Toward a Systematic Framework for an Entrepreneurial University: A Study in Iranian Context with an IPOO Model

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Abstract

Purpose - The present paper aims to elaborate and consolidate the existing knowledge of the entrepreneurial university domain, and also seeks to provide a framework for the third generation of universities, i.e. Entrepreneurial Universities. In this research the third mission of universities is considered alongside traditional teaching and research directions. Thus, a systematic framework will be offered to explain the dynamics and determinants of these entities.

Design/methodology/approach - Since this area of research is at its embryonic stage, and a variety of fragmented researches have been done by various authors, researchers and scholars, and also as we were looking for a systematic framework, in our study we took advantage of systems theory and presented a systematic approach using the IPOO Model (Input-Process-Output-Outcomes Model). Thus, we conducted a set of semi-structured interviews with 25 experts in this domain. Our experts were selected amongst university professors, policy makers, and higher education officials of Iran. Coding of the gathered data was done in three phases and resulted in some concepts and constructs and a preliminary framework. Afterwards, the interviewees attended a focus group, and revised the framework.

Findings - An entrepreneurial university could be defined and described as a dynamic system, which includes special inputs (Resources, Culture, Rules and regulations, Structure, Mission, Entrepreneurial capabilities, and Expectations of the society, industry, government and market.), processes (Teaching, Research, Managerial processes, Logistical processes, Commercialization, Selection, Funding and financial processes, Networking, Multilateral interaction, and Innovation, research and development activities), outputs (Entrepreneur human resources, Effective researches in line with the market needs, Innovations and inventions, Entrepreneurial networks, and Entrepreneurial centers) and aims to mobilize all of its resources, abilities and capabilities in order to fulfill its "Third Mission".

Practical implications - This study focuses on the concept of Entrepreneurial University, and tries to consolidate the factors mentioned in the relevant literature on university entrepreneurship and entrepreneurial university and synthesize those factors with expert's views in this area of study. Simply put, the result of this paper is a systematic framework for a typical Entrepreneurial University.

Originality/value - The principal contribution of this paper is the systematic framework for an entrepreneurial university. While there is a variety of models and architectures in the literature, there is not a universal, acceptable, comprehensive and especially "systematic" framework. This article is going to fill this gap. It also updates the knowledge in the entrepreneurial university domain; provides a common view for scholars, academics, policy-makers and other beneficiaries; and prepares a fertile background for future studies.

Keywords: Entrepreneurial University, Third Mission, Systematic Framework, IPOO Model

Paper type: Research Paper

GBMR
Vol. 3, No. 1, 2011
pp. 30-37

Introduction

Today, universities are playing a significant role in the modern and knowledge-based economy. Their brilliant and critical role in innovation becomes more and more proverbial, especially in the triple helix (Etzkowitz, 2003a). Public and private sectors are looking for the knowledge generated in universities, in order to handle their problems. It is absolutely the result of the second revolution in their mission, which includes commercial engagement and goes beyond teaching and research purposes in these entities.

After years of neglect, universities and their staffs understood and believed that the gap between their implicit knowledge and market needs should be considered as a critical and vital dilemma. They could not choose the prior trend to reach their new mission any more. At the beginning, so many scholars, researchers and prominent scientists persisted in the face of this challenge, but finally the classical Ivory Tower had no choice but "change".

Clark (1998) introduced the modern entrepreneurial university concept and paved the way for prospective authors. He put his fundamental and impressive ideas in his work: "Creating Entrepreneurial Universities: Organizational Pathways of Transition". Then, Tornatzky and his colleagues (2002) considered the industry research partnership, student internship, technology transfer programs and industrial problems solving through which elaborated the industrial aspect of the university relationships. Etzkowitz (2004) highlighted the "Third Mission" and studied the proper linkages under the "Triple Helix" concept. Afterwards, Lee (2005) conducted a research in Korean university systems and proposed issues such as faculty culture, curriculum restructuring, less emphasis on campus, and appropriate systems and practices to reach the third mission. But still there was not a common view about the third mission, so that some scholars (e.g. Jongbloed et al., 2008) defined it as anything which is not traditional teaching and research.

In this paper, we attempted to clarify the meaning and make sense of this entity, i.e. "Entrepreneurial University". In doing so, on one hand, we reviewed the existing literature on entrepreneurial university in order to note the distinctive features and characteristics of this generation of universities, and on the other hand, we took advantage of the knowledge and experience of experts of this domain by interviewing and holding focus group meetings. Due to the sensitivity of the issue in question, we reviewed all the findings and brought them back to the experts. Finally, we outlined a framework and detailed how it could be interpreted and used by its beneficiaries. It is noticeable that we used systems theory and the proposed framework elaborates the entrepreneurial university as a system.

Entrepreneurial University

Nowadays, entrepreneurial universities, which are the results of the second revolution in the mission of universities (Etzkowitz and Leydesdorff, 2000), are playing a significant role in the economic and social development of different countries. Universities, especially the entrepreneurial ones, are important actors in a triple helix of University-Industry-Government relations that promote the science-based innovative sphere of the whole Globe (Etzkowitz and Zhou, 2006).

As mentioned above, Etzkowitz considers two academic revolutions in the mission of universities. First generation of universities dealt with teaching purposes and their main mission were to teach the existing knowledge. In the late 19th century, first revolution took place in Germany, when universities commenced to do research activities. In the second half of the 20th century, with the advent of science-based innovations in World War II, the second revolution came into existence and universities added economic and social development to their teaching and research missions (Etzkowitz, 2004). This type of university is called "entrepreneurial university".

The "entrepreneurial university", in the literature, has so many implications. Clark (1998) and Van Vught (1999) mention "Innovative Universities", while Slaughter and Leslie (1997) noted

"Market Universities" and "Academic Capitalism", Dill (1995) refers to "University Technology Transfer", Ropke (1998) considers the entrepreneurial university as an "Entrepreneur Organization" and classifies his views in three items: first, a university, as an organization, adopts an entrepreneurial management style, Second, its members act entrepreneurially, and third, it follows an entrepreneurial pattern to interact with its environment. Aronowitz (2000) offers a model of the "Corporate University", in which profitable activities and practices are valuable and teaching and researches without commercial outcomes are not.

Kirby (2002) indicates that these universities are innovative, and are able to recognize and create opportunities, and work in teams. They are risk takers who try to respond to challenges. Etzkowitz (2003.b) calls these universities as natural incubators. Jacob et al. (2003) consider two points for an entrepreneurial university: commercialization and commoditization. Schulte (2004) perceives two main tasks for an entrepreneurial university: to educate the future entrepreneurs and to act like an entrepreneur. Blenker et al. (2004) believe that a modern university is a social system that its internal units, research centers and faculty are attempting to respond to real needs of the market and environment, and trying to be innovative.

Lazzeretti and Tavoletti (2005) refer to the entrepreneurial vision of universities which will result in international excellence. Guerrero et al. (2006) investigated the environmental factors that affect the creation and development of the entrepreneurial universities. They classified the factors into two categories: formal and informal.

Besides, Rothaermel et al. (2007) provided taxonomy of the literature on university entrepreneurship. Their definition of university entrepreneurship includes all types of entrepreneurial activities of universities. They found 173 articles and papers which were published between 1981 and 2005. The result of this study is of paramount importance, since it categorizes the researches in four main streams: a) entrepreneurial research university; b) productivity of Technology Transfer Offices; c) New firm creation; and d) environmental context. In their research, they attempt to provide directions for future research and policy makers. Finally, they acknowledge that their proposed framework is useful, but somehow complex. Guerrero and Urbano (2010) refer to the embryonic nature of the literature in this filed and try to propose a framework in this matter. Their proposed model includes Environmental (formal and informal) and Internal (resources and capabilities) factors.

It is incontrovertibly axiomatic that there is not a pure holistic and comprehensive framework in the literature, or if there could be in the future, no one would guarantee its complete acceptability amongst experts in all over the world. A clear witness for this claim is the differences and nuances in American (e.g. Etzkowitz, 2002; Bramwell and Wolfe, 2008), European (e.g. Shattock, 2005), and Asian (e.g. Lee, 2005; Hershberg et al., 2007) patterns of entrepreneurial university formation and their approach toward the Third Mission. However, an ontological view might be useful and instrumental.

Therefore, the inevitable role of context should not be neglected. As noted earlier, this study was conducted in Iran and follows an Iranian approach toward the proposed framework. Nevertheless, we attempted to include the American, European and also Asian patterns in our framework.

Aims and Objectives

A substantial dilemma in the domain of entrepreneurship, especially in the filed of entrepreneurial university and university entrepreneurship, is the lack of a common and acceptable definition and interpretation. It stands to reason that the more we concentrate on a concept, the more we personalize it. Each of the scholars, researchers, university professors, and even policy makers attempt to personalize the concept of entrepreneurial university, and attribute specific characteristics to it.

The authors, in this article, are searching for a more comprehendible view. Thus, the main goal of us is to propose a systematic framework for a typical entrepreneurial university. In reaching this goal, we have four research questions: What are the main *inputs* of an entrepreneurial university? What are the main *processes* of an entrepreneurial university? What are the main *outputs* of an entrepreneurial university? And finally, what are the main *outcomes* of an entrepreneurial university?

Methodology

As it is mentioned before, during our study, we referred to 25 experts in this domain. Our experts were selected amongst university professors, policy makers, and higher education officials of Iran. The university professors were assistant, associate and full professors of universities of Iran which had a good background, both practical and theoretical, in this respect. Policy makers and higher education officials were chosen from high prestige parliament members of Parliament of Iran and high status officials of Iranian Ministry of Science and Education, with relevant background.

The interviewees attended in a semi-structured in-depth interview and were asked to answer the questions in detail. It is noticeable that the questions were designed and reviewed by research methodology and well-trained experts. Then, the interviewees were asked to add any valuable ideas which might improve and develop our study results. Thereafter, the data were analyzed and coding process commenced. The coding of the gathered data was done for three times. At last, the result of this phase was a preliminary framework which we put in our focus groups. In the focus group, we tried to follow the proposed sequence by Peterson and Barron (2007).

Finally, the result of these stages was a systematic framework, in which main inputs, processes, outputs and also outcomes of an entrepreneurial university were defined and determined.

Challenging the Views on Entrepreneurial University Concept: Proposing the Entrepreneurial University Framework

From one standpoint of view, the existing interpretations, models, frameworks and conceptualizations of entrepreneurial universities can be classified in two groups: a group which concentrates on entrepreneurial aspects of the entrepreneurial universities (e.g. Ropke 1998; Jacob et al., 2003; Etzkowitz, 2004), and another one which deals with factors affecting on formation and transition of the entrepreneurial universities (e.g. Guerrero *et. al.*, 2006; Guerrero and Urbano, 2010). But in total, as mentioned by Zhou (2008), "the dawn of the entrepreneurial university model are emerging."

Our approach is so similar to the first category. Here, in this study, we took advantage of systems theory and categorized the findings in a systematic framework: Inputs, Processes, Outputs and also Outcomes. Here, in this study, we applied our definitions of inputs, processes, outputs, and outcomes. "Inputs" are defined as those elements and factors that are fed into the black box of an entrepreneurial university. "Process" is a continuum of logical interrelated transactions that transforms inputs into outputs of an entrepreneurial university. "Outputs" are the result of the transformation of inputs in the black box of processes. And finally, "Outcomes" are considered as the consequences of the Input-Process-Output Model, these elements and factors are not the direct result of the processes, but they are the result of the whole IPO Model. Then we call our final model the "IPOO Model".

Inputs

As noted earlier, Inputs are those elements and factors that are fed into the black box of an entrepreneurial university. During the data gathering, literature analysis, interview sessions and our focus groups, a variety of inputs were identified. The most important inputs were as follows: Resources (Human resources, Financial resources, Informational resources and Physical

resources), Rules and regulations, Structure, Mission, Entrepreneurial capabilities, and last but not least, the Expectations of the society, industry, government and market.

Processes

As we defined earlier, any process is a continuum of logical interrelated transactions which transforms inputs into outputs. Therefore, we were looking for such processes in an entrepreneurial university. Our study led to a series of processes, which are: Teaching processes, Research processes, Managerial processes, Logistical processes, Commercialization processes, Selection processes (for students, university professors and staff), Funding and financial processes, Networking processes, Multilateral interaction processes (between students, university professors, staff, industrial researchers, entrepreneurial centers, industries, policy makers and society), and Innovation, research and development activities (IR&D).

There is an obvious overlap between some of the processes, but it stands to reason that during our study, the experts insisted on the separation of these elements so as not to underestimate them. It is crystal clear that there could be more classifications in accordance with different studies and experts views.

Outputs

Outputs are the results of processes; however, in this study they are confined to the above mentioned processes. The principal outputs of an entrepreneurial university, in our study, are: Entrepreneur human resources (including university professors, graduates, researchers, and staff), Effective researches in line with the market needs, Innovations and inventions, Entrepreneurial networks, Entrepreneurial centers (e.g. incubators, science and technology parks, spin-offs, etc.).

Outcomes

What are the outcomes of an entrepreneurial university?. The answer to this question needs a set of considerations. Outcomes are the result of the IPO Model, and have significant and profound effects on the society as a whole. As entrepreneurial universities are consistently looking for getting closer to their Third Mission, the socio-economic development could be considered as a generic answer to the question. But it is not a satisfactory answer to this question, at least, from our stand point of view. Hence, we asked this question from the experts and their answers were quite interesting. While some of them were satisfied by this classical interpretation of the Third Mission, others pointed out some other consequences, such as: Innovation and innovative culture, socio-economic value creation, and human development. While the authors appreciate and acknowledge the experts' ideas, according to some considerations, prefer to use the term "Third Mission" in the model.

Figure1 illustrates the proposed systematic framework for a typical entrepreneurial university. As it is shown in the figure, the framework should be considered in its context and culture and we adhere to this belief that they can play a brilliant role, which might facilitate or even impede realization of its Third mission.

Context	Context				Context
	Inputs	Processes	Outputs	Outcomes	
	• Resources (Human, Financial, Informational, Physical) • Rules and regulations • Structure • Mission • Entrepreneurial capabilities • Expectations of the society, industry, government and market	• Teaching • Research • Managerial • Logistical • Commercialization • Selection (for students, university professors and staff) • Funding and financial • Networking • Multilateral interaction processes (between students, university professors, staff, industrial researchers, entrepreneurial centers, industries, policy makers and society) • Innovation, research and development activities (IR&D)	• Entrepreneur human resources (including university professors, graduates, researchers, and staff) • Effective researches in line with the market needs • Innovations and inventions • Entrepreneurial networks • Entrepreneurial centers (e.g. incubators, science and technology parks, spin-offs, etc.)	Third Mission	
	Context				

Figure1: Proposed Systematic Framework for Entrepreneurial Universities

Conclusions

By the advent of the Third Mission in universities, a new generation of universities came into existence, a university which goes beyond teaching and research missions and considers a socio-economic development for its society. In this paper, the authors attempted to get closer to this phenomenon and elaborate its elements. In order to do so, a framework proposed which follows the IPOO Model logic and tries to consolidate the knowledge in this domain. It should be noted that, this framework is dependant on its environmental factors and context.

At last, a definition of an entrepreneurial university is proposed based on our study. In this definition, an entrepreneurial university is a dynamic system, which includes special inputs (Resources, Culture, Rules and regulations, Structure, Mission, Entrepreneurial capabilities, and Expectations of the society, industry, government and market.), processes (Teaching, Research, Managerial processes, Logistical processes, Commercialization, Selection, Funding and financial processes, Networking, Multilateral interaction, and Innovation, research and development activities), outputs (Entrepreneur human resources, Effective researches in line with the market needs, Innovations and inventions, Entrepreneurial networks, and Entrepreneurial centers) and aims to mobilize all of its resources, abilities and capabilities in order to fulfill its "Third Mission".

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