CESAER

Deep tech unlocked by universities of science & technology

Position dated 31 May 2023

The leading universities of Science and Technology (S&T) united within CESAER welcome the focus of the EU institutions and the Swedish Presidency of the Council of the European Union (EU) on strengthening deep tech entrepreneurship in Europe and beyond, notably including the upcoming conference on 'deep tech entrepreneurship for an innovative, resilient, and competitive internal market'.

We welcome the strong focus of the European Commission towards a Europe fit for the digital age as part of its priorities from 2019 to 2024, including the efforts to advance a European chips act, and reiterate our plea to acknowledge the unique position of the public research and education sectors in advancing S&T and in the provision of digital services and infrastructure directed towards the common good.

Universities of S&T are at the forefront of developing deep tech and deploying related solutions for the benefit of society and to advance the development and deployment of key technologies shaping the future.

Recalling and building on our previous positions on infrastructures and synergies to help tackle local and global challenges, universities of S&T contribute to developing deep tech entrepreneurship for a sustainable future. Our association undertook a study to review the contribution of universities of S&T to innovative startups through four dimensions: (i) people, (ii) science & technology, (iii) university systems and (iv) ecosystems. This work helped inform the development of the position, and some excerpts from case studies captured are included below as examples (in italics).

In this position, we urge the EU institutions to fully acknowledge the central role of universities of S&T in developing deep tech entrepreneurship emerging from academic research activities carried out in universities of S&T. We underline the positive impact this has on the design and execution of both subsequent university research and the development of new and revolutionary products and services addressing societal challenges.

We recommend that universities of S&T develop flexibility in their processes and reward mechanisms to promote and celebrate the activities of its academic researchers in their pursuit of deploying the latest scientific knowledge and technology for the benefit of society.

This position provides recommendations to create the conditions in which academic engagement with deep tech entrepreneurship at universities can be fostered, within a wider innovation ecosystem, from regional through national to European level, by highlighting the importance of four key dimensions (people, systems, S&T innovation and ecosystems) for universities of S&T to (re-) assume their role as catalysts for innovation activity and to unlock the full potential of deep tech.

(i) People

People are at the heart of universities of S&T. Engagement with deep tech entrepreneurship occurs across the full spectrum of academic researchers, from PhD candidates to tenured full professors. These people are highly driven by their convictions to bring promising results from academic research to satisfy societal needs including through commercial means. But establishing a university deep tech start-up from research results is rarely an individual pursuit, so it requires the establishment of a multi-, trans- or interdisciplinary team.

> ''*First of all, it's a cliché, but it's always about the people. It's about the people and the drive, internally, and about people connections.*''

> Startup founder at a CESAER Member university

To increase the number of academic researchers in universities of S&T engaging in deep tech entrepreneurship, action is needed to develop and nourish a start-up mindset. An integral approach is needed where the human capital agenda and innovation policy are aligned.

> ''*At the moment academia is very much tailored to names on papers, grants and number of citations. The impact of research is not celebrated enough, even though I know it is in all the literature. And that is a fundamental mindset change.*''

> Startup founder at a CESAER Member university

The academic research environment for individual researchers and research groups is often quite narrow and well planned with a focus on specific deliverables and metrics. Deep tech entrepreneurship requires knowledge on how to operate in a complex human centred (business) environment, from early stage concept development, through to launch and scaling up. In this respect, universities of S&T must increase flexibility around incentive systems such as duration of sabbaticals available to academic researchers to enable them to focus on the critical early stages of exploitation of research in universities of S&T. In addition, universities must be further enabled to provide easy access to transferrable skills training for academic researchers across all levels and to develop a start-up mindset among all levels of academic researchers. The role and potential impact of university incubation centres support programs for academic researchers should not be underestimated. These internal as well as external programs often provide the catalyst for academic researchers to pursue deep tech entrepreneurship. Supporting modern research careers is high on the agenda of our association and our Members, which is why we were happy to accept the invitation to join a core group to develop an agreement on reforming research assessment, which our association then endorsed. Through our association's efforts, and together with partners including in the Coalition on Advancing Research Assessment, we are working to make innovation careers more attractive and rewarding.

> ''*I had the mindset as many scientists have: they have great ideas, they do great research but they are not sure they can make a business out of the research. The support of the university innovation centre was crucial. My co-founder had experience in the specific industry but it is something different when someone guides you on how*

to negotiate with customers, how to plan, how to build a product and validate your business model. He did not have experience with that. I had the opportunity to receive mentoring in almost every field of starting a business.''

Startup founder at a CESAER Member university

➢ We reiterate our previous call to establish an 'EIC Young Innovator' funding programme under the European Innovation Council to 'develop talents to advance innovation', mirroring the success of the Marie Skłodowska-Curie Actions in 'developing talents to advance research' and enhancing and facilitating transformation of excellent research into disruptive innovations.

We call upon the EU institutions to:

➢ Provide permissive legal frameworks to enable universities to deploy a range of long-term, stable and attractive career paths for their researchers and innovators (see article).
➢ Provide sustainable funding and ensure balance between (i) competitive and (ii) non-competitive funding streams to enable universities to experiment and take risks for new and improved ways to support talent both inside and outside 'conventional' career paths in research & innovation.
➢ Boost the European Innovation Council (EIC) and its role, including exploring support mechanisms for start-ups and scale-ups to operate cross border, across all of Europe and beyond.

We call upon national and regional governments to:

➢ Support and provide practical knowledge acquisition opportunities for deep tech entrepreneurs inside and outside universities. This includes financially supporting internal programmes run by university campus-based incubation centres and technology transfer offices, combined with providing external programmes run by national and regional business development agencies and similar.
➢ Capitalise on the unique role universities of S&T play in the innovation ecosystem to facilitate access to unique R&D, piloting or testing infrastructure as well as to the wide range of networks relevant for the founders and teams: from mentors and experts in innovation, to customers and investors, all of whom are required to develop and scale a deep tech concept.

''It is a crucial point to make cooperations with the industry attractive and make the whole process more transparent.''

Startup founder at a CESAER Member university

(ii) University systems

University systems are composed of tangible and intangible resources and mechanisms including those that universities of S&T put in place to facilitate academic researchers to engage in deep tech entrepreneurship. Campus-based start-up incubation centres and technology transfer offices provide critical support throughout the innovation process, but in particular during the early stage. Universities of S&T have an important reputational role to

play when deep tech start-ups engage with potential customers or investors, including acting as a well-known and trusted interlocutor. Through faculty development frameworks and university metrics, universities of S&T have been demonstrating a willingness to champion, celebrate and reward entrepreneurial risk taking to exploit the results from academic research activities. To advance this deep tech entrepreneurial agenda and for universities of S&T to create the necessary environment for engagement by academic researchers, action is needed.

> *''Common space for startups is vital (big co-shared laboratories with equipment to which everyone has an access) – labs where people can coexist and cooperate.''*
>
> Startup founder at a CESAER Member university

➢ We reiterate our plea to (i) adopt a comprehensive and inclusive approach to S&T infrastructures and (ii) advance modes for access, optimise models and cover integral costs
➢ We call upon national and regional governments to actively facilitate the co-location of academic research laboratories and associated S&T infrastructure with early stage deep tech entrepreneurship experimental and technology development spaces.

(iii) S&T innovation

The challenge for academic research to progress to deep tech entrepreneurship includes the identification of a novel technology on which to base a product or service solution, around which the start-up is developed. Enabling academic researchers to realise the (commercial) potential of laboratory results requires a multi-faceted approach, including developing an entrepreneurial mindset among all researchers, with suitable market analysis and identification of intellectual property and business development opportunities.

> "*Having the chance to test our solution using real data and receiving positive feedback from the industry played an important role in our decision to spin-off the technology. That was the moment we thought it is really worth going into the market.*'
>
> Startup founder at a CESAER Member university

> *''We need that PhDs have an experience of deciding with a minimum amount of information about variables; trying to have exercises where information is incomplete, but where decisions still need to be made. To work with the uncertainty of the market.''*
>
> Startup founder at a CESAER Member university

We call upon EU institutions and national and regional governments to:

➢ Acknowledge the importance of expanding the frontier in scientific knowledge and technology, especially in deep tech areas, and prevent its unintended and unwanted restriction through market-driven legislation in areas such as digital legislative frameworks, the Data Act and the Do No Significant Harm principle.

➢ Establish mechanisms to actively encourage and reward the identification of deep tech entrepreneurship based on novel results from academic research.

''Assessing the market opportunity of your research should be part of the training for scientists. Bootcamps and such trainings organised by universities are eye-openers and it really gives you the 1:1 of how to start a business, how to evaluate your idea and the basics you need ''

Startup founder at a CESAER Member university

➢ Strengthen support of 'proof of concept' funding from deep tech research to further explore the potential of deep tech knowledge and research, and boost the transition of knowledge to society

''We are great scientists, we could put together a great team but we realised what we were missing is the financing. It is so important for early stage projects to have access to grants for transforming research into products. With the grant we received it was possible for us to do the market validation, to work on the product and create first traction on the market which now brings us in the position that we can seriously talk to investors.''

Startup founder at a CESAER Member university

(iv) Ecosystems

The deep tech academic entrepreneur cannot succeed in isolation. Access to the innovation ecosystems around universities of S&T plays an important role in this regard. The founding team needs support from others, both inside and outside the university. Development of a start-up mindset among academic researchers at a particular university will be supported where deep tech entrepreneurship is celebrated; where start-up support is easily accessed; and where there is a wider innovation ecosystem present. University incubators and technology transfer offices play a key role providing access to that ecosystem of successful start-ups, (business) mentoring networks, customers and investors. In particular during pre-seed and seed financing phases. This can notably include facilitating the collaboration between universities and small and medium-sized enterprises in their regional innovation ecosystems.

'It is a crucial point to make cooperations with the industry attractive and make the whole process more transparent''

Startup founder at a CESAER Member university

We call upon EU institutions to:

➢ Avoid taking an overly rigid 'one size fits all' approach to start-ups that emerge from academic research results, particularly in relation to negotiations on protection and ownership of intellectual property. This also reinforces our recent position to harmonise the IP provisions related to EIC in the model grant agreement for Horizon Europe to align with international best practice.

"As a company it is crucial having the IP in-house and having the exclusive access to the IP. We had to negotiate a licence agreement with all the terms. That stood out to be a long process and tricky. We consulted an IP lawyer because we had no idea what licence fees are and what is a fair range of these buyout options. The start-up has to be viable in the environment out there so also the contract terms and clauses have to be investor-attractive.'

Startup founder at a CESAER Member university

➢ Ensure a long-term approach to explore and pilot new options with a view of moving beyond the previous linear and tech-focussed understanding of innovation (e.g. TRL) towards a more modern understanding based on the interconnectedness in innovation and its ecosystems and towards interdisciplinarity, including with the social sciences and humanities.

➢ Provide funding to allow for appropriate reward mechanisms to encourage academic researchers to pursue commercial exploitation of their research. For example by giving a substantial boost to the EIC Transition funding scheme.

➢ Support more cooperation and exchange of best practices on how to progress deep tech innovation.

Our offer

Our Members are at the forefront of the science & technology underpinning deep tech and in the development of deep tech talent. Recalling the special role of universities of science & technology in the innovation landscape and its ecosystems, we offer our continued partnership and expertise also in bridging between the broader university community and key partners including in industry, research & technology organisations, EU institutions and beyond.

For more information and enquiries, please contact our Advisor for Innovation & Sustainability Louise Drogoul.

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