The Role of Entrepreneurial Universities in Economic Development Through Innovation and Technology Transfer

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Abstract. This paper examines the potential role of the Entrepreneurial Universities in the national economic growth. The entrepreneurial universities integrate economic development as a function of teaching and research further. By focusing their research on the economic needs of the society, the results can be immediately exploited in the form of products and services. By including entrepreneurship guidance in their program, the research can be transformed into new enterprises such as start-ups and spin-offs, thus creating new jobs.

Keywords: innovation; technology transfer; economic development; university, entrepreneurship,

INTRODUCTION

The university as a key player in the knowledge based society is meant to contribute to individual and socio-economic welfare generating and transferring them knowledge through education, research and innovation.

In the context of stated mission, universities roles in relation to the economic environment redefine:

1. The role of forming competent human resources: through the education process, both the initial and the continuous the university aims to develop the skills to the graduates that create a competitive advantage in the labor market is perceived as added value to employers and make them able to contribute to society.

2. Role in generating new knowledge: through research development and innovation, the university aims results convertible by the economic environment in products and services with high added value.

3. The role of institutional citizen ("university city"): the university actively contributes to community development through the:
   - cultural intervention - education for social paradigm of the future;
   - institutional intervention - involvement of the university as an active institutional player in efforts to building and development of the society;
   - individual intervention - the direct involvement of the academic community in social life (advisory, consultative or decision-making representation etc.).
The contribution of university generated knowledge to economic development and growth in technological advanced economies has increased dramatically during the last decades (OECD, 2003). The most fast growing and wealth-creating industries, such as biotechnology, information technology, and telecommunications have for example gradually become more science-based. This has made policy makers interested in the role of universities as potential engines for innovation and job creation emphasizing their involvement in industrially relevant research and technology commercialization.

Universities are hence increasingly shifting from their traditional role as educational providers and scientific knowledge creators, to a more complex ‘entrepreneurial university model’ that incorporates the additional role of knowledge commercialization and active participation in the development of research-based spin-offs (RBSOs) in the local and regional economy (Etzkowitz et al., 2000).

To develop a world-class higher education system, utmost attention and consideration must be given to the development of academic entrepreneurship, which includes a better understanding of what it is and putting in place the right internal systems and mechanisms within the academic institutions to facilitate its development.

Firstly, it creates value in the marketplace, as well as within the academic organizations. A university creates economic value by becoming entrepreneurial. In the value creation process, leadership at all levels of the academic organization is important in facilitating, nurturing and supporting academic entrepreneurial activities. Without strong and effective leadership, the transition or transformation towards an entrepreneurial university may not be realized.

Secondly, the value creation process occurs through acts of organizational creation, renewal or innovation. The table above provides the mechanisms that can be undertaken when pursuing these entrepreneurial actions.

And thirdly, academic entrepreneurship results in research and technology commercialization. This is because it facilitates and encourages university technology transfer between the university and industry. Thus, a higher degree of academic entrepreneurship orientation will result in a greater number of technology transfer and commercialization activities.

These activities and entrepreneurial developments will not only contribute to organizational growth, profitability and wealth creation in the university but will also impact...
the external environment and economy as a whole by increasing productivity, improving best practices, creating new industries and enhancing international competitiveness and contributing to the growth and development of a knowledge-based economy and society. (Edge Daily, 2008)

An entrepreneurial University is a University where academic and administrative staff forms a united team, whose aim is to develop the institution, ensuring resources for a normal and quality functioning. In an entrepreneurial university, scientific research is strongly oriented toward applicable research results and technology transfer. In an entrepreneurial university, pulse research on higher education market is monitored continuously and leads to the change the curriculum. This sensitivity may confer a dynamic character the university, placing it on a top position in the preferences of potential students, the latter having compatible with the structure of labor market skills, which is also in a continuous motion. In this context, we note that in a traditional university academics are cut out from financial problems.

Furthermore, research in the traditional university is focused on gaining new knowledge, which further is transmitted to the scientific and students community for educating valuable citizens to society. This change of perception, from traditional to the entrepreneurial, is due, primarily, to the decline of public funding of the educational system. Therefore entrepreneurial actions are intended to offset the financial decline. To walk the entrepreneurial path, universities must build an entrepreneurial culture which wears the fingerprints of innovation and technology transfer and create an entrepreneurial favorable environment. The University should encourage foundation the satellite-companies, technology parks, as genuine forms of academic entrepreneurship. (Ciocanu, G. 2012)

RESEARCH INOVATION AND TEHNOLOGY TRANSFER

Research conducted in universities is usually classified into three categories: basic research, applied research, research such as "problem solving", called "non-oriented" (Fig. 2).

![Fig.2. Types of academic research and results](image)

We present the main characteristics of each category:

Fundamental research does not directly contribute to increased economic performance of enterprises, so it is difficult to quantify this relationship between innovation and of research.

Applied research is the creation and optimization of products, services and / or new procedures. In practice, these studies take the form of research contracts, financed both by
private companies, within the research programs targeting the assimilation of new products and processes, as well as public institutions and in specific studies, with the role of decision support.

Research type "problem solving" or "untargeted" refers to specific activities, generally short, consisting mainly of: test, measurement, analysis and consulting services. Even if it has only a very limited scientific interest, these activities are generally well received by research centers, not only due to financial contribution which they provide (are called "food" contracts) but also because of contacts that can be maintained with partners likely to orient themselves to more important greater cooperation.

Economic valorization of university knowledge can take many forms of which two most common are indisputable, namely: transfer operating licenses to existing companies and create new activities (university spin-offs).

The concession of licenses to companies, aims codified knowledge, for which the University has a property right protected by patent, and is a form of economic valuation, that knows an increasing interest in Europe since the early 1990s.

University's spin-offs are companies created by universities or public research organisms in order to exploit promising commercial prospects of certain knowledge and certain research results he two methods of capitalization, involving a different degree of involvement of the Universities.

In the case of transfers of license, there is a clear separation between the existing company technology transfer and exploitation of this technology by companies that assume its marketing and the risks.

In a spin-off valuations by contrast, the University covers both roles having to ensure the transfer of technology and to participate in the process of creating a new economic entity, in which the technology will be transferred. (Someșan, C. 2011)

In a global competition and worldwide productivity growth, it is impossible for companies to maintain performance and to survive without taking into account innovation (Băloiu L. Frasineanu I., 2001). Moreover, the company's strategic position in the market depends on its ability to meet continuous demand and changing needs of customers for high quality products sold at prices ever lower.

According to (OECD, 2005) innovation is defined: "Putting in the work of a product (good or service) new or significantly improved process (for businesses), a new marketing methods or new organizational methods - business practices, workplace organization or external media relations. Innovation is as essential for a successful modern economy and is water for life. It is at the heart of developing economic policy and the main source of job creation.

Technology transfer involves a series of relations, of formal and informal type, among institutes of research and development (R&D) and the public and private economic sectors. The aim is to strengthen the economy transfer in a territory by accelerating the application of new technologies and resources to meet the needs and opportunities of private and public sector.

Technology transfer is the process by which knowledge, facilities or existing capacity, financed from public R&D funds, are used in order to satisfy certain public and private necessities.

In principle, among the results of successful technology transfer efforts can be pointed product enhancements, more efficient services, improvement the manufacturing processes, development of new products intended for national and international markets. Basically, the technology transfer process involves three entities (Fig. 3.), under a cooperative relationship.
Therefore, technology transfer is perceived in most general sense, as the transfer of research results from R&D units (universities, research institutes), to business firms or other components of society. The three entities involved in technology transfer aim at accelerating economic use of research results involving the transition from invention to innovation and successful dissemination on the market, creating added value. (Năstase, et al., 2000)

In performance in terms of innovation, it is weak compared with the rest of EU countries, Romania being part of group of countries seeking to reduce the gaps ("catching up"), which shows that our country has a level low infrastructure and mechanisms of innovation, being in an early stage of development and without contributing significantly to economic growth.

Among the negative elements of characterization innovative capacity of Romania are: intellectual property, permanent training (life long learning), new capital in GDP, total spending (public and private) for research - development - innovation (RDI), public subsidy innovation, high technology exports, the share of expenditure on research - innovation in GDP.

Also, it appears that intellectual property offices, technology information centers and technology transfer centers are much better represented in universities in Romania compared to innovative business incubators.

In the development spin-offs should be noted that this legislation appeared recently in our country (note: in August 2008), for which currently the number of this type of initiatives at universities in Romania is very low. Although the governmental strategies are focusing on innovation and creating of new enterprises, the lack of entrepreneurial culture, slows down their momentum (Borșa A. et al., 2011).

Successful businesses are conditioned both quick and easy access to knowledge as skilled labor, technical and specialized social support and swift identification of suppliers, customers and innovative solutions. Universities must become more active players in the Romanian economy based on knowledge, able to respond effectively to market demands. In economically advanced countries, prestigious universities have a key role in their growth. Consequently, the economic-university relationship is of strategic importance and of public interest needed to be developed and continuously streamlined by appropriate government policies.

Developments in global economic (e.g. prolonged economic recession) led to loss of markets for many businesses in our country, they are increasingly feeling the need for trained personnel in areas that contribute to increased productivity and product diversification. Increasing the number of higher education graduates in our country however failed to generate a significant difference in terms of innovation among local businesses, this can lead to the conclusion that higher education in our country suffer from the more fundamental chapters.

One of the key issues in this regard is the lack of extensive and deep cooperation between academia and industry. The facts show that so far Romania has not succeeded the synergy in directing towards the economic environment the positive effects of local research projects conducted in academia. It should be noted that many of the results of research projects are not supported to transfer effectively into the economic environment. Also, there is low degree of complementarity between the various research initiatives in adjacent sectors.
and low level of cooperation between research groups from the same institution of higher education. In these conditions, the development at higher parameters of innovation infrastructure in universities should be a priority. It is worth mentioning that neither the economic environment has an adequate strategy to use the high qualification of researchers from academia to address competitiveness issues faced. It follows a legal framework need to boost efforts directed both ways.

In this context, public-private partnerships as a form of cooperation between public authorities or institutions and business environment, is a solution for the development of innovation infrastructure and the provision of innovative services.

Implementing private public partnerships in innovation would lead a number of advantages to stimulate transfer of research results in the economic environment, such as:

- orientation of RDI activities to the real requirements of the economic environment;
- diversification of financing of RDI activities through co-financing of research by private partners;
- increased management efficiency and focusing on concrete results and on time implementation of projects developed jointly;
- know-how for converting research results into market successes, namely supporting the costs of this approach.

In collaboration university (knowledge environment) - business (economic environment), intellectual property protection is required as a means of preserving the creative values as a way to encourage and motivate creators of values. (Diagnostic panel 3)

**IMPACTS OF RDI PROJECT PARTICIPATION ON SMES IN EUROPE**

Europe-wide, SMEs account for two thirds of the workforce in private sector. Economically, they account for 65% of the EU's gross domestic product (GDP). SMEs therefore have a key role to play in helping Europe emerge stronger from the economic crisis and meet the goals of the Europe 2020 Strategy. Many SMEs rely on innovation to stay ahead of the competition by developing new products and services or improving existing ones.

The impacts on SMEs of participating in EU-funded projects are many and varied, ranging from economic impacts (e.g. increased turnover, the introduction of new products and services) to enhanced skills (both research and project management) and enlarged networks. Many of these benefits are long lasting and may even grow over time.

**Economic impacts**

Many SMEs report positive impacts on economic measures of performance immediately after the project; 49% report a rise in turnover, 19% cite an increase in income and 13% state that profits are up. Furthermore, far from dwindling, these effects appear to grow stronger over time. A few years after the end of the project, the proportion of SMEs enjoying increases in turnover, income and profit had risen to 55%, 28% and 24% respectively. The growth is due to the time it often takes to turn project outcomes into commercially viable products and services.

**New products and services**

Some 60% of SMEs expand the range of products and services they offer following the project. Just over a third report that the project has helped them cut the time to market their products and services. A large proportion (70%) of SMEs note that working on the project has had a positive impact on their operations, processes, methods, tools or techniques, as well as on the quality and reliability of their products. Indeed, when interviewed, many SMEs stressed that this was one of the most important benefits of participating in the project.
Research and innovation

An overwhelming majority of SMEs report that the project had positive impacts on different aspects of their research and innovation work, although these impacts diminish gradually in the years following the end of the project. For example, for the period immediately after the end of the project, 91% say that the project bolstered their technological or scientific competitiveness, while 85% benefit from enhanced R&D skills. However, over the subsequent years these figures fall to just below 65%.

Generally speaking, the SMEs that benefit most in terms of research and innovation are those that started from a relatively low base. In interviews, SMEs that had little or no in-house research capacity at the start of the project explain that they had since adopted a fresh approach to R&D, with some launching new R&D activities and even setting up new R&D departments. (ec.europa.eu)

CONCLUSION

For national and local governments, universities are a source of key assets for a technology-driven innovation economy. They provide skilled people and valuable researchable ideas. They attract other key economic development resources, such as educated people, firms and venture capitalists. Since universities usually remain in a particular location, they can be relied upon for long-term sustainable relationships. Universities which have been successful in teaching and research have vast untapped resources for nurturing and establishing innovative start-ups and technology based ventures.

Through academic entrepreneurship, the university becomes the agent of industrial innovation, technological development, economic development and social development especially in the context of growing knowledge-based economies and globalization. (Edge Daily, 2008)

REFERENCES