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# A methodology approach to promote entrepreneurship

- from research to start-ups (*a case study*)

Eduardo L. Cardoso

Centro de Biotecnologia e Química Fina, Escola Superior de  
Biotecnologia  
Universidade Católica Portuguesa  
Porto, Portugal  
ecardoso@porto.ucp.pt

Daniel J. Pina-Cabral

Entrepreneur, Partner  
Bracing-Consulting, Lda  
Porto, Portugal  
pina.cabral@bracing-consulting.com

**Abstract**—Valorization of knowledge produced in research units has been a major challenge for research universities in contemporary societies, as they are looking to develop a “third mission”, facilitating technology transfer and engaging in a entrepreneurial paradigm. Overcoming difficulties in the development of academic entrepreneurship and the associated valorization of the knowledge produced by universities is a major required objective of bridging the gap between research and innovation in Europe.

We have raised the question on how to improve the existing institutional knowledge valorization processes, as entrepreneurship is concerned.

During a five years’ evaluation period, between 2008 and 2012, a case study was designed to develop answers, described as the institutional knowledge valorization process based in a research university and its related incubator.

The knowledge valorization processes should, as identified, benefit from the adoption of a structured framework methodology that would lead ideas and teams from business model generation to client development, in parallel, when possible, with an agile product/service development, focused on the minimum value proposition as a starter.

Although academic entrepreneurship engagement could be improved, this case study shows evidence that stronger skills development should be sought, allowing the researcher to develop an increased awareness of business development fundamentals and so contribute for research decisions and for valorization of individual and institutional knowledge actives. When research is applied to business development there are different reasons to early involve companies in the research projects or programs.

**Keywords** - *University-Industry relations; Research; Valorization of knowledge; Entrepreneurship; Business Models; Customer Development.*

## I. INTRODUCTION

Valorization of knowledge produced in research units has been a major challenge for research universities in contemporary societies, as they are looking to develop a “third mission”, facilitating technology transfer and engaging in an entrepreneurial paradigm [1]. In Portugal and Spain this

challenge can be deemed to be more relevant as the majority of firms are small and medium companies, if not micro companies, evidence showing that effective university-industry collaboration needs “well-equipped” firms [2].

Entrepreneurship has been considered, by different academics [3] and policy makers [4], [5], as a means to foster economic development and job creation, particularly relevant in the current social context, but also as an ability to promote a more dynamic, creative, innovative, competitive and sustainable society.

Entrepreneurship can be considered as both (1) the process of creating new companies, as well as (2) the process of new businesses development in an existing organizational context.

Overcoming difficulties in the development of academic entrepreneurship and the associated valorization of the knowledge produced by universities is a major required objective of bridging the gap between research and innovation in Europe. [6].

So far, the main reference to exploit knowledge presented to entrepreneurs is the “business plan”, consolidating the most relevant aspects for the organization of a business idea, so it may be evaluated, being the basis for investing decisions for further business development. The preparation of a business plan involves, however, technical components that are beyond the skills and interests of academic entrepreneurs, and involve, in an early stage, investments in developing components as market studies or accounting and financial analysis.

The complexity associated with the various components of a business plan, can become not only a barrier to the project development, but also a barrier to the investment in intellectual work on structuring business ideas based on specific knowledge [7].

This context systematically raises the question of what are the methodological tools that should be applied to transform an idea into a business, autonomously in a team, supported by local or national valorization pipelines, or within institutional structures, such as entrepreneurship centers or incubators.

Recognizing that different modes of governance of university-industry interactions should be taken in consideration, particularly when small firms are involved [8],

we raised the question on how to improve the existing knowledge valorization processes - concerning entrepreneurship and business development.

Relevant contributions to structured approaches to promote entrepreneurship and business development were identified from a wide range of proposals. The business model generation (BMG) proposed by Osterwalder and Pigneur [7], reduces the centrality of the business plan, and offers systematic steps for an early stage phase where the key resource for entrepreneurs is intellectual effort.

The construction of the business model draws attention to the design or architecture of the value creation and value capturing mechanisms of the business [9]. In other words, it describes the rationale of how an organization creates, delivers, and captures value [7]. In the context of research-based entrepreneurship and its corresponding business development, the business model generation structure fosters the thinking process “from an idea to a business” and we believe can be a relevant tool to organize the value-creation out of the research work.

The first model to organize the business thinking, named “canvas”, calls for the central identification of the value-proposition for a market segment, including the channels to reach the market and the customer relationship to be developed. These four building blocks of a business model should generate revenues. To develop the value-proposition, the “canvas” model proposes the identification of the main resources, activities, partners, and the associated cost structure. Starting from the generation of different business models, the methodology proposes tools for deepening the building blocks and for validating the hypothesis adopted.

A powerful approach to validate hypothesis, before capital investments, is proposed by Blank [10], and, later on, strongly structured by Blank and Dorf [11], as the customer development methodology articulated with the prior generation of different business models, to search, validate and create customers for a product or a service.

As far as possible, depending of the type of product or service, the adoption of principles of an agile product or service development [12], starting with the minimum value proposition [11], could lead, through a series of intense interactions with customers, to better adequate solutions to the needs or opportunities identified in the market. This should be a parallel process with the customer development focused on: individuals and interactions, prototypes, customer collaboration, and responding to change.

## II. MATERIALS AND METHODS

### A. The Case Study methodology

A case study, as a research methodology, has characteristics of its own fitted to the objectives of the defined work and to structure the design of the research, which seek to explain interactions between multiple factors that manifest themselves in a real context being developed, within a well-defined occurrence, both in terms of the organizational framework as well in a time frame, and with a reduced control of the

researcher [13], [14]. The case study should be able to involve the various actors of the innovation process, consider the various points of view and allow an analysis of data from multiple perspectives [15]. It is an empirical method of inquiry to investigate a contemporary phenomenon in its real context of occurrence, especially interesting when the boundaries between phenomenon and context are not clearly evident [13].

It responds to the need of understanding a social phenomenon, allowing the clarification of its reasons, the characterization of its processes and identifying potential implications.

### B. Description of the Case Study

The case study is described as the institutional knowledge valorization process based in a Portuguese University and a related Incubator during a five years evaluation period, between 2008 and 2012.

**University:** UCP at Porto-Portugal

**Area:** Various

**Key indicators in the period 2008-2012:** an average of 6000 students each year and 500 teachers and researchers.

[www.esb.ucp.pt/cbqf](http://www.esb.ucp.pt/cbqf)

**Incubator:** SpinLogic Incubator (Porto-Portugal)

**Area:** Bio-economy, Social economy, Creative Industries, and Other.

**Key indicators in the period 2008-2012:** Total pré-incubation projects: 55 ( 15 actual), Total incubation of start-up companies: 42 (17 actual), 7 drop-outs, 19 out in the market. Spin-offs: 4 (1 closed).

[www.spinlogic.pt](http://www.spinlogic.pt) .

### C. Instruments

A set of instruments were designed to collect data: interviews with key staff involved, observation and field notes from, research project presentations, business project presentations, coordinating meetings, training sessions, coaching services, seminars and networking events. Relevant documentation were also collected as activity reports, management reports, evaluation reports, project portfolios, project proposals and business presentations.

### D. Data analysis

Data collected were organized based on significant data units and submitted to a content analysis that allowed the identification of major underlying concepts relevant to understanding the institutional knowledge valorization process based in a research unit and a related incubator.

## III. RESULTS AND DISCUSSION

In an early phase, when a business idea associated with the exploitation of knowledge had already a patent submitted for Intellectual Property (IP) rights protection, the University

option was to partner with an institutional organization offering a structured and financed pathway for knowledge valorization, once the project was considered to have a “high tech – high growth” profile. This partner was COTEC – Portugal (there are similar organizations in Spain and Italy) which annually organizes the CoHiTec training program, the entry point to its full pathway ([www.cotec.pt](http://www.cotec.pt)). Neither the university nor the incubator had any contribution to the followed business development methodology of this partner.

This option, started to attract researchers (one team of researchers per year did participate in the program) but it recorded high levels of drop-outs in different phases of the pathway (four dropouts out of the five engaged) and ended with a quit long processes (more than five years to one project, that becomes a start-up already in 2013, with a risk capital investment of 1.4 Million Euro).

The outcomes of research teams were, in general, considered by this partner, as too early-stage and not enough business oriented for an easy evaluation by investors, companies, and even for the IP valorization pipeline.

Competencies of research teams were, in general, also considered by the same actor, too weak in what concerns, collaboration, co-competition, communication, social awareness, initiative and entrepreneurship.

Those are the skills that are often associated with the creation of value for social development [16]. The approach followed was to team researchers with participants with an MBA course thus looking for a balance of competencies in each team.

In view of results and once most of the business ideas and projects, that try the pathway to markets through the Incubator, showed low or medium knowledge intensity and some of them are based on services or include services on their own value proposition to prospected costumers a new purposed methodologies for business project development was devised. Project teams are based in researchers and, in most of the cases, also include former students from BSc and MSc programs of the University. The Incubator offers two organized phases to the teams, the pre-incubation (six to twelve months) and the incubation (one to three years).

Since the beginning of the period of analysis, as to overcome the need to start facing a business plan but, instead, to build a business case based on significant methodologies to create value around ideas, knowledge, and skills of researchers and teams, the search of methodology approaches were proposed along the time, ended proposing a starting point following fundamentals of the generation of business models [7]. Deepening this methodology, it was proposed to validate or improve it by customer development technics [11] that structures a search effort for customer discovery and validation before the actual company execution steps. The period of analysis corresponded to a new stage of the Incubator with its own and specific premises.

The business model construct is well discussed in the literature [17], sometimes with remarks related to the way as marketing or strategy is represented or considered. But currently this concept is actively used in a variety of

management and organizational practices such as innovation, strategy making, new venture creation, franchising, internationalization and organizational design [9], [18], [7].

When possible the process of design and developing of products or services is recommended to engage in an agile strategy [12] that could fit identified needs or opportunities, starting with the minimum value proposition [11]. Agile methodologies are, in particular, adequate to offer value in the software industry, but the key concepts can enlighten the thinking and practice in business development, in general.

Only some of the observed projects did follow the key milestones of the methodology proposed, so significant results could be expected if teams were able to dedicate much more time and effort to the start-up steps that need more “hand-on” effort than financial investment.

Results suggests that this hard work of business project thinking and structuring is not solved by intensive engagements in programs such are boot camps, entrepreneurship weekends, and others, that could be relevant for other objectives as networking, exposure, enlightenment, and motivation.

There is also evidence that additional external inputs are needed for the projects to reach another level of readiness to start-up. There was interesting examples of the role of business consultants, business angels and mentors, which help some projects to get stronger positions facing investors and testing the markets, areas typically not in University Researchers’ focus.

The large majority of researchers (more than 85%), in PhD programs, Post-Doctoral programs, or Project Contracted Fellowships, didn’t become involved in any observed process of institutional knowledge valorization process. PhD projects, and also Post-Doctoral projects, were claimed to be driven by scientific relevance and merit but not, in general, market business driven.

In what concerns industrial co-promoted research funded projects, they didn’t show a better company involvement that would allow significant results in terms of business innovation and development. The research projects designed and developed in co-promotion with companies follow, in the national Portuguese system of incentives to innovation, a model that didn’t seem to contribute to the best knowledge valorization.

In this situation, the project ownership is not clear, as both parts have to co-finance the project, there seem to be space for the company objectives and for the university objectives, project IP ownership becomes not so clear, and, it seems, that most of the times there are two projects articulated: one from the university and another from the company.

It is also stated by senior researchers that questions raised by the companies are usually less interesting for a research perspective, as they tend to be more applied and less fundamental.

Results also suggest that, when research work potential applications are expected, there is a need to engage in another level of university-industry interaction that would generate the

conditions to an early identification of companies or investors in the existing business ecosystem.

This effort is often tried too later, after research projects completed or patents submitted, with stronger restrictions in time and budget to achieve suitable partners.

It is thus understandable and foreseen that a significant number of patents will end public, possibly protected at a national level, with some relevance as evidence of the inventive capacity of the research university but without any chance of valorization or commercialization.

#### IV. CONCLUSION

The institutional knowledge valorization processes conducting from entrepreneurship or business development pathways should, as identified, benefit from the adoption of a structured framework methodology that would lead ideas and teams from business model generation to client development, in parallel, when possible, with an agile product/service development, starting with the minimum value proposition.

Although academic entrepreneurship engagement could be improved, this case study shows evidence that a stronger business skills development should be followed, allowing researchers to be more aware of business development fundamentals and business reality and so contribute for research decisions and for valorization of individual and institutional knowledge actives. Certainly, researchers don't need to be business managers, but acquiring some business skills should raise the value of their knowledge like "wikiskills": collaboration, coepetition, social awareness, initiative and entrepreneurship [19].

When research is applied, in the sense that results could be close to generate innovation, there was different individual and institutional reasons to early involve companies in the research projects or programs. Maybe individual companies, when the research is competitive for the sector or a cluster of companies when the research is non-competitive.

The design of the involvement could have contextual relevant issues but some concrete proposals could be proposed from the results observed:

- Presentation of the Research Plan (for a PhD or a Post-Doctoral project) to a company or a cluster at month 6 to 12;
- Annually presentation of the achievements of the Research Project to a company or a cluster;
- In the second half of the Research Project presenting achievements to potential investors.

This kind of exposure could be as controlled as adequate to each contextual condition. But it could be expected to have a better incorporation of business needs, a better awareness from the industry to research achievements, first potential clients for knowledge; reduced time to market, and much better conditions to support decisions about IP protection.

This kind of formal approaches could build the basis for a closer and earlier articulation between research, industry and investors.

When building consortiums for co-promoted research projects, even with adequate financing models, more consideration could be placed on the integration of a business development work package in any applied research plan, on the work packages that are related to demonstration, exploitation and dissemination, to be more market oriented, and it also seems that a key role should be attributed to medium and large companies on leading industry participation in research projects, even to enhance the participation of small companies.

Although no specific evidence was collected and reported, the fact that most of the researchers are not active in institutional knowledge valorization processes, may show-up that other approaches to IP governance, including IP management, should be considered and acknowledged, more based on individual interactions of university-industry relations. This could include the ability to exploit open innovation with potential benefits for researchers, institutions and society and the ability to innovate by collaboration with business professionals and within the entrepreneurial ecosystem, by coepetition in the market, by co-creation with customers, following other alternative approaches to the institutional traditional governance.

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