



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Funding gap e strumenti finanziari a supporto del trasferimento tecnologico

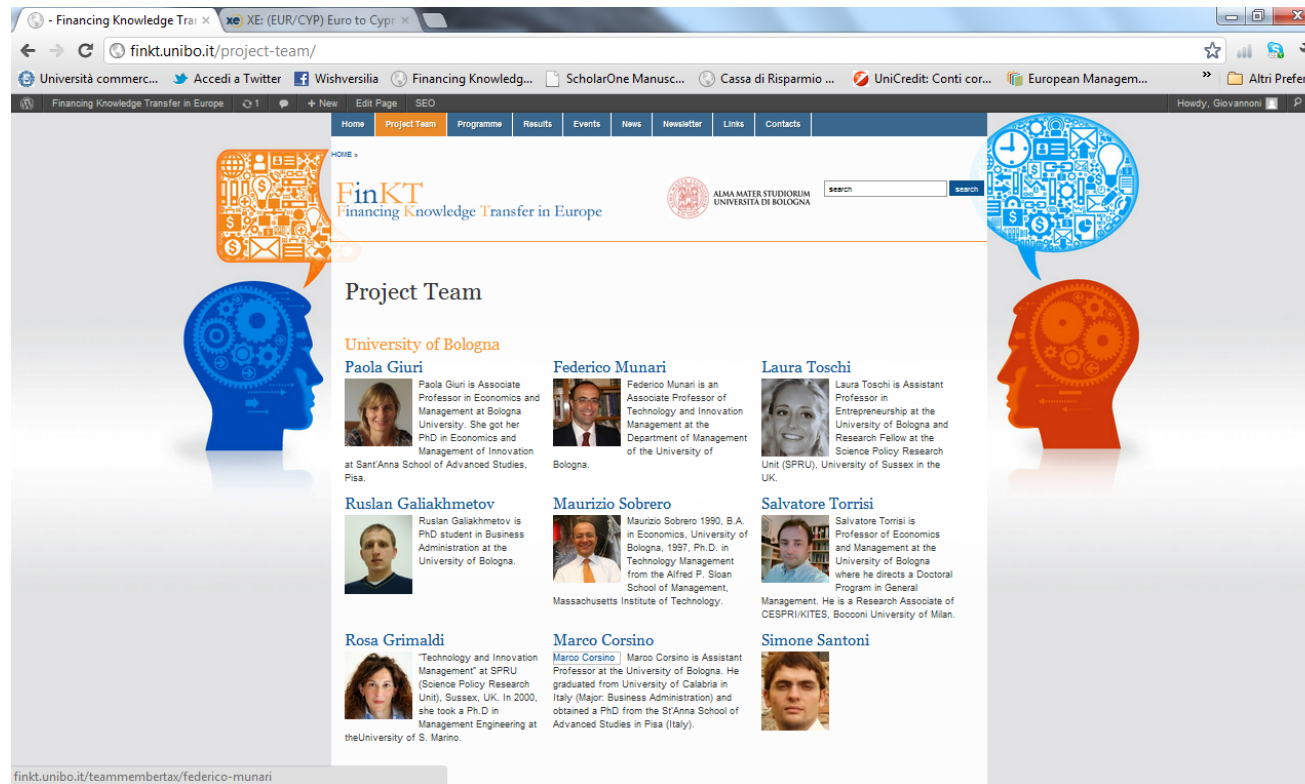
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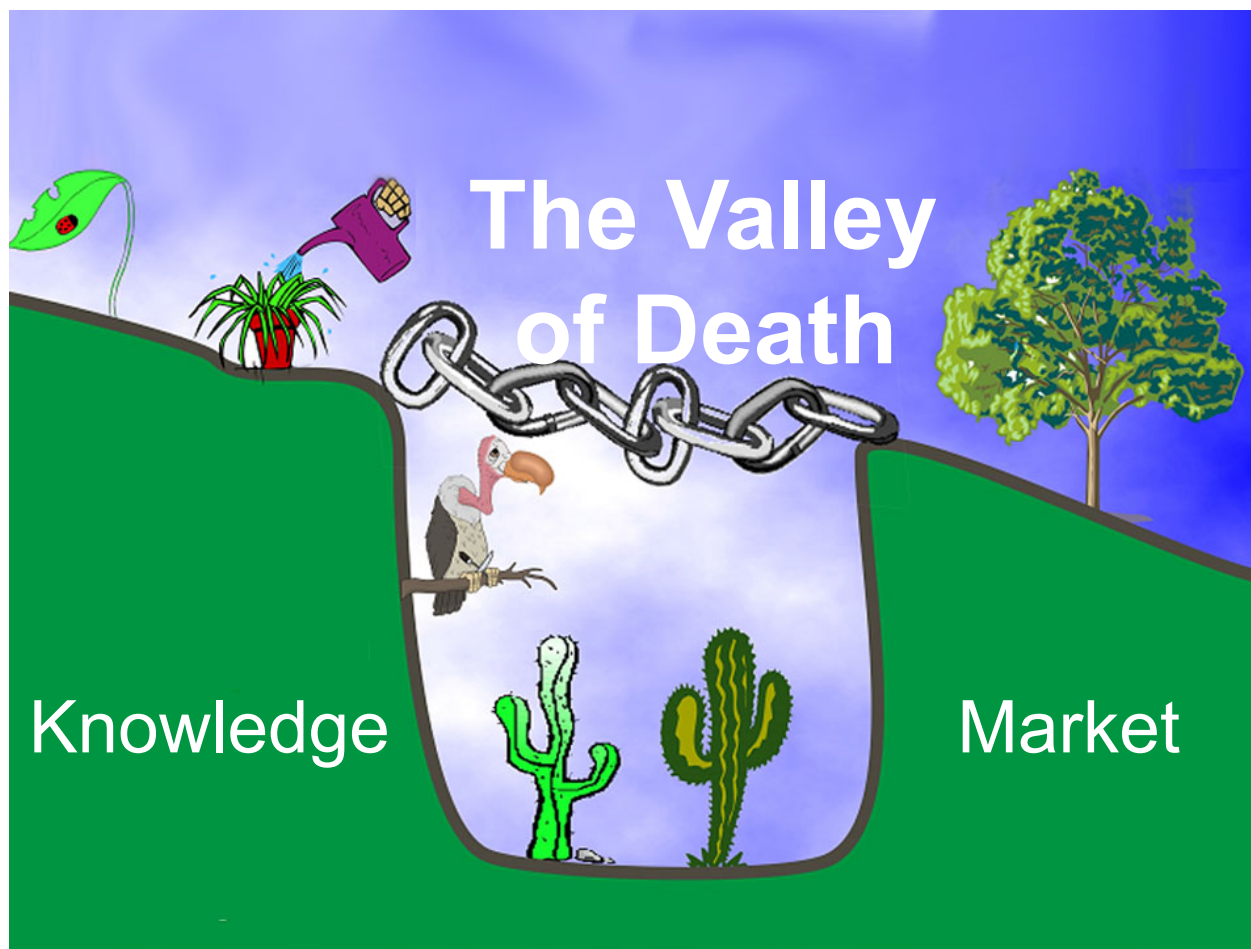


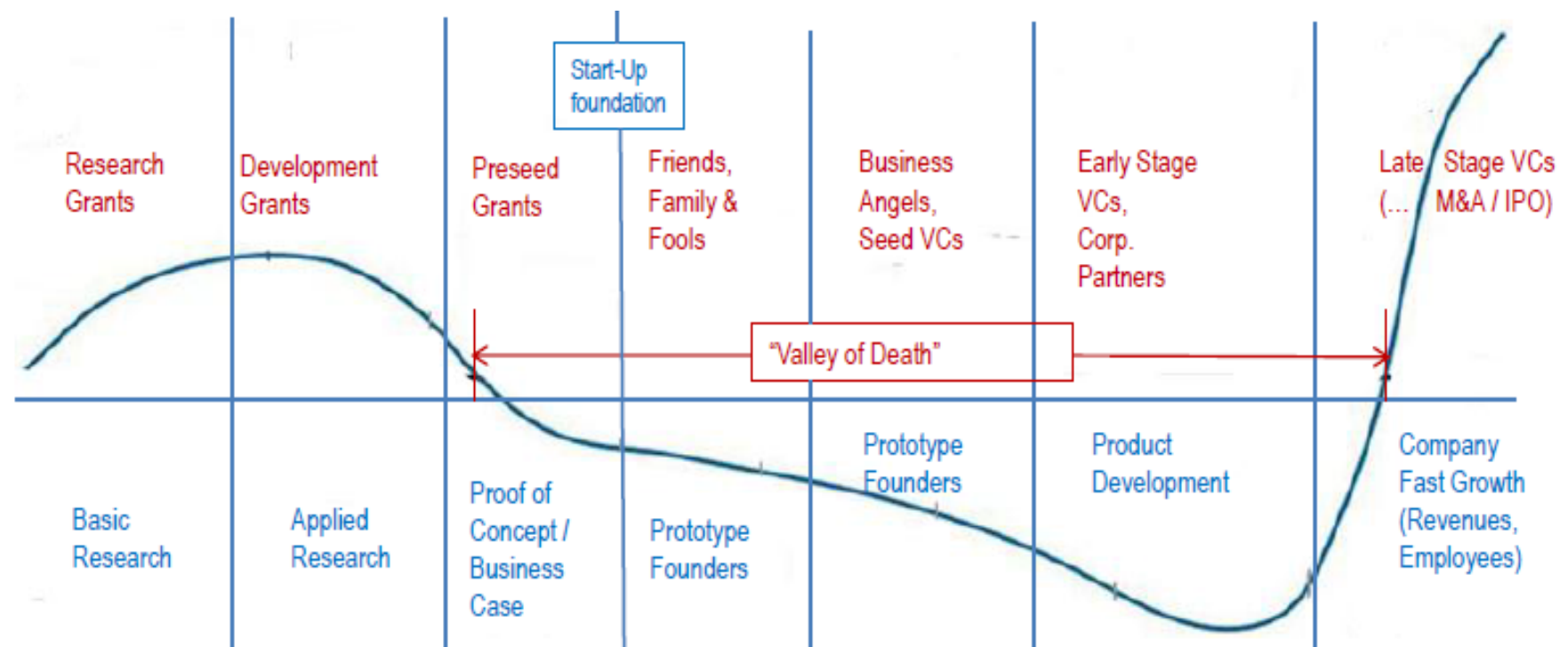
Project website: **finkt.unibo.it**



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Il funding gap come barriera al trasferimento tecnologico







Il funding gap: motivi

Le invenzioni e tecnologie sviluppate da università e centri di ricerca spesso non sono pronte per il mercato e per investitori esterni (“investor ready” e “market ready”):

- ✓ Asimmetrie informative
- ✓ Alti livelli di incertezza
- ✓ Ritorni attesi solo nel lungo periodo
- ✓ Mancanza di competenze di business e commerciali dei team di imprenditori accademici (knowledge gap)
- ✓ Gap di comunicazione (communication gap)



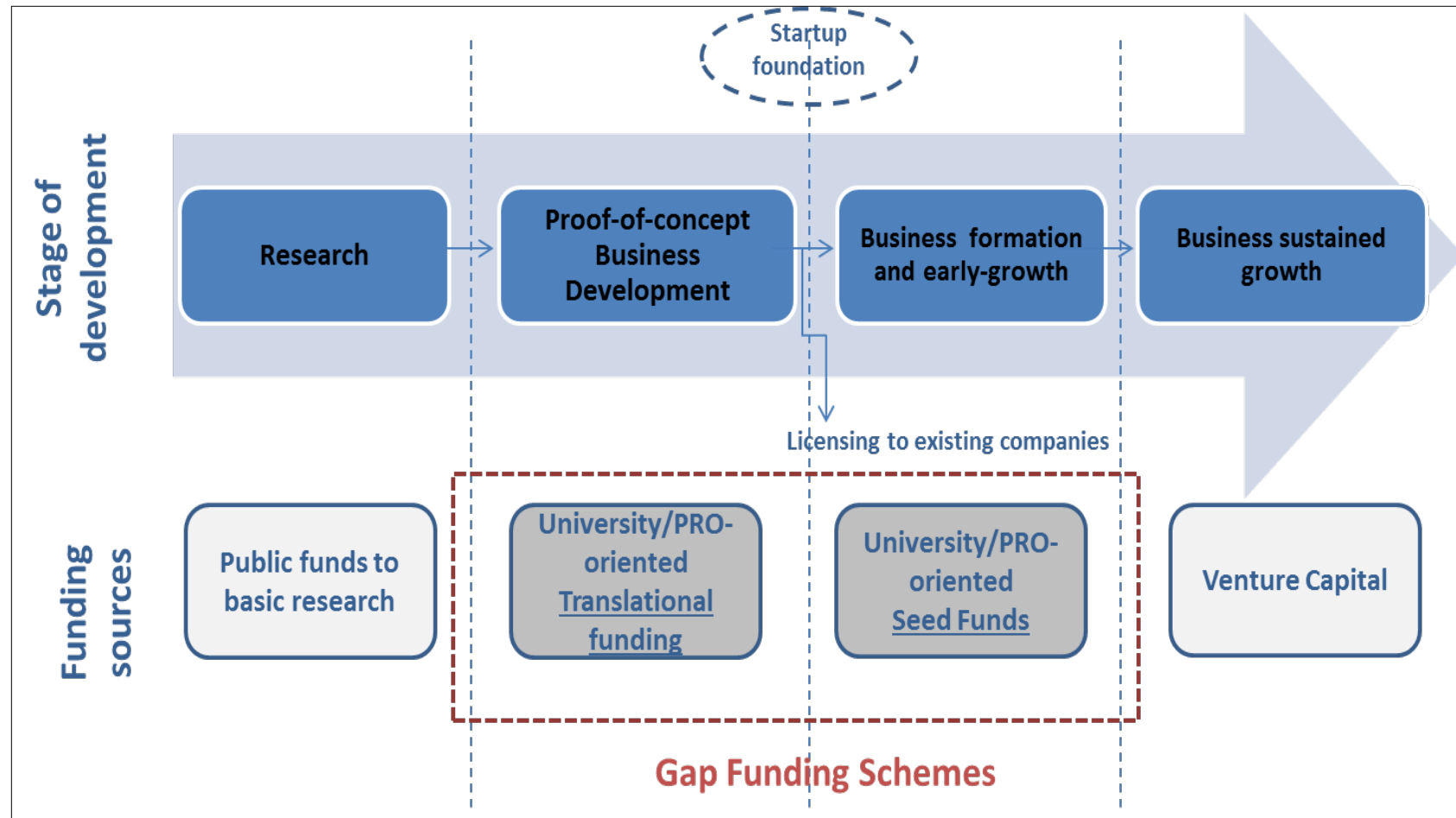
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Motivation

- ✓ The **lack of private funding sources** to support the **transition of early stage university technologies** from the lab to the marketplace represents a major obstacle for technology transfer (so-called “**funding gap**”) (OECD, 2013).
- ✓ University TTO managers perceive the **lack of venture capital funding** and of **proof of concept funding** for developing prototypes of the technology as **major impeding factors** for the creation of university spin-out companies (Wright and Lockett, 2006).
- ✓ Important **policy measures** centred on **proof-of-concept programs** recently implemented or announced (i.e. Startup America Initiative; Horizon 2020).
- ✓ **Very limited research** and **quantitative evidence** in this area.



Strumenti finanziari indirizzati al “funding gap”: programmi proof-of-concept e fondi seed





Seed Funds vs. Proof of Concept Programs

Table 1 – A comparison of University Seed Funds and Proof of Concept Programs

	University and PRO-oriented Proof of Concept Programs	University and PRO-oriented Seed Funds
<i>Objective</i>	Evaluate and support the technical feasibility and commercial potential of early-stage technologies generated by universities and PROs	Provide capital to university and PRO startups to assist the early formational steps of new company creation and early growth
<i>Focus of investment</i>	Primarily projects by individual researchers or research teams	Primarily university and PRO startups
<i>Investments typology</i>	Typically grants, but other forms are possible (i.e. loan, repayment schemes)	Typically equity-based, but other forms are possible (i.e. convertible loan)
<i>Investment stage</i>	Pre-seed stage (typically before company formation)	Seed and Early stage (Business Formation and Early Growth)



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I “proof-of-concept fund”: definizione

University-oriented Proof-of-concept Programs (POCs) include a set of funding schemes that combine money, expertise, and training to help new discoveries emerging from universities and PRO labs to show their technical/manufacturing/commercial feasibility.

(Usually labelled in many different ways across countries and organizations: i.e. proof-of-concept funds, proof-of-principle funds, translational funding, pre-seed funding, verification funding, maturation programmes, innovation grants, ignition grants, etc...)



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USFs and TFPs in Europe: research activities of the FinkT project fundend by EIB

Research activities on financial instruments

1. Mapping of USFs and POCs in Europe

2. Survey to TTO managers of European universities

- » We collected information on 26 university-managed USFs and 50 POCs

3. Analysis of the impact of USF funding on the success rates of portfolio companies

- » We analyzed 754 portfolio companies backed by USFs, as compared to a control group of other VC-backed new ventures

4. Case-studies of 7 POCs managed by universities and PROs

- » We identified a series of critical success factors for such instruments

Objectives

- ✓ analyze the diffusion and structure of such instruments in Europe;
- ✓ identify the critical success factors for their design and implementation.



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Literature review: funding and knowledge gaps

- ✓ **University-generated inventions**, being often at the frontier of scientific advancements, **involve considerable risks** associated with their subsequent validation, industrialization and commercialization (Colyvas et al., 2002; Jensen and Thursby, 2001).
- ✓ **Limited availability of seed and VC investments** for university-generated projects/spinoffs (funding gap), due to significant information asymmetries, high transaction costs, high-risks, long-term investment horizons (Munari and Toschi, 2011; Murray, 2007; Murray et al., 1998).
- ✓ Academic researchers/entrepreneurs **often lack managerial and commercial skills**, necessary to successfully bring novel ideas into the market (knowledge gap) (Roberts, 1991; Rasmussen and Rice, 2012; Franklin et al., 2001)



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Literature review: proof-of-concept programs

- ✓ **Proof-of-concept programs** represent recent and innovative financial instruments to address funding gaps (Bradley et al., 2013; OECD, 2013).
- ✓ **Very limited research** in this area, mostly based on **single case-studies** or **anecdotal evidence**:

Gulbranson and Audtretschi (2008): analysis of the Deshpande Center at MIT and the von Liebig Center at the University of California – San Diego.

Maia and Claro (2012): translational funding activities in the Portugal Innovation Ecosystem, with a particular focus on the University of Coimbra.

Rasmussen et al. (2011, 2012): description of public policies in Canada, Finland, Ireland, Norway, Scotland and Sweden, including POC funds.

Bradley and colleagues (2013): descriptive evidence of 32 POC centres in the US.

- ✓ **Absence of multi-country studies**, to assess the influence of contextual factors. Limited understanding of **success factors** for such programs.



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Research gaps e contributo atteso

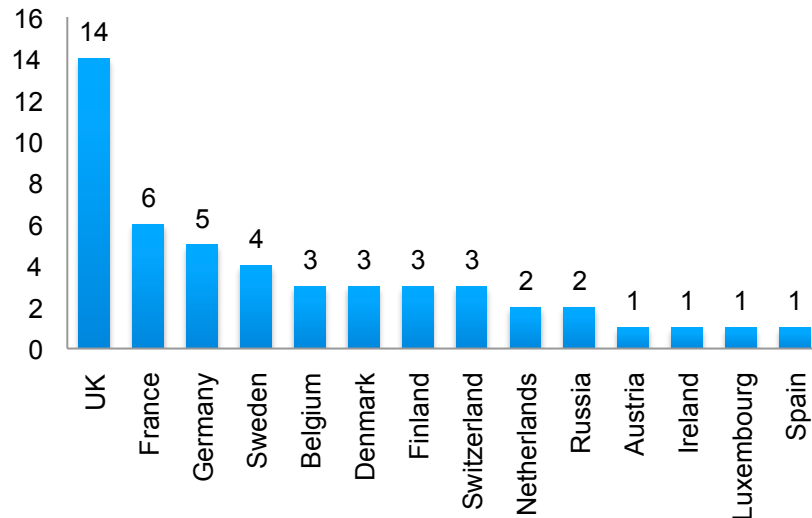
- ✓ Very little is known about the diffusion of such POC programs among European universities, their typical characteristics and critical success factors. **Several unanswered questions**, that we addressed in our study
 - ✓ Which is the **diffusion of POC programmes** among European universities?
 - ✓ Which is the **typical structure** of such programs?
 - ✓ Which are the **main sources of funding** for their activation?
 - ✓ Which are the **critical success factors** in their design and implementation?



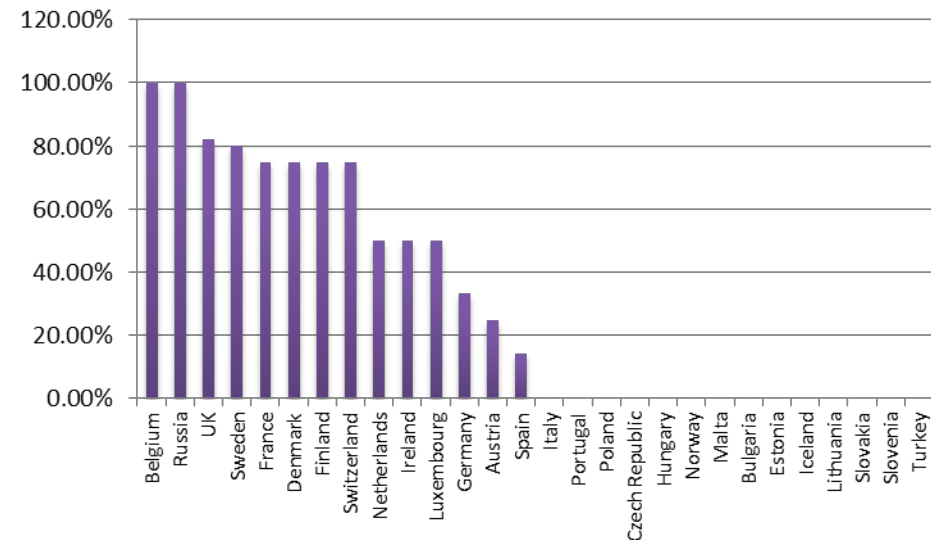
La distribuzione geografica dei programmi POC (FinKT survey)

- ✓ 36% (50 out of 138) of the universities responding to our survey declared the **presence of an internally-managed proof-of-concept program.**
- ✓ There is **high heterogeneity** across countries in the diffusion of such instruments. They are frequently present in **Northern/Western European countries**, but almost absent in **Southern/Eastern European countries**.

*Number of universities with internally managed POCs
(N=50), by country (FinKT survey)*



*Share of universities with internally managed POC
(N=50), out of total respondent universities (N=138),
by country (FinKT survey)*





La struttura dei programmi POC (FinKT survey)

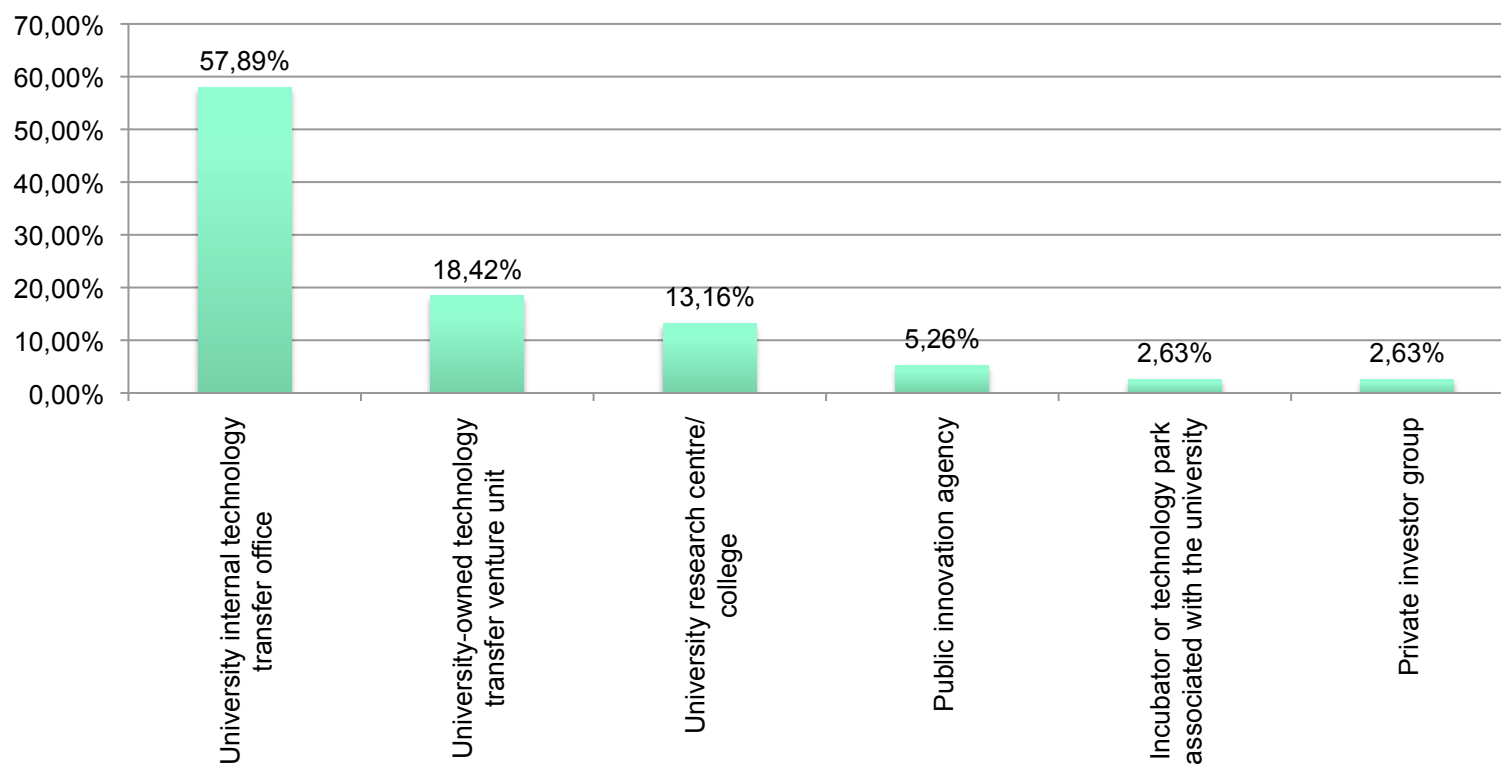
- ✓ Most university-oriented POC programs in our sample are **managed by the University internal TTO (57.88%)** or by a **university-owned TT venture (18.42%)**.
- ✓ A few universities manage **multiple POC programmes**, in order to support different phases of development of the projects.
- ✓ The **median amount of POC funding** provided per selected project is **49,500 Euro**.
- ✓ The **median share of projects funded** by the POC programme, out of total submission, is **41.5%**.

	Median value	Mean Value
Maximum amount of POC funding per selected project (Euro)	77,000 €	103,000 €
Average amount of POC funding per selected project (Euro)	49,500 €	54,000 €
Share of projects financed by the POC programme, as a percentage of the total number of submitted projects (in %)	41.5%	46.55%



Strutture e modalità di governance dei programmi POC

Distribution of POC programmes by managing organization, in %

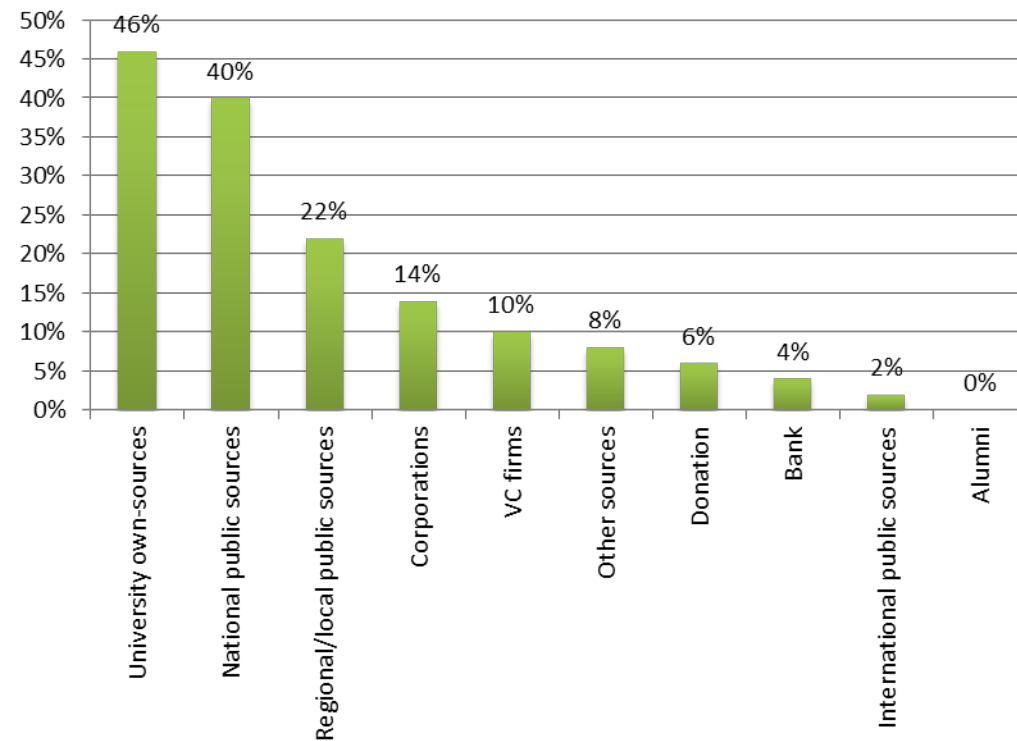




Le fonti di finanziamento degli “university-oriented proof-of-concept programmes” (FinKT survey)

- ✓ **Public funding** either from **national** (40%) or **regional/local** institutions (22%), represents a **major source of capital** for such initiatives, in addition to university own sources (46%).

Sources of capital of the POC programmes reported in the TTO survey (% reporting the use of a given source; multiple answers were possible)

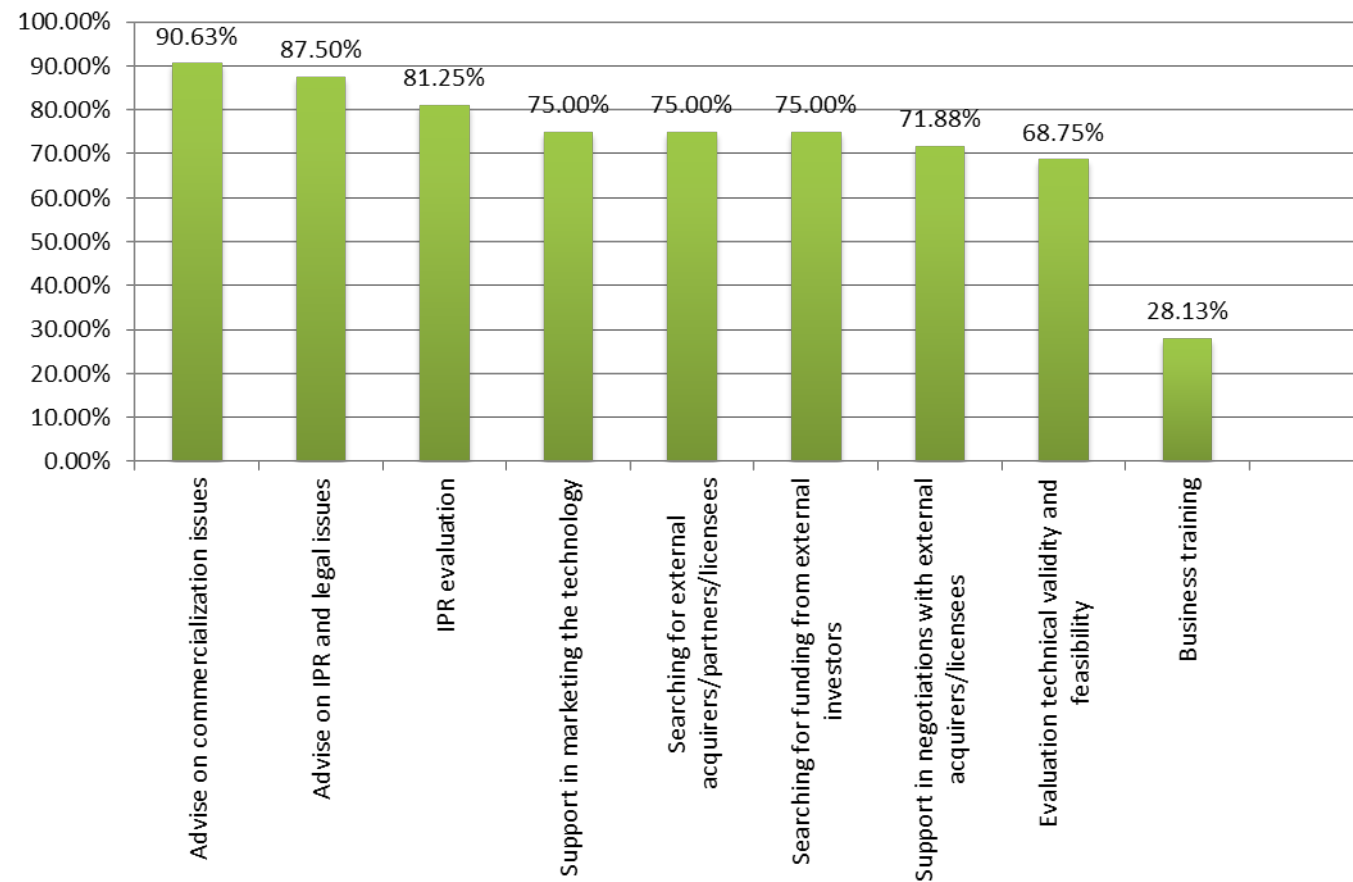




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Le attività di supporto offerte dai POC programmes (FinKT survey)

*Type of support provided by the POC programme, in addition to capital
(% reporting the use of a given support activity; multiple answers were possible)*





Casi studio: fattori di successo dei programmi POC

In order to complement the survey, we have conducted a more detailed analysis of the characteristics and success factors of **7 proof-of-concept programmes** managed by universities in Europe

Name of university/ TTO	UCL - UCL Business	KU Leuven - LRD	KTH - KTH Innovation	University of Ulster	VU Amsterdam	EPFL	Skoltech
Country	UK	Belgium	Sweden	UK	Netherlands	Switzerland	Russia
Date of creation of TTO	20 years ago	1972		2002		1998	2011
Number of translational programmes (TP) managed by the university	5 funds managed by UCLB	1 Proof of concept fund, funded by the Flemish Government.	1 translational program handed in collaboration with KTH Holding on behalf of Vinnova	1 internal program; 1 program, with other universities funded by Invest Northern Ireland	1 PoC fund + 1 pre seed fund	2	1 Proof of concept program
Average/ maximum amount of funding provided per project	25000 -50000 for the internal POC ; up to 100000 for university POC	Funding up to € 100 000.	In the first step: up to 35,000 euros; In the second step up to 250,000 euro	Maximum assistance of up to £80,000;	Up to 100,000 Euro per project for the pre-seed loan	Approx. 90000 CHF	77,000 Euro (100,000 USD)



I fattori critici di successo dei POC

Research and TTO context

- **Characteristics of the research base**
- **Expertise of TTO**
- **Supportive institutional context**
- **Continuity of effort**

Design of the program

- **Size of funding**
- **Flexibility**
- **Transparency**

Implementation of the program

- **Autonomy**
- **Dedicated support**
- **Interactions**



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Fattori di successo POC (I) - Contesto

- **Characteristics of the research base**

“The quality of the research conducted and the scope of disciplines covered ensure a wider applicant pool and strengthen the selection process”.

- **Expertise of TTO**

“You need very special type of people to do this job, having one leg in academia and one leg in business”

- **Supportive institutional context**

“Additional inputs complementary funding sources ...”, “the presence of an established industrial base ...”, “a clear set of rules and regulations governing the academia-industry interaction...”

- **Continuity of effort**

“It has been a beneficial exercise, it has provided economic value for money, but it has taken a very long time. So, you need a lot of projects and you need to be patient”.

■



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Fattori di successo POC (II) - Design

- **Size of funding**

“You shouldn’t spread the resources too thinly across projects, so that they are not able to provide the support needed to properly test the industrial feasibility of the new technology, or to guarantee time horizon sufficient to fine tune the program ”.

- **Flexibility**

“It is better not to pose too rigid ex-ante constraints...pivoting and changing of directions are frequent in the development process of a new technology”

- **Transparency**

“Investment criteria have to be clearly stated and communicated to the researchers and partners involved in the selection committee”



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Fattori di successo POC (III) - Implementazione

■ **Autonomy**

“From inception, our vision was that the decision process should be fast and simple. ”

■ **Support**

“Every project backed by the program is followed by a business development coach that follows the project and gives the support needed to move forward.”

“In the post-investment phase, a team is formed in which the business manager is assisted by a project manager and an expert from the IP and regulatory group”

■ **Interactions**

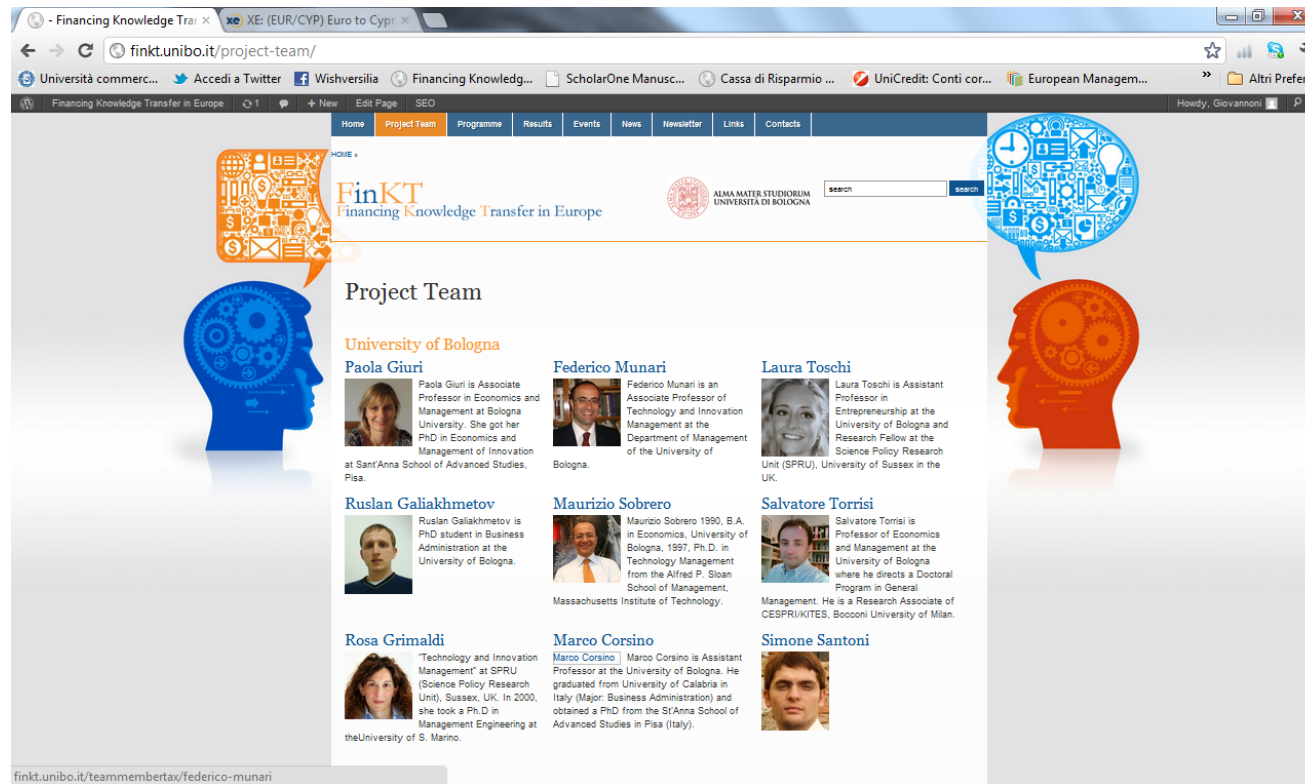
“The effective functioning of a translational funding program is very much about people interactions and relationships”



Final remarks

- A **dynamic and heterogeneous landscape** characterizing university-oriented proof-of-concept programmes in Europe .
- **The diffusion** of such instruments **is very uneven** across countries and universities.
- **Public sources of funding** necessarily play a **major role** in this area.
- Internally managed POCs seem to be characterized by a **limited size**, a potentially critical issue.
- The **size and quality of the research base** of universities managing POCs emerge from the interviews as critical success factors.
- Interviews with TTO managers highlight the importance of proof-of-concept funding to foster technology transfer. **Qualified human capital** to manage such programs and provide **adequate support** is a key precondition.

Contatti e sito web progetto FinKT

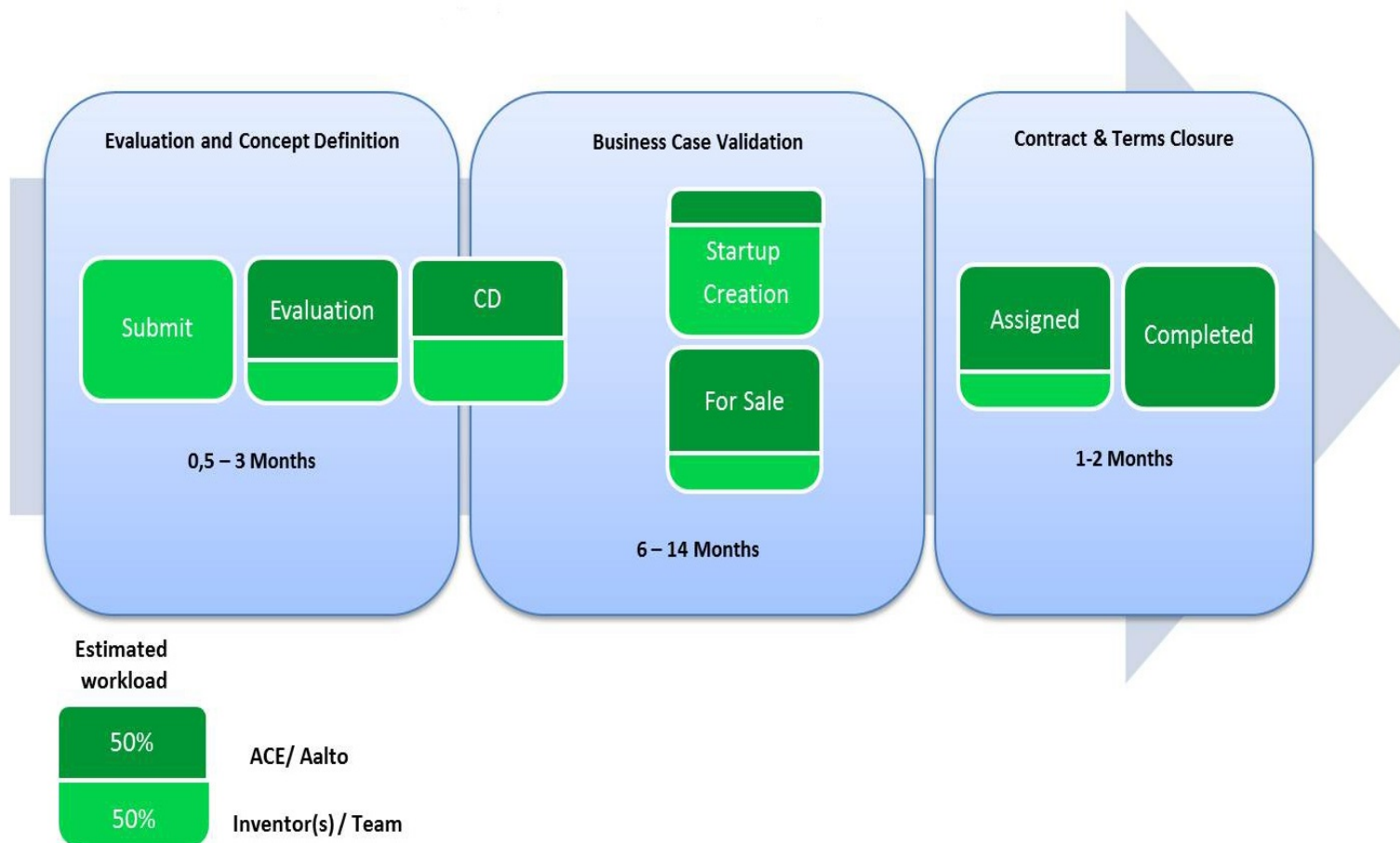


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Il processo di valorizzazione di Aalto Entrepreneurship Centre





L'attivazione di POC programmes da parte di università

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Immaginate di dovere implementare un programma di tipo POC all'interno della vostra università. Come definireste le seguenti leve di progettazione del programma:

- **Modalità di submission**

Quali contenuti principali dovrebbero essere presenti nelle domande di partecipazione al programma?

- **Modalità di valutazione e selezione**

Quali criteri è opportuno utilizzare per decidere i progetti da finanziare? Attraverso quale processo?

- **Modalità di valutazione dell'impatto del programma**

Quale tipo di indicatori utilizzereste per valutare l'efficacia del programma ex-post?



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Esempio di application guidelines POC ERC

- **1: The idea (max. 1 page)**
 - *a. Succinct description of the idea to be taken to proof of concept*
 - *b. Demonstration of the relationship between the idea and the related ERC funded project*

- **2. Early-stage innovation strategy (max 2 pages)**
 - a. Description of the innovation potential. It will be used to assess the evaluation criterion #1:
 - b. Economic and/or societal benefits
 - c. Commercialisation process and /or any other exploitation process
 - d. Proposed plans for :
- Competitive analysis; Testing, technical reports (where applicable); IPR position and strategy (where applicable); Industry/sector contacts (where applicable)



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Esempio di application guidelines POC ERC

- **Section 3: The proof of concept plan (max 2 page)**
 - a. Plan of the activities
 - b. Project management plan
 - c. Description of the team

- **Section 4: The budget (max 1 page + costing table)**
 - a. Resources
 - b. Justification (description of the budget)