project.

5. Continue proactively promote teachers and students to take part in mobility programs (for example **Erasmus**+) to be able to get an international experience. Also includes the same recommendation as for the existing study courses.

6. We recommend that new courses also would have some basics of improving I&E capacities with the skilful handling of data (for improving digitization capacities which can contribute to the increase of I&E competencies). This could be done in collaboration with the business partners, involving the I&E centre infrastructure, IT tools, which are practically being used in the business sector.

7. Recommend for students' internship in a business company, related to blue economy issue to investigate theme of the final thesis. This will ensure early students' involvement into real business actions and also will strengthen a collaboration between business and HEI and will give a bilateral advantage for both parts.

8. If it is relevant, we would recommend to develop a common study course for example in Business management with other EU country HEIs. This will make more attractive study course for students to choose it (*non-formal education element*). Also, more benefits of it:
   - Internationally recognized degree.
   - Possibility to get a **double degree**.
   - Students have an opportunity to take **internship in international and foreign capital companies**.
   - Students are trained to work in international companies, foreign capital companies, and foreign trade.
   - Graduates can participate in an internship according to **Erasmus**+ program in a European country.

3.2.3. Recommendations for I&E centres

1. I&E centres has to help creating leaders and bridge the skills and knowledge gap by:
- **increasing capacities** of staff for driving change in their institutions by employing new approach in study process
- **aligning the good practices** at UoV and UoT with collaboration strategies (quadruple helix approach).
2. The newly developed I&E infrastructure should serve as the spaces to improve education and I&E ecosystems of UoV and UoT through promotion of interdisciplinary actions. For example, practical disciplines like complex course projects where students from several departments by working together can combine different competences, skills and knowledges.
3. Ensure the development of cross-discipline (digital as well) ecosystems. I&E centres should be based on quadruple helix, i.e. involving education, government (cities), business, society, in different phases and forms of collaboration activities with business, internships, practical prototyping, functioning as a platform for employment of new innovative ideas, solutions for solving different challenges, stimulating innovation, efficient use of integration of universities with a real business. This could be done via various initiatives like Hackathons where students alone or group of students can work together on solving regional, city, societal or governmental challenges by creating, developing and prototyping ideas with the practical approach.
4. The centres have to serve as collaborative I&E space and be a part of study courses related to I&E promotion in Blue economy for learning, making and sharing. It has to be a platform for students, researchers & business companies connecting and combining their resources in pursuit of innovation. It could be done in close cooperation with business working in the field of Blue economy. Students might work with company and develop innovative solutions that are needed for company.

3.2.4. Recommendations for the promotion of HEIs-business cooperation

1. Development and constant maintenance of Alumni database. It is recommended to create a hired position for practice or permanent workplace. Someone from the faculty/university department is appreciated for this position.
2. Constantly engage business into HEIs processes:
   - development of the study courses and upgrades. Obligatory include annual meetings with the business partners in order to find out the need and lack in qualification of existing students and alumnae.
   - lectures. Invite the representatives from the business sector to the existing study courses. It is recommended to request the list of possible topics, which representatives from the company can provide for a lecture duration. Usually the big companies have topics, specialized in practical areas, which can easily by integrated in a study process.

- site visits to companies. This can easily be implemented by organizing the visit, which is integrated into the lecture. This actively being implemented in EU HEIs. This gives an opportunity for the students, together with the lecture, to visit the company in order to see practically the management processes. And from another point of view, gives the company possibility to meet and select the best students by giving the practical tasks on the meeting.

3. Internships. Business always needs high-quality human resources – this is the main attraction point for them and business can contribute to the preparation of such. University is the main source of high-quality human resources (students, future employees). Therefore, it is very important during the development of new study courses or upgrading the existing once – to involve business companies, other related industry stakeholders that can contribute for the efficient development of study course content. Effective employment of newly developed I&E infrastructure to attract business attention on innovation space that could be used solving their problems or development of new solutions. It is recommended to consider the industrial PhD possibility in the Country and HEIs, in order to grow human resources for business. Another way of attracting business, could be real employment of I&E infrastructure for solving real business problem. Renting I&E space for business (with the supervision of UoM representative) – so that the engineers of the company would come and use the infrastructure of it (this can help to keep close contact with company in the future).

4. New initiatives involving regions, cities, business to solve countries, city, society challenges. Students' interdisciplinary teams has to work together with business, city representatives, or mentors. Hackathons are the initiative where students alone or group of students can work together on solving regional, city, societal or governmental challenges by creating, developing and prototyping ideas with the practical approach.

5. If it is relevant for UoV and UoT, the internal department (Technology Transfer Office TTO, Research department) responsible for business and science cooperation can bridge you with the required business representatives. If the HEI does not have the department, responsible for science-business collaboration – this could be a good occasion to start discussion with the HEIs authority to establish such one.

1.2. The main milestones

1. Revised and upgraded study courses
2. Developed I&E centre
3. Developed new study courses
4. Developed alumni database
5. Constantly engage business into HEIs processes
6. Proactively promote the mobility
7. Development of cross-discipline (digital as well) ecosystems

8. Establishment of the TTO – recommendation not necessary within the project.

4. Practical examples on suggested recommendations

4.1. Application of experiential learning methods

Experiential learning is the process of learning through experience, and is more specifically defined as 'learning through reflection on doing'.

The first principle of experiential learning is that classrooms need to be highly engaging environments that emphasize **collaboration and cooperation**, rather than emphasizing **traditional** structure. Experiences may not always lead to success, but they never fail to produce experience, since students can still learn from their failures. (https://www.educationcorner.com/experiential-learning-guide.html).

There are many versions of experiential learning activities that can be used in a class (whether face-to-face or virtual). We suggest to involve in the BSc and MSc study courses few of them:

Project-based learning (PBL)

Project-based learning could take several forms or be a combination of:

- Designing and/or creating a tangible product, performance or event,
- Solving a real-world problem (may be simulated or fully authentic), and
- Investigating a topic or issue to develop an answer to an open-ended question (https://www.edutopia.org/blog/pbl-vs-pbl-vs-xbl-john-larmer).

Project-based learning involves an increased number of standards and time dedicated to learning. This means that PBL is a remarkable opportunity to get through many of the requirements on to-do list. Examples of PBL learning could be:

- In New Utrecht High School, for instance, students dove into the intriguing world of tourism and worked with the following guiding question: "What makes a place a destination?" They then created marketing strategies and even a website for their "client country".
- At ARISE Academy, students used a variety of different media outlets to present a civil rights topic of their choice to a panel of judges who asked difficult questions about the choices they made. Such projects help to teach 21st-century skills (such as collaboration or oral communication), making learning meaningful to students. Don't forget to incorporate extra time for feedback throughout the project for you students to discuss and for you to apply continuous assessment (https://craftedcurriculum.com/what-is-the-difference-between-problem-based-and-project-based-learning/).

More detailed examples of project-based learning are provided in section 5.2.

Problem-based learning (PrBL)

Problem-based learning allows to focus on skills and on the learning process rather than on the product.

Problem-based learning typically follows prescribed steps:

- Presentation of an ill structured (open-ended, 'messy') problem,
- Problem definition or formulation (the problem statement),
- Generation of a 'knowledge inventory' (a list of 'what we know about the problem' and 'what we need to know'),
- Generation of possible solutions,
- Formulation of learning issues for self-directed and coached learning, and
- Sharing of findings and solutions (https://www.edutopia.org/blog/pbl-vs-pbl-vs-xbl-john-larmer).

Some of the examples in section 5.2 can be applied as a problem-based learning, when the task is focused on the process and not the prototype (e.g. working on a problem during summer school).

Games, Simulations, Role-Playing, Debate

Students actively enact assigned roles that simulate real-world conditions/situations.

Community Engagement

Students are immersed in actual real-world conditions. Internships, practicums, service learning, and research studies enable students to apply acquired skills and/or to feel out situations or conditions in the outside world (https://teachingcommons.unt.edu/teaching-essentials/engaged-learning/what-experiential-learning).

4.2. Best practice examples

We believe that learning by doing is the best way to motivate students, empower collaboration between university and business and achieve the best results.

Examples below cover activities implemented in Vilnius Gediminas Technical University in different scale:

- One-week challenge (Hackathon *HACK4VILNIUS*)
- Two weeks summer school
- 3-month program *Makeademy*
- Challenge based program *DEMOLA*

Examples prepared by NTNU:

- Interdisciplinary study programs and courses in I&E at NTNU in Aalesund
- Experts in teamwork – interdisciplinary innovation project at NTNU in Aalesund

University of Split experience:

- Strategic framework for blue economy, innovations and entrepreneurship in Croatia

The examples below are more concept based not a topic based which means the same concept can be applied on different topics.

4.2.1. Hack4Vilnius

Idea

Hack4Vilnius is a three-day challenge, intended to promote innovations in Vilnius city. The aim of the Hackathon is to generate ideas, how to solve problems of Vilnius city and businesses here and to provide alternative and innovative solutions.

Concept

The event (Figs. 1 and 2) is organized by Sunrise valley science and technology park, Vilnius Gediminas technical university and Vilnius University in a collaboration with Vilnius city municipality.

Figure 1. Hack4Vilnius event, part I

All persons (IT specialists, designers, engineers, inventors, entrepreneurs, etc.), who have their ideas, want to create and suggest new solutions, can participate in the hackathon. During the last three years 400 + participants participated in the hackathon and created 59 prototypes. 25+ mentors were involved to support the idea development.

Topic of the hackathon – innovations for Vilnius city, how to make city more clean, healthy, agile and smarter. Ideas can be proposed by the participants or chosen from the suggested challenges. Challenges are created together with Vilnius city municipality.

Figure 2. Hack4Vilnius event, part II

Challenges for 2020 hackathon

- How to solve the problem of distance in the city? The Singapore example is the TraceTogether app and a special device.
- To use, integrate or adapt to Vilnius?
- The problem of surface cleanliness identification. The solution is relevant both in communication with each other and in various institutions to ensure the safety of others (schools, workplaces, etc.).
- How to manage the disposal of non-household waste (bulky, electrical electronic devices, etc.) in non-designated areas?
- How to optimize urban waste removal using open Vilnius data?
- Development of a platform for suggestions on what to do during quarantine, self-defence.
- How to make urban public transport more comfortable for visually impaired passengers?
- Development of electric car charging stations together with an interactive map showing where Vilnius residents can charge EV cars. How to choose the places where new charging stations should be installed?
- Electric scooter charging station infrastructure implementation plan.

- Summary (dashboard) of ongoing and future works and processes relevant to the population in Vilnius. Residents could see the planned renovation of the streets, emerging infrastructure projects and other relevant works.
- A way to find out where there are free parking spaces in the city. Perspective - to improve them: Parking app.
- Creation of an information platform for managing emergency situations in Vilnius by combining data from city sensors.

University – business collaboration

There are different options and motivation (Fig. 3) for the companies to be part of the hackathon:

- To be involved in setting up the challenges
- To be involved as mentors or commission for evaluation of the pitch results
- To be involved as sponsors to provide required tools and materials
- To set up a prize for the best ideas, etc.

Figure 3. Hack4Vilnius

Sometimes it is complicated to communicate with business, especially if this is not a common practice in a country. Though, we know that this practice has to be built step by step and a lot of companies support students and education.

4.2.2. Summer school

Idea

Sometimes hackathon may be a complicated task for young students due to its short term. Another option would be to organise a summer school which includes not only real prototyping, but also topic-related lectures and more guidance from the teachers.

Concept

Concept of the summer school was developed within Erasmus+ project *HEI MAKERS* together with partners from Lithuania, Latvia, Romania and UK. Summer school named Maker Camp "Makers 4.0" is a two-week program which includes lectures on selected topics and practical tasks with evaluation at the end of the program (see Fig. 4).

	Day 0 - Sunday	Day 1 - Monday	Day 2 - Tuesday	Day 3 - Wednesday	Day 4 - Thursday	Day 5 - Friday	Day 6 - Saturday
	30-Jun	1-Jul	2-Jul	3-Jul	4-Jul	5-Jul	6-Jul
10:00	Arrivals	Introduction Organisational issues Tour in VGTU "LinkMenu fabrikas"	Lesson: Technological Entrepreneurship Room 2/07 Lecturer: Laurynas Braskus	Workshop: Teambuilding for 3D project(s) Room 2/07 Lecturer: Laurynas Braskus	Teambuilding - Project idea generation workshop Room 2/07 Mentor: Laurynas Braskus	Workshop: Blender Software Room 2/07 Lecturer: Justas Ingelevičius	Exploring Vilnius
11:00							
12:00		Maker Culture Room 2/07 Lecturer: Giedrius Kavaliauskas					
13:00		Lunch					
14:00		Country presentations Room 2/07	Study visit	Lesson: Fundamentals of 3D printing (pt 1) Room 2/07 Lecturer: Rihards Rieka	Workshop: 3D modelling with Fusion 360 software Room 2/07 Lecturer: Tautvydas Vitauskas		
15:00							
16:00							
17:00							
18:00							Non-teaching days
	Day 7 - Sunday	Day 8 - Monday	Day 9 - Tuesday	Day 10 - Wednesday	Day 11 - Thursday	Day 12 - Friday	Day 13 - Saturday
	7-Jul	8-Jul	9-Jul	10-Jul	11-Jul	12-Jul	13-Jul
10:00	Exploring Vilnius	Lesson: **3D printing hardware** Room 2/07 Lecturer: Rihards Rieka	Lesson: 3D printing software Room 2/07 Lecturer: Diana Popescu	**Team project work** Room 1/05, 2/07, 2/09, 2/13	**Team project work** Room 1/05, 2/07, 2/09, 2/13	**Pitch day** Room 2/07	Departures
11:00							
12:00							
13:00		Lunch					
14:00		Workshop: **Applying 3D printing process steps for manufacturing** Room 2/07 Lecturer: Diana Popescu	**Team project work** Room 1/05, 2/07, 2/09, 2/13	**Team project work** Room 1/05, 2/07, 2/09, 2/13	**Team project work** Room 1/05, 2/07, 2/09, 2/13	Pitch competition results; Feedback of summer school; conclusion of school Room 2/07	
15:00							
16:00							
17:00							
18:00	Non-teaching days						

Figure 4. Summer school programme

Partners from other organisations (Sunrise valley science and technology park; makerspace; business) were involved as the presenters during 1st week of the program, as mentors during team project work and as commission during pitch session.

Figure 5. Pitch session

Collaboration with business

We suggest to involve stakeholders in different activities:

- As guest lecturers on Summer school topic
- As commission for evaluation
- As sponsors to provide required materials and set up a prize.

4.2.3. Makeademy

Idea

The idea of Makers academy (MAKEADEMY) was created in order to motivate university students to participate in hands on activities, promote teamwork, interdisciplinarity and to strengthen relations between university and business.

Concept

MAKEADAEMY is a three-month program for students from different universities. Students teams (at least 4 members: electronics, design, marketing, mechanics) choose their ideas on hardware products (either bring their own ideas or choose from the list).
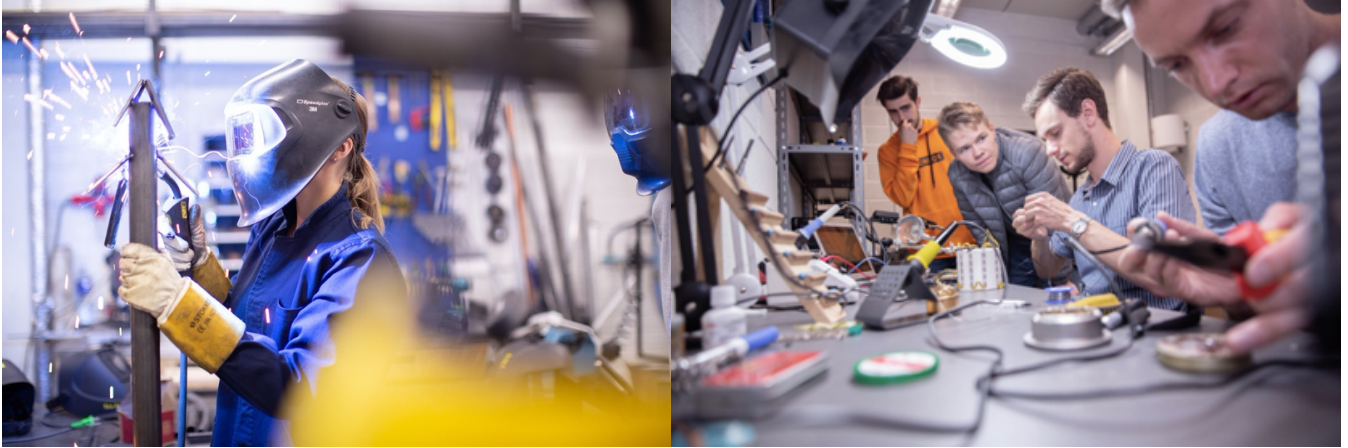
Figure 6. MAKEADEMY

The program is held in stages: instructions of the workshops and tools that are going to be used in the academy, research and brainstorm workshops, design consultations, prototyping and product finalization. In between of these stages, the critical evenings are held, during which the participants present their ideas to the mentors (teachers and business professionals).

The best teams move forward in the program, and the others have to leave the program.

MAKEADEMY prize pool is 6000 € (business support).

Teachers can serve as mentors at the makers academy, providing guidance and consultations in the process.

Modules for all the stages of the program could be prepared and embedded in the curricula of different faculties and suggested as supplementary modules for the students.

As a result, all the teams that reach the final have a functional prototype.

The participants also have a valuable network of business companies, that participate in the process.

Collaboration with business

- Commission members to evaluate intermediate and final results
- Sponsors for materials and prizes
- Provide free professional topic-related courses for students.

4.2.4. DEMOLA project

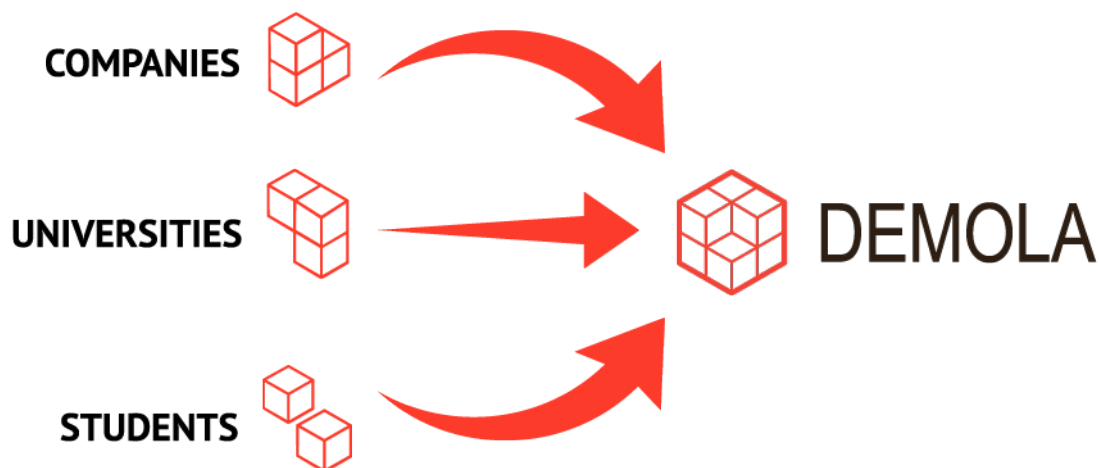**Idea**

DEMOLA is an international innovation challenge platform that brings together students and leading brands (Fig. 7). With *DEMOLA*, global and local organizations challenge university students to create a better future. Today, *DEMOLA* innovation challenges bring together over 50 universities, 750.000 students and the leading companies from around the world (https://www.demola.net).

Concept

DEMOLA trademark and innovation platform is owned by *Demola Global*. *Demola Global* was established in Tampere, Finland. Now *DEMOLA* operates in 18 countries: Finland, Sweden, Denmark, Norway, Spain, France, Lithuania, Latvia, Hungary, Portugal, Mexico, Namibia, South Africa, Slovenia, Japan, China, Nepal and Tunisia.

Figure 7.DEMOLA

DEMOLA work is challenge driven, with the project ideas coming from the industry and other organizations. The students' work is supported by both the industrial and academic partners, whose role is to provide guidance to the student team throughout the project. During an eight-week process, the team co-creates solutions to the given theme.

The process of the *DEMOLA* challenge covers following activities:
- Proposition of the challenge, problem definition
- Initial/brief meeting, sharing of ideas, definition of the brief
- Various supervised meetings and workshops; brainstorming and contextualising the proposed solution(s)
- Jam meeting to share challenges and solutions
- Pitching session for the presentation of the solution

DEMOLA is an international network and university itself can not apply these ideas so simply. Our recommendation is to bring *DEMOLA* to Montenegro and be part of that network. Even if this process is long, some *DEMOLA* concepts could be already applied. Especially knowing that *DEMOLA* proves to be particularly successful in areas where university/business cooperation hampered by weak collaboration models.

4.2.5. Interdisciplinary study programs and courses in I&E at NTNU in Aalesund

Idea:

Interdisciplinary bachelor degree in biomarin innovation at Norwegian University of Science and Technology (NTNU) in Aalesund. A study programme that has I&E specific courses combined with discipline specific biomarine courses. The biomarine component consist of courses within marine resources, aquaculture, seafood, general science courses and biomarine internship. The degree has become one of the study programs with the highest application rates at NTNU in Aalesund. It prepares students for a biomarine career where they take on responsibility for innovative and entrepreneurial efforts in the sector.

Concept:

NTNU has the main responsibility for education in engineering and technology in Norway. The university has several study programs and courses within I&E at the university, and the campus in Aalesund is known for its interdisciplinary study programs in I&E and close collaboration with industry.

In 2005, the bachelor in innovation & entrepreneurship was established at NTNU in Aalesund and quickly became a popular study program among students. The study program is a combination of theoretical and practical courses with substantial focus on hands-on practical I&E in training, especially in the third year of the study program. In the final year, students create their own start-up through the JA Company Program model in the last semester. Afterwards, several continue with their business ideas after graduation and establish their own companies. The structure for the bachelor program is illustrated below with a brief description of the different I&E courses.
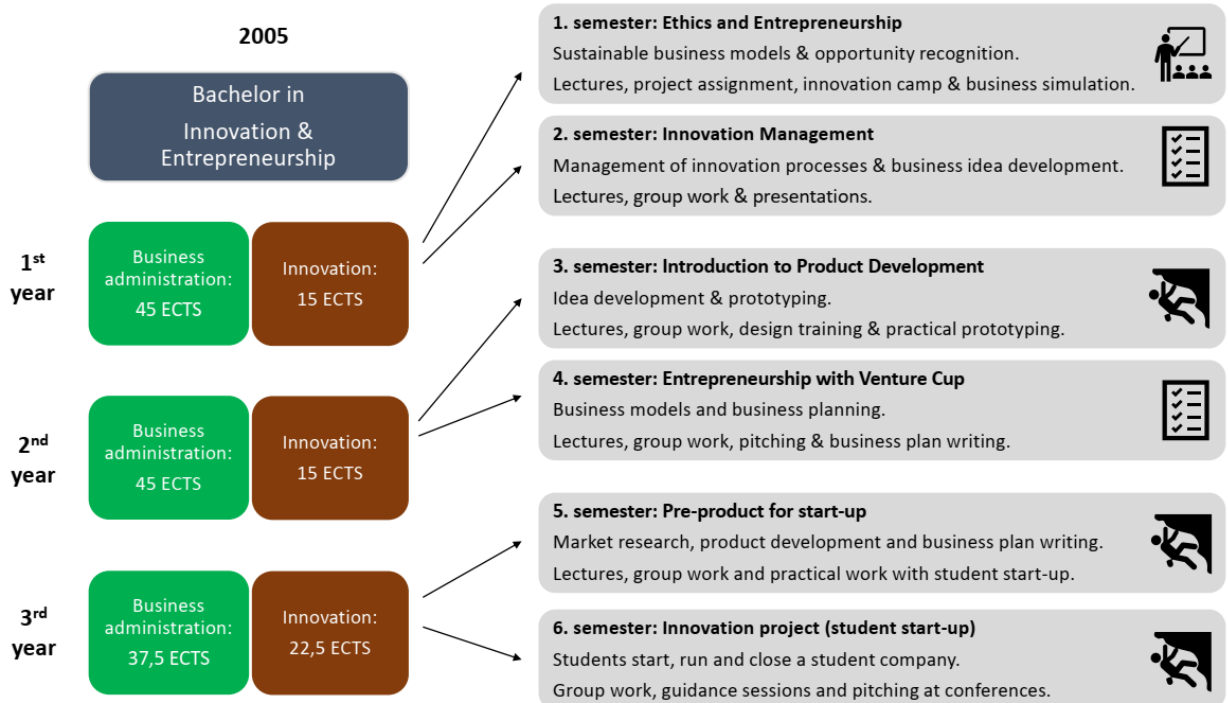
Figure 8: Study program structure of bachelor in I&E

The bachelor degree in I&E formed the basis of an interdisciplinary bachelor degree in biomarine innovation. The study program combines marine courses from the biology department with I&E and business administration courses from the business department. An overview of the structure for the bachelor program is portrayed below with a brief description of the different I&E courses.
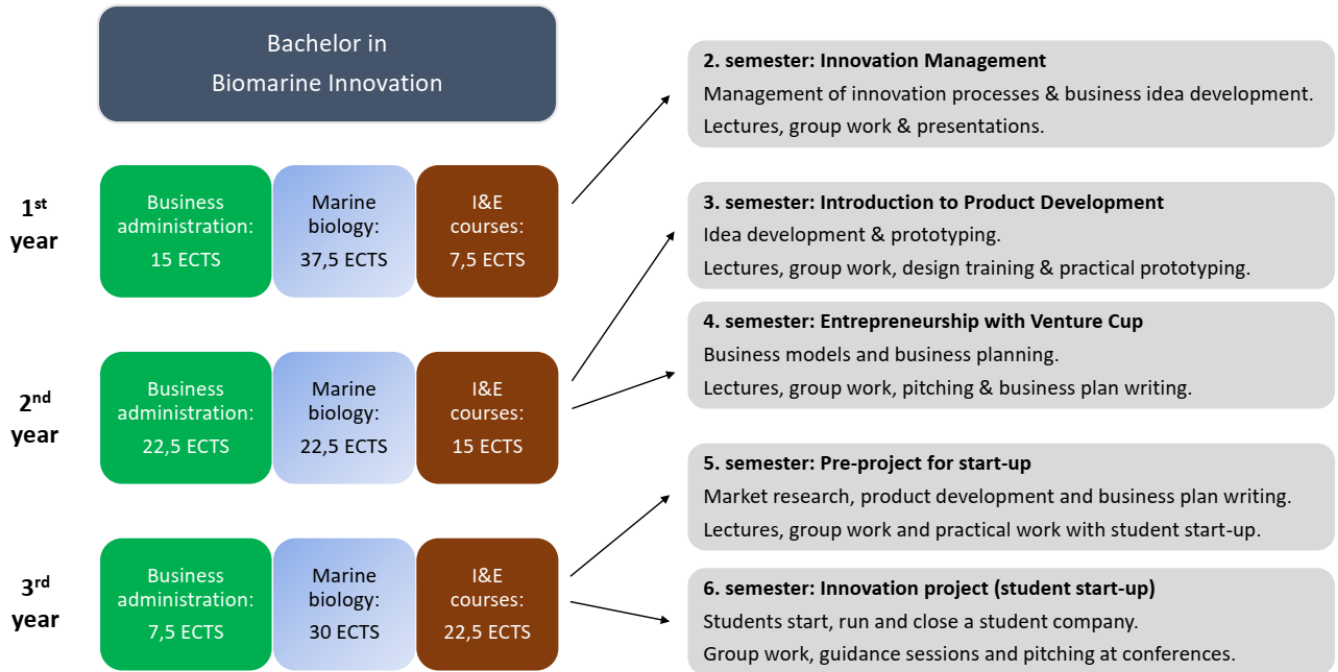
Figure 9: Study program structure of bachelor in biomarine innovation

The study program provides students with knowledge and competence about marine resources, as well as on how to make use of the marine resources for commercialization and value creation. The study program has been developed in close cooperation with the regional marine industry, and students remain in close contact with industry partners throughout the studies. In the first year, students obtain basic knowledge about marine resources, science and business. In the second year, students are introduced to aquaculture and seafood courses, as well as business development courses with focus on sustainable value creation. In the final years, students have internships in industry and thereafter create a student start-up which they run for a whole year.

Figure 10: Student in biomarin internship on fishing vessel

The competitive advantage of the bachelor program is the unique interdisciplinary competence that students acquire which enables them to understand marine biology and science, while at the same time having skills and competence on how to exploit commercial opportunities within the industry. The majority students have already signed employment contracts in industry before they start their final semester.

4.2.6. Experts in teamwork – interdisciplinary innovation project at NTNU in Aalesund

Idea:

To have one interdisciplinary innovation project for all master students at NTNU. The course is mandatory for all students in master degrees and students work in interdisciplinary teams with an innovation challenge throughout one full semester. The course is 7,5 ECTS. Several of the challenges are related to the marine and maritime sector.
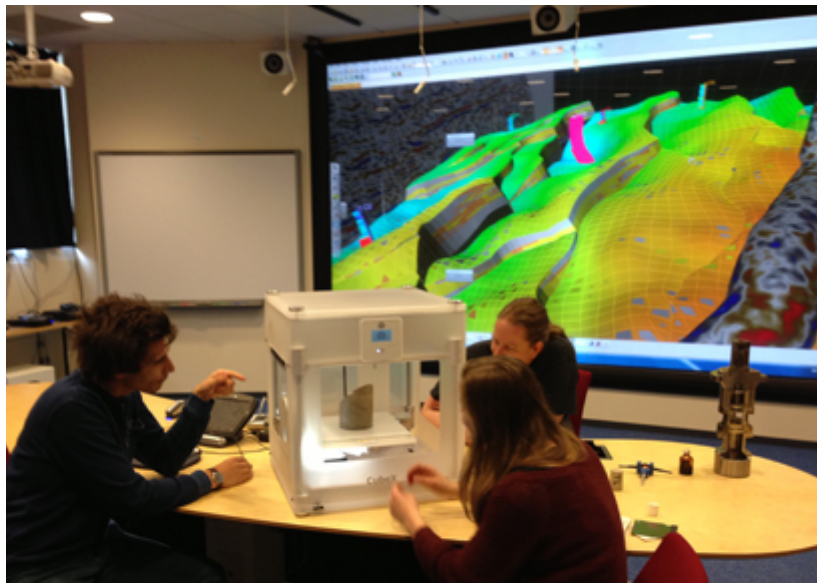
Concept:

At the master level, students register for the course *Experts in Teamwork*. The course is mandatory for all master students at NTNU across all master degrees. In the course, students work in interdisciplinary teams to make suggestions for an innovation challenge. Interdisciplinary teamwork is used as an opportunity to develop collaboration skills while carrying out an innovation project. Students spend one full day each

week on the project with guidance from a faculty, student facilitators and industry mentors. The students can choose among innovation project topics depending on their field of interest. In the course students are challenged to develop innovative solutions, often in close cooperation with industry partners.

In terms of blue economy development, several of the topics are related to creating business opportunities through sustainable development of ocean resources. There are 16 different topics to choose from at NTNU in Aalesund this semester. The ones related to blue economy this semester are:

- Sustainable Value Creation in Ocean Space (https://www.ntnu.no/eit/ip509118)
- Oceanic Recreation (https://www.ntnu.no/eit/ie509118)
- Making money from waste (https://www.ntnu.no/eit/am500218)
- Hydrogen in transportation for a safe and sustainable future (https://www.ntnu.no/eit/tpk4852)
- Oceanic Plastic Waste (https://www.ntnu.no/eit/tep4854)
- Digital twins (https://www.ntnu.no/eit/tdt4860)

Figure 11. Experts in teamwork: 3D visualization of petroleum data, NTNU in Trondheim

4.2.7. Blue economy, innovations and entrepreneurship at the University of Split, Croatia

The list of strategic frameworks/policies affecting the **Blue Economy, Innovations and Entrepreneurship** in the Republic of Croatia:

- The Strategy of Maritime Development and Integral Maritime Policy of the Republic of Croatia for the period 2014-2020 (2014).
- Tourism Development Strategy of the Republic of Croatia until 2020.
- Nautical Tourism Development Strategy of the Republic of Croatia for the Period 2009 - 2019 (2008).
- The Transport Development Strategy of the Republic of Croatia for the period 2014-2030.
- Strategic Environmental Impact Study of the Transport Development Strategy of the Republic of Croatia 2017-2030.
- National Innovation Strategies. The Strategy for Innovation Encouragement of Croatia 2014-2020 and Croatian Smart Specialization Strategy (S3) 2016 – 2020, i.e. their overall strategic framework serves to encourage and synergy use of public and private resources for research, technological development and innovation, which should result in improved efficiency of the national innovation system of the Republic of Croatia.
- The Strategy for Innovation Encouragement of Croatia 2014-2020
- Croatian Smart Specialization Strategy 2016 – 2020 (S3)
- Social Innovation Policy Framework for Croatia, Global Relations Policy Handbook.
- The National Strategy for the Creation of an Enabling Environment for Civil Society Development (2012-2016)
- Strategy for the Development of Social Entrepreneurship in the Republic of Croatia for the period 2015-2020.

The **University of Split** has many years of experience in applying for and implementing projects from EU programs and funds. In the last few years, over 40 projects financed from EU programs and funds have been successfully implemented, and over 20 are ongoing. This experience is based on partnership in numerous projects funded by Horizon 2020, Erasmus+, COSME and the European Social Fund, the European Regional Development Fund as well as other sources of funding. (http://www.unist.hr/en/science-and-innovation/projects-office/university-projects)

Among many projects, the most important one is **Erasmus+ project** (Key Action 2 – European Universities): **The European University of the Seas (SEA-EU).** Alongside the University of Split, the SEA-EU consortium consists of Universidad de Cádiz (Spain); Université de Bretagne Occidentale (Brest, France); Christian-Albrechts-Universität zu Kiel (Germany); L-Università ta' Malta (Valetta, Malta) and the University of Gdansk (Poland). The idea of encouraging emergence of European Universities was initiated by Member States, the Council and the European Commission. The objective is to establish around twenty European Universities by 2024. (https://www.clustercollaboration.eu/profile-articles/european-university-seas-sea-eu)

SEA-EU will engage in concerted efforts towards building an inclusive, sustainable and resilient future for people and planet, with the specific vocation of dealing with the sea that unites us. SEA-EU will actively foster an entrepreneurial, ownership-taking, mind-set, **supporting green/blue growth** and sustainability. SEA-EU will develop innovative pedagogies and promote the latest digital technologies in order to deliver personalised content, enable knowledge sharing, foster competitive skills and promote open science. It will assist in building the **human resources and skills necessary to match the needs of the evolving marine and maritime sectors**, now and in the foreseeable future.
(https://sea-eu.org/alliance/)

Events organised at UNIST related to Blue Economy:

- *European Sustainable Development Week (ESDW) at the University of Split (September – October, 2020)*
- *SEA-EU Blue Talks - a series of short on-line webinars focused on the topic of a blue economy organised by the European University of the Seas SEA-EU (October 2020 – March 2021)*

The University of Split is pursuing its **curriculum** on the principle of full synergy with scientific achievements, both in areas of fundamental research and in areas oriented to direct industrial and economic applications. At the University of Split, following faculties offer studies in Blue Economy sectors:

- **Faculty of Maritime Studies** - offers 5 undergraduate studies, and 4 graduate studies. All studies and almost all courses refer to Blue Economy. New elective subject *Science and innovations* (15 ECTS) has been included in curiculla of all master study programmes since academic year 2019./2020.
- **Faculty of Economics, Business and Tourism -** offers 3 undergraduate study programmes (Economics, Business studies and Tourism) and 3 graduate study programmes (Economics, Business studies and Tourism and Hotel Management).
- **Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture,**
- **Faculty of Chemistry and Technology,**
- **Faculty of Law,**
- **Faculty of Science**,

and following departments:

- **University Department of Professional Studies,**
- **University Department of Marine Studies,**
- **University Department of Naval Studies.**

The studies related to Innovations and Entrepreneurship can be found at:

- **Faculty of Economics,**

- **University Department of Professional Studies** – (Business Administration and Tourism - Study program Management of Trade and Tourism)**.**

(http://www.unist.hr/en/about/faculties-and-departments)

At the University of Split, there are several existing institutional initiatives that **support I&E**, either as informal learning or institutional support.

Student Business E-Academy (SBeA) - is a free, open, online programme developed within Erasmus+, KA203 project for university students which introduces young people to the business world and teaches them how to make a successful business model through entrepreneurship education, practical work on ideas and development of business ideas up to the start-up phase of the enterprise. Approximately, it takes six weeks to follow the programme which comprises of the following modules: Innovation, Venture Development, Marketing Innovative Products and Services, Entrepreneurial Finances, Business Start-ups and Business Model Development. SBeA also offers a guidebook and a library. In its full implementation, programme requires a mentorship from a teacher/entrepreneur. Programme is available in Croatian, English and Spanish at http://e-learning.efst.unist.hr/

List of courses:
- Business Model Development (Ivana Bilic, Associate Professor at University of Split, Faculty of Economics, Business and Tourism, Croatia)
- Business Start-ups (Rafael Ventura, Vice-President of Social Innovation and Entrepreneurship, University of Málaga, Spain)
- Entrepreneurial Finance (Dr. Ignatius Ekanem, Senior Lecturer in Business Management at Middlesex University, London, England, United Kingdom)
- Innovation (Simon Best, Senior Lecturer in Business Management at Middlesex University, London, England, United Kingdom)
- Venture Development (Rafael Ventura, Vice-President of Social Innovation and Entrepreneurship, University of Málaga, Spain)
- Marketing Innovative Products and Services (Dasa Dragnic, Full Professor at University of Split, Faculty of Economics, Business and Tourism, Croatia).

Student Business Incubator (SPI) operates at the Faculty of Economics in Split in order to support all pro-active and enterprising students of the UNIST. SPI's aim is to promote youth entrepreneurship by providing significant support in the preparation of business ventures. The initiative to start a SPI was primarily born out of the need for new programs to encourage entrepreneurial activity of students and those who recently acquired the appropriate level of formal education. Launching of SPI in 2015 was co-financed by the EU from the European Social Fund under the Operational Programme Human Resources Development.

For its members, SPI offers: technically equipped co-working space, mentoring support in developing business models and projects, training and workshops, networking events, business advisory services, SBeA programme, support and preparation for national and international start-up competitions, participation in the international entrepreneurial camp Summer Jam Croatia (SJC) that is successfully organized for several years in a row (http://www.efst.unist.hr/en/cooperation/business/student-business-incubator).

UNIST Technology Park Ltd is a company established by the UNIST with the aim of development and enhancement of entrepreneurial infrastructure for the university graduates as well as other enthusiasts in their independent ventures in the field of high technologies and general ones. It particularly emphasizes mentorship and assistance to entrepreneurs in the early development of their ventures followed by fast and sustainable development, through incubation and acceleration programmes and use of professional services. As an infrastructure, UNIST Technology park offers: modular offices, co-working space, conference rooms, hardware laboratory, accelerator office, entrepreneurial centre, meeting room, etc (https://unisthub.com/).

Technology Transfer Office (TTO) is a university department established with the scope to increase commercialization of the intellectual property at the university and to strengthen link between university and economy. Office promotes entrepreneurial spirit among students and scientists, encourages and supports transfer of the knowledge and research results from the university to the economy (http://www.utt.unist.hr/en/o-nama/o-nama).

TTO is a part of Enterprise Europe Network (EEN). Through EEN, TTO provides free of charge services to entrepreneurs including: information on technology supply and demand, publishing technological profile in the network technology database, organization of brokerage events and trainings about innovation management, support in finding partners for European research and development programs.

Events organised at UNIST related to I&E:
- Global Entrepreneurship Week https://www.genglobal.org/croatia/global-entrepreneurship-week-split-2019
- Summer Jam Croatia – international entrepreneurship conference: The second SBeA conference 2017 http://sbea.efst.unist.hr/the-second-sbea-conference-starts-on-23-august-2017/
- Global Opportunities Beyond Borders (Move it forward – Conference: 4 hours of workshops for entrepreneurs where experienced entrepreneurs from Chicago will help you tackle your business goals: WORKSHOP 1: Idea to prototype; WORKSHOP 2: Entering the market; WORKSHOP 3: Scale, grow, prosper; Learn to collaborate – Can you network like an American? Meet the team from the region that was in Chicago last spring, get their feedback and polish your networking skills with Super Six from Chicago at the networking event after the conference.) https://www.gobb2017.com/

- Shift Dev 2021 conference: A new way to bring the World's Developers Together (A two-day open air and hybrid Developer conference specifically created to continue the tradition of delivering amazing educational and inspirational talks that the developer community has come accustomed to but in a format fit for the world we live in today.) https://dev.shiftconf.co/#about

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