DEVELOPING A FRAMEWORK FOR UNIVERSITY-BASED ENTREPRENEURSHIP ECOSYSTEM – THE RATIONAL FOR A RESEARCH PLAN

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Abstract: Many countries have adopted a knowledge-based strategy for growth and university-based entrepreneurship ecosystems appear to have a greater capacity for reinvention than IT firms. To encourage universities to become more entrepreneurial we must offer them guidance and a framework to facilitate understanding and support decisions.

Although some results have been achieved, the research on university entrepreneurship is chaotic and there are major differences among different successful programs.

Thus the research question became "[How to] extract lessons from learned across context, countries, and institutions to create a model that allows entrepreneurship education to have impact]?

The paper present the rational for a research plan.

Keywords: digital innovation, high tech, higher education, entrepreneurship ecosystem

Why do we need a University-Based Entrepreneurship System?

Science and technology advances on one side, economic failures and social forces on the other side contribute to the intensification of the interest in entrepreneurial activities and entrepreneurial economy. Entrepreneurship is considered here in the larger sense and includes every aspect of the process to transform an innovative idea into a product or services, into a viable and scalable start-up.

As many countries have adopted a knowledge-based strategy for growth [11], information technology (IT) and digital innovation and high-tech entrepreneurship appear to be essential components of the knowledge economy, an economy in which knowledge is used to produce economic benefits. In this landscape, university-based entrepreneurship ecosystems appear to have a greater capacity for reinvention than IT firms that disappear through merger or technological obsolescence [10].

The term ecosystem originates in natural sciences and describes a system of interacting living organisms in an environment providing physical elements supporting life. The idea is that complex systems, (like ecosystems) can only be studied as a whole in which component plays a role supporting another component, every environment parameter is essential.

The economic importance of the university-based ecosystem derives from the strong interaction with the knowledge economy [8].

Higher education (Fig.1) is partly funded with a fraction of the output of the knowledge economy which in turn uses as (part of the) input the output of higher education. The coupled subsystems can augment their output by improving their "transfer function"

(which amplifies input value into a larger output), by increasing the input value or both.

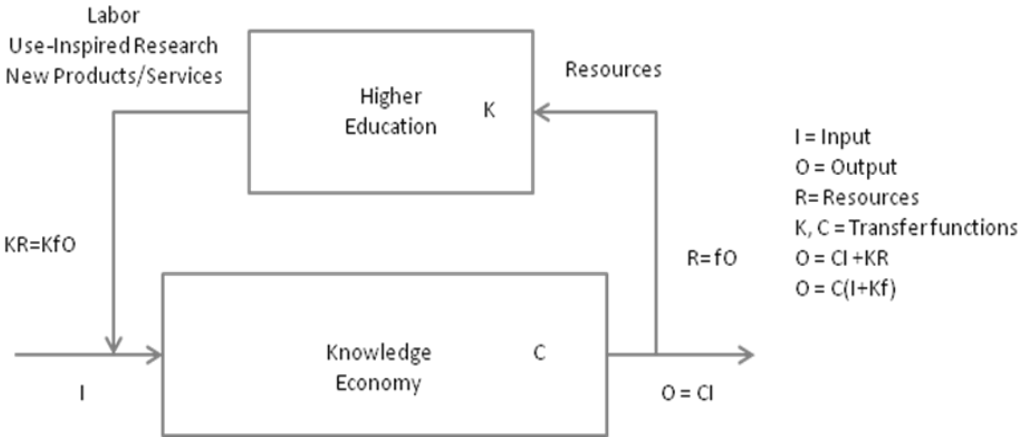

Figure 9Higher Education and Knowledge Economy System

A bird eye view at the types of research [2, 11], groups R&D work in four quadrants.

In quadrant 1 the research is aimed at "finding a solution to a practical problem" and has no interest in scientifically explaining how it works. The name to this quadrant has been given after the American innovator Thomas Edison.

In quadrant 2 the research "expands basic scientific knowledge in order to meet pressing societal needs". This quadrant is named after the French scientist Louis Pasteur.

In quadrant 3 the research is curiosity driven fundamental research, like the kind conducted by the Danish physicist Niels Bohr.

When we consider the research conducted in the academic world (Fig. 2) the most valuable work acknowledged by these organizations falls in quadrants 2 and 3.

The companies – on the other hand – value mostly research conducted in 1 and 2, for obvious reason, the monetization potential of the research.

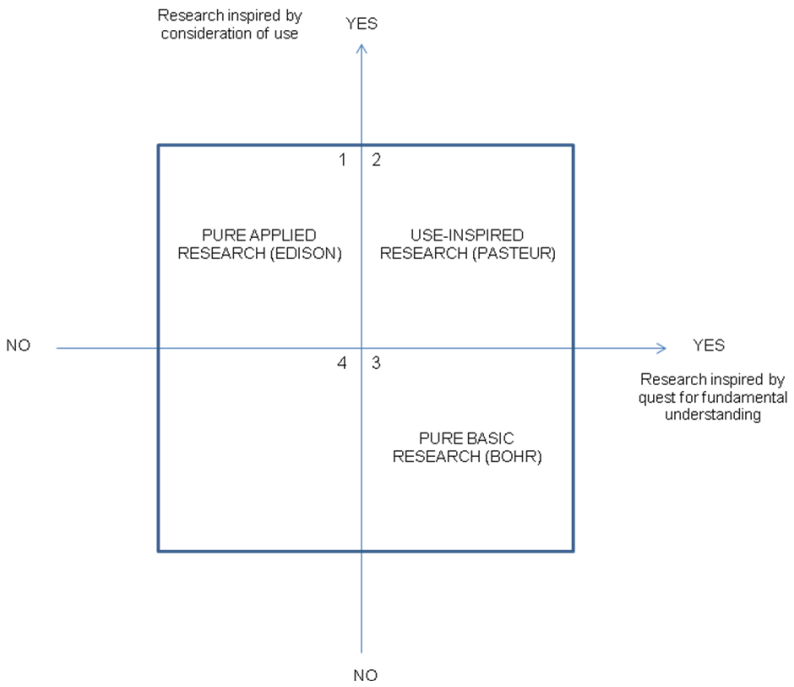

Figure 10 Scientific research categories (adapted from [2])

The difference between higher education subsystem and knowledge economy subsystem is even more evident when we consider resource allocation for the research conducted in these quadrants, for transforming research into products and services and for commercialization of knowledge (in the form of products and/or services) (Fig. 3)

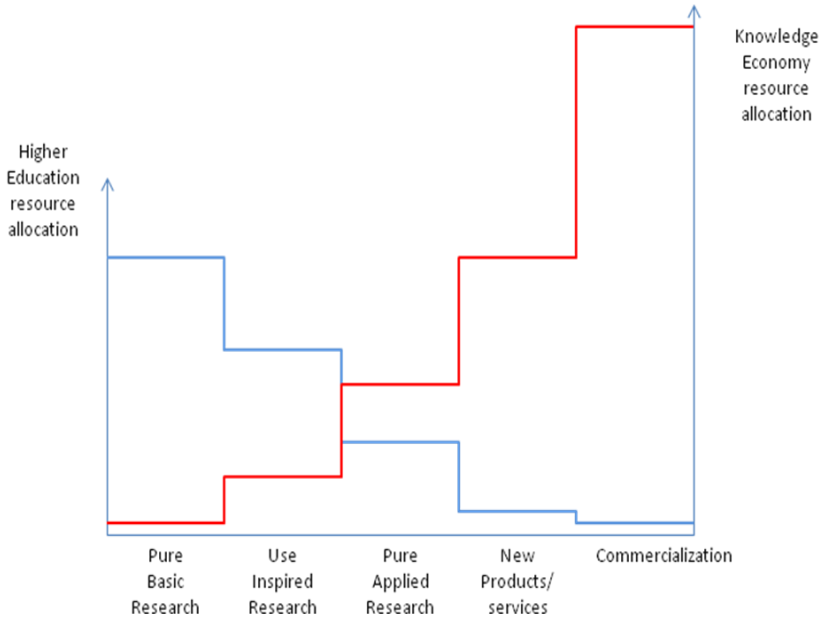

Figure 11 Resource allocation (adapted from [8])

Although there is a large agreement that university-based entrepreneurship ecosystems can provide the most effective and supportive context for high tech entrepreneurship and digital innovation and contribute more to the knowledge economy, "academic institutions vary greatly in their response to the demand for entrepreneurship education" [1] and creating an university-based entrepreneurship ecosystems remains only a goal in the development strategy.

The paper reviews existing literature and data available in the public domain to identify new research directions that lead to a framework for university-based entrepreneurship ecosystem, to promote digital innovation in a systematic manner and high-tech entrepreneurship. The goal of this research is to make this field of research more open, the results more actionable and to encourage universities to become more entrepreneurial by offering them guidance and a framework to facilitate understanding and support decisions.

A call for new research directions

A large number of reports, papers [13], books and event records identify and document the success factors of different institutions that succeeded in creating a viable university-based entrepreneurship ecosystem. The factors span from vision and leadership, through management, to adequate funding and infrastructure. These factors could be grouped in three broad categories:

A. Increase knowledge and promote (formal and informal) education for digital innovation and high tech entrepreneurship
B. Develop Infrastructure, build organization and mobilize enough financial resources
C. Mobilize a critical mass of active participants in the university- community-industry

network

The three directions of action define broad new directions for research on entrepreneurship in an effort to offer consistent answers to questions like:

- How to include systematic digital innovation and high tech entrepreneurship in higher education? - Both formal (content, methodology, mentoring and training) and informal (meet-ups, clubs, workshops).
- How to accelerate digital innovation (the linear model of innovation vs. the chain-linked model of innovation [3, 4, 5,6])
- How to connect resources, to build the social fabric, to connect university with community (to link broader entrepreneurship community to school) and industry (to fund ideas and commercialize academic research)
- How to how to measure the results? (vanity metrics vs actionable metrics)
- Now to monetize university knowledge and intellectual property?
- What are the best practices to create ecosystem infrastructure (incubators, accelerators) and to funnel entrepreneurs in the ecosystem
- What are the best practices in continuous improvement of the university-based entrepreneurial ecosystem?

Although some results have been achieved, e.g. "key stages in [… the] transition from individual to collective and organizational entrepreneurship" [10] could be identified, the research on university entrepreneurship is chaotic [9] and there are major differences among different successful programs.

Thus the research question became "[How to] extract lessons from learned across context, countries, and institutions to create a model that allows entrepreneurship education to have impact"[1]?

Research Methodology

The research should start with a comprehensive review of existing literature and exploration of available data and existing measurements (metrics). A model to fit all is not possible so we are looking for a framework to enable us to understand the process and make better decisions.

In order to structure the process (describe the components, the conceptual categories) and formalize it (describe the relationships among the components) we need to start by identifying the success factors.

The generic model could be developed using success cases that replicate and fill conceptual categories.

The process of building a model from case study (inductive case study research) is well documented by Kathleen Eisenhardt, [7] and will be adapted and used as the research framework.

Step	Activity	Reason
Get started	Literature review (Selected bibliography) Definition of research questions Generating Research Hypothesis	Focus efforts
Select case studies	Specify research domain by identifying useful cases	Model cases that replicate and fill conceptual categories
Collect research data	Define data collection methods (e.g. Structured or semi-structured interviews, questionnaires, field visits, getting involved in activities) Collect both qualitative (field notes) and quantitative data Combine them	Triangulation of evidence
Enter the Field	Overlap data collection and analysis, including field notes Flexible and opportunistic data collection methods	Speed analyses Take advantage of emergent themes and unique case features
Analyze Data	Within-case analysis. Cross-case pattern search using divergent techniques	Preliminary theory generation
Shape Hypotheses	Iterative construction. Look for replication, not sampling, for logic across cases	Construct internal validity
Compare with Literature	Both conflicting and similar	Abstraction level. Define model concepts
Closure	Generate Model	End when marginal improvement of the model becomes small

Discussion

Creating a university-based entrepreneurial ecosystem is a key factor in a knowledge-based strategy for growth [11]. Although the lack of theories makes the field very attractive, the lack of available data makes research difficult.

Even in the presence of a good framework, external factors (governments, cultural factors, industry factors, society factors) will have a major impact in the success or failure of an entrepreneurial ecosystem.

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