THE "THIRD MISSION" OF UNIVERSITIES AND SOME IMPLICATIONS

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An efficient management of the innovative resources inside the "triple-helix", namely university-industry-government network, must be provided, under the pressure of globalization demands, as an important condition for the successful implementation of the knowledge-based economy and society. Based both on (i) recent approaches about the "entrepreneurial university" syntagma (which suppose economic and social engagement in addition to traditional academic roles - education and research),but also on (ii) own experience in capitalisation of the R&D potential, this paper presents a critical analysis focused on the" third mission" of universities : (i) pros and cons to the new challenge, (ii) specific aspects of implementing the concept and (iii) possible implications for the higher education institutions.

Keywords : entrepreneurial mission, university-industry-government relations, management of innovation, knowledge-based economy

1. Introduction

The conversion of certain resources such as capital, materials, codified and tacit knowledge (**inputs**) into new goods and services (**outputs**), which will generate over time both growth and prosperity (**outcomes**), is achieved through a complex and non-linear *innovation process* that requires a permanent and performing management.

Joseph Schumpeter claimed that *"the changes in the economic process brought about by innovation, together with all their effects, and the response to them by the economic system* (feedback, n.a.), *we shall designate by the term Economic Evolution"* [1]. Analyzing the ideas of the great Austrian thinker, Christopher Freeman confirmed, once again, '*that capitalism can only be understood as an evolutionary process of continuous innovation and creative destruction'* [2]. The 20th century brought in some clarifications in theory and practice : (i) relevance for long-term integration of the socio-economic and innovation policies, (ii) strengthening the links creators / users / government in the

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knowledge conversion and (iii) technological change is a determinant driver of economic growth and progress.

A host of sensitive issues (such as involved actors, the connections between them and the concrete ways of covering the road from idea to new products and services) were studied, among others, by Christopher Freeman, Bengt-Ake Lundvall, Richard R. Nelson, Charles Edquist (who launched and developed the concept **National Innovation System**, NIS), Henry Etzkowitz, Loet Leydesdorff, Marina Ranga (who initiated and extended the innovation model **Triple Helix**, 3H).

The latter approach examines the complex process of converting knowledge and university-industry-government triad, bringing some updates to the existing theories: (i) *coherent framework* (there is the third sphere, namely governance, alloying analysis at different levels - European, national, regional, local), (ii) *changing the 'locomotive'* (proposes the decisive role of university to the detriment of industry in version NIS), (iii) *extend the analysis* (highlights the depth and complexity of the innovation process) and (iv) *systemic approach* (the model 3H becomes now the *Triple Helix system* based on components, relationships between them and the specific activities) [3].

In the context of promoting an increasingly close relationship between the three subsystems (academic, industry, government) in the creation, development and diffusion of new products and services by capitalization of knowledge, this paper presents *a critical analysis focused on the" third mission" of universities* : (i) pros and cons to the new challenge, (ii) specific aspects of implementing the concept and (iii) possible implications for the higher education institutions.

2.Literature review

Amid the debates on expanding the role of universities, it launches the innovation model *triple helix* (3H) which will focus on optimizing the relationship between the three stakeholders involved – academic, industrial, governmental, knowing the unpleasant experience of some institutional dysfunctions [4]. This model proposes three sub-dynamics, always created and adapted to allow the implementation of the **knowledge-based economy** concept (released in 1996 under OECD umbrella and taken in 2000 by European Union) : (i) **generating wealth** (in the industry), (ii) **novelty production** (based on science & technology)) and (iii) **governance of the interactions among these two** (by policies) [5].

Attracting faculty in the production of new knowledge (mainly in the field of fundamental research), started after the appearance of national states [6], [7], train still today adhesions of the actors involved – innovators, funders, users, policy makers, stakeholders. Instead, the *third mission* concept (3M), with wide

opening to partnership, innovation, market and commercialization, gives the blazon *entrepreneurial university*, but soon finds controversy in the academic world.

Launched in the 1980s in elite centers worldwide, the *new challenge* supposes involvement in the economic and social development, additional to education & research attributions, focused on *'capitalisation of knowledge'* [8] and *'global convergence'* [9], although it was seen from the beginning as an imbalance between supply and demand, well *'demands on universities outrun their capacity to respond'* [10]. The transition to the third tier of concerns involves internal changes (*new functions*), inter-institutional impact (*new structures*), interface processes (*connections among the three spheres*) and recursive effects (*setting up new firms*) [11], while requiring a higher degree of independence and interaction in the relations of university with the industry and governmental institutions [12].

At the international academic community there is a strong interest to (i) clarify the concept 3M and for (ii) the widespread dissemination of the best practices. European Commission co-funded three years (2009-2012) the project **European Indicators and Ranking Methodology for University Third Mission**, which aimed to identify, measure and compare the activities 3M quantified by (i) standardization indicators, (ii) a hierarchy methodology, (iii) a platform for consultation and comparison of the performances, (iv) a site of the European suppliers 3M, (v) case studies 3M, (vi) results dissemination by international conferences [13].

Munster University of Applied Sciences (Germania) organized together with Finnish Association for Entrepreneurship and Innovation in Higher Education (FINFIN) the event *'2012 Entrepreneurial Universities Conference'*, which brought together practitioners and researchers from several universities, and specialists representing the European Commission, the European University Association (EUA), consulting firms, specialized publications, business, thus facilitating a useful experience exchange regarding conceptual models and practical solutions [14].

Stanford University (USA) and Triple Helix Research Group hosted in November 2012 the event *'Building Entrepreneurial University'*, which occasioned a welcome ideas exchange concerning R&D results commercialization and stimulating the entrepreneurship in faculties. Together with Professor Henry Etzkowitz and dr. Marina Ranga, active promoters of (i) the innovation model *Triple Helix* and (ii) the determinant role of academic sector in building knowledge-based economy and society, attended researchers, experts in innovation, technology transfer, intellectual property protection, corporations and universities leaders, policy makers [15].

3.Analysis results (Q), comments (C) and investigation directions (ID)

Taking into account both the spread of the concept of "entrepreneurial university" in recent decades and finding viable solutions to achieve the knowledge-based economy and society, this paper proposes a view on (i) *the necessity*, (ii) *the implementation* and (iii) *the implications* of new mission for higher education institutions (links with their employees, with business and with government).

(i) pros and cons to the new challenge

(Q_1) Is the third mission of the university a necessity or a fashion ?

Rosenberg & Nelson contest the new trends citing the need to *'respecting the division of labour'*, in that industry to deal with specific aspects of the launching products on market (including design / development), and universities to focus on basic research (in large part oriented toward solving problems) [16].Bengt-Ake Lundvall considers a priority the reform and the modernization of the educational system (and not the creation of science parks or patenting research results), insisting on 'formation of graduates with a good problem-solving capacity', with solid professional knowledge, language and willingness to work in a team, interaction with partners, opening to innovation wherever they work (faculty, enterprise) [17].

Balanced reviews within academic sector argue that in complex conditions (economic crisis, the pressure of globalization, growing expectations from society) should be that universities to take responsibility and *'must rise to the challenge at this moment in history'* [18]. By analyzing different alternatives for the founding of R&D activities (applied, basic or combined), Benner & Sandstrom believe that the last option would allow to '*evolve within a wide socio-economic network, involving academic and industrial interests in the regulation of research programs'* [19].

An extensive study in UK universities (being consulted over three thousand researchers), highlighted the academic representatives differentiated attitude towards the commercialization of the research and to the relationship with industry (pros / cons options 28% and hybrid options 72%), (see Table 1), also suggesting that elite universities (and thus researchers employed there) have '*relatively strong bargaining power and varied resource options to exert control over the environment'* compared with the constraints that are subject of academic colleagues in small or recently established institutions (with less reputation and resources) [20].

Table 1

British scientists' attitude about relations with industry and research marketing

option	*share*	*target*	*mission's perception*	*comments*
traditionalists	17%	success in academic arena and money for research	with suspicion and are not interested in selling research results	academic tradition keepers
mixed with traditionalist tendencies	33%	storage academic identity, with active collaborations	appreciation for technology transfer, interest in new funding	combination old / new
mixed with entrepreneurial tendencies	39%	while maintaining some traditions, interest to extend	links with industry, trade and business on R&D	combination new / old
entrepreneurial	11%	application knowledge and operating results	strong links with industry and business, with clear solutions for recovery	promoters of new wave

Source : elaboration / *From 'Ivory Tower Traditionalists' to 'Entrepreneurial Scientists'?, 2010* [20]

(C_1) the university must assume new responsibilities in the current circumstances

Beyond the theoretical and practical controversies about the opportunity and viability of entrepreneurial building, **the university must reap benefits** in activity on three complementary levels of involvement, with different shares however, by their performance (history, resources, management) and environment (region, country), being highlighted positive externalities of the three missions' integration.

By integrating traditional responsibilities with the new mission can generate virtuous circles both within university (trilateral relations) and society (city, region, country), being identified several benefits (**positive externalities**) : (i) *entrepreneurship* (attractive for students, business, community), (ii) *networking* (physical and virtual) concerning stimulation of innovation activities, (iii) increase the *welfare* of the region (launching new products and services, jobs), (iv) *more incomes* and financial independence, (v) expanding range of regional, national, global *partnership*, (vi) high rates of *respect.*

(ii) specific aspects of implementing the concept

(Q_2) How to implement the third mission of the university ?

The completing of the traditional academic roles (education and research) with ones regarding entrepreneurial attributions supposes **specific institutional changes**, actions that contribute to '*improving regional or national economic performance as well as their own financial advantages"* [21]. The third mission is based on (i) *the support of infrastructure* (business incubators, technology transfer offices, science / technology parks), (ii) *regulations* (legislation on the marketing of research results, intellectual property rights) and (iii) *ways to exploit knowledge and innovation* (spin-off firms, licences, patents, consultancy, expertise, mobility) [22].

The desired contribution to the welfare of the community (positivist and realistic attitude under current conditions) is a strategic opening of the university management (*response*) with respect to more pressing needs of economy and society (*demand*). The transfer of codified and tacit knowledge and the recorded effects (problems solving, partners satisfaction, jobs, regional development, incomes level) differ according to (i) *university* (size, prestige, specific, staff and endowment of faculty, own policies), (ii) *environment* (absorption capacity, business culture) and (iii*) dynamic relationship* between the factors above.

Recent studies have shown that academic sector involvement in achieving knowledge-based economy and society depends substantially on (i) a *friendly or hostile environment* (governmental policies, national specific, nature and extend of the connections, economic crisis) and (ii) *internal transformations* (infrastructure, human relations, regulation of intellectual property rights, management decision).

Table 2 shows **some ways to exploit the creative potential** of the academic sector as a natural extension to (new potential) beneficiaries (from economy and society) of knowledge accumulation and skills (from education and research areas). Adjacent to current concerns (courses, publications, conferences), permanent staff (teachers, specialists) / temporary (PhD scholarship) together with students (i) *respond to specific requests* from customers (research contracts, testing, consulting, training) and (ii) *generate and convert ideas* into new products and services protected by patents, licences or directly on the channel powered start-ups, type spin-offs.

Table 2

Knowledge transfer and socio-economic role of the university

ways to exploit knowledge & skills	***economic dimension***		***social dimension***	
	r o l e	**comments**	**r o l e**	**comments**
a) human resources -researchers	-R&D activities / innovation / testing -consueling (R&D policies) -training -creation spin-off	possible migration to R&D industry / entrepreneurship (business)	-regulation / standardization councils, -counsuelling (city planning, health)	conflict of interest for those who work with industry
-students	entrepreneurship (courses, spin-offs)	further entrepreneurs	science dissemination	work with large public
-PhD scholarship	projects (with industry), R&D activities	with / without the industry support	summer courses, exhibitions	utilise university infrastructure
b) intellectual property rights	different forms / is a source of funding	10% university, 90% employers & beneficiaries	there is the possibility of the copyrights	dissemination
-patents / licences	attractive areas (life sciences)	a weak recovery R&D expenditure	sometimes	public benefits
c) entrepreneurship	creation & incubation firms	needs investments (infrastructure)	skills for organizers	faculty courses
-spin-offs	top: IT, life science, engineering	a way to recovery R&D expenditure	specific human sciences	students focused
d) contracts *(research, testing, training, consulting)*	with industry (solving problems: analysis, tests, experiments, courses, access to equipments)	beneficiaries: SME, corporate, multinational enterprises	with public institutions (services for environment, standards, clinic tests)	restrictions on participation in public debates (only their own)

Source : interpretation, elaboration / *Methodological Guide, OEU Project , 2006* [23]

The analysts argue that "*the emergence and consolidation of the entrepreneurial university is the result of a complex interplay between exogenous and endogenous factors combined in different ways in different countries* [9].

In 2011 was completed a large study, requested by the European Commission, concerning University-Business Cooperation (UBC) in Europe, which followed (i) the extension of this reality in the Higher Education Institutions (HEIs), (ii) the interest of scientists (academics) (iii) the factors with decisive influence on these activities, Table 3 briefly presenting some results of these investigations [24].

Table 3

University-Business Cooperation (UBC) in Europe – some characteristics

researchers implication: 40% not engaged, 20% low extent, 40% medium / high extent				
influence factors	BENEFITS **concerning organizations and persons** **(**students, business, HEI*, society, researchers) *HEI = higher education institutions	DRIVERS **a) relationship** (trust and mutual commitment, common goals, way to solve societal problems) **b) business** (engaging students and specialists in industry, access of business to knowledge, R&D results commercialization, accessing funding)	BARRIERS **a) usability of results** (focus on production, confidentiality, business fears) **b) funding** (lack of funding for HEI, business, UBC) **c) relational** (low absorption capacity of SME, different values / motivation / time horizons between HEI and business)	SITUATIONAL FACTORS **concerning specific characteristics of study respondents** (age, gender, competence area, years working in HEIs or business, institution, country)
action channels	STRATEGIES (university management)	INFRASTRUCTURE (technology transfer offices / career counselling, programmes)	ACTIVITIES (personnel mobility, research projects, consultancy)	CONDITIONS (regulations, incentives, policies)

Source : elaboration / *The State of European University-Business Cooperation, 2011* [24]

The UBC is still in the early stages of development in Europe and its priority refers to (i) R&D collaborations, (ii) personnel mobility, (iii) commercialisation of R&D results (iv) training & lifelong learning programmes, (v) entrepreneurship, (vi) governance, thus incorporating practical ways of manifestation of entrepreneurial mission (3M).

(C_2) Implementation of the third mission of university is determined by many factors : (i) relevance in the field of traditional activities (education and research), (ii) openness to innovation (governance, researchers), (iii) the quality of environment support (industry, banks, investment funds, region development, mass-media, human capital, (iv) willingness to exploit opportunities, (v) chance.

(iii) possible implications for the higher education institutions
(Q_3) Are there some consequences of the third mission implementation ?

Taking a decision concerning involvement of the university in entrepreneurial activities, adjacent to traditional responsibilities (education, research), is based on complex and neutral evaluation studies. Human factor, regardless of which promoter
activity is, will largely determine the success or failure of institutions, programmes, projects or business, the environment often having a secondary role (see Table 5).

Table 5

Possible implications of the third mission of the university

incomes	*missions*	*advantages*	*consequences*	*response strategies*
low incomes (single source)	M_1	'only today'	isolation, lack of motivation, regress, potential failure	rethinking objectives (supply), reorganization faculties / departments, focus R&D
	$M_1 + M_2$	'today'	a small number of students, personnel migration, declining prestige	reorganization of the faculties / departments, attracting R&D personnel, finding partners
	$M_1 + M_2 + M_3$	'may be, sometime'	discontented personnel , the reduction of innovation, the loss of partners, the failure of the 3M idea	rethinking (R&D supply + promotion + personnel + + department management), attracting sponsors
medium incomes (fewer sources)	M_1	'today'	students & personnel attracted to R&D / entrepreneurship	reorganization of the faculties / departments, orientation on R&D activities, attracting partners / beneficiaries
	$M_1 + M_2$	'today, tomorrow'	difficulty in finding partners, lack of trust in consortium, loss of personnel	rethinking (R&D supply+ personnel + management), focused entrepreneurship, strong partners / sponsors
	$M_1 + M_2 + M_3$	'today, tomorrow'	limited chances for development (assets, infrastructure) and personnel motivation	attracting strategic partners and R&D personnel, change R&D supply, networking, finding innovation managers
high incomes (multiple sources)	M_1	'today, tomorrow'	possible loss of personnel (to R&D / business)	finding solutions for the enlargement of attributions
	$M_1 + M_2$	'today, tomorrow'	possible migration of personnel to entrepreneurship	ways for the revaluation of creative potential, keeping the personnel and the partners
	$M_1 + M_2 + M_3$	'always'	possible 'overheating' effects in time	appropriate policies on human relations, inter-faculty / departments

Source : authors contribution ; M_1 – education, M_2 – research, M_3 – entrepreneurial

(C3) a strategic (re) positioning of the university supposes relevant studies

Implementing the third mission, the stakeholders of the university must take into account more factors concerning (i) *own resources* (human, capital, technologies, entrepreneurial skills), (ii) *environment* (regional, national, upper-national), (iii) *study cases* (successful, failure, settle conflicts), (iv) *regulations in the area* (interest conflicts, intellectual property rights), (v) *the innovation's management* (creation, development & diffusion of new products & services, business incubators, spin-offs).

After the accession to the European Union, under pressure to adapt both to the realities of the community in all areas and to the demands of globalization, Romania is going through a process of change (strategies, infrastructure, institutions, markets, etc) including extension of the academic sector's roles in economy and society.

(ID_1) development of the industry-university partnerships

In Romania there is an evidence of a lack of interest of industry (especially) for partnerships with the academic sector (universities, research institutes, non-profit organizations). Some motivations can be (i) *financial* (the economic crisis contributed to lower business R&D expenditures), (ii) *group interest* (multinational companies have their own policies in the field), (iii) *mistrust* (domestic supply is often unattractive). Therefore, there are required cross studies (academic, industry, government) to allow identification of the causes of dissatisfaction and to find together the most suitable solutions for the vitalization of relations on multiple levels.

(ID_2) the entrepreneurial motivation of the researchers

The diversification of ways to exploit priority the results of R&D activities is imperative both to ensure consistent supply portfolio for institutions (university, research institutes, non-profit organizations) and to real motivate all implicated staff (researchers, students, consultants, governance), currently involved in entrepreneurial activities in a small measure. Very helpful would be starting some investigations regarding (i) obstacles that block the interest of target people for this particular area of concern (regulations, mentalities, ignorance, misunderstanding) and (ii) finding appropriate answers for the entrepreneurial motivation and active participation.

4.Preliminary conclusions

It took hundreds of years of transition from isolated inventors (engineers, architects) to limited collaboration between faculty laboratories and companies,

followed by partnerships to solve major problems (in infrastructure, defence, health) and currently involvement of academic sector on the generation and conversion of knowledge in new products, services and welfare in economy and society.

The entrepreneurial concerns have priority escalated in recent years in many renowned universities from developed countries, thereby the third mission became certain reality, demonstrating, with evidence, the need and viability of *another approach* for the success of trilateral relations (with the government and the industry) in the forceful building of knowledge-based economy and society.

With the assumption of various contestations, including the internal area of interest (interfaculty, interdisciplinary and inter-human relations), related to the possible disruption of traditional prerogatives (education and research), the initiators and supporters of the new wave rely on a change of the university's behaviour : from the participant role (***sometime inactive***) to the 'locomotive' image (***always active***).

Voluntary service in the new mission has a chance of success only in a national friendly context that (i) ensure the integration of innovation policies in the governmental practice, (ii) stimulate the creation and development of public-private R&D partnerships and (iii) encourages the transfer of new knowledge to all users.

The transition to 'entrepreneurial university' status is a long process, influenced by the involved actors (including relationships between them), namely the organizations themselves and the environment (regional, national and upper-national). Institutional and technological accumulations (both quantitative and qualitative), must be accompanied by changes in the sphere of communications and management, based on trust, competence and commitment.

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