

Education, Research and Business – a Knowledge Triangle and a Strategic Partnership between Technical Academic Research and Romanian Business Community

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Abstract: The paper aims at creating an open and constructive exchange dynamic by hosting thematic encounters which go beyond the limitations of specific disciplines and which encourage active participation of key players from all levels of society. It demonstrates that the collaboration between higher education, academic research and business overcomes faculty boundaries. Universities are traditionally very conservative and need to encourage champions and bridge builders. The paper emphasizes a strategic collaboration and demonstrates that students are the partners of university projects.

University *Politehnica* of Bucharest which is the largest technical university in Romania, covers almost all technical disciplines and also does an increasing amount of interdisciplinary work. The forum for debating - *Strategic Partnership between Academic Research and Romanian Business Community* - organized at the University *Politehnica* of Bucharest demonstrated that the academic research developed here has an increasing amount of cooperation with industry. In this light, the paper highlights the importance of new models of technology transfer, incorporating long and short term collaboration. Examples of long term collaboration and strategic partnership between higher education, academic research and businesses are used to demonstrate highly successful technological collaborations.

Key-Words: strategic partnership, higher education, academic research, business community, life long learning, cross-domains research

1 Introduction

Changing competitive environments have been forcing companies in almost every sector to re-examine their strategy. Managers and practitioners are heralding strategy revolution as the new hallmark of organizational excellence. Despite the increasing relevance of strategy and strategic renewal in the new millennium, there has been relatively little accumulation of theory [1]. Many managers in today's competitive environment engage in strategic experiments without the guidance of appropriate theories, concepts and tools. In these conditions, a few questions raise. How can firms redraw boundaries and manage effective internationalization? How do firms develop dynamic capabilities (unique resources, routines and core competencies) for innovation and strategic

renewal? How will firms discover and implement viable strategy configurations (aligning strategy, structure, systems, entrepreneurship and culture for competitive advantage)?

This paper explores the connections between higher education, academic research and Romanian business community in their technological activities. A recent forum for debating - *Strategic Partnership between Academic Research and Romanian Business Community* - organized at the University *Politehnica* of Bucharest has revealed the importance of a successful collaboration of high levels between scientists, engineers, and managers. Using two examples of highly successful technological collaborations – CPRU (Human Resources Training Center) and AMCSIT (The Management Agency for Research, Innovation and Technology Transfer), it is argued that the linkage

between higher education, academic research and Romanian business community provides a framework for understanding the imperative for collaborative research partnerships, particularly those involving government, university and industry actors. The emergence of collaboration is facilitated by the sharing of knowledge across organizational boundaries, which promotes the formation of trusted relationships and builds social capital for further cooperation [2]. Furthermore, these partnerships are a vehicle for accelerating organizational learning and for coordinating trans-organizational *communities of innovation* [7]. Understanding the nature, process, and content of such collaborative research and technological development ventures can endow with strategic insights both the government policy making and the corporate strategy crafting that informs, shapes, and evolves such partnerships. In particular, government and industry can learn from past experience on how to design *intelligent trans-organizational knowledge interfaces* to ensure that knowledge sharing occurs across organizational boundaries.

The 3rd forum for debating *Strategic Partnership between Academic Research and Romanian Business Community*, organised by University Politehnica of Bucharest, the Romanian Society of Automation and Technical Informatics (SRAIT) and the Human Resources Training Center (HRTC), took place on 29th of March 2010 in Bucharest.

The Forum brought together participants from higher education institutions and associations, enterprises and business associations, and from both national and EU-level authorities. It was an opportunity to facilitate the exchange of good practice, to foster mutual learning and networking and to inspire further activities.

The Forum represents the Romanian response to calls from the academic and business communities for regular and sustainable dialogue.

2. Education, Research and Business – a Knowledge Triangle

Governments should really find means to convince academics to completely reconsider the *Governance culture* – without which nothing will change: the issue of common governance structures should not be problematic and solutions to find transposable model(s) should be found.

Students cannot be considered as ‘either/or’ but fully take part in the university system.

However, as other university actors, they must be responsible (e.g. as it is well known that there is a

very weak employability at the end of certain fields of studies, students must be responsible for their choices and not complain after having studied for several years in those fields). Students are the partners of university projects. They often provide innovative ideas and should be listened to.

For academic staff there should be more incentives, more flexible ways to recruit them, and career progression should be discussed and even seen as a fundamental question of

governance. Taking into account the evolution from elite to mass education, is it still relevant to have only one way to recruit teachers, to become professor, etc.?

Higher Education is a key element in the golden triangle which also includes academic research and business community. The Lisbon strategy mentions that the universities must consider the employability of their graduates, equip them with the skills for public and private sectors, and ensure that the unemployed can improve their skills for work.

Also in the domain of research, universities are essential to creating, improving and sharing knowledge. In this context the employability and innovation require commitment is important. Universities must foster and encourage entrepreneurship [8]. One way to achieve this is through cooperation with businesses. Universities must set up structures for life long learning. Companies must be proactive in the cooperation process, and one key to achieving this cooperation is mobility. For students themselves, mobility and business cooperation ensure that they develop a more entrepreneurial mindset. As prof. PhD. eng. Ioan Dumitrache emphasized [4], the main purpose of the 3rd edition of the Forum for debating *Strategic Partnership between Academic Research and Romanian Business Community* is to give an insight look to the state of the art of innovation best practices in common Europe, but not limited at, to reach the goal (2025) of Knowledge Society consolidation in EU.

3. The Global Competition and Markets

Universities and businesses need to communicate to supply the relevant skills for the labour force. The forum has opened dialogue and communication for these two worlds to come together. The interest of the students will prevail – more relevant curricula, more common projects, and mobility with business, to help students and professors to become more enterprising, this can stimulate work in interdisciplinary teams. Cooperation with

companies can contribute to universities becoming actors in lifelong learning. Companies can identify their needs and communicate them to universities. The challenge is to find the right balance [9]. The next step is to decide what topics to work on in the future in the given conditions of globalization, sustainable development of regional economy, digital business ecosystem, interoperability to support new wave of integration, interoperability service commodity, utility, facility, etc.

An example concerning research and higher education for engineers in Enlarged European Union, is the INTEROP VLAB initiative. Prof Guy Doumeings, Emeritus Professor, University Bordeaux 1 and General Manager of INTEROP-Vlab presented *The Virtual Laboratory on Enterprise Interoperability* at the forum for debating organized at the University *Politehnica* of Bucharest [3].

I-VLab is the result of several years of EI development. Created in March 2007, from the Network of Excellence INTEROP- NoE (Interoperability Research for Networked Enterprise Applications and Software, FP6508011, 42months, 50partners, 6,5M€ECFunds), INTEROP-VLab is a non-profit international association under the Belgian Law. Grouping 9 regional poles, bringing together leading academics, research centers, industrial stakeholders, SMEs, from 11 European countries and from China, 72partners and more than 300 researchers, INTEROP-Vlab has the following aims:

- To maintain and develop the de fragmentation of the ERA (European Research Area) in cooperation with other regions of the world, in order:
 - to support the development of the research, education, innovation, standard in Enterprise Interoperability and associated domains as Enterprise System and Applications (ESA) and Future Internet (FI);
 - to be an Excellence Centre in the domain of Enterprise Interoperability and the associated domains at the world wide level

The originality of INTEROP-VLab approach consist in achieving a multidisciplinary vision by merging three research areas supporting the development of Enterprise Interoperability and associated domains

- ICT: including the technological basis (FI) of interoperable systems

- Enterprise Modelling: defining requirements and supporting implementation solutions
- Ontology: ensuring the semantical consistency of networked organizations and solutions

I-VLab Services and tools proposed to partners are:

- Services and tools in the EI and associated domains as Future Internet, provide to partners and to non-partners;
- Collaborative Platform for the storage and exchange of information, the creation of internal projects and the support of working groups on various topics;
- Services around the Knowledge Map “I-V K Map”: a powerful Content Management System;
- e-Learning Service, Education and Training activities;
- Research Projects Service;
- Development of SMEs Network for Business Innovation using FI.

Some internal activities can be mentioned:

- creation of WIKIPEDIA articles around the EI and associated domains;
- definition of Master Courses;
- submission of Education and Training projects;
- preparation of a ‘Certification Testing Interoperability’ project;
- participation to meetings of Poles: GRIS (Portuguese Pole), I-VLab China Pole

In Romania *Human Resources Training Center* (C.P.R.U.) is an educational and academic research centre for postgraduates, organized in the University *Politehnica* of Bucharest. According to the reformation program of the higher education system in Romania and to the economic reform requirements, Human Resources Training Center (C.P.R.U.) is specialized in training professionals through training programs for scientific research in the domain of inter- and multidisciplinary advanced technologies.

The managing director of *Human Resources Training Center*, Prof. PhD. Ioan Dumitrache [5] has highlighted that the new set of grand challenges that maximizes the resource allocation and minimizes the complex problem, socio-technological-economical-organizational System of Systems (SoS) should promote the only holistic approach to address the societal challenges of the global competition and markets.

University *Politehnica* of Bucharest is an important resource network for high technology firms. In order to develop stronger links with industry the *Human Resources Training Center* have established as prospected activities practical and theoretical training in vanguard domains for students in the final years of higher education. Academic programs include master programs such as:

- Business Systems Engineering and Management,
- Integrated Information Systems,
- Innovation and Technology Transfer Management,
- Summer courses,
- Training of trainers,
- The design of curricula for continuous and long distance education,
- Technology transfer.

Some prospected benefits are estimated:

- Immediate impact on economic environment through improvement of professional and managerial competences of the participants in programs, including those for SME management
- Creating job opportunities and increasing wage level for the participants in the Center programs
- Capitalization of professional competencies of academics in interdisciplinary activities
- Reduction of the "brain drain" effect of high qualified professionals
- The education commitment in change and restructuring processes
- New active partnership formulas

4. A Quality Management System

Recent national and international studies into the work of academics reflect that they fall into two approximately equal groupings: teachers and researchers [10]. However, the distinction becomes more marked when considering older and newer universities; academics at older universities focus on research.

A number of issues were highlighted in the debate, including:

- Businesses to be engaged in the recognition and acceptance of qualifications in engineering at the European level - such as the European Accredited Engineer qualification
- The business sector needing a clear communication of the value of participating in education.
- The issue of university autonomy being crucial – state-controlled institutions to have difficulties in opening up towards business

- Accreditation and ranking of universities said to increase competitive pressures in the sector, and competition for research grants.

- Universities need to understand the role of customers, and need to define who the customers are

- Student associations being essential for the effective management of universities: it is important to create the culture of creativity among students.

The question that is normally raised is: *which approach is the correct one?* The answer to this question is explicitly recognized in the philosophy and strategy of the *Management Agency for Research, Innovation and Technology Transfer (AMCSIT) - POLITEHNICA*, which reflect particular positions within the teaching/research nexus.

Dependent on the nature of the structure and its emphasis on teaching/research that typifies a particular educational institute; academic staff is expected to meet few or many requirements in relation to teaching and research.

Further, these requirements may change as the institute re-positions itself within the teaching/research nexus adopting a different structure, and hence a different understanding of what it means to be an academic. This is precisely what has occurred in Romania with the emergence of *Management Agency for Research, Innovation and Technology Transfer – POLITEHNICA*. This public institution operates under the leadership of the National Authority for Scientific Research by the Government Decision No. 983/1999.

The main mission of *AMCSIT– POLITEHNICA* is the financing, management and marketing activities for scientifically research, innovation and technology transfer aiming to the efficient promotion of the R&D results in the society by new products, technologies, and services. From 1999 *AMCSIT–Politehnica* has coordinated the *RELANSIN R&D* program which included more than 2300 projects. The agency was than strongly involved in the management of the national program of "Excellence Research".

From 2006 the main activity field became the financing and the management of the *INNOVATION* program. Other 27 national and international research projects were processed by the agency staff. Nicolae Vasiliu, the General Director, professor, PhD, outlined in his speech (*AMCSIT-Politehnica – a Promoter of Partnership in Innovation Projects*) [10] the objectives of the agency's activities:

- coordination of the INNOVATION Program from the National Research Development and Innovation Plan – PN II;
- promotion of the transfer of the technology and innovation for sustaining the efficiency of the Romanian economy;
- coordination of the multi-disciplinary programs of development, innovation and technological transfer projects, starting from the national priorities;
- guide the human resources towards the research, development and innovation activities and improve their competence by training and instruction programs;
- disseminates of the professional results and innovative knowledge at local, national and international level.
- edit and publish the technique and scientific documents.
- organize conferences to disseminate the project results.

6 Conclusion

The business world and society are increasingly ready for sustainability. But it is still unclear how this should be achieved. The path that is chosen largely determines the outcome, and that path is determined by interactions between businesses and their societal stakeholders [6]. In the past, conflict and debate dominated those interactions, but proponents of a *dialogue* are gaining ground. A strategic *stakeholder dialogue* between businesses and their societal stakeholders maps divergent interests, identifies opportunities and reduces risks. Regarding the Knowledge Triangle: Education, Research and Business some conclusions are justified:

- Universities have to modify their governance structures in order to enable the organisation and its staff (professors, researchers, graduates, students) to face the challenges of a changing world;
- Students need to experience working in applied not just basic sciences
- Universities and business need to have more aligned ways of working to facilitate knowledge transfer through standard operating procedures and responsible partnering.
- Universities should overrule (conservative) Faculty behaviour and boundaries – mono disciplinary solutions are rare, certainly

when relevant problems have to be solved or real world demands to be fulfilled.

- Leadership is key in order to implement relevant governance models; there is a need for instruments/support to develop leadership
- Particular effort is needed to improve the management of human resources, career progression, incentive systems
- Students are the main asset of a university and have to be treated accordingly

In innovation management is important to establish the role of champions of change, gatekeepers – to enable people to undertake change – bridging agents – enable people to introduce novel practices that initiate change:

- Change is difficult. Structures are rigid, knowledge is limited.
 - Getting academics into the discussion on human resources, businesses, accounting etc., is not easy. No change comes without a champion, but often you find you have more than 1 champion with different opinions.
 - How to bring the three strands - training, education and research –together, while they are still disparate in many institutions?
 - Benchmarking to learn about knowledge transfer is very important
 - Universities have to modify their governance structures in order to enable the organisation and its staff (professors, researchers, graduates, students) to face the challenges of a changing world
 - Leadership is key in order to implement relevant governance models/need for instruments/ support to develop leadership
 - Particular effort is needed to improve the management of human resources, career progression, incentive systems
 - Students are the main asset of a university and have to be treated accordingly
- Curriculum Development
- Companies and universities have to better understand the value of cooperating in curriculum development
 - Joint curriculum development greatly improves chances for companies to find students/graduates that have the knowledge, skills and competences that are needed on the labour market
 - New concepts required to ensure that curricula contribute to the development of innovation – how to make curricula « innovation-supportive »?

In the domain of entrepreneurship:

- Move from knowledge economy to entrepreneurial economy (from knowledge to the application of knowledge)
- Develop entrepreneurial Eco-systems involving all types of stakeholders
- Will create trust and mutual understanding/
Basis for successful partnerships
Lifelong Learning
- LLL has to become a strategic objective of universities
- Technological and other changes will make « complete retraining » of persons normal
- LLL has to be done in partnership – it cannot be done by universities alone
- Updating/upgrading of skills has to be valued / recognized on the labour market

The worldwide integration creates an array of opportunities and threats for higher education, academic research and business community. All over the world communication has increased. Technological developments change the corporate environment, governments and societal organizations. Especially in the last decades, enterprises had to be seriously concerned with technology and innovation in order to be successful. The most successful enterprises are those that do not only react most adequately to changes in their environment caused by technological change, but that are also able to initiate such changes to create competitive advantages. Therefore, dealing with technology and innovation is an essential skill for a manager.

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