

PhD in Management, Production and Design

Research Title: Enabling superior university technology transfer through new entrepreneurial finance instruments

Funded by	TRIN-EIC
------------------	----------

Supervisor	Elisa Ughetto – elisa.ughetto@polito.it (supervisor) Daniele Battaglia – daniele.battaglia@polito.it (co-supervisor) Emilio Paolucci – emilio.paolucci@polito.it (co-supervisor)
-------------------	--

Contact	Elisa Ughetto – elisa.ughetto@polito.it
----------------	---

Context of the research activity	<p>Despite the widespread efforts that national and regional authorities have made to develop Technology Transfer (TT) activities in order to facilitate the flow of knowledge from universities to industry, university research-based inventions (henceforth referred to as RBIs) often remain far from industrial application and commercial exploitation (Passarelli et al., 2018). In fact, most of the research conducted at universities does not undergo any significant TRL advancement and largely remains within their boundaries (about 75% of the total amount, according to Swamidass (2013)). TRL advancements are crucial to transform university research into commercially viable products and technologies (Kirchberger and Pohl, 2016).</p> <p>A growing number of universities throughout the world are now oriented toward the commercialization of research results and have incorporated the so-called “Third Mission” (Lockett and Wright, 2005; Wright and Phan, 2018). Despite a significant amount of effort and the introduction of new metrics, the “best practices” in TT remain limited and circumscribed to a bunch of top-tier universities. This picture reflects a state of the art that has consolidated the identification of the inhibitors to the development and commercialization of RBIs (Balven et al., 2018), but has ignored the detailed mechanisms that enable such a commercialization by universities.</p>
---	--

In order to develop new mechanisms aimed at increasing the TRL, and thus the level of technology maturity and investment readiness of RBIs, a growing number of universities have recently introduced Proof-of-Concept programs (henceforth referred to as PoCs) (Battaglia et al., 2021a; Darcy et al., 2009; Munari et al., 2018) and technology transfer initiatives developed by external venture capital (VC) funds. The push toward the introduction of PoC programs and programs backed by VCs in universities has reflected the efforts made by several Technology Transfer Offices (TTOs) both within and outside Europe, which have often been endorsed with the establishment of clear-cut national programs. The ultimate goals of a PoC is to bring an RBI close enough to a point at which it can be successfully commercialized (e.g. licensed to external industrial partners or sold), to raise the interest of investors and/or to fuel the growth of a spin-off (Battaglia et al., 2021b; Bradley et al., 2013; Gulbranson and Audretsch, 2008). The debate about PoCs as instruments that favor the commercialization of RBIs has centered upon the recognition of this tool as a standalone instrument in the hands of university TTOs.

Beside the investments of single universities, even governments and other public institution have started to commit resources in PoC programs to fill the gap limiting RBIs commercialization. A recent testament of this effort has been represented in Italy by the “Bando Proof-of-Concept” published in 2019 by Invitalia which have invested 5,3 M€ in such activities. Similarly, European Commission is committed on promoting Proof-of-Concept programs through European researchers since several years, with more than 25 M€ of budget invested each year.

Despite this generalized effort, evidence on the functioning of PoC programs, on their organizational structure, as well as, on the most efficient institutions to manage such funds are lacking. For instance, PoC programs range, in terms of internal structure, from simple instruments providing some funds to researchers, to more complex instruments providing -besides funds- entrepreneurial education, network access and mentoring. However, we do not have any evidence showing which PoC design works better. Similarly, we lack evidence showing how such instruments should be managed. For instance, we do not know if PoC programs managed at the university level are more efficient in promoting TRL advancement and commercialization than PoC programs managed at the government level. The same lack of empirical evidence is associated with TT initiatives developed by external VC funds.

In this sense, this research project will focus on the exploration of these two issues. On the one hand, the research aims at understanding the different designs of PoCs, by investigating which complementary resources besides money are to be given to researchers (e.g., entrepreneurial education, network access, infrastructures) to improve the effectiveness of these problems. The research will be conducted by analysing several PoC programs developed within Italy and across Europe. On the other hand, this research aims at deepening our understanding on the differences in terms of output between PoCs managed at the university level and at the government level.

	<p>Moreover, the project will also provide an overview of the programs of entrepreneurial TT backed by VCs. Such programs imply diverging approaches: amount of financing, typology of sponsoring organization, availability of entrepreneurial team building services, provision of opportunities to validate the technology with corporations, contractual clauses regarding intellectual property and investment terms.</p> <p>This research fits with current research activities of the team at DIGEP, which has gained high experience in both qualitative and quantitative research on PoCs in the previous years. In this vein, while previous research of the team has been focused on the exploration of the mechanisms and the outcome determinants of PoCs when developed by universities, this research represents a natural consequence and extension of the evidence already gathered. Moreover, the outcomes of the research project will have a direct benefit on the local ecosystem and on local policy makers by providing guidelines on how to efficiently design and use PoCs and other technology transfer instruments to further develop regional innovation ecosystems.</p> <p>To explore this issue, the candidate will join the research group at DIGEP and will focus her/his research activity around the design of the research questions, the collection of data on PoCs and other similar technology transfer programs at the European level (both developed by universities and by other public institutions/governments) which will result in the creation of a database tracking all the PoC programs (and the underlying financed technologies) developed within the most prestigious universities within Europe, as well as the PoC programs promoted by public governments. The research will be conducted in collaboration with TRIN (Politecnico di Torino's Technology Transfer Office), the Bureau of Entrepreneurial Finance and EIC.</p>
--	--

<p>Objectives</p>	<p>Objectives</p> <p>The main objectives of the research are five, and belong to the research, practical and policy domains:</p> <ol style="list-style-type: none"> 1. Identify university PoC programs and government PoC programs across Europe. 2. Collect data and information on both PoC programs and participants to PoC programs. 3. Build a database with the information collected and conduce quantitative tests to assess the differences between governmental and university PoCs. 4. Leverage the collected information by developing a series of case studies on different PoC programs, highlighting differences in their design and discussing the advantages, disadvantages and potential outcomes of each program. 5. Compare operational and strategic models of different TT instruments across Europe. 6. Provide practical implications helping governments, university managers and, more in general, decision makers to understand
--------------------------	--

	<p>how to put in place and manage PoC programs to increase the technology transfer of inventions from the basic research stage to the market. This study can, in principle, encourage a more efficient utilization of resources by policy makers, increasing the allocation of resources to more successful PoCs (in terms of design of the instrument). This can increase the potential benefits of entrepreneurial action (innovation, employment), by promoting the development of more spin-offs and the transfer of more innovation to firms, which in turn can reduce the social costs associated with the immobilization of resources in projects that eventually fail and lead to unemployment.</p> <p>Expected competences gained from the candidate at the completion of the PhD program.</p> <ul style="list-style-type: none"> • <i>Research competences</i> (identifying a relevant research question, design the study to test it, implementing the test, writing a paper). • <i>Methodological competences</i> (extensive knowledge on quantitative techniques of data analysis, as econometric techniques; extensive knowledge on qualitative methodologies of research). • <i>Soft skills</i> (Leadership, project management, time management, communication)
--	---

<p>Skills and competencies for the development of the activity</p>	<p>We welcome candidates with a strong independent and critical thinking. The candidate should also have fairly good knowledge of statistical methods, a general interest and a basic knowledge for entrepreneurship, start-ups and technology transfer. Any prior experience in technology transfer activities is welcome.</p>
---	---