

PROMETHEUS: Services, systems and methods for HEIs in the domains of Circular Economy, and Sustainable Development

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Abstract

Prioritizing innovation and entrepreneurship is difficult for European Higher Education Institutions (HEIs), especially in the context of digital transformation. Despite fruitful partnerships, many HEIs struggle to interact with business leaders, share knowledge, and promote cross-border cooperation. The impact of research and teaching is hampered by a lack of institutional support, which limits opportunities for faculty and students.

Universities must allocate the necessary funds and recognize the value of knowledge exchange and collaboration with outside parties in order to address these problems. Effective knowledge exchange requires the development of strategic alliances with governmental organizations and private companies. Collaboration is facilitated, institutional reputation is improved, and funding is attracted through joint research initiatives, industry partnerships, and community engagement initiatives.

This paper presents the PROMETHEUS project which involves five HEIs and three research centers and enterprises across Europe, as a solution to the above mentioned lack, by developing and sharing capabilities in innovation and entrepreneurship related to digital transformation. PROMETHEUS focuses on institutional engagement and change, offering various services, systems, and methods to enhance Higher Education. These include schools, workshops, networking opportunities, digital platforms, and business accelerator programs.

Keywords: Digital Transformation, Innovation & Entrepreneurship, HEIs transformation, Entrepreneurship Acceleration Platforms

1. Introduction

For European HEIs, innovation, and entrepreneurship, particularly in the area of digital transformation, have become "burning issues" (Charalabidis, Y., & Lachana, Z., 2020) Many European Higher Education Institutions (HEIs) continue to perform poorly in engagement activities, knowledge exchange, and international

collaboration despite the existence of some champions who are able to collaborate and are visible in important international networks. Even though some faculty members are aware of the value of knowledge sharing and collaboration with outside parties, particularly in those fields where such collaborations are crucial to the advancement of both research and teaching, it is uncommon for universities to designate such activities as formal priorities. Even promising initiatives cannot be sustained in the absence of institutional support.

The lack of institutional support can hinder the potential impact of research and teaching efforts, as well as limit opportunities for students and faculty to engage with industry professionals and other experts. It is important for universities to recognize the importance of knowledge sharing and collaboration with outside parties and provide the necessary resources to support these activities (Awasthy, R. et al., 2020). At the same time, this lack of strategic relationships between HEIs and external stakeholders, such as public entities or private businesses, is another reflection of the restrictions faced in implementing knowledge sharing through entrepreneurial engagement activities (Falqueto, J. M. Z et al., 2020). Even though these stakeholders may be represented on the Administrative Board of Universities and must be involved in the development and revision of educational programs, these structured relationships frequently do not place enough emphasis on engagement activities or are not sufficiently close-knit to do so. Furthermore, prioritizing knowledge exchange as a strategic objective is insufficient when there are severe financial restrictions. HEIs must be able to assist faculty, staff, and students in sharing knowledge and working together, and in particular in building trusting relationships with external stakeholders. This can be achieved through various initiatives such as joint research projects, industry partnerships, and community engagement programs. By fostering collaboration and knowledge exchange, HEIs can enhance their reputation, attract funding opportunities, and

contribute to the socio-economic development of their region (De Wit-de Vries et al., 2019).

In parallel, there is a growing demand for new interventions and startup endeavors in non-classical entrepreneurship domains with high societal impacts, such as the areas of Circular Economy, Climate Change, Environmental Protection or Sustainable Development.

The PROMETHEUS project is an initiative of 5 HEIs and 3 Research Centres and Enterprises from Greece, the Netherlands, Italy, Romania, and North Macedonia, to develop and share their innovation and entrepreneurship support capabilities in the area of Digital Transformation related to Circular Economy, Climate Change and Sustainable Development.

2. State of the Art

As globalization has advanced, various organizations, including HEIs, have an impact on economies and societies. Many universities around the world look for and use cutting-edge materials and methods with the aim of fostering increased development as well as social and economic commitment. It is crucial to adapt and use solutions in order to increase student attraction and knowledge transfer.

In order to assess the current level of entrepreneurship and innovation of each HEI, concerning their integrated methods in both teaching and learning, a self-assessment has to be performed, targeting at evaluating the eight dimensions of: (1) Leadership and governance, (2) Organisational capacity: Funding, People and Incentives, (3) Entrepreneurial teaching and learning, (4) Preparing and supporting entrepreneurs, (5) Digital transformation, (6) Knowledge exchange and collaboration, (7) The internationalised institution, (8) Measuring impact.

A wide range of evaluation perspectives for the entrepreneurial and innovative strategies of HEIs are presented in accordance with the aforementioned dimensions. Additionally, while identifying the weak areas that require improvement, the accomplishments of HEIs can be reviewed. Stakeholders can participate as well, including administrative and academic staff as well as important partner organizations.

In the current economic climate, a recent graduate's knowledge of a particular academic subject is no longer sufficient. A wider range of employability-enhancing skills, such as those related to information processing, communication, planning, and problem-solving, as well as social interaction and development, are now expected of students. People who receive entrepreneurial education and training develop the self-assurance, knowledge, and skills needed to take advantage of economic opportunities. Lessons on spotting opportunities, turning ideas into products or services, managing resources, and launching businesses are covered.

Entrepreneurship and innovation in HEIs are currently linked to structures/elements that are about to produce

more inventive, opportunity-focused, and creative students, as well as technology transfer and business (such as start-ups). Students who are engaged and motivated can use their newfound knowledge to produce benefits for society. Such an endeavor, regardless of career choice, is at the heart of entrepreneurship and is characterized as an increasing citizen need for the societies.

3. The PROMETHEUS Project

The PROMETHEUS project is an initiative of 5 HEIs and 3 Research Centres and Enterprises from Greece, the Netherlands, Italy, Romania, and North Macedonia, to develop and share their innovation and entrepreneurship support capabilities in the area of Digital Transformation related to Circular Economy, Climate Change and Sustainable Development.

The objectives of PROMETHEUS relate to fostering institutional engagement and change, and to developing innovative services for innovation and entrepreneurship. PROMETHEUS provides a variety of new and innovative services, sustainable systems, and methods towards its scope to foster institutional engagement and change in Higher Education (HE). This abstract will present a detailed description of the above-mentioned services, systems, and methods, as well as the impact of their use on students, staff, faculty, and to broader societal goals.

Particularly, in order to achieve its goal, PROMETHEUS focuses on 3 main pillars:

- To develop an ecosystem among all HEIs stakeholders such as HEIs, NGOs, organisation coming from the public & private sectors, etc, with a target on digital entrepreneurship towards a circular economy.
- To improve high-quality education programs and non-formal education activities in the area of Digital Transformation related to Circular Economy, Climate Change and Sustainable Development
- To develop and promote new and innovative systems and services for the engagement of students, alumni, and staff in the domains of Digital Transformation, Circular Economy, and Sustainable Development (see Section 4).

To realise these knowledge exchange goals, at different levels, from education, inspiration, ideation, pre-incubation, incubation, growth, and scaleup, a list of the identified activity types is provided.

- Summer/Autumn/Winter/Spring schools for students and young professionals with (online) challenge-based learning activities.
- Workshops on awareness-raising on entrepreneurship opportunities, company creation, markets, financing, with case studies, open classes, bringing together organisations that support entrepreneurs.
- Connect with the existing networks and associations that support specific segments of entrepreneurs (e.g. based on gender, race, geographical presence).

- Digital platforms and memberships for knowledge exchange, communication, and engagement.
- Accelerator activities (such as Business start-up competition – challenge-based competition, mentorship, pitching opportunity, awards) to facilitate business innovation by supporting start-ups and scale-ups in the domains.
- Business accelerators programs to raise awareness of the dynamics of entrepreneurial business model development.

4. PROMETHEUS Systems & Tools

Prometheus Knowledge Base (PKB) is an Open Science tool. This tool will provide access to select-ed & curated open data sets and latest news on the topics of digital transformation, innovations, and entrepreneurship. In particular: (1) It will help to stay updated about the recent news on the topics of innovation, digital transformation, and entrepreneurship; (2) It will allow the users to monitor the latest trends in the digital world; (3) It will help to never miss important international activities and events. Universities, research bodies, startups, public and private organisations, and citizens will have the opportunity to draw and/or upload data for the development of new services (while serving research purposes), mostly in connection to learning and societal challenges, emphasizing on digital transformation and sustainable development to benefit society as a whole.

The PROMETHEUS Entrepreneurship Acceleration Platform (PEAP) is an academic accelerator of innovation and entrepreneurship ideas from the participating HEIs students and staff while also assembling activities to develop and nurture business in Digital transformation, Circular Economy, and Sustainable Development. It constitutes the main tool for performing activities on I&E and aids potential entrepreneurs as well as organises events to develop and nurture business ideas in the areas of Digital Transformation and Sustainable Development. The PEAP will support the existence of different roles with varying functionalities. A Visitor is considered a non-registered user who can review all open areas of the platform, while a visitor can support actions and ideas by voting. A “Member” is considered a registered user in the platform and has access to most of PEAP’s functionalities. Some member types that are foreseen to exist in the PEAP are: (1) Students/ Researchers/ young Entrepreneurs; (2) Organisations; (3) Mentors; (4) Evaluators; (5) Angel Investors; (6) Venture Capitals; (7) Incubators & Accelerators & (8) Sponsors.

Prometheus Intelligent Assistant tool (PIA) is established to enhance the innovation and business support services for students and universities. PIA is an online tool aimed at real-time evaluation of the efficiency of the start-ups or innovation driven business ideas such as the results of R&D projects by assessing the innovation, economic and social potential through more than 200 indicators. The result of the evaluation is a report which is divided in three

domains – innovation, economic and social. The assessment model is built by using indicators proposed from the above-mentioned techniques and adapting them to the operational context: The result is a framework that adopts 7 synthetic indices: 3 of them are related to specific areas of impact and related subcategories. These are the vertical indices. Each vertical index is composed of sub-indices corresponding to specific subcategories.

The PROMETHEUS MOOC (PMOOC) will be an intensive educational outreach effort from the PROMETHEUS research community focusing on Entrepreneurial Teaching and Learning, as well as teaching curricula for pre- and post-graduate levels in issues related to digital transformation and sustainable development. Such a dynamic and adaptable specialization will be utilised to deepen the expertise of its students and teach them numerous skills relevant to the knowledge areas they prefer and are interested to study further. Additionally, non-standard forms of education such as mentoring sessions, industrial lectures, and practice-based learning will be tested in terms of entrepreneurial teaching and learning.

The PROMETHEUS Network Analysis Platform (PNAP) analyses the network developments to steer the further development. The platform allows monitoring the network development and to explore different features of the knowledge graph (e.g., relationships, ego-networks, structural parameters, centrality statistics, etc.). The platform uses the power of R and python for performing various statistical analysis and data manipulations, allowing for easy development of digital applications for monitoring and evaluation. Additionally, since the platform allows for read-only access on the raw data, there can be virtually infinite data manipulations using the same raw source, each manipulation becoming a data file itself on the platform. This is extremely useful for researchers for instance – experimenting with different analysis without altering the integrity of the source data file is possible. Once the experiment is done it can be deployed in production very fast.

5. Conclusion

This paper presents PROMETHEUS, a project with a vision to develop and share their innovation and entrepreneurship support capabilities in the area of digital transformation related to circular economy, climate change and sustainable development. The solutions that the PROMETHEUS project follows can easily be adopted by any organisation interested in enhancing the entrepreneurial notion of its internal environment either fully or partially with any needed amendments. In general, HE Innovate provides a strong overall framework of 8 dimensions for entrepreneurship in HEIs. PROMETHEUS Initiative enhances this framework with collaborative systems and tools. At the same time, the HE Innovate evaluation tool can be used by HEIs for a quick assessment of their status. In this way, PROMETHEUS can quickly classify new members of its community.

By now, in a duration of 1.5 years, more than 2500 students, 50 academic and 50 non-academic staff have been engaged and trained, more than 100 stakeholders were interested in participating (and participated) in the above-mentioned activities, and more than 250 business ideas coming from groups of students were gathered with a potential of around 10 to be transformed into startups. At

the same time, the participant HEIs used the developed modules for the trainings while joint lectures among them are keep performing. According to the aforementioned, PROMETHEUS paves the way to innovation and entrepreneurship enhancement in HEIs, through its developed activities and the active engagement of staff, students, infrastructures and stakeholders.

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