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Crossing the Innovation Valley of Death through the Venture Builder Model

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Abstract

On the path to a successful deep-tech venture, many innovations fall into what is generally known as the valley of death. There are many reasons why innovative projects (and associated deep-tech ventures) fail to cross the valley of death, but some of the most common ones are; lack of commercialization and business development experience and the inability to attract investors. One possible solution to bridge this valley could come in the form of a Venture Builder model. This model (also called Venture Studio) is a novel approach that is essentially a start-up that builds start-ups using its own ideas (or innovations) while focusing on resource sharing among partners that constitute it. Venture Builders leverage their extensive network consisting of different partners, experts and seasoned entrepreneurs who share their capital, skills, and market expertise with the participating ventures, creating a perfect innovation ecosystem. When it comes to commercializing innovations and developing deep-tech ventures, collaboration between academia and industry is essential from the get-go. Hence, this paper focuses on the model proposed and instituted by the University of Zagreb Faculty of Electrical Engineering and Computing and the Innovation Centre Nikola Tesla. It will provide a detailed description of different phases of venture building as well as all of the activities, programs and partners required for the successful implementation of the venture builder model for the establishment and development of deep-tech ventures.

1. Introduction

Start-up ecosystems are the bedrock of innovation [1] especially when the accompanying field of work is deep-tech, i.e. technology that is based on tangible engineering innovation or scientific advances and discoveries. There is a universal need in the European Union (EU) for a transformation of the researchers' mind-sets and the higher education institutions' (HEI) approach to research commercialization. This need has been widely recognized, as seen by the EU agenda for higher education which has specified „Ensuring higher education institutions contribute to innovation" as one of its four priorities [2]. Furthermore, the EU made innovation a top priority through the Lisbon Agenda and the Europe Horizon 2020 initiative. It set a goal of investing 3% of the EU's GDP in R&D, while implementing a range of innovation policies to close the technological gap between EU and U.S. and to become "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" [3]. However, in 2017, R&D expenditure in the EU was only 2.07% of GDP, while in Croatia it was an even more worrying 0.86%. Compared to the US, HEIs in the EU often do not contribute as much as they could to innovation in the wider economy, particularly in their regions, i.e. they do not usually behave as entrepreneurial actors. This is a considerable issue since innovations are the most important driver of economic growth.

In addition, too few startups and spin-off companies in the EU are founded by PhD holders. In a 2018 report, only 12.57% of EU startups were founded by founders with doctoral or equivalent degrees [4]. As a result, the EU is in a serious deficit of successful startups and spin-off companies coming from the universities [5]. This is especially true for the national context of Croatia which lags behind the rest of the EU.

Even when researchers overcome all the initial challenges and manage to start a spin-off, their lack of commercialization and business development experience, coupled with the inability to attract investors, often leaves them stranded in the so called "valley of death" – the phase between basic research and successful innovation in which both the research and the commercialization resources are insufficient (Figure 1).

One possible solution to bridge the valley of death could be a Venture Builder model which brings together

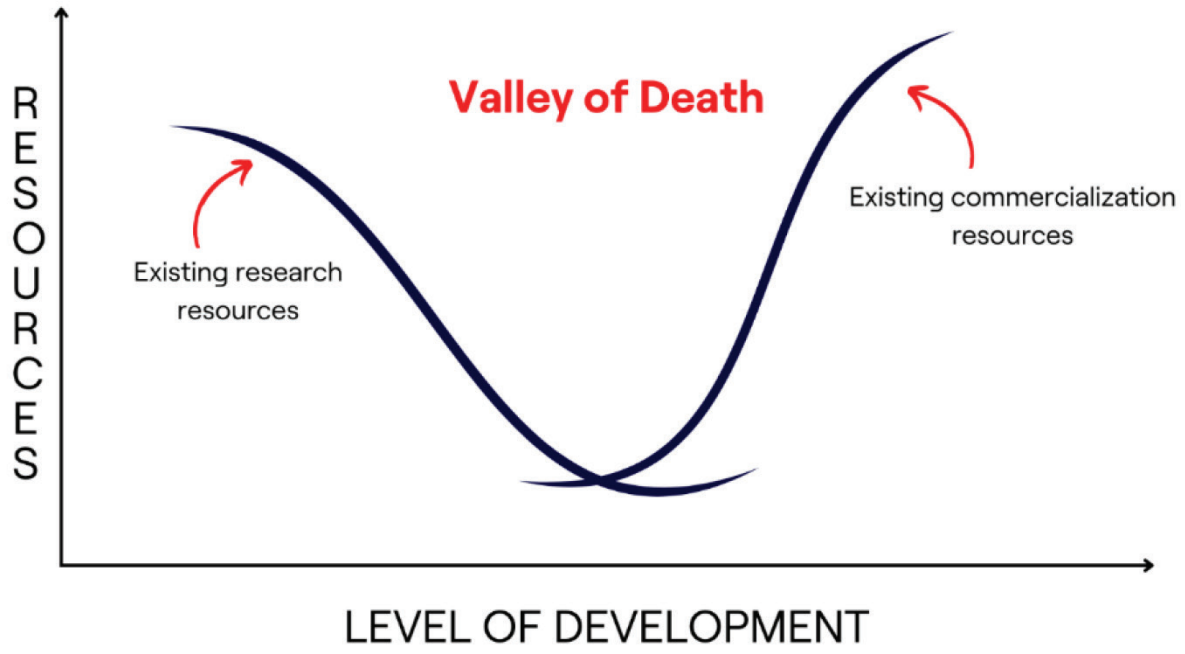

Fig. 1. Valley of death and available resources

interested industry partners, serial entrepreneurs and specialised venture capital (VC) funds to act as a proverbial ''bridge'' over the ''valley'' by sharing their resources and knowledge in the joint mission of research commercialization. This model is described in more detail in the next section.

Crossing the valley

To help get skills, knowledge, and ideas "out of the lab," researchers must collaborate with people who have varied experience and expertise, such as product designers and business developers, making the deep-tech startup development an interdisciplinary collaborative process. Having an interdisciplinary team without significant experience in creating successful businesses usually leads to a trial-and-error approach which can negatively affect startups' success and make them stuck in the valley of death. This is why it is important to have exceptional mentors that are well versed in the specific technology, industry and the process of rapid startup development and growth. For later stages, startups need strong and experienced partners with market access who can assist with client acquisition, brand building, and product creation and maintenance. Even though these processes are sequential, it is really important to involve all the above-mentioned stakeholders from the beginning so that they can help build a solid foundation and avoid major mistakes in the later stages of development.

All this can be done via a Venture Builder (VB); a novel approach which is essentially a start-up that builds start-ups using its own ideas while focusing on resource sharing between the partners that constitute it [6]. VBs leverage their extensive networks and ecosystems consisting of experienced entrepreneurs who share their capital, skills and market expertise with the participating ventures. The goal is to combine large amounts of resources, both physical and non-physical, in the most efficient manner possible, i.e. the resources must be instantly available and free flowing to create an internal culture of trust, deal flow and attentiveness. This way the venture gains a significant competitive advantage. A typical venture development process includes the following steps:

1. **Identifying business ideas** – ideas can originate from the VB team or from dedicated events,
2. **Idea validation** – VB team selects several ideas which are tested for customer demand, market size, investor interest, technical feasibility, and business model,
3. **Business creation** – best ideas are chosen by the VB teams, and they begin working with the founding team on business development, sales, branding, legal issues, and fundraising,
4. **Spin-out** – VB teams hire an experienced management team to run the company.

Compared with other similar market actors such as incubators, accelerators, etc., VBs are far more involved in the daily management of their ventures, and the relationships with their ventures are long term.

Furthermore, with this assistance, the enterprise may concentrate completely on building technology, verifying and polishing the business model, and testing its minimum viable product (MVP), reducing time-to-market for the products and increasing their chances of success. In essence, VBs industrialize and demystify the process of venture building. By doing so, VBs effectively change the labour market by speeding up and optimizing typical practices.

For the past two years, the University of Zagreb Faculty of Electrical Engineering and Computing (UniZG-FER) and the Innovation Centre Nikola Tesla (ICENT) have been working on advancing the Croatian deep-tech ecosystem with a new Venture Builder as its focal point.

Venture Builder at FER and ICENT

FER is one of Croatia's leading research institutions, with over 250 current national and European R&D projects. FER is divided into 12 departments that focus on education, research, and development in subjects such as robotics, energy, artificial intelligence, communications, electrical engineering, electronics, biomedical engineering and others. The current research and educational staff consist of more than 200 professors and 371 teaching and research assistants and around 3450 students at the undergraduate and graduate level as well as 399 PhD students. Also, FER has established valuable international cooperation with many research institutions around the world, either directly or through inter-university cooperation. To support their students, researchers and professors in the startup creation process, in 2016 FER started its own student startup incubator programme called SPOCK. FER is also currently implementing an Erasmus+ project called "Crossing the Gap: Start-up education and support for PhD students, researchers and scientists" (COGSTEPS) with the goal of connecting the academic community and startup ecosystems.

Through its two digital innovations hubs (DIHs), CybersecRDI and CROBOHUB, ICENT serves as a one-stop shop, assisting Croatian businesses in digitalizing their operations and improving cybersecurity by efficiently orchestrating various stakeholders in the robotic and cybersecurity innovation ecosystem. In 2018, ICENT started the "Imagine, Create, Innovate" program which brings together students from Croatian universities to learn about the prototype development process through several stages of education.

FER and ICENT are now working together to integrate all the above-mentioned activities and programmes into a single progressive and comprehensive programme that will enable collaboration between the research community, corporates and successful start-ups with the aim of research commercialisation and deep tech start-up development. To be able to develop a program with a clear plan and vision, the first step is to identify the key stakeholders, their needs and strengths, and

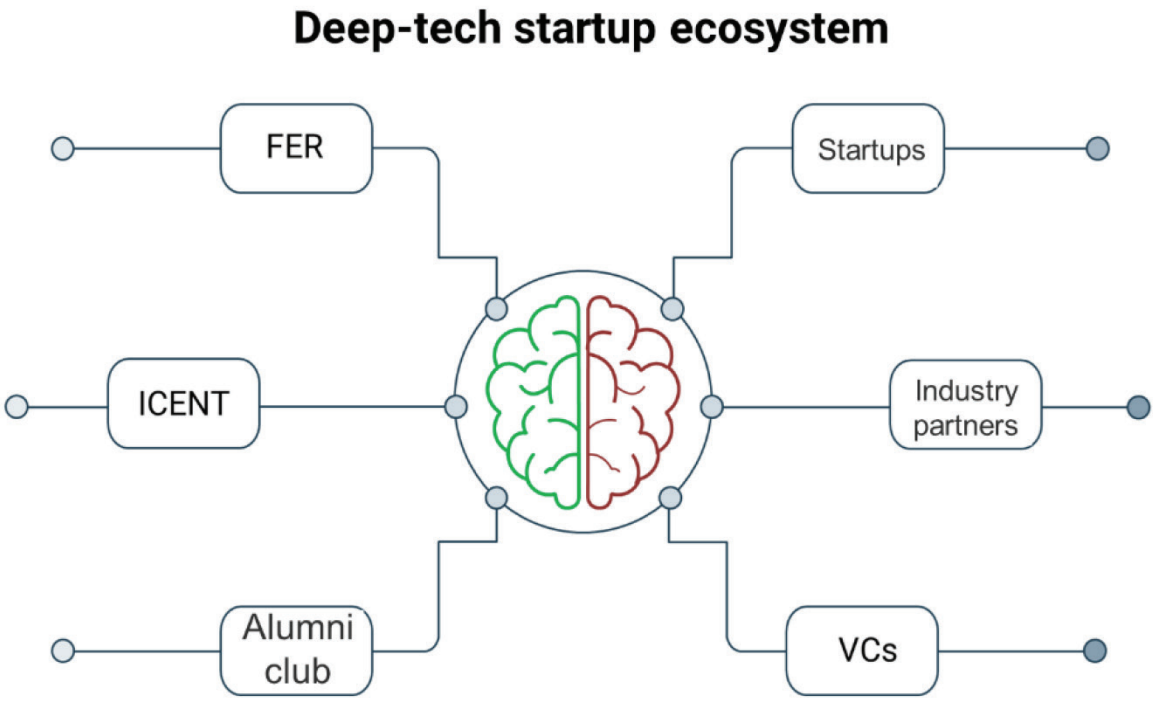

Fig. 2. Stakeholders of Croatian deep-tech ecosystem

their incentives for entering the deep-tech ecosystem (Figure 2).

An ideal scenario would be as follows: (i) FER engages best researchers and scientists to work on solving one of the recognized problems, (ii) ICENT provides its experience and support in prototyping and MVP creation, (iii) FER's alumni club provides experienced upper level management with strong R&D backgrounds who are interested in leading the startup development in early stage, (iv) successful Croatian startups provide experts with knowledge and experience in relevant fields such as market research, customer development, fundraising and storytelling, (v) industry partners provide support in branding and sales while providing access to a targeted market, (vi) VCs specialised for deep-tech provide critical early-stage funding.

All these actors will work together as part of the VB program, which is divided into four phases:

1. Partner selection and talent scouting,
2. Matchmaking and ideation,
3. Idea validation and startup education,
4. Business development and fundraising.

The VB program begins with a phase of **Partner selection and talent scouting** The first goal of this 2-month long phase is to identify and select the best industry partners interested in working with deep-tech startups who are developing an idea in their fields of interest (e. g. Energy, Finance, Smart City, Mobility, Robotics, Food, Health, Safety, Telecommunications, Internet of Things, Agriculture). The selected partners are subsequently educated on the deep-tech startup development process and what to expect from this collaboration. The second goal is to develop a comprehensive application process methodology in order to attract the greatest Croatian talents. This includes defining the application method and questions, profiling the applicants based on their background and experience, testing their entrepreneurship mindset and defining the selection criteria.

In the second phase, **Matchmaking and ideation**, the selected participants are brought to an in-person 3-day long event in Zagreb. On the first day of the event participants will be introduced to the whole VB program, have a "Startup introduction" lecture and get to know each other through speed-dating-like activities. On the second day, industry partners will pitch their challenges and participants will pitch their ideas. Participants will also be guided through a structured brainstorming session to spark idea creation and initial idea formation. On the last day of the event, previously formed teams will go through the Design Thinking process. After the event, teams will be encouraged to continue working on their ideas through weekly meetings and other activities in a dedicated working space where they will be able to meet with other participants and improve their ideas.

Then, a special committee will select the best teams who will go to the third phase of the VB program – **Idea**

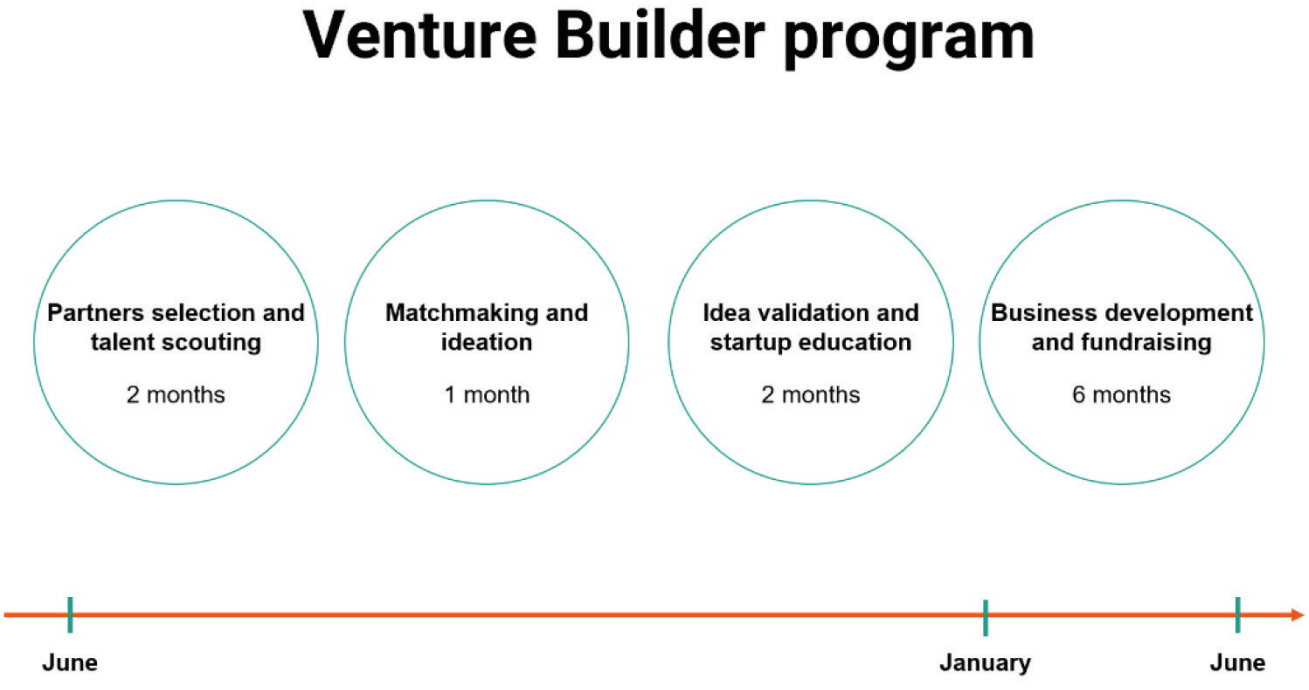

Fig. 3. Phases of VB program at FER and ICENT

validation and startup education. At this point, each team is assigned a specialized industry partner who will support them in conducting market research via client access, interviews, and data analysis. Simultaneously, teams will participate in a 10-week long startup education which will cover all important topics for early-stage startup development such as Market Research, Business Model Canvas, Customer Development, Prototyping, Pitch & Storytelling, Fundraising and IP management. At the end of this phase, each team will present their project to relevant stakeholders from industry, startup community, academia and the general public at a demo day. The best teams will continue working with the VB team in the **Business development and fundraising** phase at the end of the third phase. This phase is tailored-made for the selected teams and the VB team will continue working with each of them individually. These teams will have access to shared resources and experts who will help them prepare for the specific challenges they will face. This final phase focuses on client acquisition, product development, and fundraising.

Each year, at least one deep-tech startup is expected to successfully shift from the innovation stage to a well-defined commercial project. When they complete the VB program, they will be on their way to become a successful business.

Conclusion

The sustainable development goals [7] are staples of contemporary development plans for Croatia, the EU, and the rest of the world. Innovations are crucial to reach these goals till the optimistic 2030 deadline. Deep-tech innovations must continue to be the primary drivers of progress within the innovation landscape, as they have always been. This means that, at this point in time, the implementation of innovative methods that enable fast tracking of deep-tech ventures is definitively crucial. Hence, VB programs, which take deep-tech solutions from the research stage to full commercial viability, are the "perfect match" for this development level of the world's economy and industry. The University of Zagreb Faculty of Electrical Engineering and Computing and the Innovation Centre Nikola Tesla are well-positioned to serve as the pillars of these processes in Croatia and the wider region. The Venture Builder model is a powerful tool to have on hand.

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