DT LAUNCH PAD

Enabling Deep Tech Entrepreneurship

Synthesis Report: Slovenia

Regional Deep Tech Commercialisation Trajectory Report

www.dtlaunchpad.eu

Co-funded by the European Union

CONTENTS

Co-funded by the European Union

This project has been funded with support from the European Commission. The author is solely responsible for this publication (communication) and the Commission accepts no responsibility for any use may be made of the information contained therein. In compliance of the new GDPR framework, please note that the Partnership will only process your personal data in the sole interest and purpose of the project and without any prejudice to your rights.

Grant agreement ID: 101140195
Duration: February 2024 – January 2027 (36 months)
Project name: Deep Tech Innovation Launch Pad Community
Coordinator: Technische Universiteit Delft
Contact: Simona Rataj, Simona.Rataj@uni-lj.si

About the document:

Name: D.2.1 *European Deep Tech Commercialisation Trajectory Report*
Authors: Simona Rataj, Polona Juvančič, Peter Alešnik (University of Ljubljana)

Citation reference: Rataj S., Polona J., Alešnik P. (2024). Regional Deep Tech Commercialisation Trajectory Report – Slovenia. *Deep Tech Innovation Launch Pad Community.*

HISTORY OF CHANGES

Version	Publication date	Changes
1.0	**30.09.2024**	**Initial version**
1.1	**24.10.2024**	**Published version on the project's website**

Project Consortium

Technische Universiteit Delft (TU Delft) – The Netherlands
University Industry Innovation Network BV (UIIN) – The Netherlands
Univerza V Ljubljani (UL) – Slovenia
Momentum Marketing Services Limited (Momentum) - Ireland
Crazy Town Oy (Crazy Town) - Finland
Institut Mines-Telecom (IMTBS) - France
Munster Technological University (MTU) - Ireland
accent Inkubator Gmbh (accent) - Austria
Ege University (Ege University) - Turkey

The Country Report Slovenia: Regional Deep Tech Commercialisation Trajectory Report was developed with the expert contributions of our interviewees, round-table participants and experts, who replied to the DT questionnaire: Urša Jerše, Robert Blatnik, Tina Mesarič, Jure Vindišar, Mateja Košir, Andrej Kos, Blaž Zupan, Rok Stritar, Špela Rozman Dolenc, Mitja Ruzzier, Polona Juvančič, Damijan Miklavčič, Janez Gorenc, Jernej Ženko, Nina Dremelj, Tomaž Bizjak, Matija Gatalo, Luka Mali, Tanja Senekovič, Leon Pavlič, Andrej Černetič, Doroteja Novak, Žiga Lampe, Jana Hojnik, Urban Lapajne.

Glossary

DT: Deep Tech, deep technologies

IP: Intellectual property

KTO: Knowledge and Technology transfer office(s)

POC: Proof of concept

PRO, PROs: Public research organisation(s)

TRL: technology readiness level

UL: University of Ljubljana

1 | INTRODUCTION & POLICY

Introduction to the DTLaunchPad Project

The Deep Tech Innovation Launch Pad (DTLaunchPad) project aims to enable the European Deep Tech Community through creating coordinated support services, building the capacity of Deep Tech talent within participating HEIs, encouraging the international exchange of knowledge and providing partner talents with the opportunity to initiate and sustain Deep Tech start-ups.

More specifically, DTLaunchPad project explores the needs and opportunities for Deep Tech at participating HEIs and incubators through primary and secondary research and asset mapping. It will also enable European Deep Tech talent through a Deep Tech to Market Services pack, including a training programme, (pre-)incubation and acceleration services, mentoring and peer to peer exchange, including the pilot testing of these programmes with training participants, Deep Tech teams incubated/accelerated per partner region, with a cohort of mentors. The project will create a platform to pool and host Deep Tech opportunities to encourage international team building and resource gathering. With the project activities we will raise the awareness of the Deep Tech pathway through an educational Introduction to Deep Tech video services, Introduction to Deep Tech mini workshops series as well as promotional multiplier events. We will bring together the European Deep Tech community to allow Deep Tech trainees to be able to present their ideas and be exposed to potential funding bodies, culminating in in a Fundraising Fair with 100+ participants from across Europe.

In Work package 2, the DT Launchpad project **aims to advance understanding of the needs of the Deep Tech community in Europe and specifically at HEI** (Higher Education Institutions) partner institutions, and to lay a strong knowledgebase for the subsequent work packages, particularly regarding the planning and implementation of the Market Services Pack (WP3) and Awareness Raising (WP7).

To achieve its goal, **WP2** is

- Identifying (though literature overview, assets mapping, interviews and national roundtables) and describing the uniqueness of the Deep Tech commercialisation process, including necessary adaptations to the standard research valorisation process as well as an outline of the necessary support services and skills required in Deep Tech commercialisation
- Taking efforts to understand the current Deep Tech commercialisation opportunities in Slovenia, as well as the drivers and challenges associated to the commercialisation of Deep Tech solutions

- Identifying, describing, and prioritising the skills needed for Deep Tech talent in Slovenia to pursue Deep Tech ventures
- Defining the focus and scope of the remaining project activities.

Deep Tech Regional Policy

In recent years, Slovenia has experienced notable political instability, with several successive governments failing to complete their mandates. The government led by Miro Cerar (2014-2018) resigned early, followed by Marjan Šarec's administration (2018-2020), which also ended prematurely, leading to a government under Janez Janša (2020-2022), which faced significant challenges and protests. Most recently, Robert Golob (2022 -) administration has also struggled with continuity. This turbulence has hindered sustainable policy adoption, particularly in the startup and deep tech ecosystem. For instance, the Startup Action Plan drafted under Cerar's government was never fully implemented due to its early resignation. Similar issues plagued other strategic initiatives. Consequently, the unpredictable political environment has impeded long-term planning and investment, affecting the growth of Slovenia's entrepreneurial ecosystem.

Nevertheless, the awareness about the importance of the deeptech sector has been growing constantly in the recent years. It started with the first policy support instruments (such as Valor in 2010) and project funding for establishment of technology transfer offices at public research organisations (Call 2013-2014 and 2017-2022).

Below, we present some of the strategically important documents.

Slovenian Development Strategy 2030

The Slovenian Development Strategy 2030, adopted in 2017, aims to provide a high quality of life through balanced economic, social, and environmental development. The strategy outlines five strategic orientations: fostering an inclusive society, promoting lifelong learning, developing a highly productive economy, preserving the natural environment, and ensuring effective governance. Key goals relevant to deep tech include enhancing knowledge and skills, promoting a competitive and socially responsible entrepreneurial sector, creating high-quality jobs, and transitioning to a low-carbon circular economy.

Central Eastern European Technology Transfer (CEETT) Platform

In 2021, the Slovenian Investment Bank (SID) partnered with the European Investment Fund (EIF) and the Croatian Bank for Reconstruction and Development (HBOR) to launch the Central Eastern European Technology Transfer (CEETT) platform. This initiative supports promising technology transfer projects from public

research organizations in Slovenia and Croatia, targeting those not mature enough for traditional venture capital. The platform aims to bridge the gap between excellent research results and the lack of financial resources for commercializing deep tech solutions.

Law on Scientific Research and Innovation

Adopted in 2021, the Law on Scientific Research and Innovation aims to create favorable conditions for a modern, publicly funded scientific research and innovation system. The law supports social and economic progress, improves quality of life, and consolidates national identity. It facilitates the acquisition and transfer of new knowledge and skills, strengthens international cooperation, and promotes the development of scientific careers. The law also defines funding mechanisms for scientific research and innovation, including stable funding, public tenders, and support for international cooperation and infrastructure development.

Resolution on the Scientific Research and Innovation Strategy for Slovenia 2030

In 2022, the National Assembly adopted the Resolution on the Scientific Research and Innovation Strategy for Slovenia 2030. This key strategic document guides policy-making in research, development, and innovation to address societal challenges. The resolution aims to position Slovenia as a knowledge-based and innovation-driven society, increasing public investment in research and innovation to 1.25% of GDP by 2030 and total investment to 3.5% of GDP. It focuses on effective governance, enhanced investment, career development for researchers, competitive research infrastructure, and accelerated cooperation between science and industry.

Slovenia’s Sustainable Smart Specialisation Strategy

The Smart Specialisation Strategy identifies priority areas where the Slovenian economy and research sector are well-developed, including smart cities, smart buildings, health and medicine, sustainable food production, circular economy networks, sustainable tourism, mobility, factories of the future, and materials as end products. The strategy emphasizes health (biotech) and sustainability, leveraging Slovenia's strengths in biotech and green technologies to drive economic growth and innovation.

Support to Technology and Knowledge Transfer Offices

In 2023, the Ministry of Higher Education, Science, and Innovation issued a call to support technology and knowledge transfer offices in Slovenia. Two consortia, one for research institutes and one for universities, successfully applied for funding. Over the next five years, these consortia will focus on IP protection, entrepreneurial training, spin-off creation, and promoting an innovation culture.

Action Plan for Increasing the Competitiveness of the Slovenian Economy

In September 2023, the Strategic Economic Council discussed a draft Action Plan for Increasing the Competitiveness of the Slovenian Economy. The plan aims to position Slovenia as a leading European hub for cutting-edge technologies and double the value added per employee to 100,000 EUR by 2030. It includes increasing investment in research and development from 1.5% to 3.5% of GDP by 2030 and supports internationalization, decarbonization, digitalization, startup ecosystem development, and attracting innovative companies. Short-term measures include establishing a fund for green and digital transformation, technological upgrading of companies, developing a venture capital fund, improving profit-sharing conditions, and funding research commercialization.

2 | METHODOLOGY

The collection of information included in this report has gone through several phases, spanning from a literature review and in-depth interviews to an expert feedback roundtable and an additional feedback questionnaire to confirm the findings.

Phase 1.1: Secondary research activities: Literature Review

The aim of the Literature Review was to identify the current status of the Deep Tech commercialisation process in Slovenia. This involved documenting opportunities, challenges, needed support and Deep Tech talent's skill gaps for commercialisation. It is worth noting, that several documents included in this review do not explicitly mention Deep Tech but address relevant topics, suggesting that the term itself is still emerging in Slovenia.

We have dived into **white and grey Literature Review** to investigate the following research topics:

- **Deep Tech Context**
  - Definition and importance of Deep Tech per different partners countries
  - Policy context of Deep Tech on both European and regional/national level
- **Uniqueness of Deep Tech commercialisation process**
  - Necessary adaptations to the standard commercialisation process
  - Deep Tech commercialisation process on a European and commercialisation context on partners' regional/national levels
- **Deep Tech commercialisation potential on a regional/national level**
  - Common barriers and challenges to incubating Deep Tech ventures
  - Enablers and success factors of Deep Tech incubation
  - Pre-incubation, incubation, and acceleration support instruments
  - Knowledge, skills, and attitudes for talent to pursue Deep Tech commercialisation
  - Identification of best training practices on supporting Deep tech commercialisation

- **Implications for the project**
  - Key takeaways from the current state of the Deep Tech commercialisation

Phase 1.2: Secondary research activities: Asset Mapping

The **aim** of Asset Mapping was to help us understand and catalogue existing resources/assets and identify key professionals and stakeholders supporting Deep Tech commercialisation in their regions on two levels: 1. Internally, within University of Ljubljana and 2. Externally, within our local/regional and, due to smallness of Slovenia, international ecosystem.

The **results of the Asset Mapping** have:

- Illustrated relevant experts to invite for *Interviews and Roundtable Discussions*
- Been documented in *Deliverable D2.4.*
- Will be utilised, on an ongoing basis, as assets, resources, and professionals pool for subsequent project activities, e.g., reach out to identified key stakeholders to contribute as training mentors, coaches etc.

Phase 2.1: Primary research activities: Qualitative Interviews

Through the **Interview process,** the **two-fold aim** was to collect insights on (1) the opportunities, challenges and success factors of the Deep Tech commercialisation process on a European and partners' regional level, via **Deep Tech experts' interviews** and (2) the current status of Deep Tech pre-incubation, incubation and acceleration services and gaps within the partner HEIs, via **Deep Tech educators/incubator staff interviews.**

At University of Ljubljana, we have conducted 17 interviews with experts, educators, investors, and Deep Tech entrepreneurs.

The **results of the Interviews have**:

- Informed the *Roundtable discussion* compositions and topics of discussion
- Provide qualitative insights for this *Deep Tech Commercialisation Trajectory Report* as well as for *Deep Tech Entrepreneurs Needs Analysis*

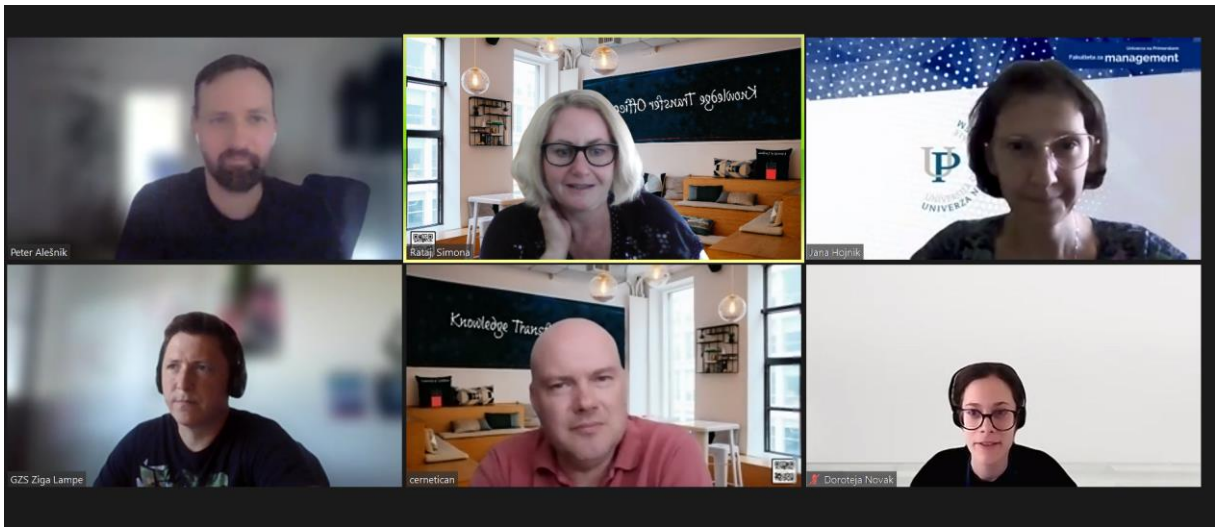
Phase 2.2: Primary research activities: Deep Tech Community Roundtables and additional DT questionnaire

2.2.1. DT Roundtable

The **aim** of the Deep Tech Community Roundtables was to corroborate, validate, and communicate the insights collected by the Literature Review, the Asset Mapping, and

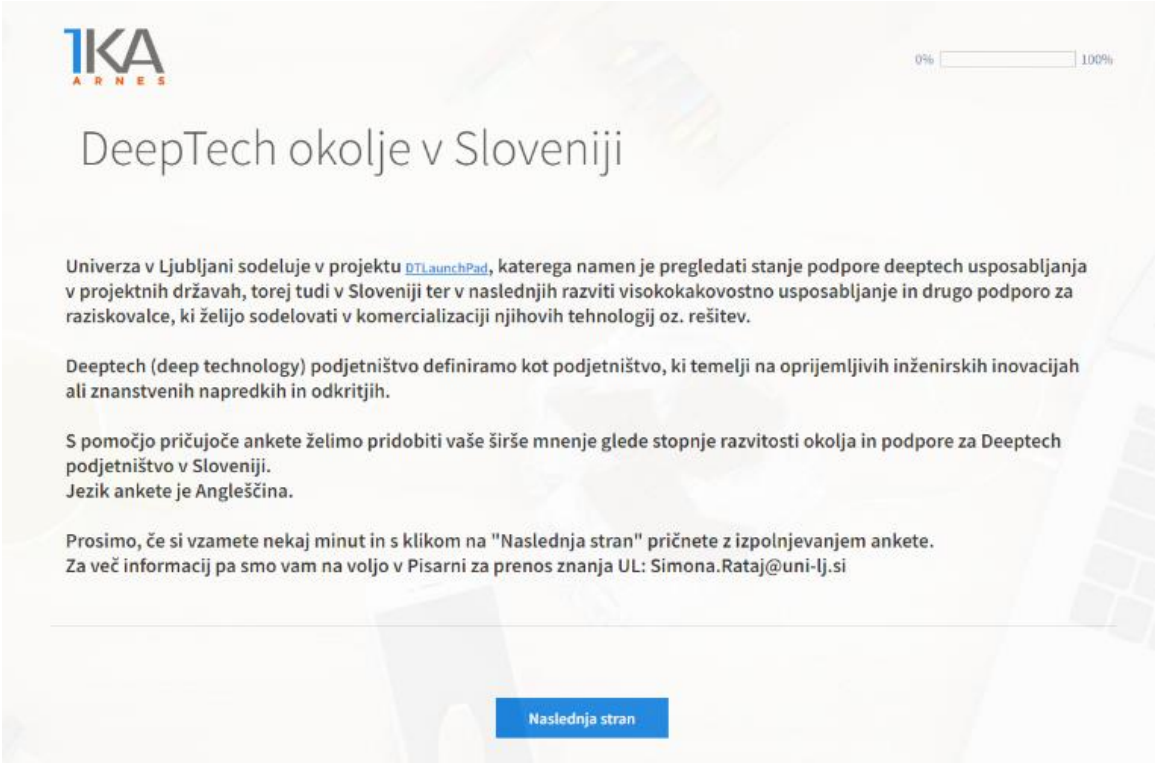
the Interviews on the current status of the Deep Tech commercialisation trajectories on European and regional levels. The participants invited were different from those interviewed.

The time frame in which we were able to organise the round table coincided with the end of the school year and the beginning of the holidays, thus making it impossible to find a suitable date for enough (at least 9) of participants. Eventually, we managed to get the commitment of 4 participants. The results of the Deep Tech Community Roundtables have provided additional qualitative insights to the *European Deep Tech Commercialisation Report* (International roundtable discussion) and to *Deep Tech Commercialisation Report: Slovenia.*



Participants at the DT Roundtable, July 5th, 2024.

2.2.2. Additional DT questionnaire



Since we were not able to secure at least 9 experts to participate at the roundtable, we decided to create an additional questionnaire (Appendix 3) to check the feedback and confirm the outcomes from the interviews discussed also at the round table. We invited experts who could not attend the round table to participate via this questionnaire. We received 8 additional responses from experts.

The list of all experts (interviewees, round table participants and some of the respondents to the questionnaire) is available in Appendix 1.

3 | DEEP TECH COMMERCIALISATION IN SLOVENIA

3.1. How Deep Tech (DT) ventures are different from standard tech ventures

In Slovenia, the standard commercialisation process is developed and so it the StartUp community. Slovenia has been supporting innovative small companies and start-ups since 2007 through various instruments of Slovene Entrepreneurial Fund. In addition to the financial support, the support environment also developed, bringing together competent mentors, investors, incubators, and experienced managers of innovative companies.

Nevertheless, Črnogaj and Rus (2023)[1] in their analysis of Slovenian start-ups and scale-ups conclude:
"*Despite its potential, Slovenia's startup ecosystem is not progressing fast enough to solidify its position as a leading regional hub. Much depends on the boldness and strategic direction of government policymakers. To implement successful changes, awareness, expertise, political will, and effective monitoring are crucial. Slovenian startup and scaleup representatives primarily desire favorable tax laws and regulations, enabling successful entrepreneurs to invest in startups over conventional investments. Stability in the legal environment and legislation, early-stage funding sources, reduced bureaucracy, better understanding of startup needs, and later-stage funding are also high priorities.*"

Deep Tech sector in Slovenia on the other hand is still in its early stages of development. Deep Tech support environment thus faces even more challenges, described in the following pages.

I. OVERVIEW (DT VENTURES)

Similarly to EU (European Union), DT ventures in Slovenia are characterised with the following elements:

IP (Intellectual Property) intensive: DT ventures rely heavily on intellectual property, protected in most cases by patents, in lesser cases with copyright, specific know-how or business secrets.

Longer development time: Deep Tech projects, due to the complexity and novelty of their core technologies, require a longer R&D phase before their solutions reach the market.

[1] Črnogaj, K., Rus, M. (2023): From Start to Scale: Navigating Innovation, Entrepreneurial Ecosystem, and Strategic Evolution, https://www.mdpi.com/2076-3387/13/12/254

Higher costs: the longer time frame needed for the development phase results in higher costs for advanced research, prototyping and the longer time to market; all these require significantly higher investments, both in financial and other resources.

Higher risk: The risk is higher as the technology may not work as intended.

Composition of the team: The team often consists of experts with a strong scientific and technical background, but who lack the commercial experience that is crucial for the successful commercialisation of their innovation. They often want to continue their research career. Therefore, additional support in connecting scientists with entrepreneurs is necessary.

Access to DT support environment: Due to the smallness of Slovenia and the fact that the competencies for DT need to be further and wider developed, also experiences need to be gained, there is a lack of DT experienced entrepreneurs, investors, and support staff. Therefore, we are open to collaboration with international DT support environment to expedite the development of our DT spin-off companies.

Črnogaj and Rus (2023)[2] in their article explain the results of the survey among slovenian start-ups and scale-ups: their results suggest "*that factors, such as legislative support, availability of venture capital, and mentorship networks within the startup ecosystem, play a substantial role in influencing how startups navigate and overcome growth-related challenges. This significant impact underscores the necessity for a well-structured and supportive startup ecosystem to facilitate smoother growth transitions, resonating with the contemporary focus on enhancing startup environments for sustainable growth and development.*"

II. UNIQUE ASPECTS OF DEEP TECH VENTURES

According to the Slovenian DT commercialisation and start-up experts the unique aspect of deep tech ventures in Slovenia are the following:

- **Complexity**

Deep tech ventures involve a more complex commercialisation process compared to digital or general tech ventures. This complexity arises from the need for significant proof-of-concept stages and extensive IP protection.

- **Timeframe**

The time to market is considerably longer due to the need for rigorous validation, prototyping, and regulatory approvals (certifications). This extended timeframe increases the risk and requires substantial upfront investment in laboratory equipment and other resources

- **Financial Challenges**

[2] Črnogaj, K., Rus, M. (2023): From Start to Scale: Navigating Innovation, Entrepreneurial Ecosystem, and Strategic Evolution, https://www.mdpi.com/2076-3387/13/12/254

Deep tech ventures are more capital-intensive, requiring greater financial resources to cover the long development cycles and expensive equipment needed for testing and proving the concept.

- **Access to funding**

Access to funding and especially access to early-stage funding (pre-seed, seed) is a significant barrier, due to the lack of DT investors in Slovenia. DT ventures need to search for international investors. There is a need, in Slovenia, for dedicated funding instruments and financial support mechanisms tailored to the needs of deep tech ventures.

- **Intellectual Property (IP) Importance**

Protecting intellectual property is crucial and more emphasized in deep tech ventures. This includes patents and other forms of IP, which are vital for securing investments and partnerships. The transfer of tacit knowledge and continued involvement of researchers even after IP licensing is a unique feature, as ongoing research and upgrades are often necessary.

- **Skills and Competencies**

Entrepreneurs in deep tech need a blend of technical expertise and entrepreneurial skills. This includes understanding market needs, business models, and possessing strong soft skills like communication and perseverance. Training programs should focus on developing these skills through practical, hands-on experiences and long-term mentoring.

- **Collaboration and Ecosystem**

Successful deep tech ventures require robust collaboration between academia, industry, and government. Building a supportive ecosystem that includes access to mentors, industry partners, and international networks is essential. In regions like Slovenia, the ecosystem is still developing, which poses additional challenges. Learning from more established ecosystems like Oxford or Silicon Valley can provide valuable insights.

- **Cultural and Organisational Barriers**

A significant challenge are the cultural and organisational barriers within universities and research institutions, where the focus (still) remains on academic outputs rather than (commercial) impact. Changing this mindset to value commercialisation activities is crucial. Overcoming these barriers requires strategic policy support, incentives for researchers, and promoting a culture that accepts failure as part of the innovation process.

- **Market and Industry Engagement**

Engaging with the market and industry early in the development process is vital. However, finding suitable industry partners and convincing them of the potential of early-stage technologies can be challenging. Facilitating industry engagement through networking events, collaboration platforms, and continuous communication can help bridge this gap

III. HIGHLIGHTS FROM VALIDATION AND ADDITIONAL QUESTIONNAIRE

Generally, round table participants and questionnaire respondents agreed with the interview outcomes. There have been some additions:

- **Feedback, related to the complexity of DT commercialization:** it really depends on the product; some DT products can be ready-to-use and the

commercialization is not difficult; others need more support and time to market. The speed of market entry is related to the absorption capacity of the society – the acceptance readiness level.

- **Feedback regarding the "push" principle of marketing:** any process where you search for applications and market post factum is difficult; the more novel and disruptive the technology is, the harder it is. Meaning, researchers need to be in constant contact with the market to receive and potentially use the market information for future technology commercialization.
- **Feedback was related to trust:** building market trust is a critical challenge for every new company, regardless of whether it operates in deep tech or other industries. Establishing this trust typically requires a substantial amount of time and consistent effort.

3.2. The Current State of Deep Tech Commercialisation in Slovenia

IV. Overview

The DT support ecosystem in Slovenia has room for improvement. Policies, instruments and support services should be recognized on a larger scale. Moreover, the attitude towards DT commercialisation should to be translated into culture in research, not only in PROs, but also in other organisations.

In the pre-incubation phase, universities, and research organizations (PROs) offer various levels of IP protection, commercialization support, mentorships, and proof of concept (POC) funds. Some PROs provide comprehensive support, including IP protection and commercialization, others focus primarily on patenting. There is an initiative (prenosznanja.si), supported by the Ministry of Higher Education, Science and Innovation, connecting the Technology Transfer Offices (TTOs) of PROsinto two consortia. This initiative encourages learning from best practices to enhance overall support capabilities.

The incubation phase features university incubators, technology parks, and financial support from the VESNA fund, Slovene Entrepreneurial Funds, Venture capital funds and private investors.

The acceleration phase involves case-specific support and plans for the Slovene Technology Innovation Fund to aid in scaling and market entry.

V. EXTENT OF THE EXISTENCE OF THREE (I.E., [PRE-]INCUBATION AND ACCELERATION) DEEP TECH COMMERCIALISATION STAGES

As already mentioned, DT support ecosystem in Slovenia has still a lot of room for improvement. Policies are, at least in most PROs, set in place (Strategies, related to economic and societal development of Slovenia, Knowledge valorisation as part of the PROs strategies, policies, related to PROs' IP rights legislation management…). The structures and support that are already available, are stated below, but could be used by a higher number of researchers.

Pre-Incubation Phase

Knowledge and Technology Transfer offices (KTOs) are established at the level of universities and research organisations. Their support includes: the identification of potential innovation, disclosure of invention, IP protection, support to commercialization (connecting researchers to industrial partners, negotiation support and support to creating spin-off companies). KTOs can also be responsible for boosting innovative culture (with the support of top management) into PROs.

Measures that had been taken in order to enhance the motivation of researchers for DT have achieved some goals, but not as many as intended. The habilitation criteria is still not favorable to DT commercialisation; they include some elements, important for DT, such as patents, collaboration with industry, but there is a lot of room for improvement. Many PROs in Slovenia have thus joined the Coalition for Advancing Research Assessment (COARA[3]).

There is a varying degree of support for Deep Tech commercialisation among TTO at PROs, depending on their experience, age, and number of employees. TTOs have been established at different times and generally operate with limited personnel and budgets. To connect, enhance, and further develop these TTOs, the government supports two consortia: one for research institutes and one for universities, encompassing all Slovenian PROs. Typically, the activities of these consortia are led by the more advanced TTOs, allowing the less developed TTOs to benefit from their experience and resources.

Some of the PROs have established internal proof of concept (POC) funds to help developi technologies further by increasing the technology readiness levels and supporting prototyping efforts. However, these POCs are constrained by their limited budgets and, to a larger extent, by habilitation criteria. Consequently, commercialisation efforts are often carried out in researcher's private time or in addition to their teaching and research activities.

[3] CoARA - Coalition for Advancing Research Assessment

Most PROs also offer mentorships to innovative researchers (especially mentorships related to business development models, economic impact).

PROs also offer internal Maker labs (test labs) for early-stage development of research ideas, or they connect researchers with external Maker labs and similar organisations, such as RogLab.

Training and skill development are also offered by most PROs; some offer the training more systematically, others according to the need or opportunity.

Regional POC (VESNA) for Slovenia and Croatia has been developed under the patronage of SID bank, HBOR and EIF. VESNA POC fund started with their operation in early 2024 and is now actively searching for technologies for initial investments (50.000 eur for pre-seed phase).

Incubation Phase

The incubation phase focuses on further developing and prototyping the technology. Researchers need to move from theoretical concepts to tangible products or services, often requiring advanced laboratory equipment and technical support. Here, collaboration with industry partners becomes critical.

There are three University incubators in Slovenia, geographically well balanced (to support PROs in Ljubljana, Maribor and Primorska region). There are 4 Technology parks (Primorska, Ljubljana, Maribor and Pomurje).

Those support organizations offer connections to (international) industrial partners, various business-related training programs and access to experienced mentors, who he help researchers navigate technical challenges, market validation, and business model development.

Equity financial support for the incubation phase is available also through VESNA fund; upto 400.000 eur are available for technologies in seed stage and 700.000 eur for late seed stage.

Another source of financial support is the Slovene entrepreneurial fund: incentives for start-ups (also start-ups in less developed areas and green start-ups)[4]. A proposal for equity financing for innovative startups with growth potential in the process of development. It is foreseen that Slovene Early-Stage Innovation Fund (SEF) will replace its existing public seed capital tenders with the establishment of a Fund of Funds for Startup Innovations. Thus, SEF will no longer directly invest in companies but will select a manager for the venture/seed capital fund through a public tender, who will invest in young innovative startups.[5].

[4] https://www.podjetniskisklad.si/en/zagonske-subvencije/
[5] https://www.podjetniskisklad.si/en/zagonski-kapital/

Acceleration Phase

The acceleration phase involves scaling the technology and entering the market. This phase requires significant financial resources to support production, marketing, and distribution. The support available in Slovenia can be best described “from case to case.” For each case we try to find the most appropriate partner, even internationally, since there are not a lot of support structures available (also due to scarcity of DT acceleration cases). The space for improvement is abundant.

Equity financial support for the acceleration phase is available through VESNA fund, between 850.000 and 1.5 million EUR are available for the growth phase.

Equity financing for growth of high-tech and innovative companies is available through Slovene entrepreneurial fund. A plan for stablishing the Slovene Technology Innovation Fund (2024-2029), a “fund of funds” with investments in specialized funds, is in its place. It will support all phases of development – from pre-seed to mature stages (https://www.podjetniskisklad.si/en/kapital-za-rast-slovenija/).

VI. Highlights from validation and additional questionnaires

On a general level, round table participants and questionnaire respondents have agreed with the outcomes from interviews.

The experts involved highlighted three facts:

1. There is a lack of business orientation in research sector in Slovenia. By implementing institutional measures, such as favourable habilitation criteria, sabbaticals, we can create an environment that not only motivates researchers but also streamline the DT commercialization process, leading to more innovative solutions reaching the market.
2. Start-up ecosystem is well developed in Slovenia. The awareness regarding deep tech particularities is not high though. Most investors are not familiar with the specifics of deep tech technologies.
3. Scale-up companies lack support during the process of rapid growth of the company; there is room for improvement – either in national support or in good connections with international support organisations.

3.3. Common Barriers and Enablers of Deep Tech Commercialisation

VII. Overview

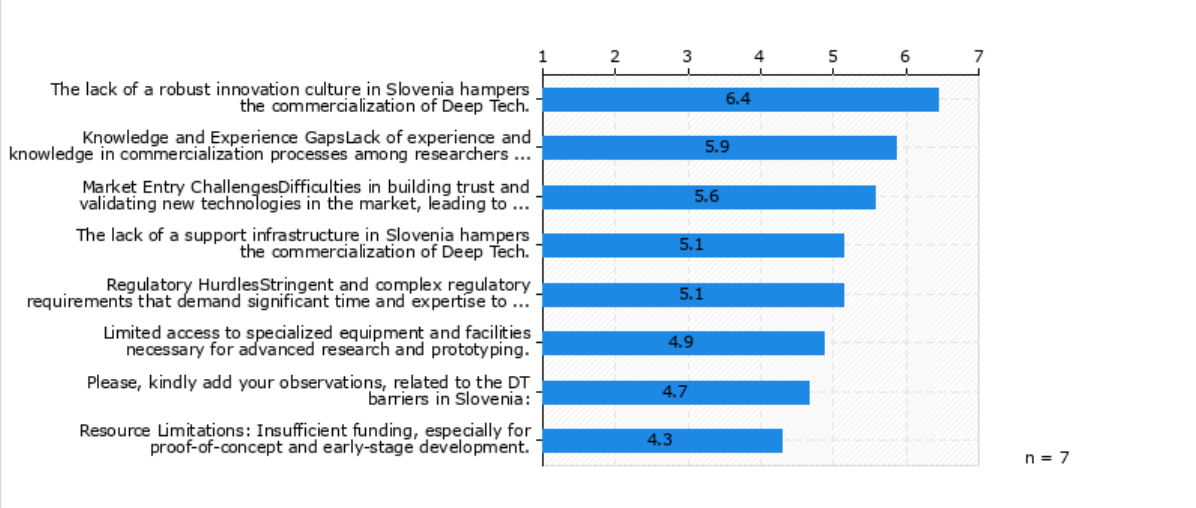
We have identified the barriers and enablers of DT commercialisation from all our interaction with experts.

The most important barrier is the lack of innovation culture in Slovenia (accompanied with lack of ambition and thus accompanied with habilitation criteria). The least severe obstacle is access to finance.

The most important enabler is access to quality mentorship programmes and the least important bit still very important are the policies.

VIII. Barriers and Challenges

From the analysis of interviews, we have identified the following common barriers and challenges of deep tech commercialisation. We have asked the experts, not included in the interview and roundtable: In your opinion, how important are these enablers (1 means not important, 7 means very important)?



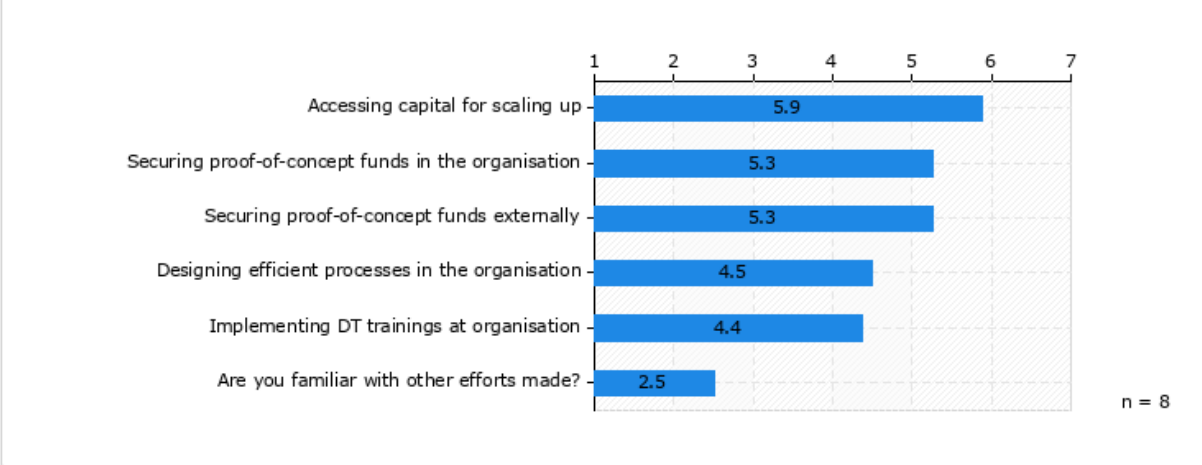
In addition to these challenges, the respondents stated the following additional challenges:

- The lack of ambition of researchers for DT commercialisation (Academic KPIs (key performance indicators) are only partially coherent with DT commercialisation. Researchers motivated for DT often dedicate private time to commercialization activities while still needing to fulfil traditional academic KPIs like publishing in high-impact journals). There is also the lack of entrepreneursial & business skills, competences.
- Interdisciplinary collaboration: deep tech innovations require skills in team management, communication, and cross-disciplinary collaboration. presentation and communication. Communicating complex ideas effectively to stakeholders, including investors and the public, remains challenging.

- Lack of possibility to have a research career oriented towards commercial success. Researchers who leave academia for entrepreneurial activities often find it difficult to return, which discourages engagement in commercialization.
- Not favorable taxation policy in Slovenia
- Over-regulation of the EU; regulation may contradict each other.
- Issue of inclusiveness to DT environments (thresholds exists to pass before becoming a member of community).

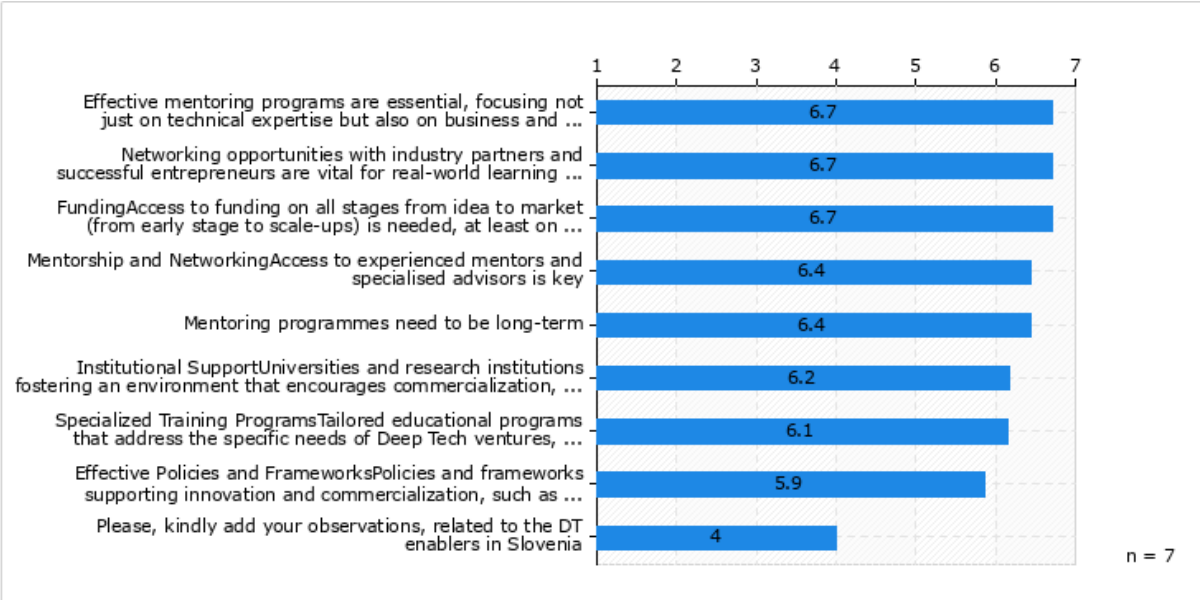
We were also interested: How severe are the following bottlenecks in the standardisation of the Deep Tech commercialization process? (1 means not severe, 7 means very severe).

The results show that most respondents tend to view the bottlenecks as serious.



IX. ENABLERS AND SUCCESS FACTORS

From our analysis, we have identified the following common enablers of deep tech commercialisation. We have also asked the experts (non-interviewees), how important these enablers are (1 means not important, 7 means very important).



Additional enablers, that came out of the roundtable discussion, were access to expert knowledge (specific knowledge) and access to international innovation support organisations, incubators, and accelerators.

3.4. Knowledge, Skills, and Attitudes for Talent to Pursue Deep Tech Commercialisation

X. Overview

DT training should cover 3 main groups of competences (technical, entrepreneurial, and transversal) and should be practical, hands-on, experience – centered. They should include working on interdisciplinary projects that simulate real-world challenges and encourage collaboration between different fields.

The trainings should be iterated annually with a focus on continuous improvement. A standard program should be complemented by tailored mentoring initiatives, reflecting best practices observed in successful deep tech programs. “One-size-fits-all” approach often does not satisfy the needs of researchers.

XI. Technical Competencies

The experts stated the following technical competencies, important for the DT commercialisation:

- **Scientific and Technical Expertise:** In-depth knowledge in specific scientific or engineering domains.

- **IP Management:** Understanding of intellectual property landscape, patenting strategies – freedom to operate, and IP protection.
- **Product Development:** Skills in designing, developing, and prototyping new products or technologies. Skills in developing business cases, leading sales operations.
- **Research competence:** Excellence in conducting rigorous scientific research.
- **Technical & regulatory expertise:** Specialized knowledge in a narrow technical field and the ability to anticipate future development trends. Familiarity with industry regulations, standards, and certification processes.

XII. ENTREPRENEURIAL COMPETENCIES

The experts stated the following entrepreneurial competencies, important for the DT commercialisation:

- **Business Development:** Understanding business principles, including market analysis, business planning. Knowledge of business methodologies, strategic planning, and technological development.
- **Market Entry and Sales:** Skills in navigating market entry, conducting sales operations, and understanding customer needs. Ability to market and sell new technologies, including creating value propositions and engaging with customers.
- **Finance and Investment:** Understanding financial management, investment strategies, and the rules of investing in high-tech ventures. Knowledge & ability to secure funding from investors, grants, and other sources.
- **Leadership and management:** Team creation, building and motivation, decision-making skills, and the ability to lead diverse teams. Emphatic leadership.
- **Entrepreneurial Vision:** Ability to foresee market opportunities and adapt research findings into commercial products.

XIII. TRANSVERSAL COMPETENCIES

The experts stated the following transversal competencies, important for the DT commercialisation:

- **Communication Skills:** Effective verbal and written communication skills, particularly in explaining complex technical& scientific concepts to different audiences (non-experts).
- **Collaboration Skills:** Ability to work effectively in interdisciplinary, diverse teams and with researchers, business professionals, and industry partners; also networking skills.
- **Soft Skills:** Psychological resilience, self-confidence, stress management and determination to persevere through challenges and setbacks.

- **Problem-Solving:** Ability to tackle engineering problems and automate processes. Strong analytical skills and creativity to solve complex problems and overcome obstacles.
- **Adaptability:** Openness to uncomfortable situations and readiness to pivot strategies, as necessary. Flexibility to adapt to changing circumstances and pivot strategies when necessary.

4. | RESEARCH INTO PRACTICE: SUPPORTING DEEP TECH

4.1. Overview and Next Steps for Training and Service Packs Development (WP3)

The Deep Tech Learning Programme should include training on IP fundamentals, industry-specific technical courses, commercialization skills workshops, and structured programs tailored to Deep Tech.

The Mentorship Scheme should aim to identify and increase access to qualified mentors. Mentorship should cover connections with industry experts.

The Deep Tech Incubation Service Pack focuses on financial support, continuous IP monitoring, industry partnerships, and structured acceleration programs.

The Peer2Peer Learning Framework emphasizes goal clarity, best practices exchange, peer collaboration, and industry connections.

4.2. Recommendations on How Training, Mentorship, Peer-to-peer Learning and Deep Tech Incubation Support Tools can be Utilised to Support Deep Tech

Recommendations regarding the **Deep Tech Learning Programme**

- **Basic IP Knowledge:** Incorporate training modules on intellectual property fundamentals.
- **Industry-Specific Expertise:** Provide courses on technical knowledge relevant to specific fields such as biotech, technical fields, etc. Targeted support programmes and trainings will lead to the raise the business competencies of tech experts and tech competencies of business experts.
- **Commercialization Skills Building:** Include ongoing activities and workshops to develop commercialization skills.
- **Structured Programs:** Develop more structured and tailored programs specific to the challenges of Deep Tech commercialization.

Recommendations regarding the **Mentorship Scheme**

- **Qualified Personnel:** Increase the number of qualified mentors and staff to provide direct support to Deep Tech ventures.

- **Support Network Awareness:** Train mentors on the support ecosystem and referral processes to specialized incubators.
- **Industry Connections:** Establish connections with industry professionals who can act as mentors and provide insights into innovation processes. Building the bridge between PROs & business sector

Recommendations regarding the **Deep Tech Incubation Service Pack**

- **Financial Support and Structure:** Enhance financial backing and structured funding options for incubation stages by connecting with international and technology-specific investors and strategic development partners.
- **Industry Connections:** Strengthen partnerships with industry players for pilot opportunities and customer connections; checking the validation of the technology viability.
- **Structured Acceleration Programs:** Develop structured and targeted acceleration programs for scaling Deep Tech ventures.
- Develop **Entrepreneurial Guide** for First Time Spinoff Founders & **Checklists**
- **Building innovative teams;** connecting researchers with entrepreneurs, building teams that grow business not (just) create prototype/technology. Continuous commercialisation activities and skills building.

Recommendations regarding the **Peer2Peer Learning Framework**

- **Focus and Process Clarity:** Emphasize specific goals such as MVP and first sales with well-defined transitions between stages, facilitating peer-to-peer learning through shared experiences.
- **Good Practice Example**: Promote initiatives that focus on best practices and personal connections within the industry. Foster the culture of cooperation.
- **Peer Collaboration:** Foster an environment where peers can share knowledge and experiences, enhancing learning through collaboration.
- **Pilot and Customer Connections:** Encourage peer discussions and networks to identify and connect with potential industry partners and first customers.

Other recommendations

- **More career paths:** Create specific career path, not measured with teaching and articles.
- Support DT commercialisation through **National tenders.**
- A **workshop with policy makers** is needed: the requirements for DT commercialisation shall be presented and discussed.
- Be open internationally!

4.3. Identification of Existing Training Best Practices on Supporting Deep Tech Commercialisation in Slovenia

The identified good practices are:

Courses: Developing business idea (SEB UL)	Several courses: Anja Svetina Nabergoj; Blaž Zupan Mojca Svetek
Modular training on entrepreneurials, impact and IP	A comprehensive training that addresses four main areas closely related to research and its broader societal impact: Collaboration with the External Environment, Research Impact, Entrepreneurial Competences, Intellectual Property.
Deep Tech Alliance	Connects European deep tech entrepreneurs, international corporates and investors in a close-knit community dedicated to exploring strategic and commercial partnerships
VESNA POC fund	Regional POC fund, investing in pre-seed, seed and growth phase of DT ventures. The are also providing trainings related to DT commercialisation & access to mentors.
Deep tech hub Katapult	An entrepreneurial environment for innovators with a physical product. The hub offers shared services and production for physical products, so that the entrepreneur can focus on the core business (product development and sales), while hiring the rest of the areas in shared services. In doing so, he/she has support from the mentors with high-tech knowledge.
EIT jumpstarter	EIT Jumpstarter is a pre-accelerator run by seven communities of the European Institute of Innovation and Technology (EIT). It is a creative community, providing advanced know-how, unique programme, expert trainers and mentors.
SIO (mentorship)	Mentors to start-ups and scale-ups; covering many topics, from IP to business development.
Labs to market, Commercialization Reactor	Events, trainings and process of connecting researchers with entrepreneurs.
Startup clinic	The Startup Clinic with the best consultants in individual business functions helps entrepreneurs to solve the most difficult business problems and professionalize their business.
EIT venture program	Transforming a business idea into MVP and new venture. (EIT Digital, EIT Manufacturing, EIT Food).
Deep tech talent initiative	The Deep Tech Talent Initiative is a pioneering programme led by the EIT that will skill one million people within deep tech fields over the next three years. Deep tech innovations – cutting-edge technological solutions combining fields of science and engineering in the physical, biological and digital spheres – are indispensable in addressing the most pressing global challenges.
Eurydice	The Eurydice network supports and facilitates European cooperation in the field of lifelong learning by providing information on education systems and policies in 37 countries and by producing studies on issues common to European education systems.

5. | CONCLUSION

Deep tech ventures in Slovenia face unique challenges compared to standard tech ventures, including longer development times, higher costs, and increased risk due to the complexity and novelty of their technologies. These ventures also require significant proof-of-concept stages, extensive IP protection, and substantial upfront investments.

The deep tech sector is still in its nascent stage in Slovenia, facing more significant challenges than the more established start-up community. The support environment, while developed for standard tech ventures, lacks adequate resources for deep tech.

Conclusion from the recommendations:

The Deep Tech Learning Programme should incorporate training modules on intellectual property fundamentals to ensure researchers understand the importance and mechanisms of IP protection. Additionally, targeted courses on DT commercialisation process to specific industrial fields, such as biotech and nanotech, should be provided to bridge the gap between technical experts and business professionals. The programme should include ongoing workshops and activities focused on developing commercialization skills, such as market analysis, business planning, and sales strategies. Developing more structured and tailored programs with an emphasis on practical, hands-on experiences is crucial.

For the Mentorship Scheme, it is crucial to increase the number of qualified mentors who can provide direct support to deep tech ventures, covering both technical and entrepreneurial aspects. Mentors should be trained on the support ecosystem and referral processes to specialized incubators and other support structures. Establishing robust connections with industry professionals who can act as mentors is necessary to provide insights into innovation processes and help bridge the gap between research and commercial application.

The Deep Tech Incubation Service Pack should focus on connecting with international providers of finance for DT (technology-specific investors and strategic development partners). Strengthening partnerships with industry players for pilot opportunities, validation of technology viability, and customer connections is essential. Developing structured and targeted acceleration programs to support the scaling of deep tech ventures will ensure they have the necessary resources and guidance to grow.

The Peer2Peer Learning Framework should emphasize the exchange of good and bad practices in several DT commercialisation steps (such as Minimum Viable Product and first sales). Promoting initiatives that focus on best practices and personal connections within the industry will help foster a culture of cooperation. Creating an environment where peers can share knowledge and experiences, enhancing learning through collaboration, and encouraging discussions and networks to identify and connect with potential industry partners and customers is vital.

In terms of Institutional Measures, implementing favorable habilitation criteria that motivate researchers to engage in commercialization activities, such as sabbaticals for entrepreneurial pursuits and recognition of patents, industry collaboration, spin-off mentorships and spin-off creation in academic evaluations, is essential. Promoting a cultural shift within research institutions to value commercial impact alongside academic outputs can be achieved through strategic policy support and incentives for researchers.

To improve Ecosystem Awareness and Development, awareness programs should be created to raise awareness among investors and support organizations about the unique aspects and potential of deep tech ventures. Fostering openness to international collaborations by learning from more established ecosystems, such as Oxford or Silicon Valley, and actively seeking partnerships with international deep tech support environments is also important. Additionally, improving national support structures to better assist scale-up companies during their rapid growth phases can be achieved through better connections with international support organizations.

Policy and Regulatory Support should focus on advocating for streamlined and coherent regulatory policies that support deep tech commercialization without overburdening ventures with contradictory requirements. Implementing favorable tax laws and regulations that enable successful entrepreneurs to invest in startups rather than opting for conventional investments is also crucial.

For Continuous Improvement and Adaptability, training programs should be iterated annually with a focus on continuous improvement, adapting to the evolving needs of deep tech ventures. Tailored mentoring initiatives reflecting best practices from successful deep tech programs should complement standard programs.

6. | APPENDIXES

APPENDIX 1

Interviewee and Roundtable Discussion's Profiles

Names of the interviewees - experts	Profile
Urša Jerše Ursa Jerse - LinkedIn	Head of Knowledge Transfer Office at the University of Ljubljana. Legal counselling in intellectual property matters, responsible for the patent portfolio, drafting and revising licences, R&D, NDA and other intellectual property agreements.
Tina Mesarič, PhD Tina Mesaric - LinkedIn	Head of TTO at the University of Maribor. KTO has 9 employees and simultaneously juggle with many projects, some are not connected to the core of KTO. They have limited experiences with support to DT companies. Actually no cases with DeepTech Spinouts at UM, but they do commercialize DeepTech technologies – fairs, direct calls, technology offers.
Jure Vindišar, MSc. Jure Vindisar - LinkedIn	Head of Technology transfer office at National institute of biology.
Robert Blatnik, MSc Robert Blatnik | LinkedIn	Head of the Office for Substantive Project Support, Technology Transfer and Innovation. Coordinator of formation of spin-out companies at Josef Stefan Institute
Mateja Košir Mateja Košir | LinkedIn	Started to think about DeepTech during PhD studies and especially but intensified during last 5 years. At ZAG (Slovenian National Building and Civil Engineering Institute) she covers EIT (European Innovation Technologies) activities. Focus on the EU industrial and raw material self-reliance. A lot of technologies in the sector, herself in the sector of industrial and mining waste. In the waste a lot of critical raw material, rear earths, magnets etc. recycling technologies are highly needed, ZAG subspecialize in a reuse of recycled materials in construction. As a project leaders involved in a project of a recycling of a dangerous material in aluminum production. The result is a pilot facility and licensing agreement to further commercialize via DeepTech.
Mitja Ruzzier, PhD Mitja Ruzzier - LinkedIn	Entrepreneurship: leadership roles before coming to academia, during academia founding member of a DeepTech company AmiBit d.o.o., 5 years then exit, business development, product-market fit Professor/Lecturer: full professor, PhD, Head of Department for Entrepreneurship, University of Primorska, author of

	several books and renowned scholar in entrepreneurial community, strategic advisor (innovation, marketing Investor: business angel investor in several startup/DeepTech companies
Names of the interviewees – educators / incubators / investors	Profile
Blaž Zupan, PhD Blaz Zupan - LinkedIn	Professor of Entrepreneurship at SEB UL Entrepreneur, Investor, Design Thinking & LEAN Consultant.
Špela Rozman Dolenc Spela Rozman Dolenc | LinkedIn	Project Manager with 5 years of experience in programs supporting Deep Tech (Labs to Market, CogSteps). Financing mainly by projects that aid the development of support for Deep Tech. Differentiation from other incubators and support systems (DeepTech focus for the last 3 years). Development in the field across EU, learning hands-on about the support for Deep Tech. Certified Market Opportunity Navigator and Innovation 360 Yellow Belt trainer.
Rok Stritar, PhD Rok Stritar | LinkedIn	Teacher and Research Assistant at the Faculty of economics, University of Ljubljana (till 2016). Founder and Chief Developer at the company Kibuba. Design thinking, Lean management and IT Consultant. Mentor to start-ups.
Damijan Miklavcic, PhD Damijan Miklavcic LinkedIn	Educator: Course: Development of a product or a service (prototyping, IP protection). Owner of several patents, that have been licenced to the industry. Co-founder of a spin-out company MPor. Mpor develops various signal generators, applicators, and meters that are used in the field of biomedicine and biotechnology. The company is specialized in the development of high-voltage pulse generators or electroporators, which generate pulses up to a few kilovolts and hundreds of amperes and duration from a few nanoseconds to several milliseconds.
Janez Gorenc Janez Gorenc - LinkedIn	For the past 12 years, he has led the entrepreneurial club at Novo Mesto High School. Additionally, he serves as an assistant at the Faculty of Economics, University of Ljubljana, and as an entrepreneurial mentor at the Podbreznik Business Incubator. Throughout his mentorships, he has gained extensive experience. Our work with students is particularly impactful, highlighted by the ScienceJam project. This initiative supports the preparation of numerous research theses with practical applications, offering students valuable evaluation opportunities through competition.
Jernej Ženko Jernej Ženko - LinkedIn	6 years ago worked as a researcher at the FERI, University of Maribor. Very experienced with developing hardware products. After that he started to work with Katapult (He is CTO of Katapult). In Katapult they focus mainly on hardware products, because they have knowledge and skills to produce hardware (legacy of a Dewesoft, mother company).

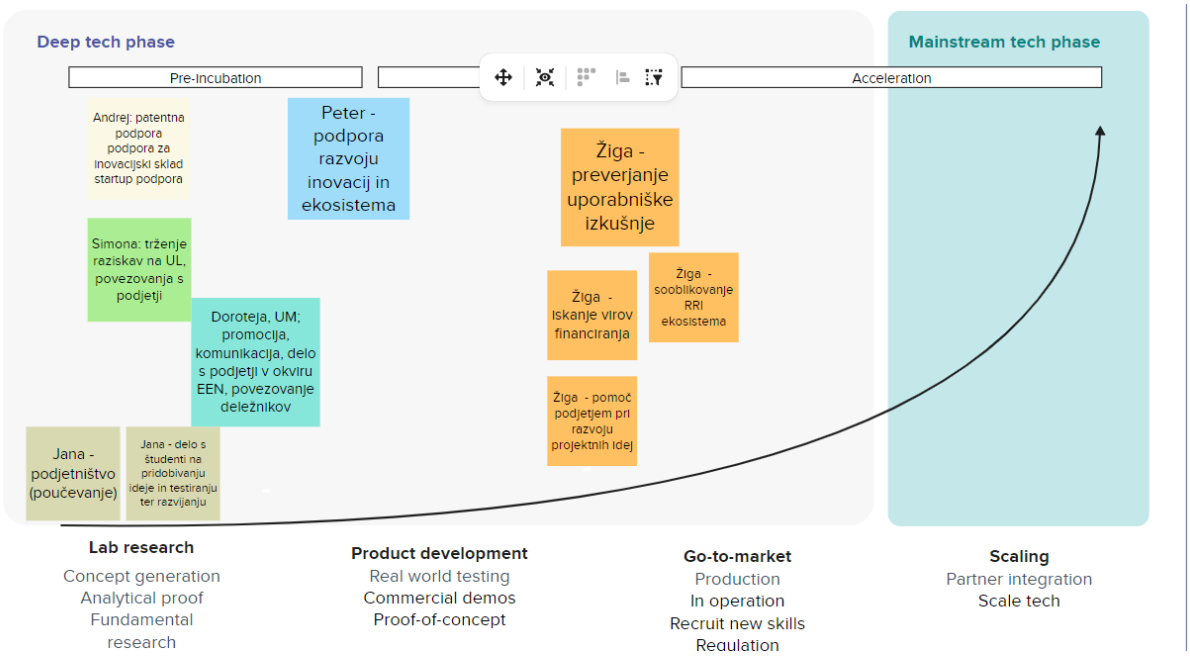
	Jernej is a mentor, especially focusing on technical parts and sales. Most of a mentored individuals are engineers. Katapult does not “work” for them (core development), they provide counseling and expertise services (industrialization, logistics, CE certification, law and accounting office etc.).
Andrej Kos, PhD Andrej Kos - LinkedIn	Professor at Faculty of Electrical Engineering, University of Ljubljana. Interdisciplinary study programme (Interdisciplinary challenges of the industry). President of the Innovation committee at University of Ljubljana. Member of the EUA Expert Group on Innovation.
Nina Dremelj Nina Dremelj - LinkedIn	Head of Business Angels Slovenia, Business angel herself, Principle at Vesna Venture Capirtal. Several investments in DeepTech and “regular” startups, experience with mentoring founders and teams, also resarchers becoming entrepreneurs.
Tomaž Bizjak Tomaz Bizjak - LinkedIn	Tomaz has experiences in start-up creation, Tech transfer at National institute of Chemistry of Slovenia (KI). He is the co-founder and CEO at DT spin-off ReCatalyst. ReCatalyst develops, produces, and supplies customizable next-generation platinum-alloy catalyst solutions with the mission to optimize the usage of your precious metals. In 2023 the company received 2,5 million EUR from Eutopean Innovation Council - Transition and later also 1.7 million EUR investments.
Matija Gatalo, PhD Matija Gatalo - LinkedIn	Co-founder, CTO at ReCatalyst. Matija is main inventor of ReCatalyst’s core technology, 10 years in fuel cell catalysts development. ReCatalyst develops, produces, and supplies customizable next-generation platinum-alloy catalyst solutions with the mission to optimize the usage of your precious metals. In 2023 the company received 2,5 million EUR from Eutopean Innovation Council - Transition and later also 1.7 million EUR investments.
Urban Lapajne Urban Lapajne - LinkedIn	Urban joined the Tovarna Podjemov team in 2003. At the time he started with basic mentoring to startups, but in the last 10 years he has an extensive experience mentoring DeepTech teams coming from University of Maribor background or companies that are included in support of SPS (Slovenian Entrepreneus fund) – like P2, SK50, SK75, SK200 etc. He mentored about 50 companies that had strong footing in DeeptTech.
Names of the roundtable participants	Profile
Jana Hojnik, PhD Jana Hojnik - LinkedIn	Associate professor and researcher of entrepreneurship at Faculty of Management. Working in the technology transfer office at University of Primorska.
Žiga Lampe Ziga Lampe - LinkedIn	Director of Strategic development at Chamber of Commerce and Industry of Slovenia, experienced entrepreneur.

	Developing tools and instruments for University – Business collaborations.
Andrej Černetič, MSc.	Adviser for the identification and protection of intellectual property (for the field of technical sciences), working the Knowledge transfer office, UL.
Doroteja Novak	Works in the Knowledge and Technology transfer office at the University of Maribor. The office supports innovative researchers and students who want to protect and economically exploit the potential of their innovations. At the same time, it acts as an entry point for companies looking for technologies and know-how or project partnerships. Its main mission is to encourage and support various forms of knowledge transfer to the economy and thus to the wider society.
Names of the questionnaire respondents (that informed us about their replies)	Profile
Luka Mali Luka Mali - LinkedIn	Head of makerspace at Faculty of Electrical engineering. 20 years of experience in IoT, as an innovator, mentor, and tech visionary, turning futuristic ideas into today's innovations. He holds a blend of expertise in project management, academia and a knack for product development.
Maša Abrič Masa Abric - LinkedIn	Navigated the startup landscape at Ljubljana university incubator. She is a Founder, a Startup Mentor dedicated to guiding the next generation and she is connecting minds within the ecosystem, weaving a tapestry of collaboration and innovation.
Leon Pavlič Leon Pavlic - LinkedIn	EN internationalization advisor and project manager at Centre for Development and Knowledge Transfer, University of Primorska, Faculty of management
Tanja Senekovič Tanja Senekovic - LinkedIn	Experienced Business-support & Innovation Expert. Skilled in Business Planning, Business Process Improvement, Operations Management, Project Portfolio Management, and Management Consulting.
Polona Juvančič Polona Juvancic - LinkedIn	As Head of Department for Spin-out Creation, she provides (1) Support in the preparation of applications for start-up tenders and competitions; (2) Advice in the preparatory phases of the entrepreneurial process; (3) Assistance in finding partnerships and creating a business model

APPENDIX 2

Printscreens from the Round table (Murial collaboration tool)

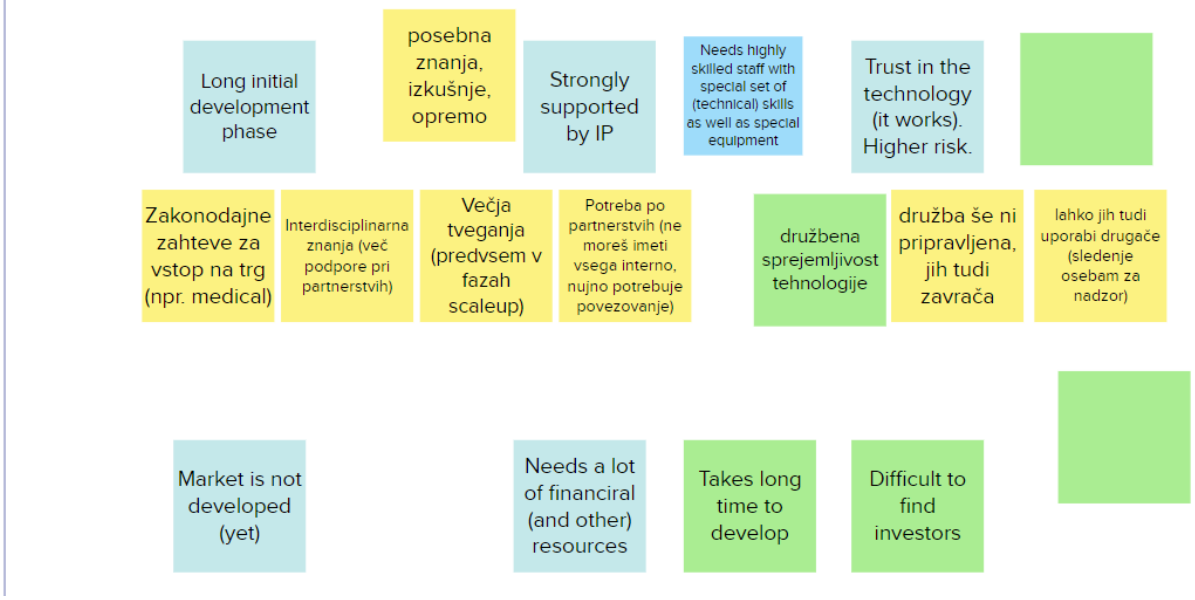
Expertise of the participants



Uniqueness of deep tech ventures

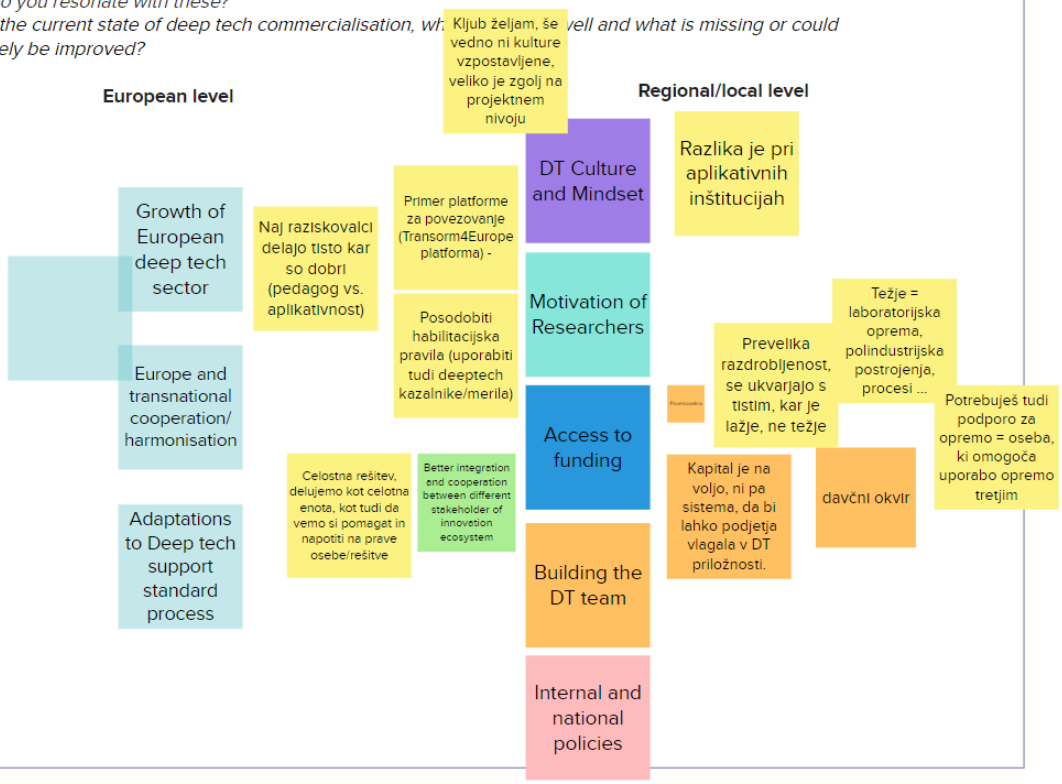
Below you can see researched elements distinguishing the deep tech commercialisation phase from the standard tech one. How do you resonate with these?

What adaptations can be developed for each element to better support the deep tech commercialisation?



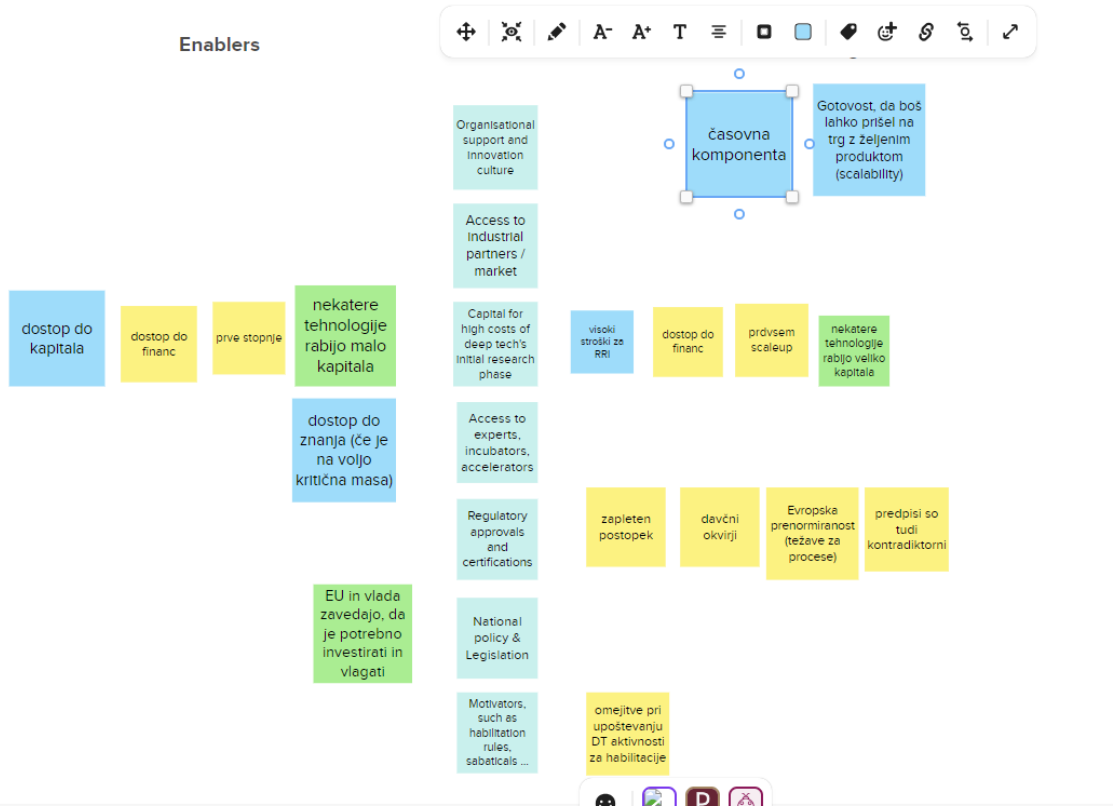
Below you can see insights from teh current state of deep tech on a European and regional level.

How do you resonate with these?
Given the current state of deep tech commercialisation, wh vell and what is missing or could definitely be improved?



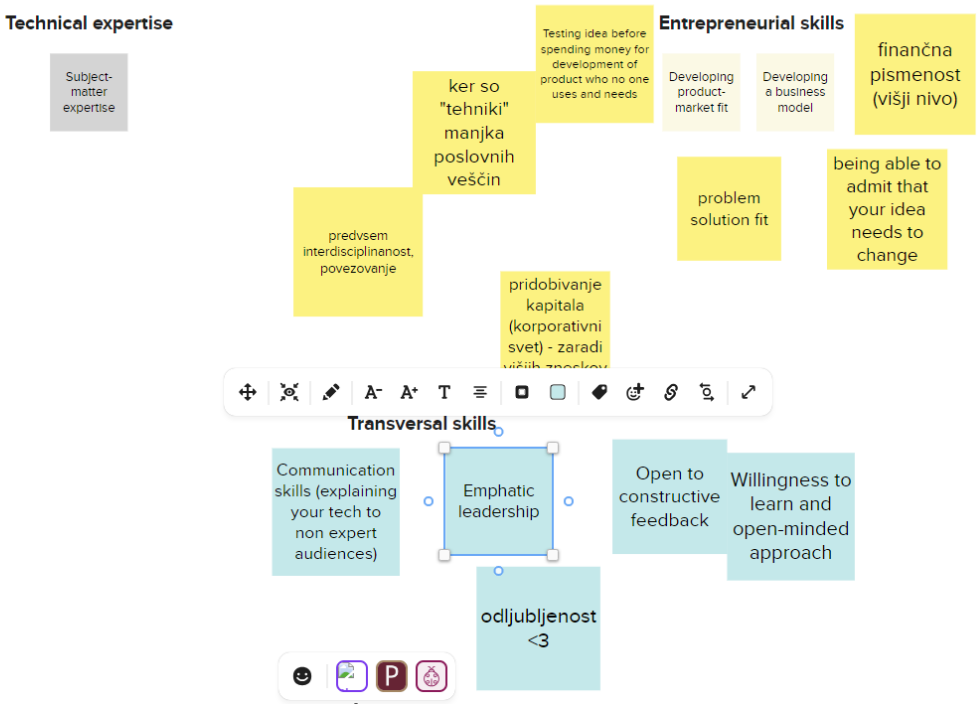
can see the main researched elements that under different conditions/in different regions act as common enablers or challenges for deep tech commercialisation.

How do you resonate with these?
In your region, do you recognise them as enablers or challenges?



Below you can see some major researched knowledge, skills and attitude gaps for academics talent pursuing deep tech commercialisation of their research.

How do you resonate with these?
In your region, have you encountered these gaps in academics/talent?



4 | Research into practice: how to support deep tech

*How could the **different elements of the conducted research be utilised** to create educational and incubation programmes to support deep tech ventures? (The DTLaunchpad initiative will design 4 such educational and incubation programmes, see below.)*

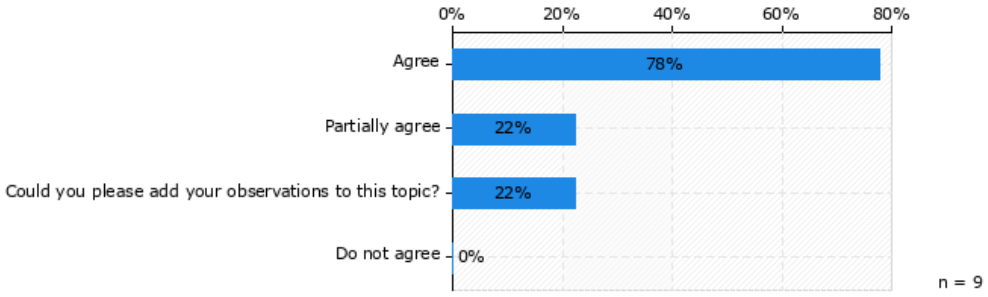
APPENDIX 3

The additional questionnaire “DT environment in Slovenia” and answers.

DT Environment in Slovenia, additional questionnaire

The Deep Tech commercialization process is more complex than standard tech commercialization.

(n = 9)

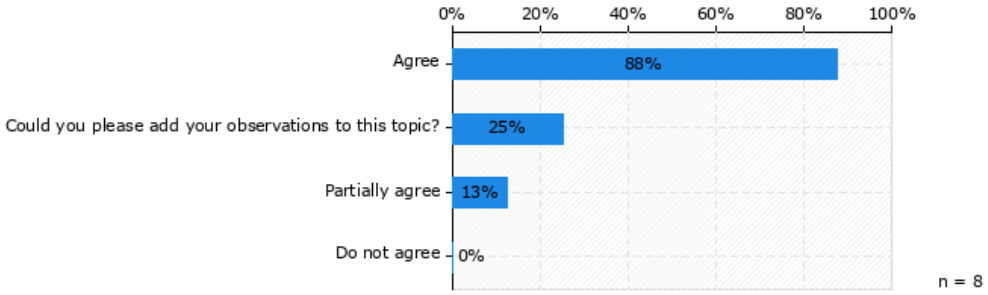


Additional observations:

- it depends on the product. there are products in the deep tech sector that are right away ready to use and you can commercialize it no problem. there are ont he other hand products that need a lot more ip and brokerage care.
- any process where you search for applications and market post factum is difficult. the more novel and disruptive the technology is, the harder it is.

Deep Tech Ventures require longer timeframes for development and commercialization due to the need for extensive research, prototyping, and regulatory approvals.

(n = 8)

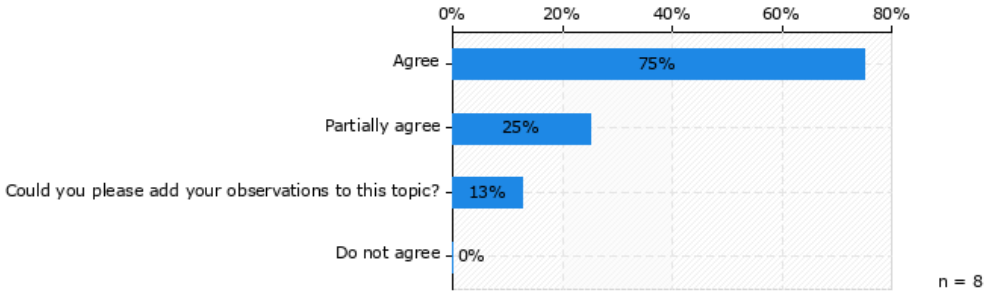


Additional observations:

- indeed, as it usually is the case that nothing is adapted to the new tech
- the same as previous.

Deep Tech Ventures require higher investment, both in terms of financial resources and specialized equipment.

(n = 8)

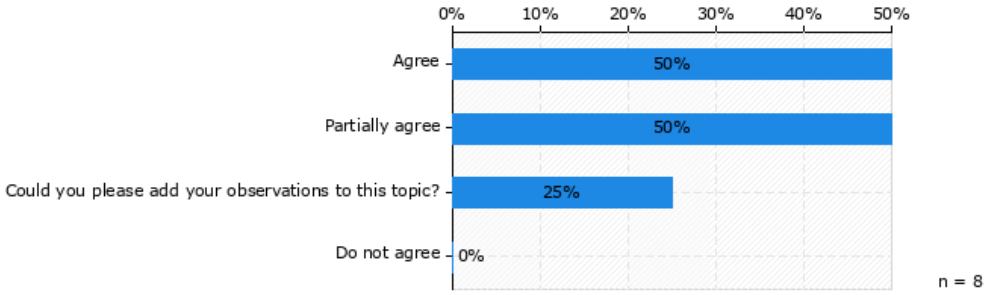


Additional observations:

- i do not think that it is only the amount of money. it is also how accessible it is, how much administration it requires etc. there is also a big threat of supporting something financially, thus creating a false sense of success - deep tech companies to need to have product-market fit. too much investment can delay that

Due to high risk in DT ventures, there is limited room for pivoting, especially in the B2B sector where there are fewer target companies.

(n = 8)

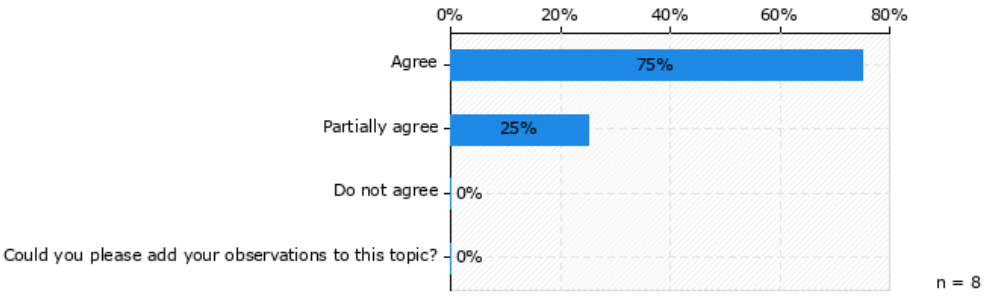


Additional observations:

- depends on the circumstances. i am a firm proponent of pivoting, as there is always room for adjustment and improvement. while there may be additional costs associated with pivoting, the opportunity to adapt and evolve should always be considered.
- not sure i understand. pivoting is different for deep tech, but all the more important as one is in a sense creating a market, sisrupting established markets…

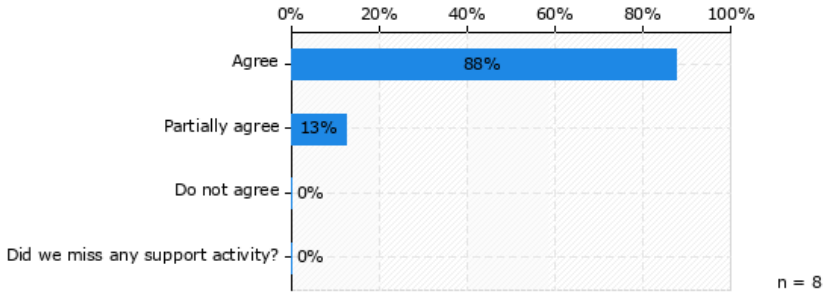
Traditional Tech Ventures generally have shorter development cycles and lower initial investment requirements, especially in sectors like software development where rapid prototyping and quick market entry are possible.

(n = 8)

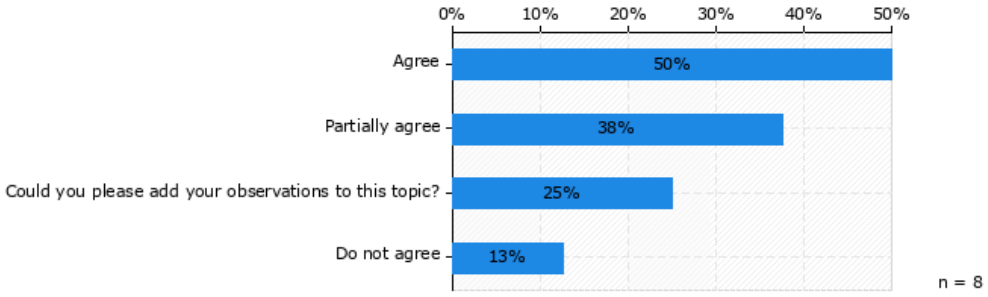


The DT commercialization typically involves several stages from ideation to market entry. This includes support activities, such as legal counselling on intellectual property, patent portfolio management, drafting and revising licences, creating R&D agreements, searching for business partners, ...

(n = 8)



Building market trust in the DT technology is crucial due to the high stakes involved. Proving the concept and technological viability requires significant effort and resources. (n = 8)

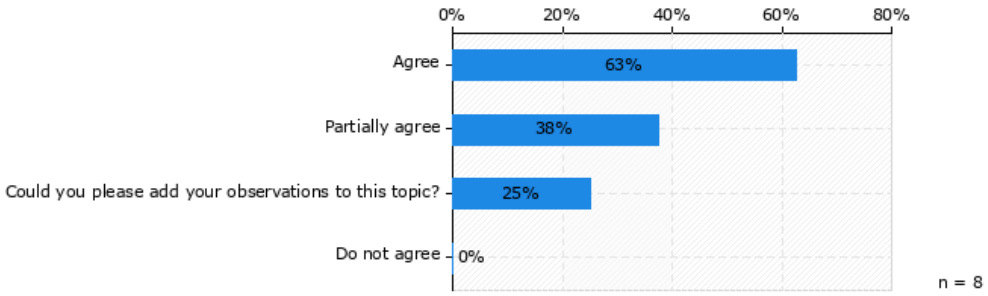


Additional observations:

- it depends on the shareholders and stakeholders
- building market trust is a critical challenge for every new company, regardless of whether it operates in deep tech or other industries. establishing this trust typically requires a substantial amount of time and consistent effort.

Traditional Tech Ventures often face fewer challenges in building market trust, as the technologies are typically less disruptive and more easily understood by potential customers and investors.

(n = 8)



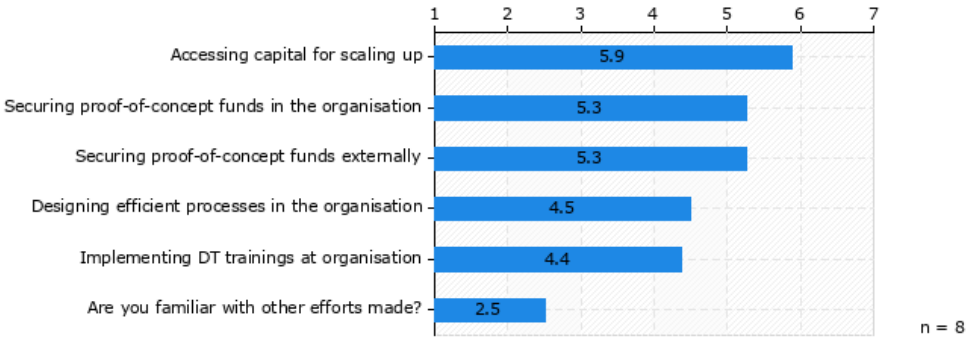
Additional observations:

- building market trust is a critical challenge for every new company, regardless of whether it operates in deep tech or other industries. establishing this trust typically requires a substantial amount of time and consistent effort.
- i would have to see a difference in what is meant by traditional tech venture and a deep tech venture, but generally, the more novel,unknown,unprecedented the science/tech behind the venture, the harder it tends to be.

In your experience, how severe are the following bottlenecks in the standardisation of the Deep Tech commercialization process?

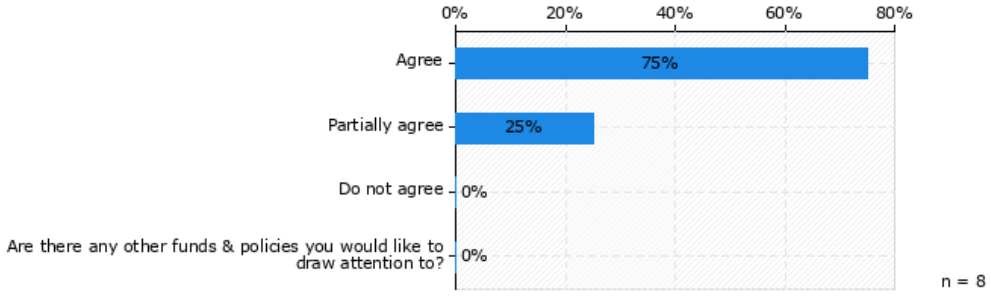
(1 means not severe, 7 means very severe)

(n = 8)

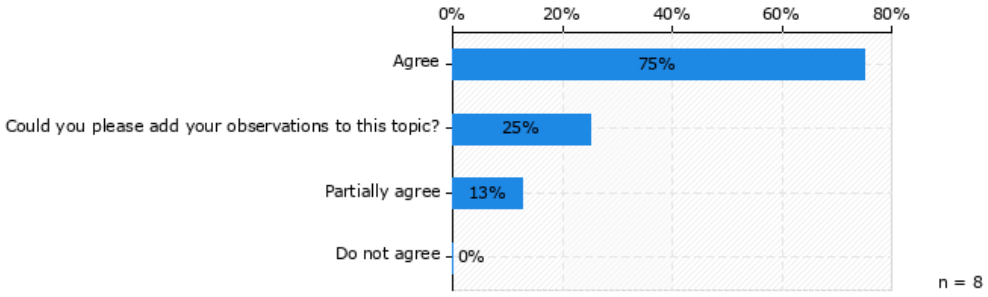


Deep Tech commercialization policies and frameworks include regional funds, national innovation agencies, and European Innovation Council funding.

(n = 8)



There is a need for more institutional measures (such as favourable habilitation criteria, sabbaticals ...) to motivate researchers and facilitate the DT commercialization process. (n = 8)

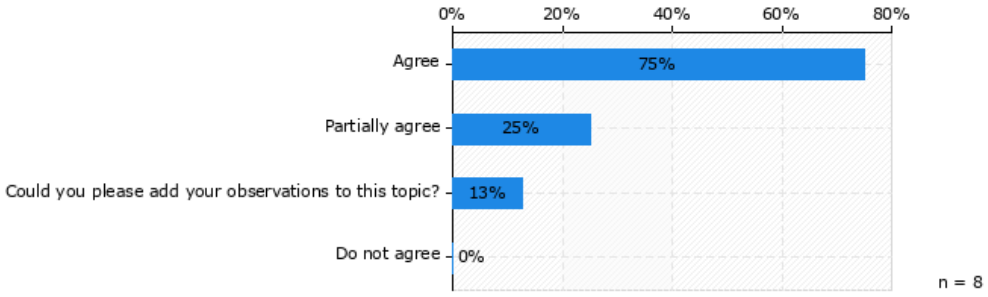


Additional observations:

- lack of business orientation in rdi sector in slovenia
- overall, by implementing these institutional measures, we can create an environment that not only motivates researchers but also streamlines the dt commercialization process, leading to more innovative solutions reaching the market.

Regulatory approvals and certifications in Deep Tech are particularly critical and challenging, often requiring significant investments of both time and resources.

(n = 8)

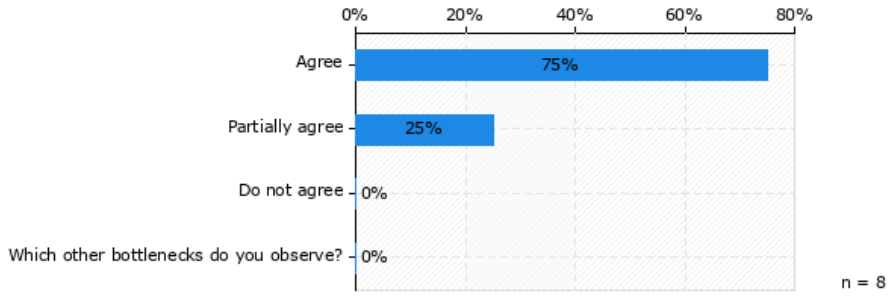


Additional observations:

- streamlined processes, support programs, and expert guidance can help. increasing financial opportunities, such as venture capital and government grants, also assist in navigating these requirements. in slovenia, there are many such opportunities, and in my opinion, they are growing each year. leveraging these resources helps bring innovations to market more efficiently, benefiting society.

Major bottlenecks identified in the DT process include designing an efficient organizational and regional process, accessing sufficient proof-of-concept (POC) funds, and obtaining capital for scaling up.

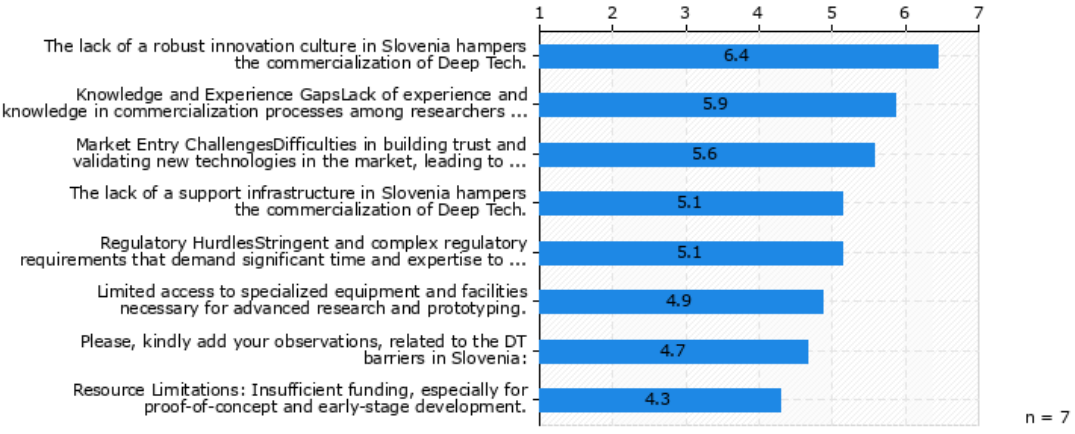
(n = 8)



From our analysis, we've identified the following common barriers of deep tech commercialisation. In your opinion, how severe are these barriers?

(1 means not severe, 7 means very severe)

(n = 7)



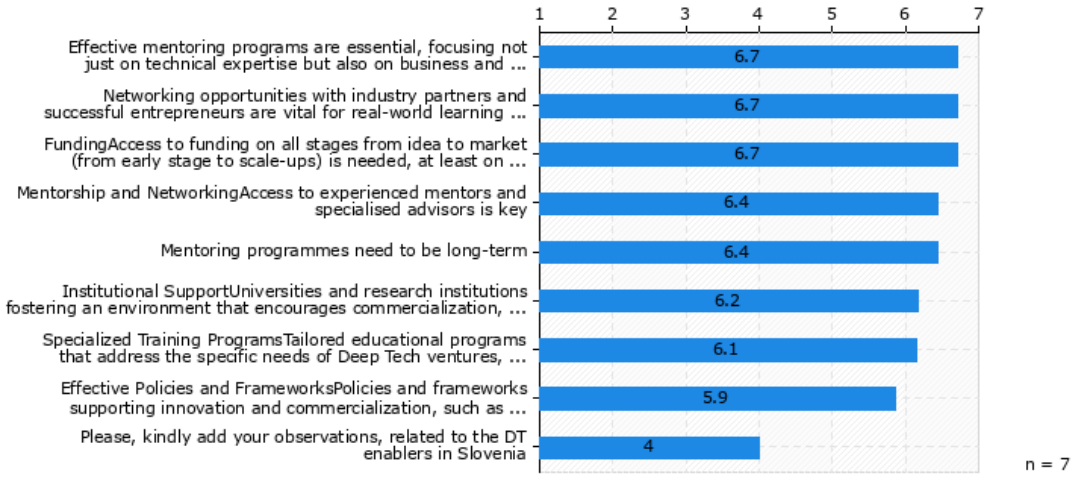
Additional observations:

- lack of ambition and lack of possibility to have a research career oriented towards commercial success
- lack of dt culture

From our analysis, we've identified the following common enablers of deep tech commercialisation. In your opinion, how important are these enablers?

(1 means not important, 7 means very important)

(n = 7)



Additional observations:

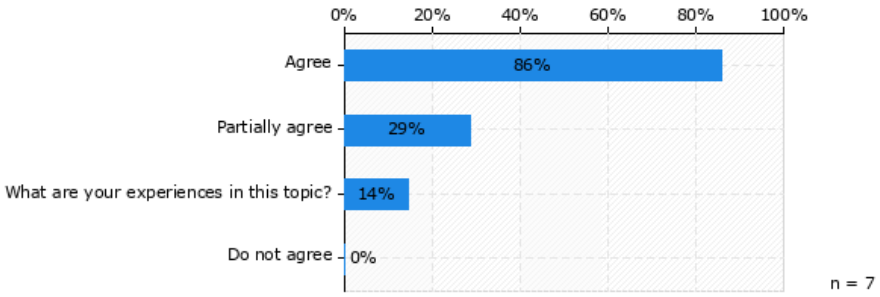
- researchers need the freedom from teaching and other obligations. perhaps a separate career path for innovation/commercialisation….

Knowledge, skills and attitudes for talent to pursue deep tech commercialisation

Current tech-entrepreneurship training programs are generally similar across universities and incubators.

They need to be adapted to be specifically tailored to deep tech ventures, for example by focusing on more practical exercises and addressing the unique challenges of deep tech commercialisation.

(n = 7)

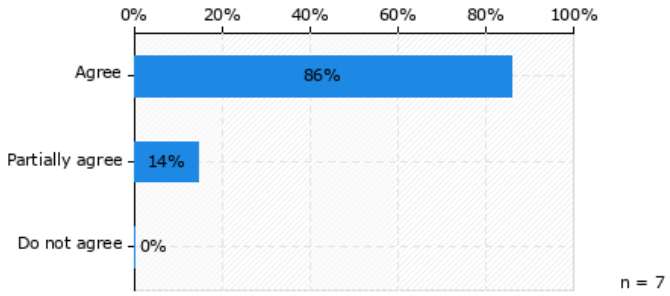


Additional observations:

- i believe that programs should be iterated annually with a focus on continuous improvement. adopting a \‘one-size-fits-all\‘ approach often results in a solution that satisfies no one. instead, a foundational standard program should be complemented by tailored mentoring initiatives, reflecting best practices observed in successful deep tech programs

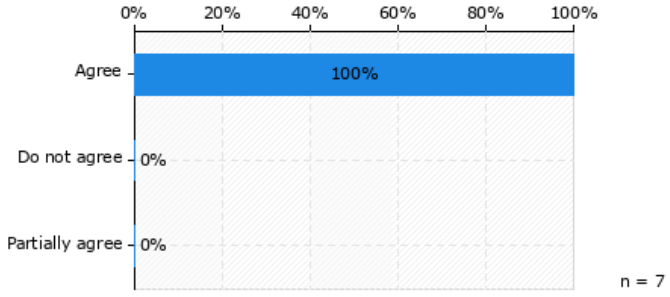
Expertise in relevant scientific and technological fields is essential for DT. Researchers must be able to conduct advanced research and understand the intricacies of their innovations.

(n = 7)



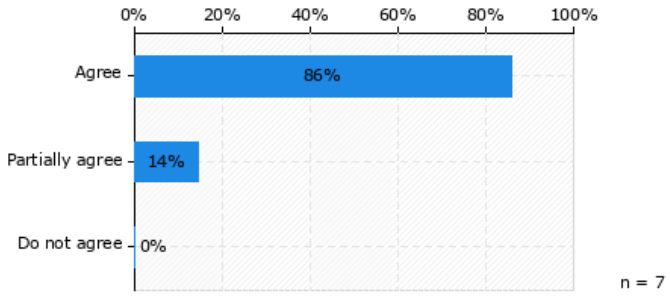
Understanding the business aspects of commercialization, including market analysis, business planning, and fundraising is essential. Entrepreneurial skills are critical for navigating the commercialization process and driving ventures forward.

(n = 7)



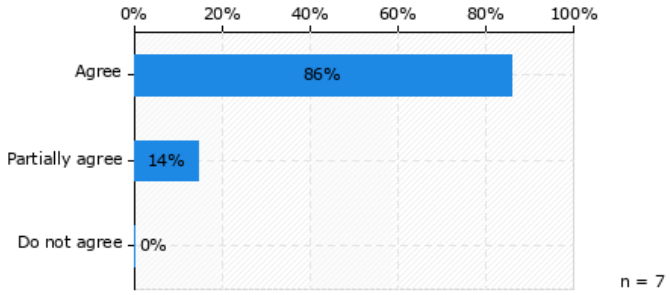
Communication, negotiation, and leadership skills are vital. These skills enable researchers to articulate their ideas, negotiate with stakeholders, and lead their ventures effectively.

(n = 7)



The commercialisation process is associated with challenges and setbacks. Perseverance and the ability to adapt to changing circumstances are crucial for success.

(n = 7)



Collaboration with industry partners, investors, and mentors is essential. A collaborative mindset helps in leveraging external expertise and resources, thereby enhancing the commercialization potential of Deep Tech ventures.

(n = 7)

What other skills and competences in DT do you see as important?

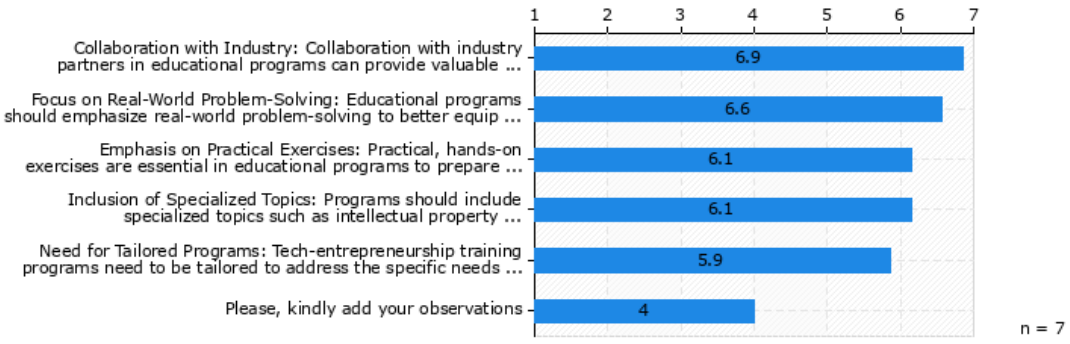
- communication skills, empathy, conservatism at introducing novel tech if not proven safe
- fast response to changes
- skills of tt staff and university in general. we should create an environment that enables those that want to be innovative to do so and not push everybody towards that. recognise, hone and enable. not every scientist is a teacher, nor an inventor. inter and multidisciplinarity and several career track
- options are essential
- i believe that soft skills—such as team navigation and effective communication—are crucial. in my experience, researchers often struggle with trust within their teams. ultimately, the success or failure of a startup hinges on the cohesion of its team, not just in deep tech but universally. additionally, the ability to present and perform effectively is paramount.

Which DT training programmes in Slovenia (and EU) are you familiar with?

- eurydice
- vesna POC fund
- deep tech hub katapult
- none since i do not work in the DT sector
- deep tech hub - slovenski deep tech pospeševalniški program
- eit jumpstarter, sio (mentorship), from labs to market, commercialization reactor, startup klinika, eit venture program, deep tech talent initiative,...

What would a perfect DT training programme look like? Please rate the elements of training that have emerged from our analysis.(1 means - not important, 7 means very important)

(n = 7)



Additional observations:

- communication of ideas, enthusiasm, negotiation skills,

What specific skill gaps exist in the current overall Deep Tech sector?

- Specific career path, not measured with teaching and articles….
- Funds
- Issue of inclusiveness to such DT environments (thresholds to pass before becoming a member of community)
- I am not informed
- A gap between business and tech skills
- interdisciplinary collaboration: deep tech innovations require skills in team management, communication, and cross-disciplinary collaboration. presentation and communication: communicating complex ideas effectively to stakeholders, including investors and the public, remains challenging.
- Business / capitalisation & commercialisation skills

In your opinion and expertise, how can these gaps be addressed?

- by enabling targeted support programmes and trainings to raise the business competencies of tech experts and tech competencies of business experts
- new career path created
- national tenders
- these aspects should be integrated into dt programs. moreover, they will evolve over time as best practices continue to improve. it is a gradual process, but in my opinion, the situation is steadil y improving.
- building the bridge between rdi & business sector
- fostering culture of cooperation?
- only with international connections and trainings

DT LAUNCH PAD

Enabling Deep Tech Entrepreneurship

Poročilo o

Komercializaciji globokih tehnologij (ang. Deeptech) Slovenija

www.dtlaunchpad.eu

Co-funded by the European Union

VSEBINA

Co-funded by the European Union

This project has been funded with support from the European Commission. The author is solely responsible for this publication (communication) and the Commission accepts no responsibility for any use may be made of the information contained therein. In compliance of the new GDPR framework, please note that the Partnership will only process your personal data in the sole interest and purpose of the project and without any prejudice to your rights.

Avtorji

Simona Rataj (Univerza v Ljubljani)

Polona Juvančič (Univerza v Ljubljani)

Peter Alešnik (Univerza v Ljubljani)

Poročilo o komercializaciji DT tehnologij Slovenija je bilo pripravljeno s strokovnimi prispevki naših intervjuvancev, udeležencev okrogle mize in strokovnjakov, ki so odgovorili na vprašalnik o DT: Urša Jerše, Robert Blatnik, Tina Mesarič, Jure Vindišar, Mateja Košir, Andrej Kos, Blaž Zupan, Rok Stritar, Špela Rozman Dolenc, Mitja Ruzzier, Polona Juvančič, Damijan Miklavčič, Janez Gorenc, Jernej Ženko, Nina Dremelj, Tomaž Bizjak, Matija Gatalo, Luka Mali, Tanja Senekovič, Leon Pavlič, Andrej Černetič, Doroteja Novak, Žiga Lampe, Jana Hojnik, Urban Lapajne.

Financira Evropska unija. Stališča, predstavljena v poročilu, so stališča in mnenja izključno avtorjev in ne odražajo nujno stališč in mnenj Evropske unije. Niti Evropska unija niti organ, ki je odobril sredstva, zanje ne odgovarjata.

Slovar

DT: Deep Tech, Globoke tehnologije

HEI: Higher Education Institutions, Visokošolski zavodi in Univerze

IP: Intellectual Property, Intelektualna lastnina

KTO: Knowledge Transfer Office, Pisarna za prenos znanja in tehnologij

POC: Proof of Concept**,** potrditev koncepta

PRO, JRO: Public Research Organisation, Javna raziskovalna organizacija

TRL: Technology Readiness Level, stopnja tehnološke pripravljenosti

UL: Univerza v Ljubljani

SPIN-OFF: Odcepljeno podjetje

1 | UVOD IN ZAKONODAJNE OSNOVE

O projektu DTLaunchPad

Projekt **Deep Tech Innovation Launch Pad (DTLaunchPad)** si prizadeva omogočiti evropsko skupnost globokih tehnologij (Deep Tech) preko vzpostavitve koordiniranih podpornih storitev, gradnje kapacitet za razvoj DT talentov znotraj sodelujočih visokošolskih zavodov (HEI) ter spodbujanja mednarodne izmenjave znanja. Projekt udeležencem nudi tudi priložnost za zagon in trajnostno rast DT zagonskih podjetij.

Natančneje, projekt DTLaunchPad raziskuje potrebe in priložnosti za deep tech na sodelujočih visokošolskih zavodih in inkubatorjih preko primarnih in sekundarnih raziskav ter pregleda obstoječih sredstev in infrastrukture. Poleg tega bo omogočil evropske talente na področju DT preko niza storitev »Deep tech na trg«, vključno z izobraževalnim programom, (pred)inkubacijskimi in pospeševalnimi storitvami, mentorstvom in peer-to-peer izmenjavo, skupaj s pilotno izvedbo teh programov s sodelujočimi DT ekipami in inkubiranimi/rastočimi podjetjiv vsaki partnerski regiji z naborom mentorjev.

Projekt bo ustvaril platformo za zbiranje in predstavitev priložnosti vezanih na DT, s ciljem spodbujanja mednarodnega timskega dela in zbiranja virov. S projektnimi aktivnostmi bomo dvignili zavest o poti razvoja DT: preko uvodnih izobraževalnih videov »Uvod v globoke tehnlogije (DT)«, serijo mini delavnic ter promocijskih dogodkov. Združili bomo evropsko DT skupnost, da bodo lahko udeleženci predstavili svoje ideje in jih izpostavili potencialnim finančnim telesom, kar bo kulminiralo na sejmu financiranja s 100+ udeleženci iz vse Evrope.

V sklopu **delovnega paketa 2 (WP2)** projekt DTLaunchPad stremi k naprednemu razumevanju potreb DT skupnosti v Evropi, še posebej na partnerskih visokošolskih institucijah, ter k vzpostavitvi močne baze znanja za nadaljnje delovne pakete, zlasti za načrtovanje in implementacijo storitvenega paketa na trgu (WP3) in dvig zavesti (WP7).

Da bi dosegli svoj cilj, WP2 vključuje:

- Identifikacijo (preko pregleda literature, pregled sredstev in infrastrukture, intervjujev in nacionalnih okroglih miz) in opisovanje edinstvenosti procesa DT komercializacije, vključno s potrebnimi prilagoditvami standardnega procesa vrednotenja raziskav ter potrebnimi podpornimi storitvami in spretnostmi za DT komercializacijo.
- Prizadevanje za razumevanje trenutnih priložnosti DT komercializacije v Sloveniji ter gonil in izzivov, povezanih s komercializacijo DT rešitev.

- Identifikacijo, opisovanje in prioritizacijo veščin, potrebnih za talente na področju DT v Sloveniji, da bi se lahko usmerili na vzpostavitev DT podjetij.
- Določanje fokusa in obsega nadaljnjih projektnih aktivnosti.

Regionalna DT politika

V zadnjih letih je Slovenija izkusila opazno politično nestabilnost, saj več zaporednih vlad ni uspelo dokončati svojih mandatov. Vlada pod vodstvom Mira Cerarja (2014-2018) je predčasno odstopila, sledila ji je administracija Marjana Šarca (2018-2020), ki se je prav tako končala predčasno, kar je pripeljalo do vlade Janeza Janše (2020-2022), ki se je soočala z velikimi izzivi in protesti. Najnovejša administracija Roberta Goloba (od 2022 dalje) se prav tako sooča s težavami pri zagotavljanju kontinuitete. Ta nestabilnost je ovirala sprejemanje trajnostnih politik, zlasti v ekosistemu zagonskih ter deep tech podjetij. Na primer, Akcijski načrt za zagonska podjetja, ki je bil pripravljen pod Cerarjevo vlado, zaradi njenega predčasnega odstopa ni bil nikoli v celoti izveden. Podobne težave so pestile tudi druge strateške pobude. Zaradi nepredvidljivega političnega okolja je prišlo do ovir pri dolgoročnem načrtovanju in investiranju, kar vpliva na rast podjetniškega ekosistema v Sloveniji.

Kljub temu se je v zadnjih letih stalno povečevala zavest o pomenu DT sektorja. Začelo se je s prvimi podporami politik (kot je Valor v letu 2010) in financiranjem projektov za ustanovitev pisarn za prenos tehnologij na javnih raziskovalnih organizacijah (razpisa 2013-2014 in 2017-2022).

V nadaljevanju predstavljamo nekaj strateško pomembnih zakonodajnih dokumentov.

Strategija razvoja Slovenije 2030

Strategija razvoja Slovenije 2030, sprejeta leta 2017, si prizadeva zagotoviti visoko kakovost življenja s pomočjo uravnoteženega gospodarskega, družbenega in okoljskega razvoja. Strategija določa pet strateških usmeritev: spodbujanje vključujoče družbe, spodbujanje vseživljenjskega učenja, razvoj visoko produktivnega gospodarstva, ohranjanje naravnega okolja in zagotavljanje učinkovitega upravljanja. Ključni cilji, povezani z DT, vključujejo krepitev znanja in veščin, spodbujanje konkurenčnega in družbeno odgovornega podjetniškega sektorja, ustvarjanje kakovostnih delovnih mest in prehod na nizkoogljično krožno gospodarstvo.

Platforma za prenos tehnologij v Srednji in Vzhodni Evropi (CEETT)

Leta 2021 je Slovenska investicijska banka (SID) v partnerstvu z Evropskim investicijskim skladom (EIF) in Hrvaško banko za obnovo in razvoj (HBOR) ustanovila platformo za prenos tehnologij v Srednji in Vzhodni Evropi (CEETT). Ta pobuda podpira obetavne projekte prenosa tehnologij iz javnih raziskovalnih organizacij v Sloveniji in na Hrvaškem,

ki niso dovolj zreli za tradicionalni tvegani kapital. Platforma si prizadeva premostiti vrzel med odličnimi raziskovalnimi rezultati in pomanjkanjem finančnih virov za komercializacijo DT rešitev.

Zakon o znanstvenoraziskovalni in inovacijski dejavnosti

Zakon o znanstvenoraziskovalni in inovacijski dejavnosti, sprejet leta 2021, si prizadeva ustvariti ugodne pogoje za sodoben, javno financiran znanstvenoraziskovalni in inovacijski sistem. Zakon podpira družbeni in gospodarski napredek, izboljšuje kakovost življenja in krepi nacionalno identiteto. Omogoča pridobivanje in prenos novih znanj in veščin, krepi mednarodno sodelovanje ter spodbuja razvoj znanstvenih karier. Zakon prav tako opredeljuje mehanizme financiranja znanstvenoraziskovalne in inovacijske dejavnosti, vključno s stabilnim financiranjem, javnimi razpisi ter podporo za mednarodno sodelovanje in razvoj infrastrukture.

Resolucija o znanstvenoraziskovalni in inovacijski strategiji Slovenije do leta 2030

Leta 2022 je Državni zbor sprejel Resolucijo o znanstvenoraziskovalni in inovacijski strategiji Slovenije do leta 2030. Ta ključni strateški dokument usmerja oblikovanje politik na področju raziskav, razvoja in inovacij za naslavljanje družbenih izzivov. Resolucija si prizadeva postaviti Slovenijo kot družbo, ki temelji na znanju in inovacijah, z javnimi investicijami v raziskave in inovacije, ki bodo do leta 2030 dosegle 1,25 % BDP, ter skupnimi investicijami, ki bodo dosegle 3,5 % BDP. Osredotoča se na učinkovito upravljanje, povečanje investicij, razvoj kariere raziskovalcev, konkurenčno raziskovalno infrastrukturo in pospešeno sodelovanje med znanostjo in industrijo.

Strategija pametne specializacije Slovenije

Strategija pametne specializacije opredeljuje prednostna področja, kjer sta slovensko gospodarstvo in raziskovalni sektor dobro razvita, vključno s pametnimi mesti, pametnimi stavbami, zdravjem in medicino, trajnostno pridelavo hrane, krožnim gospodarstvom, omrežji, trajnostnim turizmom, mobilnostjo, tovarnami prihodnosti in materiali kot končnimi izdelki. Strategija poudarja zdravje (biotehnologija) in trajnost, pri čemer izkorišča slovenske prednosti na področju biotehnologij in zelenih tehnologij za spodbujanje gospodarske rasti in inovacij.

Podpora pisarnam za prenos tehnologij in znanja

Leta 2023 je Ministrstvo za visoko šolstvo, znanost in inovacije objavilo razpis za podporo pisarnam za prenos tehnologij in znanja v Sloveniji. Dva konzorcija, eden za raziskovalne inštitute in eden za univerze, sta uspešno pridobila sredstva. V naslednjih petih letih se bodo konzorciji osredotočali na zaščito intelektualne lastnine, podjetniško usposabljanje, ustvarjanje odcepljenih podjetij in spodbujanje inovacijske kulture.

Akcijski načrt za povečanje konkurenčnosti slovenskega gospodarstva

Septembra 2023 je Strateški ekonomski svet razpravljal o osnutku Akcijskega načrta za povečanje konkurenčnosti slovenskega gospodarstva. Načrt si prizadeva postaviti Slovenijo kot vodilno evropsko središče za napredne tehnologije in podvojiti dodano vrednost na zaposlenega na 100.000 EUR do leta 2030. Vključuje povečanje naložb v raziskave in razvoj z 1,5 % na 3,5 % BDP do leta 2030 ter podpira internacionalizacijo, razogljičenje, digitalizacijo, razvoj ekosistema zagonskih podjetij in privabljanje inovativnih podjetij. Kratkoročni ukrepi vključujejo vzpostavitev sklada za zeleno in digitalno preobrazbo, tehnološko nadgradnjo podjetij, razvoj sklada tveganega kapitala, izboljšanje pogojev za delitev dobička ter financiranje komercializacije raziskav.

2 | METODOLOGIJA

Zbiranje informacij, vključenih v to poročilo, je potekalo v več fazah, od pregleda literature in poglobljenih intervjujev do strokovnega okroglega omizja ter dodatnega vprašalnika za potrjevanje ugotovitev.

Faza 1.1: Sekundarne raziskovalne aktivnosti: Pregled literature

Cilj pregleda literature je bil identificirati trenutni status procesa DT komercializacije v Sloveniji. To je vključevalo dokumentiranje priložnosti, izzivov, potrebne podpore in vrzeli v znanju DT talentov za komercializacijo. Omeniti velja, da več dokumentov, vključenih v ta pregled, ne omenja izrecno DT področja, ampak obravnava relevantne teme, kar nakazuje, da je pojem deep tech v Sloveniji še v razvoju.

Naredili smo sistematični pregled znanstvene in poljudne literature, da bi preučili naslednje raziskovalne teme:

- Kontekst DT
    - Definicija in pomen DT po različnih državah partnericah
    - Kontekst DT politik na evropski in regionalni/nacionalni ravni
- Edinstvenost procesa DT komercializacije
    - Potrebne prilagoditve standardnega procesa komercializacije
    - Proces DT komercializacije na evropski in regionalni/nacionalni ravni
- Potencial DT komercializacije na regionalni/nacionalni ravni
    - Skupne ovire in izzivi pri inkubaciji DT podjetij
    - Spodbude in dejavniki uspeha pri inkubaciji DT

    - Podporni instrumenti za predinkubacijo, inkubacijo in pospeševanje
    - Znanje, veščine in naravnanost talentov za usmerjanje proti DT komercializaciji
    - Identifikacija najboljših praks pri usposabljanju za podporo DT komercializaciji
- Implicitni vplivi na projekt
    - Ključni zaključki o trenutnem stanju DT komercializacije

Faza 1.2: Sekundarne raziskovalne aktivnosti: Pregled sredstev in infrastrukture

Cilj pregleda sredstev je bil, da nam pomaga razumeti in katalogizirati obstoječe vire in identificirati ključne strokovnjake in deležnike, ki podpirajo DT komercializacijo v svojih regijah na dveh ravneh: 1. Znotraj Univerze v Ljubljani in 2. Zunaj UL in sočasno znotraj naše lokalne/regionalne ter zaradi majhnosti Slovenije tudi mednarodne ekosisteme.

Rezultati pregleda sredstev :

- Identificirali smo relevantne strokovnjake, ki jih je bilo treba povabiti na intervjuje in okrogle mize.
- Dokumentirani so v Deliverable D2.4.
- Bodo kontinuirano uporabljeni kot vir strokovnjakov za nadaljnje projektne aktivnosti, npr. vzpostavljanje stikov z identificiranimi ključnimi deležniki za mentorstvo, treniranje ipd.

Faza 2.1: Primarne raziskovalne aktivnosti: Kvalitativni intervjuji

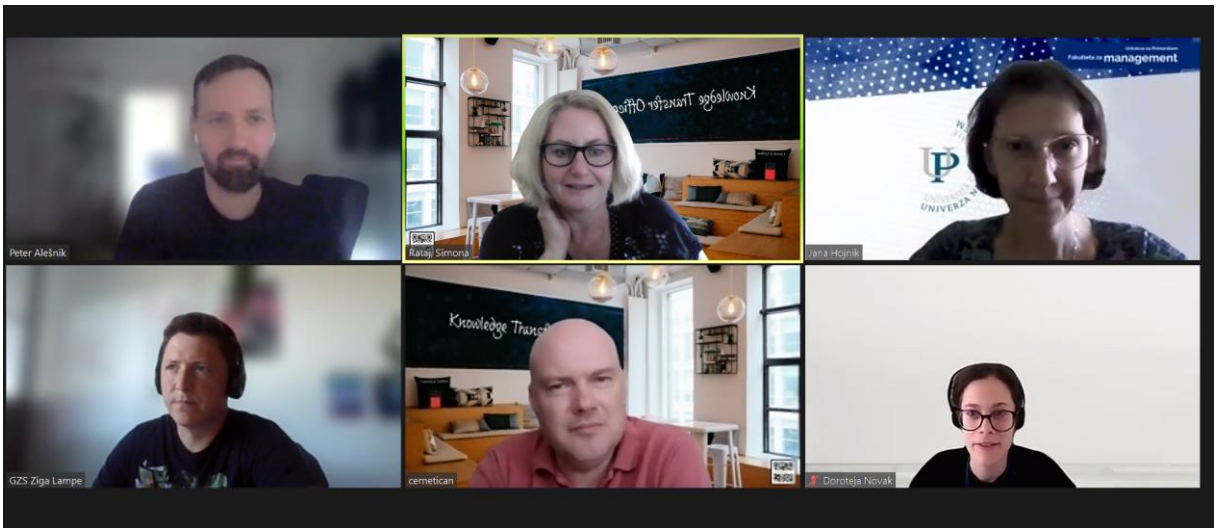
S procesom intervjujev smo imeli dvojen cilj: zbrati vpoglede o (1) priložnostih, izzivih in dejavnikih uspeha pri DT komercializaciji na evropski in regionalni ravni partnerjev preko intervjujev z DT strokovnjaki in (2) trenutnem statusu predinkubacijskih, inkubacijskih in pospeševalnih storitev in vrzeli v partnerskih visokošolskih zavodih preko intervjujev s strokovnjaki za izobraževanje za globoke tehnologije (DT) in zaposlenimi v inkubatorjih. Na Univerzi v Ljubljani smo opravili 17 intervjujev z DT strokovnjaki, investitorji in podjetniki. Rezultati intervjujev so:

- Oblikovali vsebino in teme razprav na okrogli mizi.
- Nudili kvalitativne vpoglede za to poročilo o DT komercializaciji ter analizo potreb podjetnikov na področju globokih tehnologij (DT).

Faza 2.2: Primarne raziskovalne aktivnosti: Okrogla miza DTskupnosti in dodatni vprašalnik

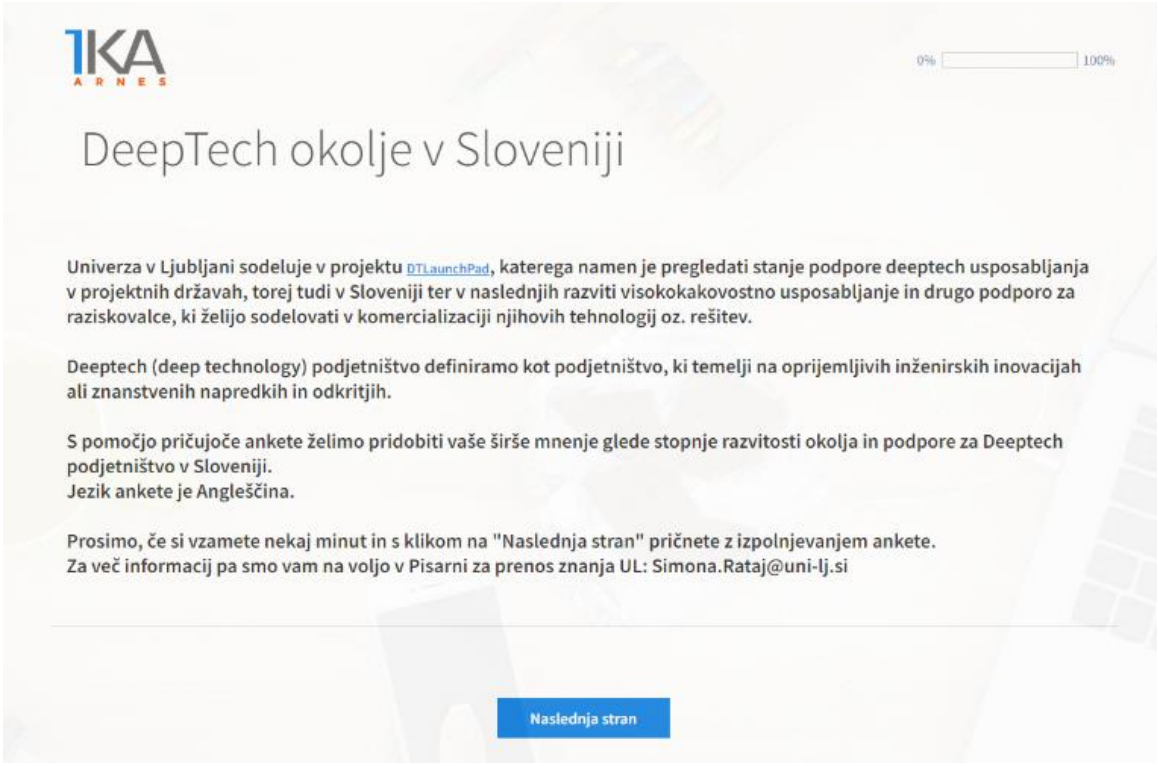
2.2.1. Okrogla miza o globokih tehnologijah (DT)

Cilj okrogle mize DT skupnosti je bil podpreti, potrditi in komunicirati vpoglede, zbrane s pregledom literature, pregledom sredstev in intervjuji, o trenutnem stanju DT komercializacijskih poti na evropski in regionalni ravni. Povabili smo strokovnjake, ki niso so sodelovali v intervjujih. Časovni okvir, v katerem smo lahko organizirali okroglo mizo, se je ujemal s koncem šolskega leta in začetkom počitnic, kar je otežilo iskanje primernega datuma za zadostno število (vsaj 9) udeležencev. Uspelo nam je zagotoviti udeležbo 4 udeležencev. Rezultati okrogle mize DT skupnosti so ponudili dodatne kvalitativne vpoglede v evropsko poročilo o DT komercializaciji (mednarodna okrogla miza) in v poročilo o DT komercializaciji v Sloveniji.



Udeleženci okrogle mize o deep tech, 5. julij, 2024.

2.2.2. Dodatni vprašalnik o DT podpori v Sloveniji



Ker nam ni uspelo zagotoviti 9 strokovnjakov za udeležbo na okrogli mizi, smo se odločili ustvariti dodatni vprašalnik (Priloga 3), da bi preverili povratne informacije in potrdili ugotovitve iz intervjujev, ki so bili prav tako obravnavani na okrogli mizi. Strokovnjake, ki se niso mogli udeležiti okrogle mize, smo povabili k sodelovanju prek tega vprašalnika. Prejeli smo 8 dodatnih odgovorov strokovnjakov.

Seznam vseh strokovnjakov (intervjuvancev, udeležencev okrogle mize in nekaterih anketirancev) je na voljo v Prilogi 1.

3 | KOMERCIALIZACIJA GLOBOKIH TEHNOLOGIJ (DT) V SLOVENIJI

3.1. Kako se DT podjetja razlikujejo od standardnih tehnoloških podjetij

V Sloveniji je proces komercializacije že dobro razvit, prav tako tudi skupnost zagonskih podjetij. Slovenija od leta 2007 podpira inovativna mala podjetja in zagonska podjetja prek različnih instrumentov Slovenskega podjetniškega sklada. Poleg finančne podpore se je razvilo tudi podporno okolje, ki združuje usposobljene mentorje, investitorje, inkubatorje in izkušene manadžerje inovativnih podjetij.

Kljub temu v svoji analizi slovenskih zagonskih in rastočih podjetij Črnogaj in Rus (2023) ugotavljata: "Kljub svojemu potencialu slovenski startup ekosistem ne napreduje dovolj hitro, da bi utrdil svoj položaj kot vodilno regionalno središče. Veliko je odvisno od drznosti in strateške usmeritve vladnih politik. Za uspešno izvedbo sprememb so ključni ozaveščenost, strokovno znanje, politična volja in učinkovito spremljanje. Predstavniki slovenskih startupov in scaleup podjetij si predvsem želijo ugodnejših davčnih zakonov in predpisov, ki bi uspešnim podjetnikom omogočili vlaganje v startupe namesto v tradicionalne naložbe. Stabilnost pravnega okolja in zakonodaje, viri financiranja v zgodnjih fazah, zmanjšana birokracija, boljše razumevanje potreb startupov in financiranje v kasnejših fazah so prav tako visoko na seznamu prioritet."

DT sektor v Sloveniji pa je še vedno v zgodnji fazi razvoja. Podporno okolje za globoke tehnologije (DT) se tako sooča z dodatnimi izzivi, ki so opisani v nadaljevanju.

I. PREGLED (DT PODJETJA)

Podobno kot v EU so tudi v Sloveniji značilnosti DT podjetij naslednje:

- **Močna odvisnost od intelektualne lastnine (IP):** DT podjetja se močno zanašajo na intelektualno lastnino, ki je v večini primerov zaščitena s patenti, v manjši meri s pravicami avtorskih pravic, specifičnim znanjem ali poslovnimi skrivnostmi.
- **Daljši razvojni čas:** Zaradi kompleksnosti in novosti njihovih ključnih tehnologij DT podjetja zahtevajo daljšo fazo raziskav in razvoja (R&D), preden njihove rešitve dosežejo trg.
- **Višji stroški:** Daljši časovni okvir, potreben za razvojno fazo, povzroča višje stroške za napredne raziskave, prototipiranje in daljši čas do trga; vse to zahteva znatno večje naložbe, tako finančne kot tudi druge vire.

- **Višje tveganje:** Tveganje je večje, saj lahko tehnologija ne deluje po pričakovanjih.
- **Sestava ekipe:** Ekipa pogosto vključuje strokovnjake z močnim znanstvenim in tehničnim ozadjem, ki pa jim pogosto primanjkuje komercialnih izkušenj, ključnih za uspešno komercializacijo njihove inovacije. Pogosto želijo nadaljevati svojo raziskovalno kariero, zato je potrebna dodatna podpora pri povezovanju znanstvenikov s podjetniki.
- **Dostop do podpornega okolja za globoke tehnologije:** Zaradi majhnosti Slovenije in dejstva, da je potrebno DT kompetence še dodatno razviti in razširiti, primanjkuje izkušenih podjetnikov, investitorjev in podpornega osebja. Zato smo odprti za sodelovanje z mednarodnim DT podpornim okoljem, da pospešimo razvoj naših odcepljenih, DT podjetij.

Črnogaj in Rus (2023) v svojem članku pojasnjujeta rezultate ankete med slovenskimi zagonskimi in rastočimi podjetji: "Rezultati kažejo, da dejavniki, kot so zakonodajna podpora, dostopnost tveganega kapitala in mentorjev znotraj startup ekosistema, bistveno vplivajo na to, kako start-up podjetja navigirajo in presegajo izzive rasti. Ta pomemben vpliv poudarja potrebo po dobro strukturiranem in podporno naravnanem startup ekosistemu za olajšanje prehoda v fazo rasti, kar odraža sodobno osredotočenost na izboljšanje startup okolij za trajnostno rast in razvoj."

II. EDINSTVENE ZNAČILNOSTI DT PODJETIJ

Glede na mnenja slovenskih strokovnjakov za DT komercializacijo in startup podjetij so edinstvene značilnosti DT podjetij v Sloveniji naslednje:

- **Kompleksnost:** DT podjetja vključujejo bolj kompleksen proces komercializacije v primerjavi z digitalnimi ali splošnimi tehnološkimi podjetji. Ta kompleksnost izhaja iz potrebe po več fazah dokazovanja koncepta in obsežni zaščiti intelektualne lastnine (IP).
- **Časovni okvir:** Čas do trga je precej daljši zaradi potrebe po temeljitem preverjanju, prototipiranju in pridobivanju regulatornih odobritev (certifikatov). Ta podaljšan časovni okvir povečuje tveganje in zahteva znatne začetne naložbe v laboratorijsko opremo in druge vire.
- **Finančni izzivi:** DT podjetja so bolj kapitalsko intenzivna, saj zahtevajo več finančnih virov za pokritje dolgotrajnih razvojnih ciklov in drage opreme, potrebne za testiranje in dokazovanje koncepta.
- **Dostop do financiranja:** Dostop do financiranja, še posebej v zgodnjih fazah (predsemensko, semensko), je pomembna ovira zaradi pomanjkanja vlagateljev v DT v Sloveniji. DT podjetja morajo iskati vlagatelje v tujini. V Sloveniji primanjkuje

namenskih instrumentov financiranja in finančnih podpornih mehanizmov, prilagojenih potrebam DT podjetij.

- **Pomen intelektualne lastnine (IP):** Zaščita intelektualne lastnine je ključnega pomena in je še bolj poudarjena pri DT podjetjih. To vključuje patente in druge oblike intelektualne lastnine, ki so ključne za pridobivanje investicij in partnerstev. Prenos implicitnega znanja in nadaljnje vključevanje raziskovalcev tudi po licenciranju intelektualne lastnine je edinstvena značilnost, saj so pogosto potrebne nadaljnje raziskave in nadgradnje.
- **Veščine in kompetence:** DT podjetniki potrebujejo mešanico tehničnega znanja in podjetniških veščin. To vključuje razumevanje potreb trga, poslovnih modelov ter obvladovanje mehkih veščin, kot so komunikacija in vztrajnost. Izobraževalni programi bi morali biti osredotočeni na razvoj teh veščin skozi praktične izkušnje in dolgoročno mentorstvo.
- **Sodelovanje in ekosistem:** Uspešna DT podjetja zahtevajo tesno sodelovanje med akademsko sfero, industrijo in vlado. Gradnja podpornega ekosistema, ki vključuje dostop do mentorjev, industrijskih partnerjev in mednarodnih mrež, je bistvenega pomena. V regijah, kot je Slovenija, je ekosistem še vedno v razvoju, kar prinaša dodatne izzive. Učenje iz bolj razvitih ekosistemov, kot sta Oxford ali Silicijeva dolina, lahko ponudi dragocene vpoglede.
- **Kulturne in organizacijske ovire:** Pomemben izziv so kulturne in organizacijske ovire znotraj univerz in raziskovalnih institucij, kjer je poudarek (še vedno) na akademskih dosežkih namesto na (komercialnem) učinku. Sprememba te miselnosti, ki bi cenila komercializacijske aktivnosti, je ključnega pomena. Premagovanje teh ovir zahteva strateško podporo politike, spodbude za raziskovalce in promocijo kulture, ki sprejema neuspeh kot del inovacijskega procesa.
- **Vključevanje trga in industrije:** Zgodnje vključevanje trga in industrije v razvojni proces je bistveno. Vendar pa je iskanje ustreznih industrijskih partnerjev in njihovo prepričanje o potencialu zgodnjih tehnologij lahko zahtevno. Spodbujanje sodelovanja z industrijo preko mrežnih dogodkov, platform za sodelovanje in stalne komunikacije lahko pomaga premostiti to vrzel.

III. POUDARKI IZ OKROGLE MIZE IN DODATNEGA VPRAŠALNIKA

Udeleženci okroglih miz in tisti, ki so odgovorili na naše vprašalnike, so se na splošno strinjali z rezultati intervjujev. Dodali so nekaj novih vpogledov:

- **Povratne informacije glede kompleksnosti DT komercializacije:** To je zelo odvisno od produkta; nekateri DT izdelki so lahko že pripravljeni za uporabo in

komercializacija ni težavna; drugi pa potrebujejo več podpore in daljši čas do trga. Hitrost vstopa na trg je povezana s sposobnostjo absorpcije družbe – stopnjo pripravljenosti na sprejemanje.

- **Povratne informacije o principu »push« marketinga:** Vsak proces, pri katerem se iskanje aplikacij in trga izvaja naknadno, je težaven; bolj kot je tehnologija nova in disruptivna, težje je. Raziskovalci morajo biti v stalnem stiku s trgom, da bi prejeli in po možnosti uporabili tržne informacije za prihodnjo komercializacijo tehnologije.
- **Povratne informacije, povezane z zaupanjem:** Gradnja tržnega zaupanja je ključni izziv za vsako novo podjetje, ne glede na to, ali deluje v DT ali drugih industrijah. Ustvarjanje tega zaupanja običajno zahteva precej časa in dosledne napore.

3.2. Trenutno stanje DT komercializacije v Sloveniji

IV. PREGLED

DT podporno okolje v Sloveniji ima še veliko prostora za izboljšave. Politike, instrumenti in podporne storitve bi morali biti prepoznani v večjem obsegu. Poleg tega bi morala biti miselnost glede DT komercializacije vključena v raziskovalno kulturo ne samo v javnih raziskovalnih organizacijah (PRO/JRO), temveč tudi v drugih organizacijah.

V fazi predinkubacije (ang. pre-seed) univerze in raziskovalne organizacije (PRO) ponujajo različne ravni podpore za zaščito intelektualne lastnine (IP), komercializacijo, mentorstvo in sklade za preverjanje koncepta (Proof of Concept – POC). Nekatere PRO zagotavljajo celovito podporo, vključno z zaščito intelektualne lastnine in komercializacijo, medtem ko se druge osredotočajo predvsem na patentiranje. Obstaja pobuda (prenosznanja.si), ki jo podpira Ministrstvo za visoko šolstvo, znanost in inovacije, ki povezuje pisarne za prenos tehnologij PRO v dva konzorcija. Ta pobuda spodbuja učenje iz najboljših praks za izboljšanje splošnih zmogljivosti podpore.

V fazi inkubacije so na voljo univerzitetni inkubatorji, tehnološki parki in finančna podpora iz sklada VESNA, Slovenskega podjetniškega sklada, tveganega kapitala in zasebnih investitorjev.

Faza pospeševanja vključuje podporo, prilagojeno posameznim primerom, z načrti za slovenski tehnološki inovacijski sklad, ki bi podprl rast in vstop na trg.

V. TRI FAZE (PREDINKUBACIJA, INKUBACIJA IN POSPEŠEVANJE) KOMERCIALIZACIJE GLOBOKIH TEHNOLOGIJ (DT) PREGLED STANJA

Kot je že bilo omenjeno, ima DT podporno okolje v Sloveniji še veliko prostora za izboljšave. Politike so, vsaj v večini PRO, že postavljene (strategije, povezane z gospodarskim in družbenim razvojem Slovenije, vrednotenje znanja kot del strategij PRO, politike, povezane s pravicami intelektualne lastnine PRO, zakonodaja o upravljanju itd.). Spodaj navedene strukture in podpora so že na voljo, vendar bi jih lahko uporabljalo več raziskovalcev.

Faza predinkubacije

Pisarne za prenos znanja in tehnologij (KTO) so ustanovljene na ravni univerz in raziskovalnih organizacij. Njihova podpora vključuje: identifikacijo potencialnih inovacij, razkritje izuma, podporo pri zaščiti intelektualne lastnine, podporo pri komercializaciji (povezovanje raziskovalcev z industrijskimi partnerji, podporo pri pogajanjih in podporo pri ustvarjanju odcepljenih podjetij). KTO so lahko tudi odgovorne za spodbujanje inovacijske kulture (s podporo vodstva) znotraj PRO.

Ukrepi za povečanje motivacije raziskovalcev za DT komercializacijo so dosegli nekaj ciljev, vendar ne toliko, kot je bilo pričakovano. Habilitacijski kriteriji še vedno niso naklonjeni DT komercializaciji; vključujejo sicer nekaj elementov, pomembnih za DT, kot so patenti in sodelovanje z industrijo, vendar je še vedno veliko prostora za izboljšave. Veliko PRO v Sloveniji se je zato pridružilo Koaliciji za napredek raziskovalne ocene (COARA).

Stopnja podpore za DT komercializacijo med pisarnami za prenos tehnologij (TTO) pri PRO se razlikuje glede na njihove izkušnje, starost in število zaposlenih. TTO so bile ustanovljene v različnih časih in običajno delujejo z omejenim osebjem in proračuni. Za povezovanje, izboljšanje in nadaljnji razvoj teh TTO vlada podpira dva konzorcija: enega za raziskovalne inštitute in enega za univerze, ki vključujeta vse slovenske PRO. Običajno aktivnosti teh konzorcijev vodijo bolj razviti TTO, kar manj razvitim omogoča, da izkoristijo njihove izkušnje in vire.

Nekatere PRO so ustanovile interne sklade za preverjanje koncepta (POC), ki pomagajo pri nadaljnjem razvoju tehnologij s povečanjem ravni pripravljenosti tehnologije in podporo pri prototipiranju. Vendar so ti skladi POC omejeni s svojimi proračuni in, v večji meri, s habilitacijskimi kriteriji. Posledično se komercializacijska prizadevanja pogosto izvajajo v prostem času raziskovalcev ali kot dodatek k njihovim raziskovalnim in pedagoškim dejavnostim.

Večina PRO ponuja tudi mentorstvo inovativnim raziskovalcem (zlasti mentorstvo, povezano z razvojem poslovnih modelov in ekonomskega učinka).

JRO prav tako ponujajo interne laboratorije (Makerlabs) za zgodnjo fazo razvoja raziskovalnih idej ali povezujejo raziskovalce z zunanjimi laboratoriji, kot je RogLab.

Usposabljanje in razvoj veščin sta prav tako na voljo v večini PRO; nekatere ponujajo usposabljanja bolj sistematično, druge glede na potrebe ali priložnosti.

Regionalni POC (VESNA) za Slovenijo in Hrvaško je bil razvit pod pokroviteljstvom SID banke, HBOR in EIF. Sklad VESNA POC je začel delovati v začetku leta 2024 in zdaj aktivno išče tehnologije za začetne naložbe (50.000 EUR za predsemensko fazo).

Faza inkubacije

Faza inkubacije se osredotoča na nadaljnji razvoj in prototipiranje tehnologije. Raziskovalci morajo preiti od teoretičnih konceptov do otipljivih izdelkov ali storitev, kar pogosto zahteva napredno laboratorijsko opremo in tehnično podporo. Na tej točki postane sodelovanje z industrijskimi partnerji ključno.

V Sloveniji obstajajo trije univerzitetni inkubatorji, ki so geografsko dobro uravnoteženi (podpirajo JRO v Ljubljani, Mariboru in Primorski regiji). Poleg tega so na voljo štirje tehnološki parki (Primorska, Ljubljana, Maribor in Pomurje).

Te podporne organizacije ponujajo povezave z (mednarodnimi) industrijskimi partnerji, različne programe usposabljanja s poudarkom na poslovanju in dostop do izkušenih mentorjev, ki raziskovalcem pomagajo pri tehničnih izzivih, validaciji trga in razvoju poslovnih modelov.

Kapitalska podpora za fazo inkubacije je na voljo tudi prek sklada VESNA; na voljo je do 400.000 EUR za tehnologije v semenski fazi (ang. Seed) in 700.000 EUR za pozno semensko fazo (ang. late-seed,scale-up).

Drugi vir finančne podpore je Slovenski podjetniški sklad (SPS): spodbude za zagonska podjetja (vključno z zagonskimi podjetji na manj razvitih območjih in zelenimi startupi)[1]. V pripravi je tudi predlog za financiranje lastniškega kapitala za inovativna zagonska podjetja z rastnim potencialom. Predvideno je, da bo Slovenski sklad za inovacije v zgodnji fazi (SEF) nadomestil svoje obstoječe javne razpise za semenski kapital z vzpostavitvijo sklada skladov za zagonske inovacije. Tako SPS ne bo več neposredno vlagal v podjetja, ampak bo izbral upravljavca za sklad tveganega/semenskega kapitala prek javnega razpisa, ki bo vlagal v mlada inovativna zagonska podjetja[2].

[1] https://www.podjetniskisklad.si/en/zagonske-subvencije/
[2] https://www.podjetniskisklad.si/en/zagonski-kapital/

Faza pospeševanja

Faza pospeševanja vključuje širitev tehnologije in vstop na trg. Ta faza zahteva znatne finančne vire za podporo proizvodnje, trženja in distribucije. Podpora, ki je na voljo v Sloveniji, je v večini primerov opisljiva kot "od primera do primera." Za vsak posamezni primer se poskuša najti najprimernejšega partnerja, pogosto tudi na mednarodnem nivoju, saj ni veliko obstoječih podpornih struktur (tudi zaradi majhnega števila primerov pospeševanja globokih tehnologij). Tako je na voljo veliko prostora za izboljšave.

Kapitalska podpora za fazo pospeševanja je na voljo prek sklada VESNA, ki omogoča med 850.000 in 1,5 milijona EUR za fazo rasti.

Kapitalsko financiranje za rast visokotehnoloških in inovativnih podjetij je prav tako na voljo prek Slovenskega podjetniškega sklada. V načrtu je ustanovitev Slovenskega tehnološkega inovacijskega sklada (2024-2029), "sklada skladov" z investicijami v specializirane sklade. Sklad bo podpiral vse faze razvoja – od predsemenske do zrelih faz (https://www.podjetniskisklad.si/en/kapital-za-rast-slovenija/).

VI. POUDARKI IZ OKROGLE MIZE IN DODATNIH VPRAŠALNIKOV

Na splošno so se udeleženci okrogle mize in respondenti vprašalnikov strinjali z izsledki intervjujev. Strokovnjaki so poudarili tri ključne dejavnike:

1. **Pomanjkanje poslovne usmerjenosti v raziskovalnem sektorju v Sloveniji:** Z izvajanjem institucionalnih ukrepov, kot so ugodni habilitacijski kriteriji in raziskovalni dopusti, lahko ustvarimo okolje, ki ne samo motivira raziskovalce, temveč tudi poenostavi proces komercializacije globokih tehnologij, kar vodi do več inovativnih rešitev na trgu.

2. **Startup ekosistem je v Sloveniji dobro razvit**: Zavest o posebnostih globokih tehnologij pa ni na visoki ravni. Večina investitorjev ni dovolj seznanjena s specifičnostmi tehnologij globokih tehnologij.

3. **Podjetja v fazi rasti nimajo zadostne podpore:** Med hitrim razvojem podjetja primanjkuje podpore. Obstaja veliko prostora za izboljšave – bodisi v obliki nacionalne podpore bodisi prek boljših povezav z mednarodnimi podpornih organizacijami.

3.3. Pogoste ovire in spodbude DT komercializacije

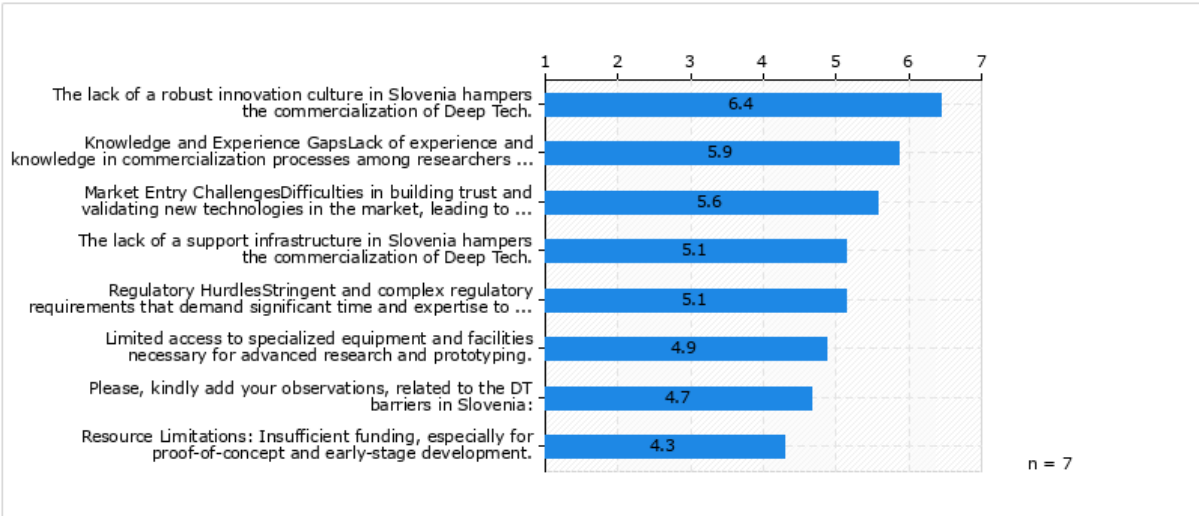
VII. PREGLED

Na podlagi vseh pogovorov s strokovnjaki smo identificirali ovire in spodbude deep tech komercializacije. Najpomembnejša ovira je pomanjkanje inovacijske kulture v Sloveniji (ki jo spremlja pomanjkanje ambicij in s tem povezani habilitacijski kriteriji). Najmanj resna ovira je dostop do financiranja.

Najpomembnejša spodbuda je dostop do kakovostnih programov mentorstva, najmanj pomembne (a še vedno zelo pomembne) pa so politike.

VIII. OVIRE IN IZZIVI

Na podlagi analize intervjujev smo identificirali naslednje pogoste ovire in izzive DT komercializacije. Strokovnjake, ki niso sodelovali v intervjujih in na okroglih mizah, smo vprašali: »Kako pomembne so po vašem mnenju te spodbude? (1 pomeni nepomembno, 7 pomeni zelo pomembno).«



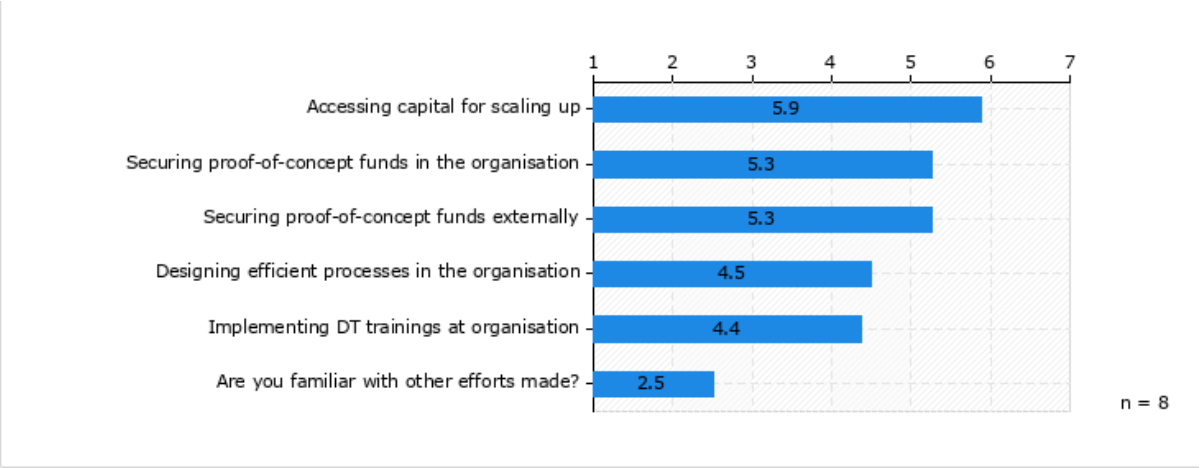
Poleg teh izzivov so respondenti izpostavili še naslednje dodatne izzive:

- Pomanjkanje ambicij raziskovalcev za DT komercializacijo: Akademski kazalniki uspešnosti (KPI) so le deloma skladni z DT komercializacijo. Raziskovalci, motivirani za komercializacijo, pogosto posvečajo zasebni čas komercializacijskim aktivnostim, medtem ko morajo še vedno izpolnjevati tradicionalne akademske KPI, kot je objavljanje v revijah z visokim vplivom. Poleg tega je značilno tudi pomanjkanje podjetniških in poslovnih veščin.
- Interdisciplinarno sodelovanje: DT inovacije zahtevajo veščine na področju vodenja ekip, komunikacije in medsektorskega sodelovanja. Učinkovito

komuniciranje zapletenih idej z zainteresiranimi stranmi, vključno z vlagatelji in javnostjo, ostaja izziv.

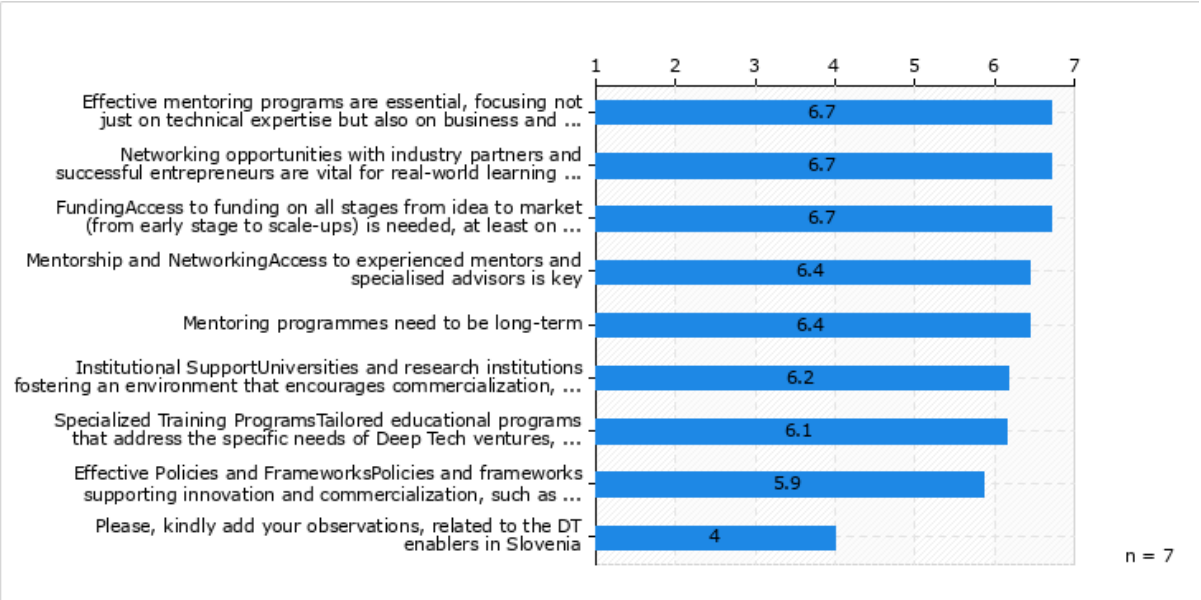
- Pomanjkanje možnosti za raziskovalno kariero, usmerjeno v komercialni uspeh: Raziskovalci, ki zapustijo akademsko okolje zaradi podjetniških dejavnosti, pogosto ugotovijo, da se težko vrnejo, kar odvrača od vključevanja v komercializacijo.
- Neugodne davčne politike v Sloveniji.
- Prekomerna regulacija EU: Predpisi so lahko med seboj v nasprotju.
- Težave z vključevanjem v okolje globokih tehnologij: Obstajajo meje , ki jih je treba preseči, preden postaneš član skupnosti.

Strokovnjake smo vprašali tudi: »Kako resna so po vašem mnenju ta ozka grla v standardizaciji procesa komercializacije globokih tehnologij? (1 pomeni ne resno, 7 pomeni zelo resno).« Rezultati kažejo, da večina respondentov ozka grla dojema kot resna.



IX. SPODBUDE IN DEJAVNIKI USPEHA

Na podlagi analize smo identificirali naslednje skupne spodbude DT komercializacije. Strokovnjake (ki niso sodelovali na intervjujih) smo vprašali, kako pomembne so po njihovem mnenju te spodbude (1 pomeni nepomembno, 7 pomeni zelo pomembno).



Dodatne spodbude, ki so se pokazale med razpravo na okroglih mizah, so bile dostop do strokovnega znanja (specifičnega znanja) in dostop do mednarodnih organizacij za podporo inovacijam, inkubatorjev in pospeševalnikov.

3.4. Znanje, veščine in naravnanost talentov, ki se podajajo na pot DT komercializacije

X. PREGLED

Usposabljanje na področju globokih tehnologij (DT) bi moralo pokrivati tri glavne skupine kompetenc (tehnične, podjetniške in prečne) in bi moralo temeljiti na praktičnih izkušnjah. Vključevati bi moralo delo na interdisciplinarnih projektih, ki simulirajo realne izzive in spodbujajo sodelovanje med različnimi področji. Usposabljanja bi se morala ponavljati vsako leto, s poudarkom na stalnem izboljševanju. Standardni program bi moral biti dopolnjen s prilagojenimi mentorskimi pobudami, ki odražajo najboljše prakse iz uspešnih programov globokih tehnologij. Pristop ”enotna rešitev za vse" pogosto ne zadovolji potreb raziskovalcev.

XI. TEHNIČNE KOMPETENCE

Strokovnjaki so izpostavili naslednje tehnične kompetence, pomembne za DT komercializacijo:

- **Znanstveno in tehnično znanje:** Poglobljeno znanje na specifičnih znanstvenih ali inženirskih področjih.

- **Upravljanje intelektualne lastnine (IP):** Razumevanje konteksta e intelektualne lastnine, strategij patentiranja, svobode delovanja in zaščite intelektualne lastnine.
- **Razvoj izdelkov:** Sposobnosti načrtovanja, razvoja in prototipiranja novih izdelkov ali tehnologij. Veščine v razvijanju poslovnih primerov in vodenju prodajnih operacij.
- **Raziskovalne kompetence:** Odličnost pri izvajanju temeljitih znanstvenih raziskav.
- **Tehnično in regulatorno znanje:** Specializirano znanje na ozkem tehničnem področju ter sposobnost predvidevanja prihodnjih razvojnih trendov. Poznavanje industrijskih predpisov, standardov in certifikacijskih procesov.

XII. Podjetniške kompetence

Strokovnjaki so izpostavili naslednje podjetniške kompetence, pomembne za DT komercializacijo:

- **Razvoj poslovanja:** Razumevanje poslovnih načel, vključno z analizo trga in poslovnim načrtovanjem. Znanje poslovnih metodologij, strateškega načrtovanja in tehnološkega razvoja.
- **Vstop na trg in prodaja:** Sposobnosti pri navigiranju vstopa na trg, izvajanju prodajnih operacij in razumevanju potreb strank. Zmožnost trženja in prodaje novih tehnologij, vključno z ustvarjanjem vrednostnih predlogov in sodelovanjem s strankami.
- **Finance in investicije:** Razumevanje finančnega upravljanja, investicijskih strategij in pravil investiranja v visokotehnološka podjetja. Znanje in sposobnost pridobivanja sredstev od investitorjev, donacij in drugih virov.
- **Vodenje in upravljanje:** Oblikovanje, gradnja in motivacija ekip, sprejemanje odločitev ter sposobnost vodenja raznolikih ekip. Empatično vodenje.
- **Podjetniška vizija:** Sposobnost predvideti tržne priložnosti in prilagoditi raziskovalne ugotovitve v komercialne izdelke.

XII. Splošne (transverzalne) kompetence

Strokovnjaki so izpostavili naslednje splošne, transverzalne kompetence, pomembne za DT komercializacijo:

- **Komunikacijske veščine:** Učinkovite verbalne in pisne komunikacijske veščine, zlasti pri razlaganju kompleksnih tehničnih in znanstvenih konceptov različnim občinstvom (nestrokovnjakom).
- **Sodelovalne veščine:** Sposobnost učinkovitega dela v interdisciplinarnih in raznolikih ekipah ter sodelovanja z raziskovalci, poslovnimi strokovnjaki in industrijskimi partnerji; prav tako so pomembne veščine mreženja.

- **Mehke veščine:** Psihološka odpornost, samozavest, upravljanje stresa in odločnost, da se soočajo z izzivi in neuspehi.
- **Reševanje problemov:** Sposobnost reševanja inženirskih problemov in avtomatizacije procesov. Močne analitične sposobnosti in ustvarjalnost pri reševanju zapletenih problemov in premagovanju ovir.
- **Prilagodljivost:** Odprtost za neprijetne situacije in pripravljenost na prilagoditev strategij po potrebi. Fleksibilnost za prilagajanje spreminjajočim se okoliščinam in spremembe strategij, ko je to potrebno.

4. | RAZISKAVE V PRAKSI: PODPORA GLOBOKIM TEHNOLOGIJAM (DT)

4.1. Pregled in naslednji koraki za razvoj izobraževalnih in podpornih storitev (WP3)

Program usposabljanja na področju globokih tehnologij (DT) bi moral vključevati izobraževanje o osnovah intelektualne lastnine (IP), tehnične tečaje, specifične za posamezno industrijo, delavnice o komercializacijskih veščinah in strukturirane programe, prilagojene globokim tehnologijam (DT).

Program mentorstva bi moral imeti cilj identificirati in povečati dostop do usposobljenih mentorjev. Mentorstvo bi moralo vključevati povezave z industrijskimi strokovnjaki.

Paket storitev za DT inkubacijo se osredotoča na finančno podporo, stalno spremljanje intelektualne lastnine, industrijska partnerstva in strukturirane pospeševalne programe.

Učni okvir Peer2Peer poudarja jasnost ciljev, izmenjavo najboljših praks, sodelovanje med vrstniki in povezave z industrijo.

4.2. Priporočila o uporabi usposabljanj, mentorstva, peer-to-peer učenja in orodij za podporo inkubaciji globokih tehnologij za DT podporo

Priporočila glede programa usposabljanja na področju globokih tehnologij (DT):

- **Osnovno znanje o intelektualni lastnini:** V izobraževalne module vključite osnovna znanja o intelektualni lastnini.
- **Industrijsko-specifična strokovna znanja:** Zagotovite tečaje, ki pokrivajo tehnična znanja, relevantna za specifična področja, kot so biotehnologija, tehnična področja itd. Ciljani podporni programi in usposabljanja bodo dvignili poslovne kompetence tehnoloških strokovnjakov in tehnološke kompetence poslovnih strokovnjakov.
- **Razvoj komercializacijskih veščin:** Vključite stalne aktivnosti in delavnice za razvoj komercializacijskih veščin.
- **Strukturirani programi:** Razvijte bolj strukturirane in prilagojene programe, specifične za izzive komercializacije globokih tehnologij.

Priporočila glede sheme mentorstva

- **Kvalificirano osebje:** Povečajte število usposobljenih mentorjev in osebja, ki lahko nudijo neposredno podporo DT podjetjem.
- **Ozaveščenost o podpornih mrežah:** Usposobite mentorje o podpornih ekosistemih in postopkih napotitve na specializirane inkubatorje.
- **Povezave z industrijo:** Ustanovite povezave z industrijskimi strokovnjaki, ki lahko delujejo kot mentorji in nudijo vpoglede v inovacijske procese. Povežite javne raziskovalne organizacije (PRO) z gospodarskim sektorjem.

Priporočila glede paketa podpornih storitev za inkubacijo globokih tehnologij

- **Finančna podpora in struktura:** Izboljšajte finančno podporo in strukturirane možnosti financiranja za fazo inkubacije s povezovanjem z mednarodnimi vlagatelji in strateškimi razvojnimi partnerji, specifičnimi za tehnologije.
- **Povezave z industrijo:** Okrepite partnerstva z industrijskimi partnerji za pilotne priložnosti in povezave s strankami; preverjanje tržne izvedljivosti tehnologije.
- **Strukturirani pospeševalni programi:** Razvijte strukturirane in ciljno usmerjene pospeševalne programe za rast DT podjetij.

Priporočila glede okvira za peer to peer učenje

- **Jasnost glede ciljev in procesov:** Poudarite specifične cilje, kot so minimalno izvedljiv izdelek (MVP) in prve prodaje, z jasno določenimi prehodi med fazami, kar bo olajšalo peer-to-peer učenje skozi izmenjavo izkušenj.
- **Primeri dobrih praks:** Spodbujajte pobude, ki se osredotočajo na najboljše prakse in osebne povezave znotraj industrije. Spodbujajte kulturo sodelovanja.

- **Peer-to-peer sodelovanje:** Ustvarite okolje, kjer lahko podobno misleči delijo znanje in izkušnje, s čimer se okrepi učenje skozi sodelovanje.
- **Povezave s prvimi strankami in industrijskimi partnerji:** Spodbujajte peer -to-peer razprave in mreže za identifikacijo ter povezovanje s potencialnimi industrijskimi partnerji in prvimi strankami.

Druga priporočila

- **Več kariernih poti:** Ustvarite specifične karierne poti, ki ne temeljijo zgolj na poučevanju in znanstvenih člankih.
- **Podpora komercializaciji globokih tehnologij prek nacionalnih razpisov.**
- **Delavnica s snovalci politik:** Predstavite in razpravljajte o zahtevah za DT komercializacijo.
- **Bodite odprti za mednarodno sodelovanje!**

4.3. Identifikacija obstoječih dobrih praks usposabljanj za podporo DT komercializacije v Sloveniji

Identificirane dobre prakse so:

Predmeti: Razvoj poslovne ideje (EF UL):	Več predmetov: Anja Svetina Nabergoj; Blaž Zupan Mojca Svetek
Modularno usposabljanje o podjetništvu, vplivu in intelektualni lastnini	Celovito usposabljanje, ki obravnava štiri glavna področja, tesno povezana z raziskavami in njihovim širšim družbenim učinkom: Sodelovanje z zunanjim okoljem, učinek raziskav, Podjetniške kompetence, Intelektualna lastnina.
Deep Tech Alliance	Povezuje evropske podjetnike na področju DT, mednarodne korporacije in vlagatelje v tesno povezano skupnost, namenjeno raziskovanju strateških in komercialnih partnerstev.
VESNA POC sklad	Regionalni sklad POC, ki vlaga v predsemenske, semenske in faze rasti DT podjetij. Prav tako zagotavljajo usposabljanja, povezana s komercializacijo globokih tehnologij, in dostop do mentorjev.
Deep tech hub Katapult	Podjetniško okolje za inovatorje s fizičnimi izdelki. Hub ponuja deljene storitve in proizvodnjo za fizične izdelke, da se podjetnik lahko osredotoči na osnovno poslovanje (razvoj izdelkov in prodaja), medtem ko preostala področja najame v

	deljenih storitvah. Pri tem ima podporo mentorjev z visokotehnološkim znanjem.
EIT jumpstarter	EIT Jumpstarter je predpospeševalnik, ki ga izvaja sedem skupnosti Evropskega inštituta za inovacije in tehnologijo (EIT). Gre za kreativno skupnost, ki zagotavlja napredno znanje, edinstven program, strokovne trenerje in mentorje.
SIO (mentorski program)	Mentorski program za zagonska in rastoča podjetja, ki pokriva številne teme, od intelektualne lastnine do razvoja poslovanja.
Labs to market, Commercialization Reactor	Dogodki, usposabljanja in proces povezovanja raziskovalcev s podjetniki.
Startup clinic	Startup klinika s svetovalci, specializiranimi za posamezne poslovne funkcije, pomaga podjetnikom rešiti najtežje poslovne težave in profesionalizirati njihovo poslovanje.
EIT venture program	Preoblikovanje poslovne ideje v MVP in novo podjetje (EIT Digital, EIT Manufacturing, EIT Food).
Pobuda za DT talente	Pobuda za DT talente je pionirski program pod vodstvom EIT, ki bo v naslednjih treh letih usposobil milijon ljudi na področju globokiih tehnologij. Inovacije na področju deep tech – vrhunske tehnološke rešitve, ki združujejo znanstvena in inženirska področja v fizičnih, bioloških in digitalnih sferah – so nepogrešljive za reševanje najnujnejših globalnih izzivov.
Eurydice	Mreža Eurydice podpira in olajšuje evropsko sodelovanje na področju vseživljenjskega učenja z zagotavljanjem informacij o izobraževalnih sistemih in politikah v 37 državah ter s pripravo študij o vprašanjih, skupnih evropskim izobraževalnim sistemom.

5. | ZAKLJUČKI

DT podjetja v Sloveniji se soočajo z edinstvenimi izzivi v primerjavi s klasičnimi oziroma zagonskimi tehnološkimi podjetji, vključno z daljšimi časi razvoja, višjimi stroški in povečanimi tveganji zaradi kompleksnosti in novosti njihovih tehnologij. Razvoj DT podjetij zahteva pomembne faze preverjanja koncepta, obsežno zaščito intelektualne lastnine (IP) in znatne začetne naložbe.

Sektor globokih tehnologij je v Sloveniji še vedno v začetni fazi razvoja in se sooča z večjimi izzivi kot bolj uveljavljena skupnost zagonskih podjetij. Podporno okolje, čeprav razvito za klasična zagonska tehnološka podjetja, nima zadostnih virov za podporo globokim tehnologijam.

Zaključki iz priporočil:

Program DT Usposabljanja bi moral vključevati izobraževalne module o osnovah intelektualne lastnine, da bodo raziskovalci razumeli pomen in mehanizme zaščite IP. Poleg tega bi bilo treba zagotoviti ciljno usmerjena usposabljanja o DT komercializacijskem procesu, prilagojena posebnim industrijskim področjem, kot sta biotehnologija in nanotehnologija, da bi premostili vrzel med oziroma naredili podjetniške skupine med tehničnimi/domenskimi in poslovnimi strokovnjaki. Program bi moral vključevati redne delavnice in aktivnosti, osredotočene na razvoj komercializacijskih veščin, kot so analiza trga, poslovno načrtovanje in prodajne strategije. Razvoj bolj strukturiranih in prilagojenih programov s poudarkom na praktičnih, izkustvenih izkušnjah je ključnega pomena.

Za mentorski program je nujno povečati število usposobljenih mentorjev, ki lahko nudijo neposredno podporo DT podjetjem , pokrivajoč tehnične in podjetniške vidike. Mentorji bi morali biti usposobljeni o podpornem ekosistemu in postopkih napotitve na specializirane inkubatorje in druge podporne strukture. Ustvarjanje močnih povezav z industrijskimi strokovnjaki, ki lahko delujejo kot mentorji, je nujna aktivnost za zagotavljanje vpogledov v inovacijske procese in pomoč pri premoščanju vrzeli med raziskavami in komercialnimi aplikacijami.

Paket storitev za DT inkubacijo bi se moral osredotočiti na povezovanje z mednarodnimi ponudniki financiranja globokih tehnologij (investitorji, specializirani za določene tehnologije, in strateški razvojni partnerji). Krepitev partnerstev z industrijskimi akterji za priložnosti pilotnih projektov, validacijo tehnološke izvedljivosti in povezave s strankami so bistvenega pomena. Razvoj strukturiranih in ciljno usmerjenih pospeševalnih programov za podporo rasti DT podjetij bo zagotovil, da bodo imeli potrebne vire in usmeritve za rast.

Učni okvir Peer2Peer bi moral poudarjati izmenjavo dobrih in slabih praks na več korakih DT komercializacije (kot sta npr. MVP in prve prodaje). Spodbujanje pobud, osredotočenih na najboljše prakse, in osebne povezave znotraj industrije, bo pripomoglo k vzpostavitvi kulture sodelovanja. Ustvarjanje okolja, kjer lahko somišljeniki delijo znanje in izkušnje, krepi učenje skozi sodelovanje in spodbuja razprave ter mreženje za prepoznavanje in povezovanje s potencialnimi industrijskimi partnerji in strankami.

Glede institucionalnih ukrepov je ključnega pomena uvesti ugodne habilitacijske kriterije, ki bodo raziskovalce motivirali za vključevanje v komercializacijske dejavnosti,

kot so dopusti za podjetniške dejavnosti in priznanje patentov, sodelovanja z industrijo, mentorstvo pri odcepljenih podjetjih in ustvarjanje odcepljenih podjetij v okviru akademskih ocen. Spodbujanje kulturne spremembe v raziskovalnih institucijah, kjer bi se vrednotil (komercialni) učinek poleg akademskih dosežkov, je mogoče doseči s strateško podporo politik in spodbudami za raziskovalce.

Za izboljšanje ozaveščenosti o ekosistemu in njegov razvoj je treba oblikovati programe za povečanje ozaveščenosti med vlagatelji in podpornimi organizacijami o edinstvenih značilnostih in potencialu podvigov globokih tehnologij. Spodbujanje odprtosti za mednarodna sodelovanja z učenjem od bolj uveljavljenih ekosistemov, kot sta Oxford ali Silicijeva dolina, in aktivno iskanje partnerstev z mednarodnimi podporami za globoke tehnologije je prav tako pomembno. Poleg tega lahko izboljšanje nacionalnih podpornih struktur za boljšo podporo podjetjem v fazi rasti dosežemo z boljšimi povezavami z mednarodnimi podpornimi organizacijami.

Podpora politik in regulativ mora biti usmerjena v zagovarjanje poenostavljenih in usklajenih regulativnih politik, ki podpirajo DT komercializacijo brez preobremenjevanja podjetij z nasprotujočimi si zahtevami. Pomembno je tudi uvesti ugodne davčne zakone in predpise, ki bodo omogočili uspešnim podjetnikom, da vlagajo v zagonska podjetja namesto v tradicionalne naložbe.

Za stalno izboljševanje in prilagodljivost je treba izobraževalne programe ponavljati vsako leto s poudarkom na nenehnem izboljševanju in prilagajanju spreminjajočim se potrebam DT podjetij. Prilagojene mentorske pobude, ki odražajo najboljše prakse iz uspešnih DT programov, bi morale dopolnjevati standardne programe.

6| PRILOGE

PRILOGA 1

Seznam intervjuvancev in udeležencev okroglih miz

Ime intervjuvanca - strokovnjaki	Profil
Urša Jerše Ursa Jerse - LinkedIn	Vodja Pisarne za prenos znanja na Univerzi v Ljubljani. Pravno svetovanje na področju intelektualne lastnine, odgovorna za portfelj patentov, priprava in revizija licenc, pogodb o raziskavah in razvoju (R&D), pogodb o nerazkritju (NDA) in drugih pogodb o intelektualni lastnini.
Dr. Tina Mesarič Tina Mesaric - LinkedIn	Vodja KTO na Univerzi v Mariboru. KTO ima 9 zaposlenih in hkrati upravlja z mnogimi projekti, nekateri niso povezani z osnovnimi dejavnostmi KTO. Imajo omejene izkušnje s podporo DT podjetjem. Trenutno na UM ni primerov odcepljenih DT podjetij, vendar komercializirajo DT tehnologije– sejmi, neposredni pozivi, ponudbe tehnologij.
Mag. Jure Vindišar Jure Vindisar - LinkedIn	Vodja pisarne za prenos tehnologij na Nacionalnem inštitutu za biologijo.
Mag. Robert Blatnik Robert Blatnik | LinkedIn	Vodja Pisarne da za vsebinsko projektno podporo, prenos tehnologij in inovacije. Koordinator za oblikovanje odcepljenih podjetij na Inštitutu Jožef Stefan.
Dr. Mateja Košir Mateja Košir | LinkedIn	Začela razmišljati o DT med doktorskim študijem, še posebej pa se je to intenziviralo v zadnjih 5 letih. Na ZAG (Slovenski nacionalni inštitut za gradbeništvo in civilno inženirstvo) pokriva dejavnosti EIT (Evropski inovacijski inštitut). Osredotoča se na industrijsko in surovinsko samooskrbo EU. V sektorju je veliko tehnologij, sama deluje v sektorju industrijskih in rudarskih odpadkov. V odpadkih se nahaja veliko kritičnih surovin, redkih zemelj, magnetov itd., zelo potrebne so tehnologije za recikliranje. ZAG se specializira za ponovno uporabo recikliranih materialov v gradbeništvu. Kot vodja projektov je vključena v projekt recikliranja nevarnega materiala v proizvodnji aluminija. Rezultat je pilotski obrat in licenčna pogodba za nadaljnjo komercializacijo. Soustanoviteljica odcepljenega podjetja.
Dr. Mitja Ruzzier Mitja Ruzzier - LinkedIn	Podjetništvo: vodstvene vloge pred prihodom v akademsko sfero, med delom na akademiji soustanovitelj DT podjetja AmiBit d.o.o., 5 let, nato izstop, razvoj poslovanja, iskanje ustreznosti med izdelkom in trgom. Profesor/Predavatelj: redni profesor, doktor znanosti, vodja Katedre za podjetništvo na Univerzi na Primorskem, avtor več knjig in priznan strokovnjak v podjetniški skupnosti, strateški

	svetovalec (inovacije, marketing). Poslovni angel, investitor v zagonska in DT podjetja.
Ime intervjuvanca: inkubatorji, investitorji, strokovnjaki s področja izobraževanja	**Profil**
Dr. Blaž Zupan Blaz Zupan - LinkedIn	Profesor podjetništva na Ekonomski fakulteti Univerze v Ljubljani (SEB UL). Podjetnik, investitor, svetovalec za Design Thinking in LEAN. Mentor podjetnikov.
Špela Rozman Dolenc Spela Rozman Dolenc | LinkedIn	Vodja projektov s 5 leti izkušenj v programih za DT podporo (Labs to Market, CogSteps). Financiranje predvsem s projekti, ki podpirajo razvoj podpore za DT. Razlikovanje od drugih inkubatorjev in podpornih sistemov (osredotočenost na DT v zadnjih 3 letih). Razvoj na tem področju po vsej EU, učenje skozi prakso o podpori DT. Certificiran trener Market Opportunity Navigator in Innovation 360 Yellow Belt.
Dr. Rok Stritar Rok Stritar | LinkedIn	Učitelj in asistent za raziskave na Ekonomski fakulteti Univerze v Ljubljani (do leta 2016). Ustanovitelj in glavni razvijalec podjetja Kibuba. Svetovalec za Design Thinking, Lean management in IT. Mentor zagonskim podjetjem. Izobraževalec: Tečaj: Razvoj izdelka ali storitve (prototipiranje, zaščita intelektualne lastnine).
Dr. Damijan Miklavčič Damijan Miklavcic LinkedIn	Lastnik več patentov, ki so bili licencirani industriji. Soustanovitelj odcepljenega podjetja MPor. MPor razvija različne signalne generatorje, aplikatorje in merilnike, ki se uporabljajo na področju biomedicine in biotehnologije. Podjetje je specializirano za razvoj visokonapetostnih pulznih generatorjev ali elektroporatorjev, ki ustvarjajo pulze do nekaj kilovoltov in več sto amperov z dolžino trajanja od nekaj nanosekund do več milisekund.
Janez Gorenc Janez Gorenc - LinkedIn	Zadnjih 12 let vodi podjetniški klub na Gimnaziji Novo mesto. Poleg tega je asistent na Ekonomski fakulteti Univerze v Ljubljani in podjetniški mentor v Podbrezniškem poslovnem inkubatorju. Skozi mentorstva je pridobil obsežne izkušnje. Delo s študenti je še posebej vplivno, kar izpostavlja projekt ScienceJam. Ta pobuda podpira pripravo številnih raziskovalnih nalog s praktično uporabnostjo ter študentom ponuja dragocene priložnosti za ocenjevanje skozi tekmovanja.
Jernej Ženko Jernej Ženko - LinkedIn	Pred šestimi leti je delal kot raziskovalec na FERI, Univerza v Mariboru. Ima veliko izkušenj z razvojem strojnih izdelkov. Po tem je začel delati pri Katapultu (je tehnični direktor - CTO Katapulta). V Katapultu se osredotočajo predvsem na fizične izdelke, saj imajo znanje in veščine za njihovo proizvodnjo (dedovanje podjetja Dewesoft, matičnega podjetja). Jernej je mentor, še posebej osredotočen na tehničo izvedbo in prodajo. Večina mentoriranih posameznikov so inženirji. Katapult ne "dela" zanje (osnovni razvoj), temveč zagotavljajo

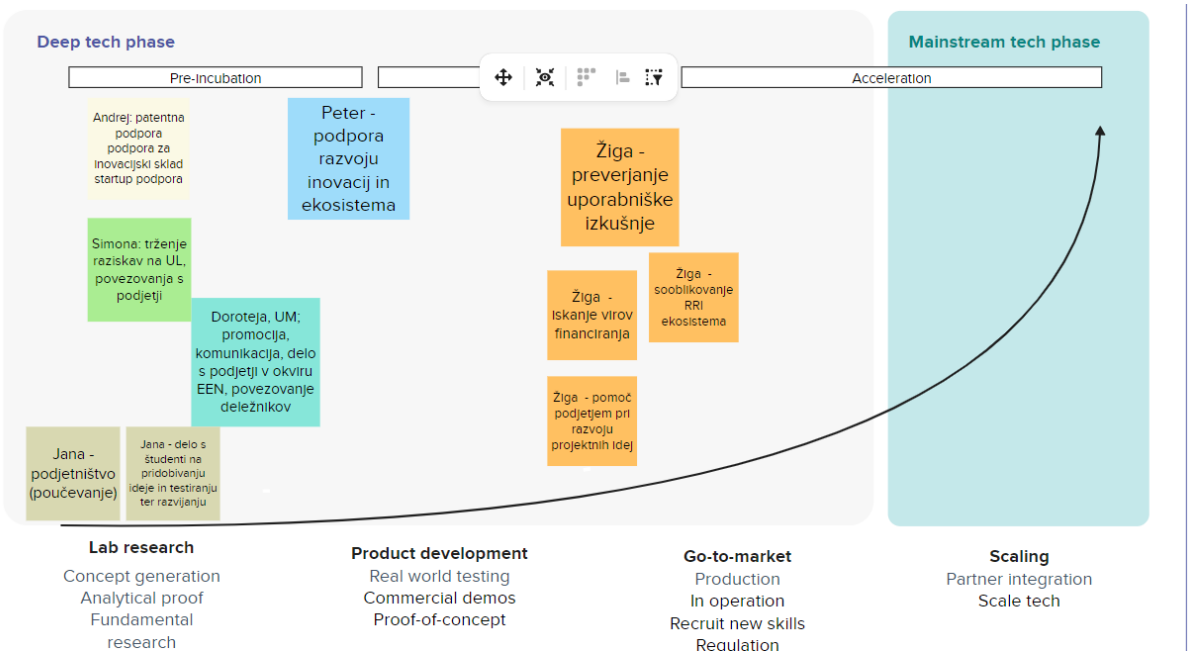
	svetovanje in strokovne storitve (industrializacija, logistika, CE certificiranje, pravna in računovodska pisarna itd.).
Dr. Andrej Kos Andrej Kos - LinkedIn	Profesor na Fakulteti za elektrotehniko, Univerza v Ljubljani. Vodi interdisciplinarni študijski program (Interdisciplinarni izzivi industrije). Predsednik komisije za inovacije na Univerzi v Ljubljani. Član ekspertne skupine EUA za inovacije.
Nina Dremelj Nina Dremelj - LinkedIn	Vodja Poslovnih angelov Slovenije, sama poslovni angel, vodja pri Vesna Venture Capital. Več investicij v globoke tehnlogije in "običajna" zagonska podjetja, izkušnje z mentoriranjem ustanoviteljev in ekip, prav tako raziskovalcev, ki postajajo podjetniki.
Tomaž Bizjak Tomaz Bizjak - LinkedIn	Tomaž ima izkušnje z ustanavljanjem zagonskih podjetij in prenosom tehnologij na Kemijskem inštitutu Slovenije (KI). Je soustanovitelj in izvršni direktor DT odcepljenega podjetja ReCatalyst. ReCatalyst razvija, proizvaja in dobavlja prilagodljive katalizatorske rešitve naslednje generacije iz platinskih zlitin z namenom optimizacije uporabe plemenitih kovin. Leta 2023 je podjetje prejelo 2,5 milijona EUR od Evropskega sveta za inovacije – Transition, kasneje pa še 1,7 milijona EUR investicij.
Dr. Matija Gatalo Matija Gatalo - LinkedIn	Soustanovitelj in tehnični direktor (CTO) v podjetju ReCatalyst. Matija je glavni izumitelj osnovne tehnologije podjetja ReCatalyst in ima 10 let izkušenj na področju razvoja katalizatorjev za gorivne celice. ReCatalyst razvija, proizvaja in dobavlja prilagodljive katalizatorske rešitve naslednje generacije iz platinskih zlitin z namenom optimizacije uporabe plemenitih kovin. Leta 2023 je podjetje prejelo 2,5 milijona EUR od Evropskega sveta za inovacije – Transition, kasneje pa še 1,7 milijona EUR investicij.
Urban Lapajne Urban Lapajne - LinkedIn	Urban se je ekipi Tovarne podjemov pridružil leta 2003. Takrat je začel z osnovnim mentorstvom zagonskim podjetjem, v zadnjih 10 letih pa ima obsežne izkušnje z mentoriranjem DT ekip, ki izhajajo iz Univerze v Mariboru ali podjetij, vključenih v podporne programe SPS (Slovenski podjetniški sklad) – kot so P2, SK50, SK75, SK200 itd. Mentoriral je približno 50 podjetij, ki so imela močne temelje v globokih tehnologijah.
Udeleženci okrogle mize	**Profil**
Dr. Jana Hojnik Jana Hojnik - LinkedIn	Izredna profesorica in raziskovalka podjetništva na Fakulteti za management. Deluje v Centru za razvoj in prenos znanja na Univerzi na Primorskem.
Žiga Lampe Ziga Lampe - LinkedIn	Direktor strateškega razvoja na Gospodarski zbornici Slovenije, izkušen podjetnik. Razvija orodja in instrumente za sodelovanje med univerzami in podjetji.
Mag. Andrej Černetič	Svetovalec za identifikacijo in zaščito intelektualne lastnine (na področju tehničnih znanosti), dela v Pisarni za prenos znanja, UL.

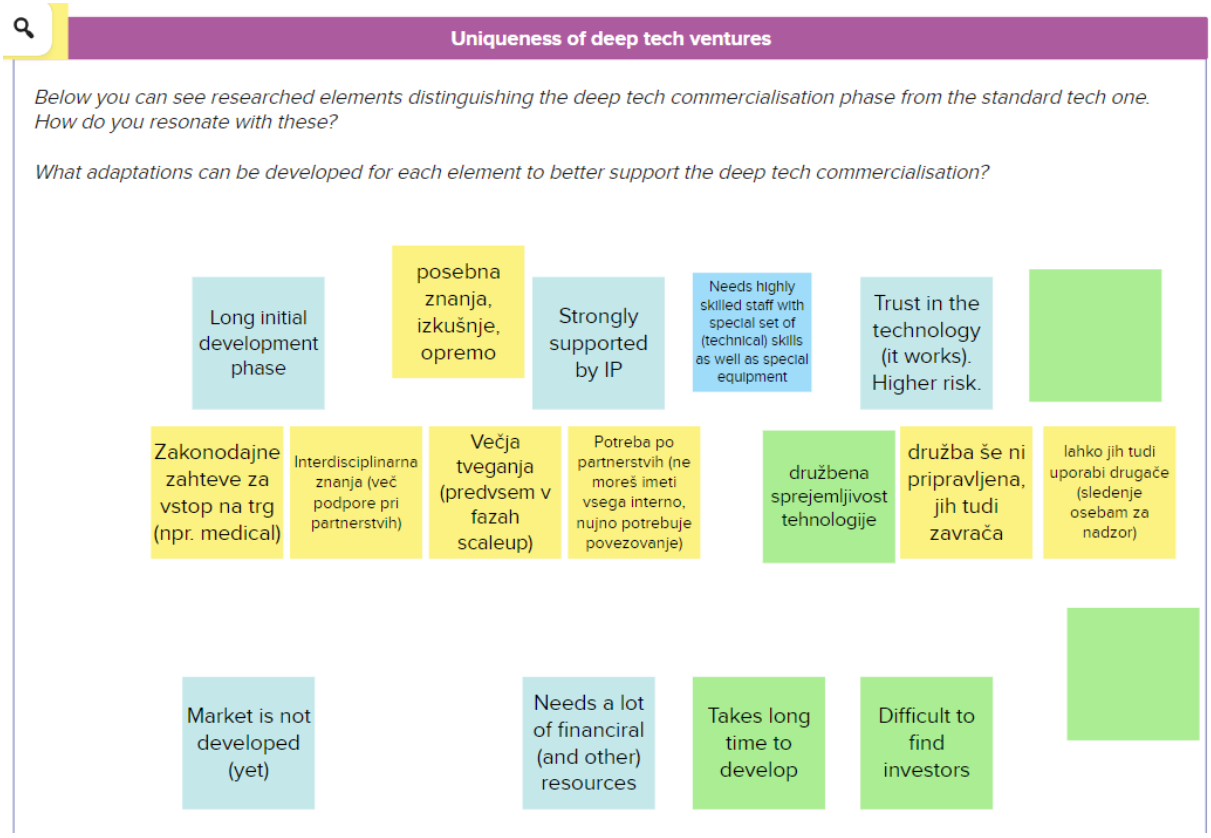
Doroteja Novak	Deluje v Službi za prenos znanja in tehnologij na Univerzi v Mariboru. Pisarna podpira inovativne raziskovalce in študente, ki želijo zaščititi in ekonomsko izkoristiti potencial svojih inovacij. Hkrati deluje kot vstopna točka za podjetja, ki iščejo tehnologije in znanje ali projektna partnerstva. Njeno glavno poslanstvo je spodbujanje in podpora različnim oblikam prenosa znanja v gospodarstvo in s tem v širšo družbo.
Strokovnjaki, ki so sodelovali z odgovori na dodatni vprašalnik (in so nas o sodelovanju obvestili)	**Profil**
Luka Mali Luka Mali - LinkedIn	Vodja makerspace na Fakulteti za elektrotehniko. Ima 20 let izkušenj na področju IoT kot inovator, mentor in tehnološki vizionar, ki spreminja futuristične ideje v današnje inovacije. Združuje strokovno znanje s področja projektnega vodenja, akademskega dela in razvoja izdelkov.
Maša Abrič Masa Abric - LinkedIn	Navigirala je po startup okolju v univerzitetnem inkubatorju Univerze v Ljubljani. Je ustanoviteljica in mentorica startupom, posvečena vodenju naslednje generacije podjetnikov ter povezovanju misli znotraj ekosistema, s čimer ustvarja preplet sodelovanja in inovacij.
Leon Pavlič Leon Pavlic - LinkedIn	Svetovalec za internacionalizacijo in vodja projektov v Centru za razvoj in prenos znanja na Univerzi na Primorskem, Fakulteta za management.
Tanja Senekovič Tanja Senekovic - LinkedIn	Izkušena strokovnjakinja za podporo poslovanju in inovacije. Vešča poslovnega načrtovanja, izboljševanja poslovnih procesov, operativnega vodenja, upravljanja projektnega portfelja in poslovnega svetovanja.
Polona Juvančič Polona Juvancic - LinkedIn	Kot vodja oddelka za ustanavljanje odcepljenih podjetij nudi: (1) Podporo pri pripravi vlog za razpise in tekmovanja za zagonska podjetja; (2) Svetovanje v pripravljalnih fazah podjetniškega procesa; (3) Pomoč pri iskanju partnerstev in ustvarjanju poslovnega modela.

Priloga 2

Posnetki zaslona z okrogle mize (orodje za sodelovanje Mural).

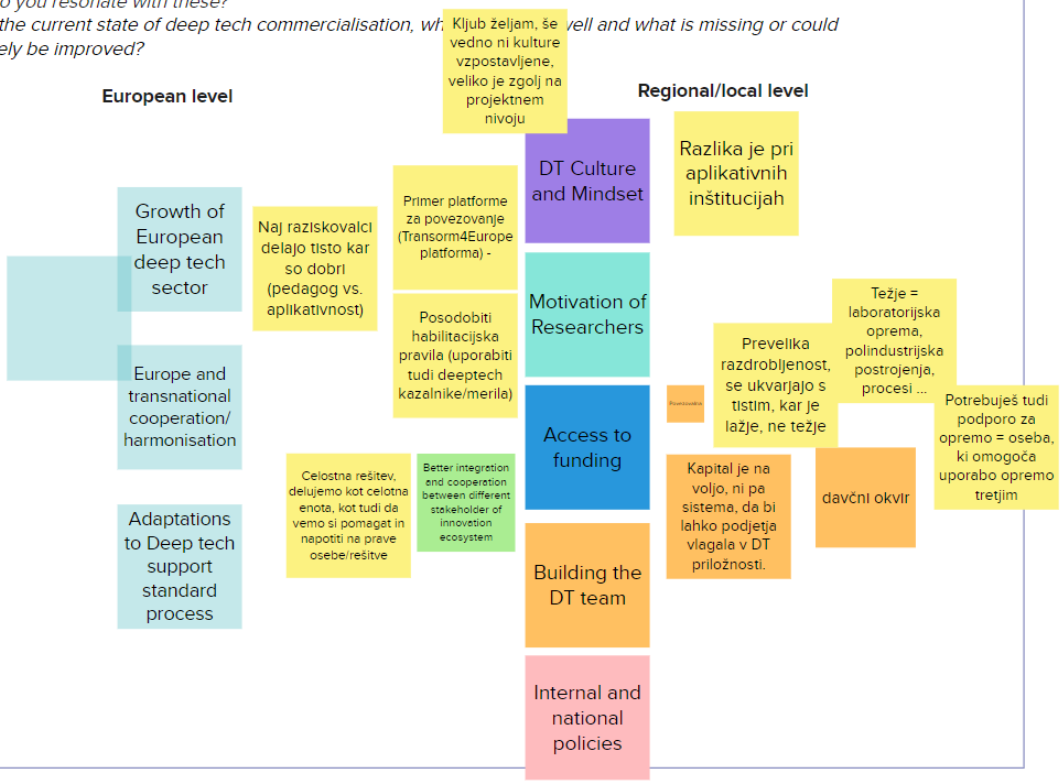
Strokovna področja udeležencev





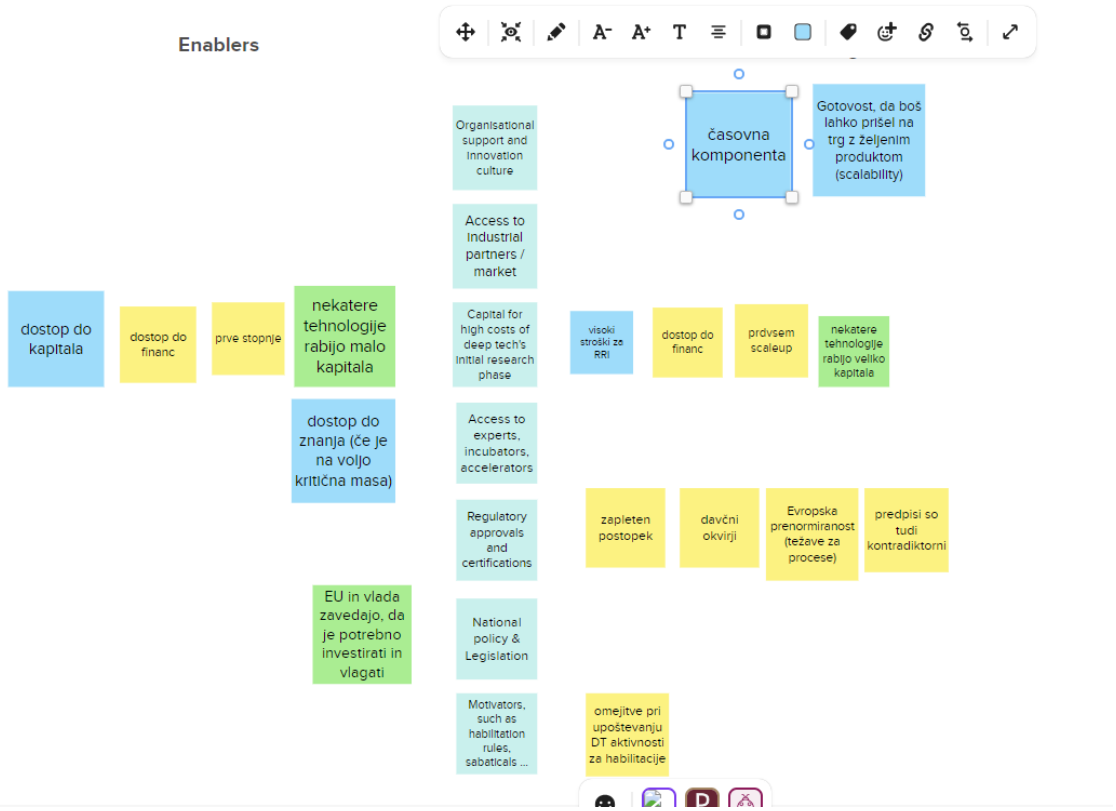
Below you can see insights from teh current state of deep tech on a European and regional level.

How do you resonate with these?
Given the current state of deep tech commercialisation, wh vell and what is missing or could definitely be improved?



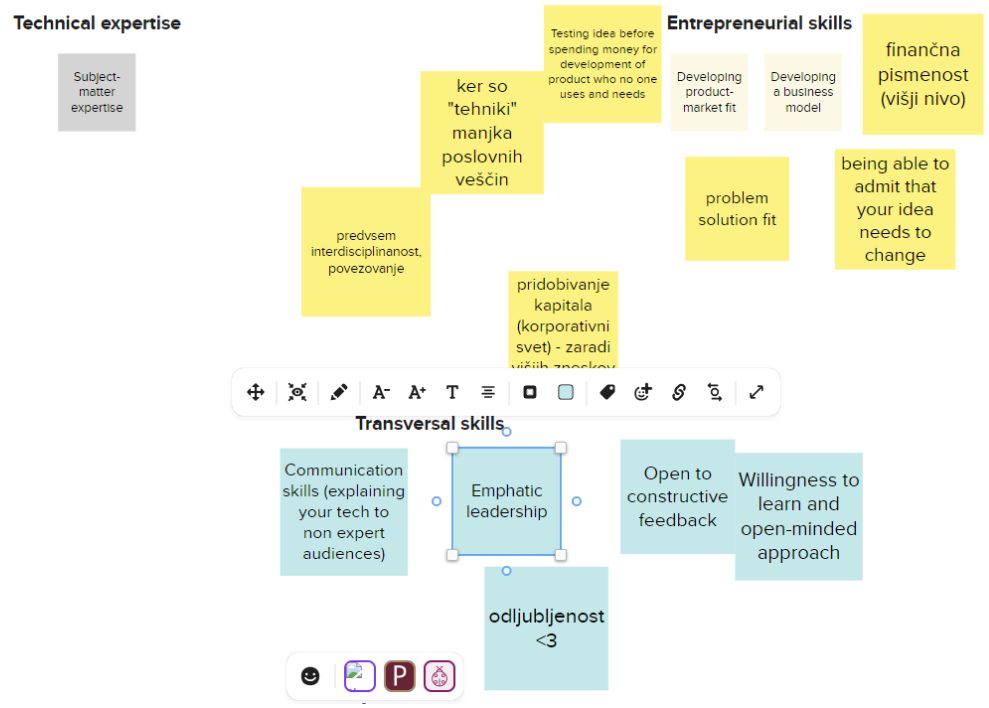
can see the main researched elements that under different conditions/in different regions act as common enablers or challenges for deep tech commercialisation.

How do you resonate with these?
In your region, do you recognise them as enablers or challenges?



Below you can see some major researched knowledge, skills and attitude gaps for academics talent pursuing deep tech commercialisation of their research.

How do you resonate with these?
In your region, have you encountered these gaps in academics/talent?



4 | Research into practice: how to support deep tech

*How could the **different elements of the conducted research be utilised** to create educational and incubation programmes to support deep tech ventures? (The DTLaunchpad initiative will design 4 such educational and incubation programmes, see below.)*

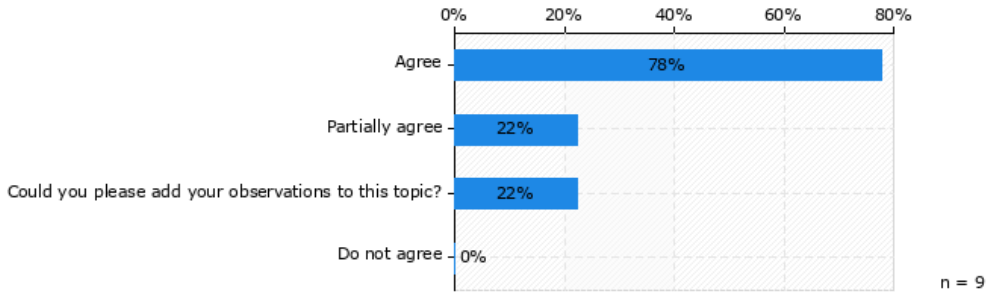
Priloga 3

Dodatni vprašalnik "Deep tech okolje v Sloveniji" in odgovori.

DT Environment in Slovenia, additional questionnaire

The Deep Tech commercialization process is more complex than standard tech commercialization.

(n = 9)

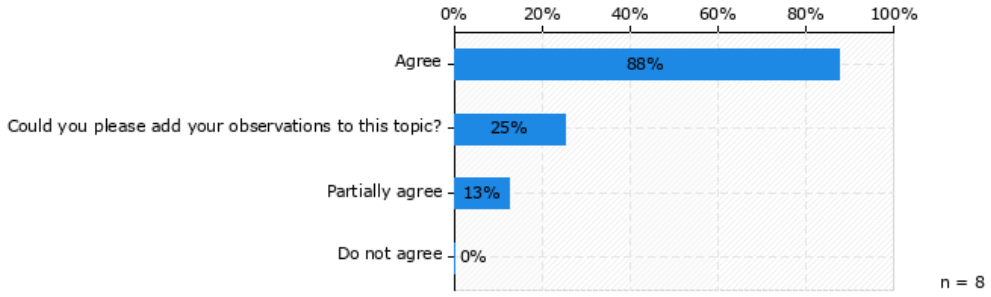


Additional observations:

- it depends on the product. there are products in the deep tech sector that are right away ready to use and you can commercialize it no problem. there are ont he other hand products that need a lot more ip and brokerage care.
- any process where you search for applications and market post factum is difficult. the more novel and disruptive the technology is, the harder it is.

Deep Tech Ventures require longer timeframes for development and commercialization due to the need for extensive research, prototyping, and regulatory approvals.

(n = 8)

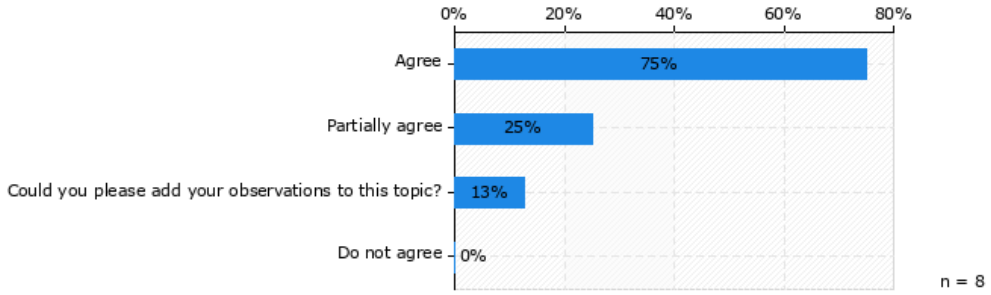


Additional observations:

- indeed, as it usually is the case that nothing is adapted to the new tech
- the same as previous.

Deep Tech Ventures require higher investment, both in terms of financial resources and specialized equipment.

(n = 8)

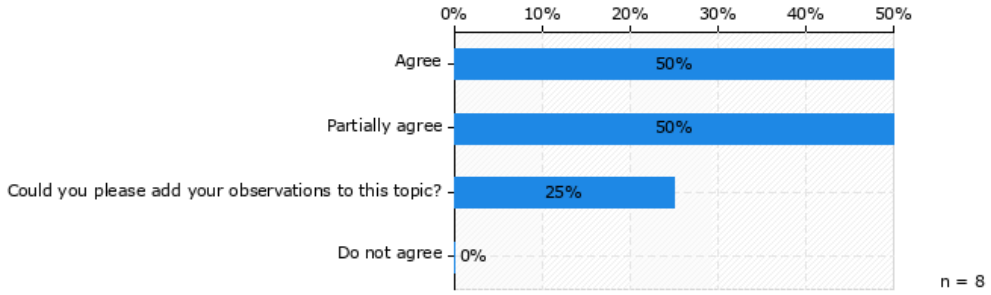


Additional observations:

- i do not think that it is only the amount of money. it is also how accessible it is, how much administration it requires etc. there is also a big threat of supporting something financially, thus creating a false sense of success - deep tech companies to need to have product-market fit. too much investment can delay that

Due to high risk in DT ventures, there is limited room for pivoting, especially in the B2B sector where there are fewer target companies.

(n = 8)

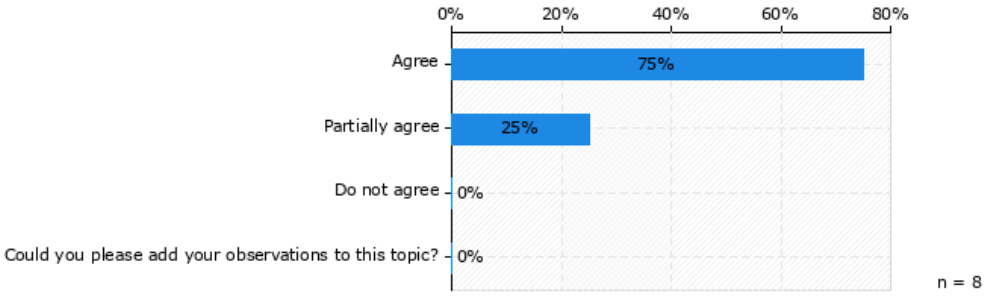


Additional observations:

- depends on the circumstances. i am a firm proponent of pivoting, as there is always room for adjustment and improvement. while there may be additional costs associated with pivoting, the opportunity to adapt and evolve should always be considered.
- not sure i understand. pivoting is different for deep tech, but all the more important as one is in a sense creating a market, sisrupting established markets...

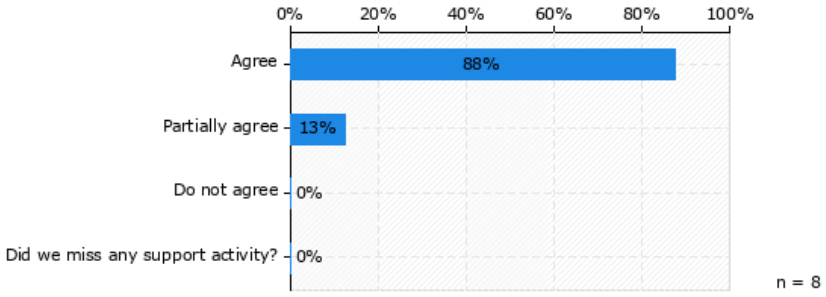
Traditional Tech Ventures generally have shorter development cycles and lower initial investment requirements, especially in sectors like software development where rapid prototyping and quick market entry are possible.

(n = 8)



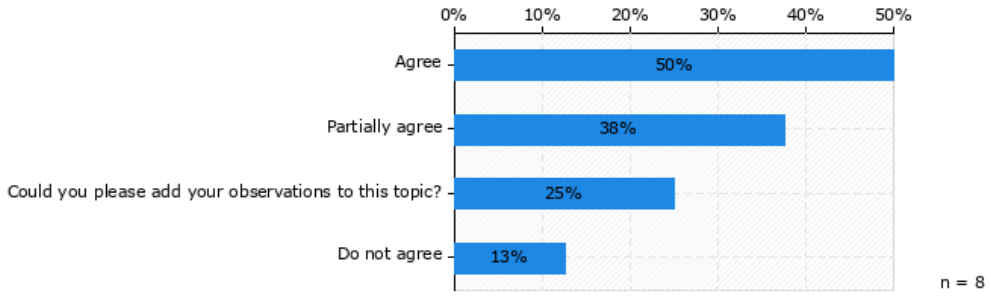
The DT commercialization typically involves several stages from ideation to market entry. This includes support activities, such as legal counselling on intellectual property, patent portfolio management, drafting and revising licences, creating R&D agreements, searching for business partners, ...

(n = 8)



Building market trust in the DT technology is crucial due to the high stakes involved. Proving the concept and technological viability requires significant effort and resources.

(n = 8)

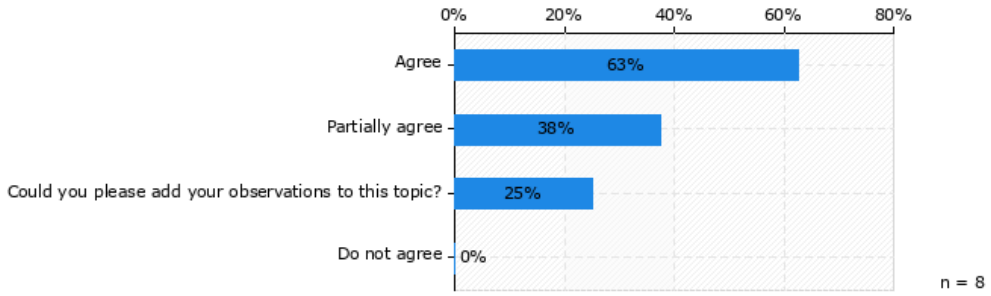


Additional observations:

- it depends on the shareholders and stakeholders
- building market trust is a critical challenge for every new company, regardless of whether it operates in deep tech or other industries. establishing this trust typically requires a substantial amount of time and consistent effort.

Traditional Tech Ventures often face fewer challenges in building market trust, as the technologies are typically less disruptive and more easily understood by potential customers and investors.

(n = 8)



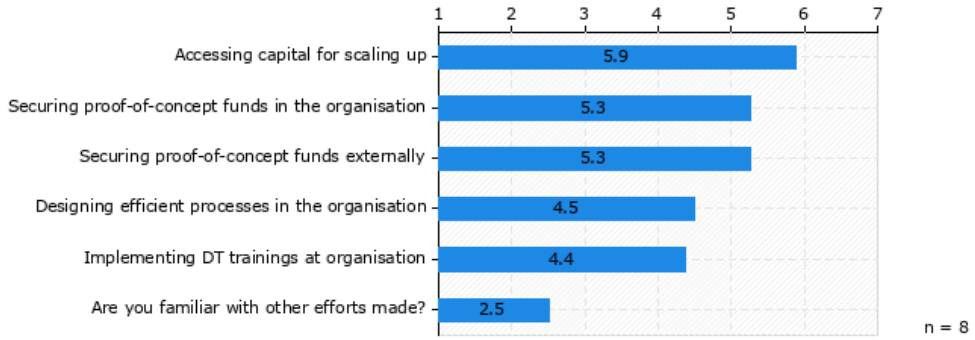
Additional observations:

- building market trust is a critical challenge for every new company, regardless of whether it operates in deep tech or other industries. establishing this trust typically requires a substantial amount of time and consistent effort.
- i would have to see a difference in what is meant by traditional tech venture and a deep tech venture, but generally, the more novel,unknown,unprecedented the science/tech behind the venture, the harder it tends to be.

In your experience, how severe are the following bottlenecks in the standardisation of the Deep Tech commercialization process?

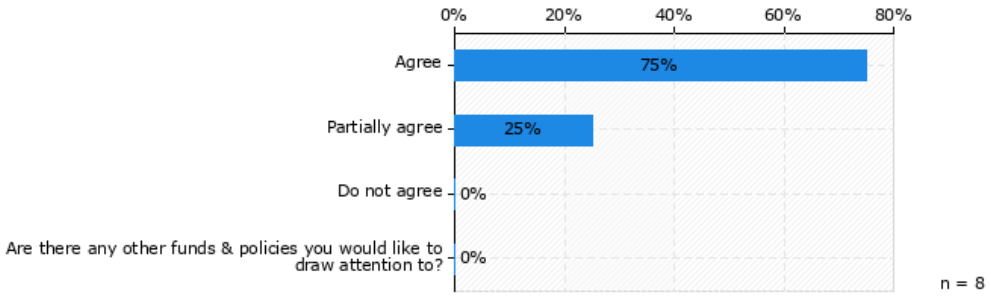
(1 means not severe, 7 means very severe)

(n = 8)



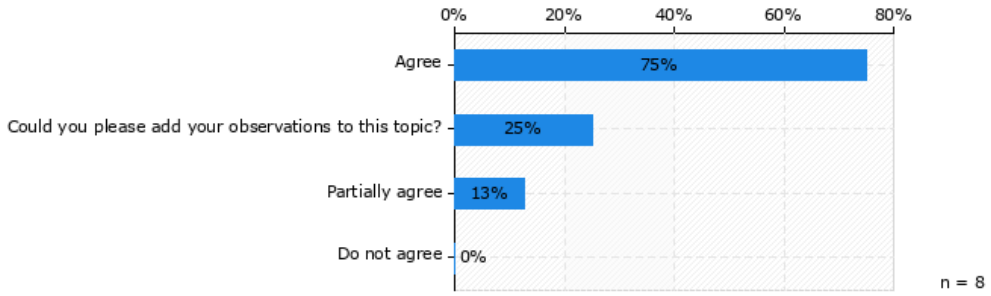
Deep Tech commercialization policies and frameworks include regional funds, national innovation agencies, and European Innovation Council funding.

(n = 8)



There is a need for more institutional measures (such as favourable habilitation criteria, sabbaticals ...) to motivate researchers and facilitate the DT commercialization process.

(n = 8)

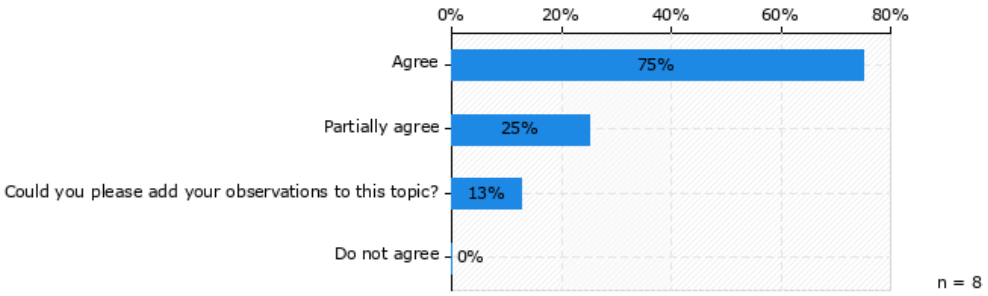


Additional observations:

- lack of business orientation in rdi sector in slovenia
- overall, by implementing these institutional measures, we can create an environment that not only motivates researchers but also streamlines the dt commercialization process, leading to more innovative solutions reaching the market.

Regulatory approvals and certifications in Deep Tech are particularly critical and challenging, often requiring significant investments of both time and resources.

(n = 8)

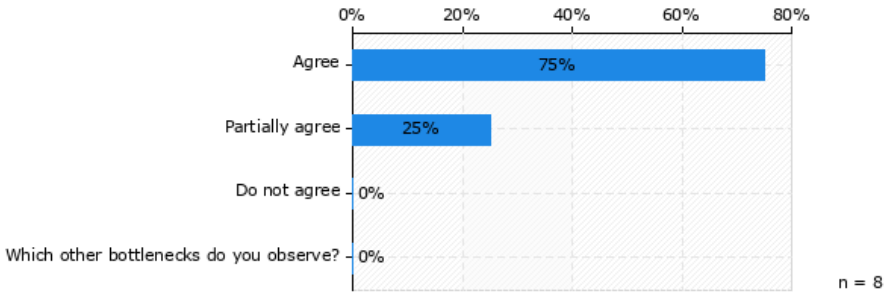


Additional observations:

- streamlined processes, support programs, and expert guidance can help. increasing financial opportunities, such as venture capital and government grants, also assist in navigating these requirements. in slovenia, there are many such opportunities, and in my opinion, they are growing each year. leveraging these resources helps bring innovations to market more efficiently, benefiting society.

Major bottlenecks identified in the DT process include designing an efficient organizational and regional process, accessing sufficient proof-of-concept (POC) funds, and obtaining capital for scaling up.

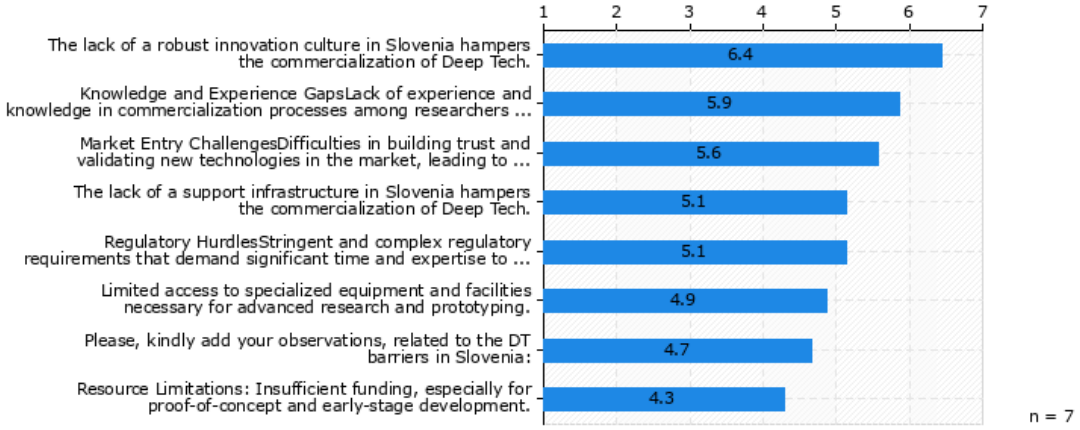
(n = 8)



From our analysis, we've identified the following common barriers of deep tech commercialisation. In your opinion, how severe are these barriers?

(1 means not severe, 7 means very severe)

(n = 7)



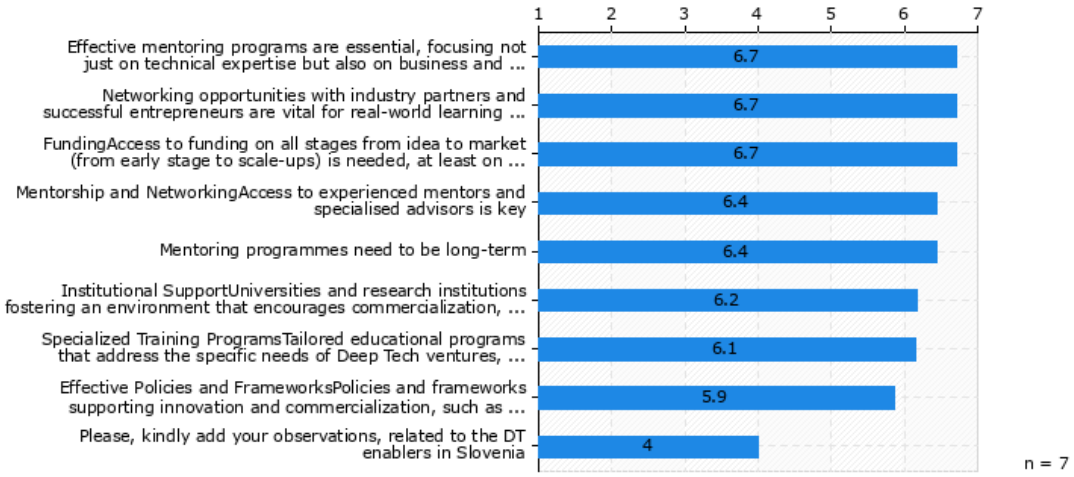
Additional observations:

- lack of ambition and lack of possibility to have a research career oriented towards commercial success
- lack of dt culture

From our analysis, we've identified the following common enablers of deep tech commercialisation. In your opinion, how important are these enablers?

(1 means not important, 7 means very important)

(n = 7)



Additional observations:

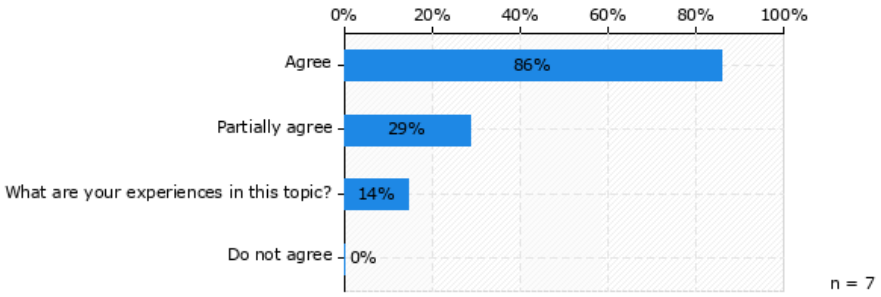
- researchers need the freedom from teaching and other obligations. perhaps a separate career path for innovation/commercialisation....

Knowledge, skills and attitudes for talent to pursue deep tech commercialisation

Current tech-entrepreneurship training programs are generally similar across universities and incubators.

They need to be adapted to be specifically tailored to deep tech ventures, for example by focusing on more practical exercises and addressing the unique challenges of deep tech commercialisation.

(n = 7)

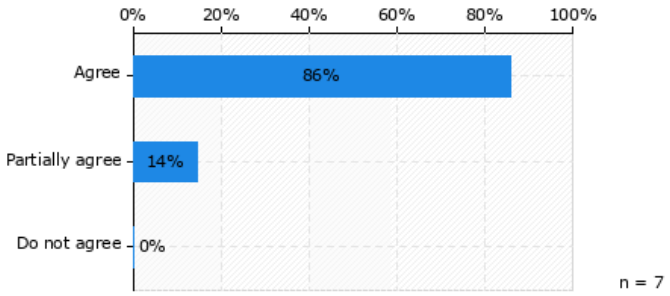


Additional observations:

- i believe that programs should be iterated annually with a focus on continuous improvement. adopting a \'one-size-fits-all\' approach often results in a solution that satisfies no one. instead, a foundational standard program should be complemented by tailored mentoring initiatives, reflecting best practices observed in successful deep tech programs

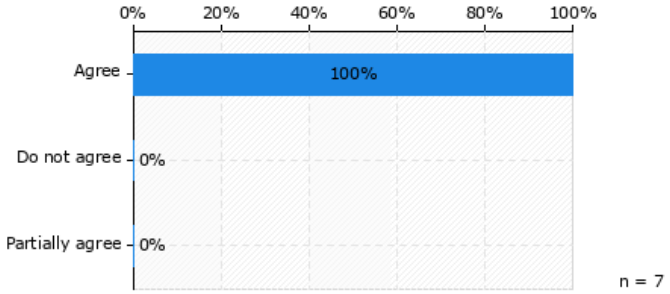
Expertise in relevant scientific and technological fields is essential for DT. Researchers must be able to conduct advanced research and understand the intricacies of their innovations.

(n = 7)



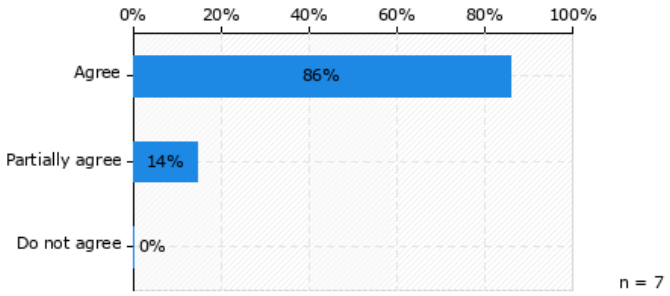
Understanding the business aspects of commercialization, including market analysis, business planning, and fundraising is essential. Entrepreneurial skills are critical for navigating the commercialization process and driving ventures forward.

(n = 7)



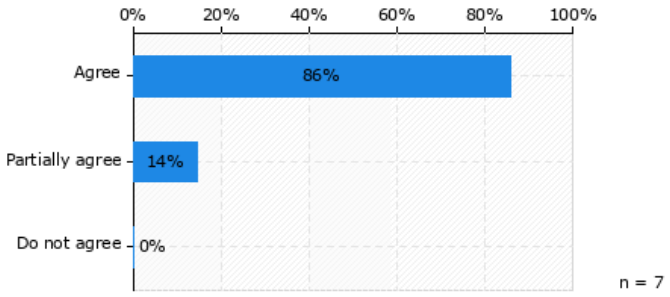
Communication, negotiation, and leadership skills are vital. These skills enable researchers to articulate their ideas, negotiate with stakeholders, and lead their ventures effectively.

(n = 7)



The commercialisation process is associated with challenges and setbacks. Perseverance and the ability to adapt to changing circumstances are crucial for success.

(n = 7)



Collaboration with industry partners, investors, and mentors is essential. A collaborative mindset helps in leveraging external expertise and resources, thereby enhancing the commercialization potential of Deep Tech ventures.

(n = 7)

What other skills and competences in DT do you see as important?

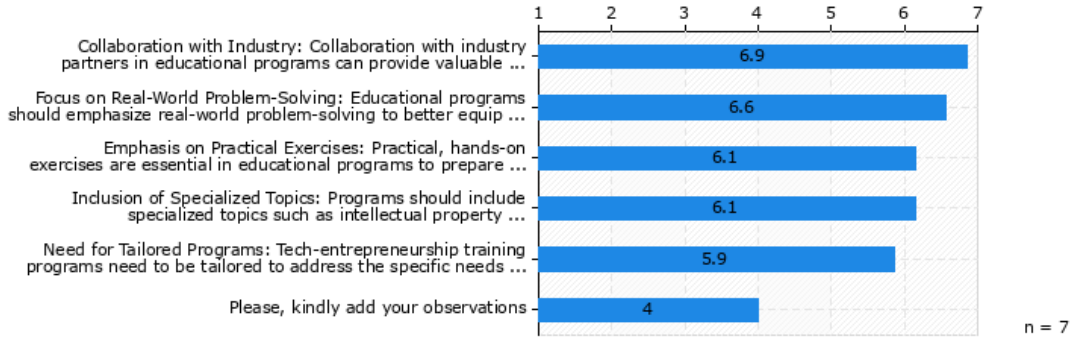
- communication skills, empathy, conservatism at introducing novel tech if not proven safe
- fast response to changes
- skills of tt staff and university in general. we should create an environment that enables those that want to be innovative to do so and not push everybody towards that. recognise, hone and enable. not every scientist is a teacher, nor an inventor. inter and multidisciplinarity and several career track
- options are essential
- i believe that soft skills—such as team navigation and effective communication—are crucial. in my experience, researchers often struggle with trust within their teams. ultimately, the success or failure of a startup hinges on the cohesion of its team, not just in deep tech but universally. additionally, the ability to present and perform effectively is paramount.

Which DT training programmes in Slovenia (and EU) are you familiar with?

- eurydice
- vesna POC fund
- deep tech hub katapult
- none since i do not work in the DT sector
- deep tech hub - slovenski deep tech pospeševalniški program
- eit jumpstarter, sio (mentorship), from labs to market, commercialization reactor, startup klinika, eit venture program, deep tech talent initiative,...

What would a perfect DT training programme look like? Please rate the elements of training that have emerged from our analysis.(1 means - not important, 7 means very important)

(n = 7)



Additional observations:

- communication of ideas, enthusiasm, negotiation skills,

What specific skill gaps exist in the current overall Deep Tech sector?

- Specific career path, not measured with teaching and articles....
- Funds
- Issue of inclusiveness to such DT environments (thresholds to pass before becoming a member of community)
- I am not informed
- A gap between business and tech skills
- interdisciplinary collaboration: deep tech innovations require skills in team management, communication, and cross-disciplinary collaboration. presentation and communication: communicating complex ideas effectively to stakeholders, including investors and the public, remains challenging.
- Business / capitalisation & commercialisation skills

In your opinion and expertise, how can these gaps be addressed?

- by enabling targeted support programmes and trainings to raise the business competencies of tech experts and tech competencies of business experts
- new career path created
- national tenders
- these aspects should be integrated into dt programs. moreover, they will evolve over time as best practices continue to improve. it is a gradual process, but in my opinion, the situation is steadil y improving.
- building the bridge between rdi & business sector
- fostering culture of cooperation?
- only with international connections and trainings