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**THE IMPACT OF INNOVATION ON THE
PERFORMANCE OF THE MODERN UNIVERSITY**

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Abstract

In the current economic context, innovation is seen as a result of interactions between different actors of innovative systems. Through this work we aimed to illustrate the fact that fulfilling the third mission of the modern university, contributing to economic and social development is possible only by anchoring it in a new model that includes variables identified in the scientific literature. Anchoring the modern university in an adaptive strategy based on the orientation towards collaboration for permanent research and innovation is the key to competitiveness in the European economy. Achieving the European goals on the development of a smart, sustainable economy and favorable to the inclusion is possible through the involvement of the university in partnership founded on mutual interests and benefits in innovative systems where graduates have professional, scientific research and social skills to integrate quickly and effectively in the labor market and academics put in value their capabilities in research-development-innovation area.

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1. Introduction

In terms of the transition from modern to postmodern society, the university must adapt to achieve increased efficiency and effectiveness through internal transformation of governance, management, flexibility, organizational structure. The transition to postmodernism has also led to changing the university's mission by adding a new feature, respectively contributing to social and economic development of the nation.



Fulfilling the third mission of the modern university, the contribution to economic and social development can be possible only through a complex process of transforming the organizational environment by forming a collaborative culture with the economic environment. The effectiveness of organizational university environment requires innovation as a strategic objective that can be met only through the involvement of the university in partnership with the socio-economic environment within innovative systems.

In order to identify the variables to be included in a model of success for the performance of the third mission of modern university, we have developed an approach for identifying in specialized literature patterns of academic entrepreneurship, concrete successful ways of university – academic environment partnership that supports innovation, models for intra and inter-organizational knowledge transfer, empirical studies on the effect of the transfer of knowledge on academic performance.

2. Entrepreneurial, Adaptive University - Important Player in Local Economic and Social Development

Universities are complex organizations that carry out a variety of activities with economic impact; they act as employers, create knowledge, form human capital, make the transfer of know-how, research for technological innovation, capital investment, have impact on regional environment and support knowledge infrastructure (Drucker & Goldstein, 2007).

In response to the influences of external environmental factors involving new organizational structures, procedures and new relationships at strategic, tactical and operational level and a new way of allocating resources, Sporn (2001) proposed the concept of *adaptive university*. “More and more aspects of the academic enterprise are thus perceived as being significant to the regeneration and transformation of the regions” (Arbo & Benneworth, 2007, p. 18). Etzkowitz et al. (2000) points out that the financial support of the university by the state, allocation of public funding for scientific research in universities is influenced by the direct contribution of research to community development, stimulating regional innovation.

The impact of the university's contribution to economic and social development can be revealed through the process of creating shared value (CSV) by connecting university activity with the activities of individual stakeholders. The analysis of the university processes which lead to obtain superior value for all stakeholders was initiated by Clark (1998, 2004), continued by Rothaermel et al. (2007) and Gibb et al. (2009) who outlined the coordinates of entrepreneurial university.

Aranha & Garcia (2014) are the authors of *a metamodel of university entrepreneurship* that highlights the impact of entrepreneurial university in modern society. In achieving this model, it was started from studies made by Clark (1998, 2004) which emphasized the entrepreneurial pathway of university, studies made by Etzkowitz (2001, 2004) referring to norms of the entrepreneurial university, Kirby's research (2006) who described the strategic actions of entrepreneurial university and the studies made by Rothaermel et al. (2007) which revealed the conceptual framework of entrepreneurial university.

The innovative contributions of the proposed metamodel are:

- Entrepreneurial vision which is considered a strategic component of the entrepreneurial university;

- The process of creating shared value - CSV as a new relating framework of the university with its stakeholders that ensure economic, social and cultural development of the region.

The structural components used as support in designing the metamodel of entrepreneurial university proposed by Aranha & Garcia (2014, p. 340) are:

- *Entrepreneurial vision* of the university which is characterized by projecting the image and mission in an environment within a flexible internal environment with efficient structures and efficiency to successfully fulfill the function of teaching and research and the role of an economic, social and cultural agent;

- *Committed strategic leadership*, respectively the commitment in implementing the entrepreneurial vision and pursuing the efficiency and flexibility of the activities at all levels of the university;

- *Generation of innovative knowledge* which involves the development of programs, projects and actions to form skills, reformulating curricula and strategies for teaching and learning, generating benefits for the region by creating new businesses, technological parks and encouraging innovative ecosystem;

- *Capitalization and innovative knowledge*, namely transforming the results of basic scientific research and applied research in financial, economic and social assets and their transfer to organizations;

- *Economic, social and cultural development of the region* by rethinking products, services, redefining productivity in the value chain, development of clusters, innovative ecosystems, industrial parks in the interest areas of the university, business development, technological parks, innovative ecosystems, promote the legal and ethical framework meant to conduct the environmental behavior of people within the university entrepreneurship;

- *Integrated entrepreneurial culture* by institutionalizing the tools and mechanisms that contribute to raising awareness of employees dependent on the principles of entrepreneurship, development of programs, projects and training of entrepreneurial skills essential in the development of entrepreneurial behavior, designing incentive strategies to develop entrepreneurial attitudes within and outside the university.

3. University – Business Environment Partnership, Innovation Tool in Knowledge Economy and Support Of Economic Development

3.1. Innovation, Innovation Systems

Innovation means creating successful value through exploitation of new knowledge. It should not be equated with invention (Freeman, 1982). He noted that "an invention is an idea, a sketch or model for a new device, product, process or improved system "while" an innovation in the economic sense refers to the first commercial transaction involving a new product, process, system or device".(Freeman, 1982, p.7). Innovation can be administered in different ways in different contexts.

In Roos opinion (2007), research is transforming money into new knowledge offered to businesses, industry and the world and innovation is turning knowledge into money by adapting or adopting, by the organization, something new that turns into products, services, processes, systems, structures, brands, IP, etc., namely all that client and/or consumer is willing to pay or anything that can reduce the cost to serve a client / consumer.

The current economical context interaction between actors in innovation systems can lead to economic success. In Porter's opinion, the factors that define the economic success of a region, so-called "Porter diamond" and that should be reflected in innovative systems, are: the availability of resources, access to information, the objectives of each organization, organizations need to innovate in order to invest. Starting from the theory of competitive advantage of Porter and by considering the concepts of individual and institutional learning (interactivity, networks), Guth (2006) developed the New Diamond of innovation. In the 90's, a systemic view of innovation has been promoted by Lundvall (1992) and Nelson (1993).

Innovation systems built as assemblies made up of institutions that support learning, research, exploitation can be analyzed at the micro, meso and macro level, namely:

- At micro level - through an organization's ability to interact with one or more organizations to get value in the value chain as a result of work carried out within the innovation system;

- At meso level – through the ability of companies with common characteristics of relating in a particular industry, geographic area and functional point of view;

- At macro level – through the ability to create a network of sectoral clusters which interact on the following streams of knowledge:

- a) Interactions between businesses;

- b) Interactions between businesses, universities and public research institutes, including joint research, co-patenting, co-publications and informal links;

- c) Other interactions with innovation support institutions, such as those related to financing of innovation, technical training, research and engineering facilities, marketing services, etc.;

- d) Technology diffusion, namely rates of adoption by industry of new technologies through machinery and equipment;

- e) Staff mobility, focusing on key personnel movement within and between public and private sectors.

OCDE considers that innovation has an important contribution to economic growth through intensive in knowledge goods and services. A key element of competitiveness in the knowledge economy is "interconnection" between companies, universities and governments. For Romanian reality, triple helix model of thinking must be changed by adding the fourth actor - Four clover model (Guth & Cosnita, 2010) represented by institutions as a catalyst: service providers in the field of innovation and technology transfer, technology transfer centers, chambers of commerce.

Universities are interested to develop active partnerships with the business environment that benefits both sides. "It is necessary for universities to collaborate with regional and local businesses to develop new and innovative business" Smart (2009, p.307). Long-term collaboration between academia and industry is considered profitable because frequent interactions have wider benefits (Lee, 2005). Because the objectives, the cultures and their constraints are different and more difficult to understand by the other side, the collaboration between universities and industry must be stronger (Siegel et al., 2007). Mutual success is possible if the value obtained by dynamic collaboration is greater than the unique interactions (Burnside, & Witkin, 2008). Collaboration between two different organizations involves people with different competences, knowledge, experiences and points of view, which is important for innovation. However, there is a gap in the contextual understanding between the people from the two different organizations and there are difficulties to ensure efficient communication to resolve issues,

misunderstandings and preconceptions. This points to the need to create a collaborative culture, common meeting places and effective communication in order to understand the different perspectives of the university–industry collaboration and create a stable long-term collaborative relationship (Wallin et al., 2014).

3.2. Successful Concrete Ways of University – Business Environment Partnership And Innovation Support

Clark, 1983	Triple Helix of university-industry-government interaction - as a base of innovation
Hall et al., 2001	Joint research
Poyago-Thetoky et al., 2002	Three types of university-industry partnerships: scientific research conducted by the university on behalf of industry; ideas developed by universities through research activity offered to market through marketing services provided by the industry; basic scientific research conducted by the university and developed by industry. Joint ventures or partnerships between universities and industry can exploit its complementarities and mutual benefit can generate profit.
Gill, 2002	Transfer of technology as the foundation of innovation
Friedman & Silberman, 2003	Academic activities and creating patents, licensing, creating spin-off companies
Hill, 2005	Strategic alliance enables organizations the opportunity to promote their products and services through theories: Transaction Cost Economics (TCE), Resource-Based View Theory (RBT) and Knowledge-Based View Theory (KBT)
Tödting, 2006	Providing knowledge for business and higher qualified human resources; Identification and dissemination of new knowledge at local level; Support of modern marketing of its own incubator type scientific research results for spin-offs
Rynes, 2007	Creating interactive sessions where people from both organizations interact to solve important problems
Grimpe & Hussinger, 2008	Informal collaboration – through tacit knowledge and formal collaboration which is based on contract - codified knowledge (for example, patent)
Borrell-Damian, 2009	C & D partnership between universities and industry for innovation, long-term collaboration that have higher chances; Doctoral education seen as a bridge that makes it possible to develop comprehensive and lasting relationships
Rossi, 2010	Development of start-up; the commercial exploitation of university, academic advice, development and commercialization of intellectual property rights; cooperation in education; company personnel training, exchange of researchers.
Garcia, Sapsed, 2011	Industrial clustering
Anatan, 2013	A conceptual model of technology transfer through alliance that includes as variables organizational performance, competitive advantage, new product development, innovation, technological capacity building, quality improvement. Learning ability, duration alliance, knowledge ambiguity, uncertainty mediate the transfer of knowledge and influence the performance.
Wallin et al., 2014	Three levels for university – industry collaboration in innovation: strategic, tactical and operational by considering the time factor and resource-three effective mechanisms for innovation: the technology readiness level TRL as part of the strategic dimension, workshops as elements of tactical and dimension and the prototype as part of the operational dimension used for products, services, business models

Stăiculescu, 2015	Education partnership between the university and businesses based on: Assistance of students employed during the course of their studies; Provide support in the form of students' grants for the development of internships, paid both by employers and/or by universities; Organize learning internships, meetings with people in the corporate management structure, promotion of professional success models among students; Organizing and conducting training programs for teachers in collaboration with employers; Organize job fairs for graduates; Providing information services, career guidance and counselling for students
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4. Empirical Findings

Empirical studies on the effect of the transfer of knowledge on academic performance show mixed results:

- There is a positive relationship between performance in knowledge transfer between academia and industry alliance (Breschi et al, 2006).

- Theoretical studies suggest that alliances are needed to address market failures innovation, particularly those relating to basic research (Poyago-Thetoky et.al., 2002)

- Knowledge transfer from university to industry may cause changes in long-term objectives of the university related to research activity because it's put in a position to solve the industry's problems in the short term and to reduce intellectual freedom related to research agenda and scope of applying research results (Martin, & Etzkowitz, 2000).

- In the context of university collaboration with industry in research, applied research will be more advanced than basic research which is considered the main axis of university research agenda (Lee, 1996), and this aspect influences the financial support of the government offered for research activity in universities.

- There are differences of interest related to different priorities of the university and industry related to research activity. The priority of the university is to disseminate knowledge, while industry's one is to obtain patent for results of research conducted in collaboration with the university (Jelenik & Markham, 2007) and to block the publication of research results on the grounds of protecting intellectual property.

- Concerning the effect of knowledge transfer from university to industry on industry performance, empirical studies show that the transfer is mostly informal through citation patent (Hall, & Ziedonis, 2001), and the creation of spin-offs (Link, & Scott, 2005).

- The alliance success between university and industry in research is affected by decisions relating to research and project management. A study conducted by Monjon & Waelbroeck (2003) in French companies found that collaboration with universities in an alliance enhances radical innovation for the company. These research results are offset by Sung (2005), who demonstrated that cooperation within the alliance had no significant effect on the company's innovation in general in Korea.

- Van Wijk et al. (2008) and Martinkenaite (2011) conducted a critical review of the literature to provide information related to research on intra and inter-organizational transfer of knowledge. They concluded that integrative model of knowledge transfer between academia and industry is still unclear

and there were no quantitative studies to provide empirical evidence to explain the relationship between related variables (Van Wijk et al., 2008). To understand how organizations can be organized to obtain benefits through the transfer of knowledge it is necessary to develop empirical studies that focus on integrative model of knowledge transfer between industry and university. In fact there is not yet a systematic overview and a mechanism of result and basic knowledge transfer.

- Industrial clustering is a source of regional advantage (Garcia, & Sapsed, 2011) because it allows access to important resources, developing more efficient links of value chain, an innovative climate. Although industrial clusters have gained importance, there are still debates on what to do for them to become sustainable and which would be the best ways to support them.

Anatan (2013) develops a model for knowledge transfer based on conceptual and empirical literature review, based on two conclusions. The first conclusion is that knowledge transfer is influenced by:

a) *The ambiguity level of knowledge*, namely on the conditions that influence the process of knowledge transfer (tacitness, asset specificity, complexity, experience, protectiveness partner, cultural and organizational distance);

b) *Organization size*, namely the number of employees and the intellectual capital of the organization which has the role of supporting the process of knowledge creation;

c) *Organizational age* which determines the limits of the organization's ability to learn and adapt to a changing environment;

d) *Organizational decentralization*, namely the autonomy of each unit of organization for the development and creation of knowledge within the business unit;

e) *Absorption capacity*, namely an organization's ability to identify, assimilate and apply new forms of knowledge coming from the external environment;

f) *Structural dimension* (the level of high quality trust and commitment and intense communications) *relational dimension* (common objectives and cultures), *cognitive dimension*.

The second conclusion drawn is that the relationship between the transfer of knowledge and level of institutionalization of knowledge transfer activities is influenced by the organizational uncertainty level.

5. Conclusions

Anchoring modern university in an adaptive strategy based on the orientation towards the collaboration between research and permanent innovation is the key to competitiveness in the European economy. There is no universally valid model for implementing adaptive strategy by modern university. The studies identified in the literature presents a number of variables that can be inserted into innovative model of adaptation of modern university in the in the ever-changing requirements of economic and social environment.

In our view, the steps along the way to increase performances of modern university through innovative adaptation are:

- Analyzing the ability of the university to interact with key stakeholders to achieve value in the value chain as a result of work carried out within the innovation system;

- Analyzing the ability of the university to relate in a particular industry, geographic area and a functional perspective;

- The interconnection between the economic and industrial environment – university - government as the basis of innovation;

- Developing partnerships between academia and industry at the strategic, tactical and operational level, within which to exploit its complementarities and mutual advantage to generate profit;

- Creating a culture of collaboration between academia and industry as the foundation of sustainable collaboration that highlight the skills, knowledge, experiences, viewpoints, ideas for innovation of academics and industry. For the university there are required in this regard actions related to: allocating resources to successfully fulfill the function of teaching and research and the role of an economic, social and cultural agent within a flexible internal environment; implementation of entrepreneurial vision and tracking to streamline the processes at all levels of the university; innovative ecosystem development; transfer of results of fundamental scientific and applied research towards the business environment; promoting individual and institutional learning concepts within joint projects with other industry organizations to harmonize interests on scientific research.

The factors that may support an attractive and innovative partnership between universities and business environment represent an organizational culture based on the values of entrepreneurship, a shared vision for the use of own resources to create hared added value, the specific role of each partner correlated with the level of expertise of the people involved.

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