



Image inspiration courtesy Peter Plapper, University of Luxembourg

"ECARDINALE" - An ENTOV-HVM Proposal to the EIT Manufacturing Proposal to "Enable the CAbility for Rapid Diffusion of Innovation in High Value Manufacturing"

Pre-Call Submission Date: 30 March 2020

This project proposal is submitted by the **xxx** representing the [Open European Network for ENTerprise InnOVation in High Value Manufacturing - ENTOV-HVM](#) in response to the EIT Manufacturing [pre-call guidelines](#) for activities to be executed in 2010.

### Aim

ECARDINALE aims to help strengthen Europe's innovation capacity and at fostering innovation in higher education, business and the broader socio-economic environment of the EU helping to disruptively accelerate the value creation from ideas in high value manufacturing (HVM) ecosystems from ideation to market saturation.

The aim will be achieved by designing, developing, and sustainably implementing a virtual and open education offering to enable participants to rapidly diffuse innovations related to technology, processes, organizational design and culture from initial idea to becoming a household name across the iterative (living) innovation ecosystems as seen from a [value network perspective](#).

### Background

The speed of value creation was prioritized especially because social and political pressure is rapidly growing for industry to adapt to immediate and growing global challenges such as population growth, climate change and trade imbalances. Especially industries with comparatively complex products struggle to address these challenges in a timely manner. The major financial and planning uncertainties in this context give rise to concern in high value manufacturing spaces. The lower the speed of value creation the greater the uncertainty associated with successfully evolving from the front-loaded high investment profile to a profit generation phase through asset usage. High uncertainty exists because the needed changes are complex adaptations (innovations) of highly regulated design and manufacturing engineering solutions in very complicated whole product life cycles, which can span multiple decades. Additionally these innovations occur in deeply tiered globally diverse supply networks and eco-systems, and must diffuse to a point of market saturation in order to generate the intended benefits. This uncertainty is very dynamic and involves a very high number of interdependent (systemic) variables, which leads to volatile risk profiles that are extremely difficult to forecast with the robustness required for investment decision making and monitoring. Disruptively accelerating the diffusion of innovation from ideation to market saturation requires acknowledgement of the complex adaptive nature of the innovation phenomenon and shifting the perspective from linear process to living systems. It also means focusing on ecosystems versus individual organizations.

### Key Definitions

- Ecosystems are that interplay of multiple stakeholders assuming multiple roles in a web of tangible and intangible exchanges that work towards a shared purpose. Innovation is understood as the

ability to transfer knowledge from the point of origin to the point of highest need across the complete whole product life cycle and diffusion of innovation curve from ideation to market saturation.

- HVM is the application of leading edge technical knowledge and expertise to the creation of products and associated services which have strong potential to bring sustainable growth and high economic value. Such potential is characterized by a combination of high R&D intensity and high growth typically found in industries such as aerospace and pharmaceuticals.

## Objectives

In order to achieve this aim ECARDINALE proposes an accredited education activity for the engagement, connection and empowerment of professionals and executives in high value manufacturing through training focused on increasing the capability to accelerate the diffusion of innovations from ideation to market saturation. This activity primarily targets strategic object 2 of the EIT Manufacturing "Manufacturing Innovation Ecosystems" aligned to the flagship "Platforms for Digitized Value Networks". The proposal furthermore aligns with Pillar 3 of the preliminary Horizon Europe strategic plan "Innovative Europe" and in particular with the emphasis on [European innovation ecosystems and European Institute of Innovation Technology](#). The relevant mission area is considered to be "[climate neutral and smart cities](#)" and within that the concept of "urban manufacturing" as a potentially viable avenue of (re-) creating European competitive advantage in a knowledge economy that is dependent on social integration of manufacturing with urban centers. The project proposal supports the European policies in the fields of education and training as formulated by the [European Policy Cooperation ET 2020 framework](#). The proposal also follows principles of the "[Responsible and Flexible Career Development Framework for Researchers](#)".

The education activity will be based on a series of courses offering a vocational, higher education and continuous professional development solution for all levels of experience. The curriculum will align to the [European transparency and recognition tools and principles](#). The curriculum is furthermore based on the [European Qualifications Framework](#) and initial considerations expect the vocational solution to align to EQF level 3, the higher education solution to align to EQF level 5 and the continuous professional development solution to align to EQF level 4. Formal assessment and sanctioning of the EQF levels will be sought respecting that national qualification frameworks may differ. The courses developed during the project will be submitted for assessment under the [European Credit and Transfer System](#). The vocational solution will be submitted for assessment under the European Credit System for Vocational Education and Training. In respect to the validation of non-formal and informal learning the project will and consider examine relevant [recommendations of the Commission](#).

## Course Details

The activity will be implemented as a series of stackable Masters-level certificate courses delivered purely online with a duration of six weeks each that are joint-accredited by the university partners of this proposal and follow not only EU Open Education principles but are also designed in accordance with US ASTD standards for accredited online course delivery. Face to face and hybrid learning offerings can be created and delivered by project partners under separate licensing agreements. Completion of the mandatory foundations courses plus one specialization will qualify for (to be defined) ECTS. Each module will be completed through an online time-bound multiple choice test. Face-to-face "day schools" will be optional. This activity will run one year whereby the courses will be developed and accredited in the first six months with delivery commencing in the second half of the year and serving as the foundation for an ongoing delivery as an embedded part of the university offerings after the end of the project. Initial participants will be drawn from current business members of the ENTOV-HVM network.

ECARDINALE will furthermore create an open, adaptive and inclusive community of applied learning and collaboration from a diverse set of higher education, business, and individuals.

The following individual certificate courses will (potentially) be provided. The nature of an overarching certificate for participants upon completion of all foundations courses and one specialization course, i.e. a Master degree in Innovation Acceleration Management is aspired:

- Foundations (All mandatory – each led and lead-accredited by a university)
  - F-1: Principles and Orchestration of Living End-to-End Innovation Ecosystems in High Value Manufacturing.
  - F-2: From STEM (Science Technology Engineering Maths) to STEAM Science Technology Engineering ARTS Maths – The Role of Liberal Arts in Manufacturing Innovation
  - F-3: Design Principles of Innovations for Rapid Diffusion from Ideation to Market Saturation
  - F-4: Innovation Ecosystem Simulation, Monitoring and Forecasting
  - F-5: Method: Experimental Innovation
  - F-6 Method: Contamination Labs
  - F-7 Method: Structured Ideation
  - F-8 Method: Risk and Uncertainty Management
- Potential Specializations (At least three to be developed collaboratively between university and business partners)
  - S-1 Additive Manufacturing
  - S-2 Advanced Materials
  - S-3 Agile Manufacturing Technologies
  - S-4 Bio-Inspired Manufacturing
  - S-5 Blockchain and Cybersecurity
  - S-6 Collaborative Robots
  - S-7 Connectivity 5G and Internet of Things
  - S-8 Digital (Ecosystem) Platforms
  - S-9 Digital Twins and VR/AR
  - S-x (Further specializations can be requested by business partners)

The development of a course is estimated to require six weeks full-time effort. The completion of a course by participants is structured for six weeks with a weekly asynchronous workload of 10 hours and a weekly synchronous workload of 2 hours. Moderation of a course by a dedicated trained facilitator is estimated to require 1 hour weekly per participant on average.

The project aspires to deliver 10 full (foundation and specialization) courses with 10 participants each to 10 individual business enterprises as “closed events”, 10 courses with 10 participants as “open events” and also offer the courses as self-paced unfacilitated “open” offerings.

### **Funding Requested**

Since proposal partners are non-member organizations of the EIT Manufacturing they will act as “activity partners” whereby the maximum of €300k funding including travel and subsistence for quarterly management meetings plus an initial and a final face-to-face project meeting of all partners in Padua, Italy is requested.

The EIT Manufacturing costs of xxx are factored into the funding request.

University partners will be funded at 0.5 or 0.25 FTE for the year duration of the project. Funding rates will be aligned with Horizon 2020 Erasmus+ Knowledge Alliance rates.

Business partners neither receive nor contribute funding.

100% of "KAVA" (KIC Complementary Activity) cost contribution is expected from the EIT Manufacturing, therefore staff funding (contribution to existing employment contracts due to partial position funding), sub-contractor funding (daily rates) and travel/subsistence.

It is acknowledged that participating organizations will be required to become a member of the EIT Manufacturing and pay a membership fee of 7.5% of the funding received.

### Project Partners

The EIT Manufacturing member organization required to act as lead partner is xxx.

The ENTOV-HVM member organization acting as coordinator supporting the lead partner is xxx.

The business organization acting as lead industry representative to ensure that unmet needs of industry are addressed is xxx.

The following five university partners will be aligned with the EIT Manufacturing Innovation Hubs (Co-location Centres) and are considered as "core" partners:

1. xxx aligned to Milan – CLC South (Italy, Switzerland)
2. xxx aligned to Bilbao– CLC West (France, Portugal, Spain)
3. xxx aligned to Darmstadt – CLC Central (Germany, The Netherlands, Belgium)
4. xxx aligned to Gothenburg – CLC North (Finland, Sweden, Estonia, Lithuania, Ireland)
5. xxx aligned to Vienna – CLC East (Czech Republic, Greece, Slovakia, Austria)

The following business partners (solicited by the core partner universities and not previous members of the ENTOV-HVM network) will potentially be aligned with the university partners aligned to the EIT Manufacturing Innovation Hubs (Co-location Centres):

1. xxx aligned to Bilbao– CLC West (France, Portugal, Spain)
2. xxx aligned to Darmstadt – CLC Central (Germany, The Netherlands, Belgium)
3. xxx aligned to Gothenburg – CLC North (Finland, Sweden, Estonia, Lithuania, Ireland)
4. xxx aligned to Milan – CLC South (Italy, Switzerland)
5. xxx aligned to Vienna – CLC East (Czech Republic, Greece, Slovakia, Austria)

Current ENTOV-HVM business partners will be invited to participate in the proposal separately.

Funding is requested for course development (including a train the trainer course) and course delivery for 0.5 FTE each by the following core partners:

1. xxx
2. xxx
3. xxx
4. xxx
5. xxx

0.5 FTE each funding is furthermore requested for support functions by the following core partners:

- xxx – Program Management & Administration
- xxx – Learning Content Creation
- xxx – Quality Management

- xxx – Effectiveness Evaluation
- xxx – Dissemination & Marketing

Requested FTE funding sums are based on the unit cost structure of Erasmus+ Knowledge Alliances.

Non-funded dissemination and delivery partners receiving free (train the trainer) training and 36 month revenue sharing partnerships with free licensing are:

- xxx

Potential further university and business partners from Luxembourg, Poland, Israel and Turkey plus non-European countries such as the USA and Malaysia can be included if feasible.

### **EIT Return on Investment**

A return on investment will be achieved through a revenue sharing partnership related to course deliveries.

### **Intellectual Property**

All content will be made publicly available under Creative Common Attribution Only license. Accredited delivery of content will generally be licensed under revenue sharing partnership principles.