



EDITORIAL WELCOME

Summer Greetings!

Towards the end of academic year we welcome you to the Second Issue of Volume Two of the Triple Helix Association Newsletter - *Hélice*.

Once an oxymoron has today become the focus of a burgeoning amount of academic studies: the Entrepreneurial University. Universities worldwide have been increasingly focusing on engaging in the third mission. They have been encouraged to commercialize their academic research results, create new companies, as well as protect their intellectual property.

This issue provides an opportunity to present selected studies on entrepreneurial activity in three different national contexts. It is often difficult for young and aspiring scholars to communicate their work in mainstream journals as well as in other academic settings. We have, therefore, invited young and aspiring scholars whose work on entrepreneurial universities has made an important contribution to the literature. We encourage you to follow up other studies by these young scholars.

Articles presented result from their doctoral studies, and these include (a) *Entrepreneurial Universities: Determinants, Impacts, and Challenges* (Maribel Guerrero and David Urbano), (b) *The Process of the Formation of an Entrepreneurial University in Russia* (Nataliya Ivashchenko and Tatiana Pospelova), and (c) *The Role of Researcher in Developing an Entrepreneurial University* (Azele Matthieu).

The topic has been further strengthened by Professor Henry Etzkowitz's reflection on *The Entrepreneurial University Wave*.

In the Book Review section, we present a review of Tapan Munroe's latest book, *Innovation: Key to America's Prosperity and Job Growth* by Branca Terra Rio de Janeiro State University, Brazil.

The THA is also pleased to announce the launch of a new Springer journal in 2014 - *Triple Helix: a Journal of University-Industry-Government Innovation and Entrepreneurship (THJ)*. This is a milestone achievement for THA, and we encourage responses to a call for papers for the inaugural issue on "Innovation's Future".

Finally, we would like to draw your attention to the article by Birgitte Anderson and Will Hutton, *Raising the Potential of the Triple Helix. Co-innovation to Drive the World Forward*, on the forthcoming

Triple Helix XI Conference to be held in London, 8-10 July 2013. Things are shaping up nicely for what looks like another stimulating THA Conference!

We as Editors of *Hélice* encourage you to share your reflections which will help sustain and extend the innovative dialogue of *Hélice*. For information, or for publishing in *Hélice*, contact Devrim Göktepe-Hultén (devrimgoktepe@gmail.com), or Sheila Forbes (sheila.forbes@strath.ac.uk).

We wish you a pleasant and enjoyable summer, and look forward to welcoming you to the Triple Helix XI Conference in London.

**Devrim Goktepe-Hulten and
Sheila Forbes**
June 2013

Triple Helix Association Election of Officers

The election for THA Officers, Executive Committee Members. and Auditors is coming soon!

Join THA by 30 September 2013 to participate.

Electoral Roll closes at the end September 2013.

Hélice - THA Newsletter

Editorial Board

Editor in Chief

Devrim Göktepe-Hultén
devringoktepe@gmail.com

Managing Editor

Sheila Forbes
sheila.forbes@strath.ac.uk

Board Members

Marcelo Amaral
mgamaral@gmail.com

James Dzisah
James.dzisah@usask.ca

Loet Leydesdorff
loet@leydesdorff.net

Jose Manoel Carvalho de Mello
Josemanoel.carvalhodemello@gmail.com

Marina Ranga
marina.ranga@stanford.edu

Alexander Uvarov
au@tusur.ru

Board Members (Ex-Officio)

Henry Etzkowitz
henry.etzkowitz@stanford.edu

Daniela Italia
info@triplehelixassociation.org

Headquarters

Triple Helix Secretariat
Triple Helix Association
Corso Giulio Cesare 4bis/b
10152 Turin
Italy

Contact

Daniela Italia
THA Secretary General

Email

info@triplehelixassociation.org

Website

www.triplehelixassociation.org

CONTENTS

Volume 2, Issue 2, June 2013

THA JOURNAL TO LAUNCH IN 2014	3
<i>Henry Etzkowitz, Christine Gebhardt and Daniela Italia</i>	
LATEST NEWS - THXI, 8-10 JULY 2013, LONDON	4
Raising the Potential of the triple Helix Co-innovation to drive the world forward	
<i>Birgitte Anderson and Will Hutton</i>	
PRE-CONFERENCE SPECIAL EVENTS, SUNDAY 7 JULY 2013	7
PRESIDENT'S CORNER	8
Strategy for Success: Learning from Failure and Ambivalence in Triple Helix Studies	
<i>Henry Etzkowitz</i>	
TRIPLE HELIX SCIENTIFIC NEWS	
Entrepreneurial Universities: Determinants, Impacts, and Challenges	11
<i>Maribel Guerrero and David Urbano</i>	
The Process of the Formation of an Entrepreneurial University in Russia	14
<i>Nataliya Ivashchenko and Tatiana Pospelova</i>	
The Role of Researcher in Developing an Entrepreneurial University	18
<i>Azele Mathieu</i>	
The Entrepreneurial University Wave	21
<i>Henry Etzkowitz</i>	
CALL FOR PROPOSALS FOR FUTURE TH CONFERENCE	25
TRIPLE HELIX ASSOCIATION NEWS	25
BOOK REVIEW	27
PUBLICATIONS	28
THA WORKING PAPERS	30
ANNOUNCEMENTS	30

The Triple Helix Newsletter, *Hélice*, will be published quarterly - March, June, September and December. Contributions, articles, news or announcements, should be sent to:

Devrim Göktepe-Hultén
Editor in Chief
devringoktepe@gmail.com
or
Sheila Forbes
Managing Editor
sheila.forbes@strath.ac.uk

Deadline for inclusion in September 2013 issue: **12 August 2013**

NEW TRIPLE HELIX ASSOCIATION JOURNAL TO LAUNCH IN 2014

TRIPLE HELIX: A JOURNAL OF UNIVERSITY-INDUSTRY-GOVERNMENT INNOVATION AND ENTREPRENEURSHIP (THJ)

Dear Colleagues and Friends

We are delighted to inform you that contractual arrangements have been successfully agreed between the Triple Helix Association (THA) and TUSUR University, Tomsk, in cooperation and with full THA editorial control, and between THA and SPRINGER, to publish *Triple Helix: A Journal of University-Industry-Government Innovation and Entrepreneurship* (THJ). The THJ will launch in 2014 as an open access, on-line publication, free to all individuals and universities, and to "bronze level" firm and government THA members.

An open call for the Inaugural issue on "Innovation's Future" will appear in the September 2013 issue of *Helix*, and will be available shortly on the THA website, and in hard-copy at the THA booth: THXI 8-10 July 2013. Key people in the Innovation and Entrepreneurship fields will be invited to contribute as well.

Henry Etzkowitz has accepted to serve as Acting Editor-in-Chief. Christiane Gebhardt, Chair of the THA Journal Committee; Riccardo Viale, Editor of *Mind and Society*; Chunyan Zhou, Editor of the *Journal of Knowledge Innovation in China*; and Loet Leydesdorff, co-founder of the Triple Helix movement, have agreed to be Associate Editors.

Anne Rocha Perazzo, Editor-in-Chief of *Social Science Information* (Paris), has accepted to be THJ's Managing Editor, and members of the current THA Executive Committee have been invited to serve as the founding Editorial Board.

More than twenty leading innovation scholars and practitioners have accepted to be members of THJ's Expert Advisory Board, covering a broad range of subject matters and geographical areas.



Launch Lunch for Triple Helix Journal
l-r: Barbara Fess, Springer; Henry Etzkowitz, President of THA;
Christiane Gebhardt, Chair, THA Journal Committee

A Distinguished Advisory Board has been established with Carlotta Perez, UK and Estonia, and Hebe Vessuri, Venezuela, as initial members. A "Junior" Editorial Board is "in organization" with the initial invitee, the winner of the Bandung THX student best paper competition, to be followed by the first and second prize holders at THXI, London.

As you may know, the General Assembly of the THA Singapore Conference authorized the establishment of our Journal in 2006. There has been a general vote for Springer, after a global procurement and assessment process carried out by the Executive Committee members, and managed by Christiane Gebhardt. We look forward to additional language versions in due course. THJ abstracts will appear with each article in the five official United Nations languages as well as Portuguese.

We pledge to renew the theme of THIV (Copenhagen and Lund) 2002 "Breaking Boundaries and Building Bridges."

THJ welcomes contributions from across

the various theoretical, methodological, policy, and practice communities. There is work ahead of us to achieve international recognition and impact, but we are now starting off with Springer as a strong brand, and rely on our large pool of academic excellence in the Triple Helix community for contributions as well as from colleagues across cognate fields of research and practice.

This is a moment to celebrate and take stock of a milestone achievement in the development of the THA and the Triple Helix movement.

Skol, L'chaim, Prost, Salute, Santé, Cheers!

Henry Etzkowitz
President

Christiane Gebhardt
Chair, Journal Committee

Daniela Italia
Secretary General

THE TRIPLE HELIX ASSOCIATION

LATEST NEWS
THXI CONFERENCE, 8-10 JULY 2013, LONDON, ENGLAND
www.tha2013.org

**RAISING THE POTENTIAL OF THE TRIPLE HELIX
CO-INNOVATION TO DRIVE THE WORLD FORWARD**

BIRGITTE ANDERSEN AND WILL HUTTON

Professor Birgitte Andersen
Director, The Big Innovation Centre
Professor in Business Innovation, Lancaster University

Will Hutton
Chair, The Big Innovation Centre
Principal of Hertford College, University of Oxford

PROVOCATION

The Triple Helix's mission¹ could hardly be more timely. Globally the economy faces two existential challenges: how to create sustainable growth given the vast overhang of private debt in Asia, Europe and North America, and how that is to be done given the disruptive - if transformational - impact of digitalisation on traditional business models. The response has to be smart, radical and above all innovative, imposing a new urgency on universities, business and government to work together in a clear-eyed and decisive way. With our backs against the wall, we have to innovate our way out of this crisis.

The 2013 Triple Helix Conference will integrate highly topical contributions on opportunities and challenges in each of the three spheres of the Triple Helix. Universities, industry and government will address the key question that lies at the heart of the Triple Helix approach: how to build 'the enterprising state' in which universities, businesses, and governments, co-innovate to solve the global economic challenges?

The successful twenty first century university, firm, or government, will be much more open, more networked, and more absorptive of external ideas than even before. Universities, firms and governments have no option but to sponsor such open innovation, networked growth on which, in different ways, their own intellectual, operational and financial vitality will increasingly depend. This cannot be left to luck and chance. The international evidence is unambiguous.

Successful clusters of firms grow in self-consciously designed ecosystems in which there are "thick" relationship networks between economic anchor institutions - from banks to universities - with both high absorptive capacity to the external and the new, and who actively seek to promote creative external relationships. This is the mechanism through which opportunities can be seized and the many risks associated with investment and innovation at the knowledge frontier mitigated. Some of what is needed is already in place: we do not start in a completely green field. This Triple Helix international 2013 conference aims to be a catalyst to such thinking. By bringing together the key players in London we hope to trigger thinking, identify potential actions, and start the process. The prize is the creation of world class, open innovation growth hubs, but organised in such a way that they enhance the quality of life in the global regions rather than diminishes it. We have an obligation to ourselves - and each region or country - to get this right.

TRIPLE HELIX INNOVATION

The competitiveness and economic performance of firms, regions and nations must be understood in a local context. This is not despite, but because of the globalisation of production, trade, and labour mobility - the growth of transnational corporations, information and communication advances, and the emergence of e-business. Far from wiping out the role of local business networks or the regions, these forces of globalisation reinforce their importance. Directors of leading companies, for example, look closely at the innovation and investment ecosystems of different cities and

¹Etzkowitz, H. (2003) Innovation in Innovation: The Triple Helix of University-Industry-Government Relations, *Social Science Information* 42 (3): p293-338

LATEST NEWS

THXI CONFERENCE, 8-10 JULY 2013, LONDON, ENGLAND

www.tha2013.org

regions when they make decisions about where to invest and create jobs.

Differences in regional institutions - and the interplay between them - matter profoundly to competitive success because innovation does not take place in an institutional vacuum. Rather it is determined by the configuration of businesses, finance, research, education, law, regulation, skills, local government, entrepreneurial spirit, social capital, and more. All these institutions and organisations have a local expression. The task for an enterprising region or city or county, is to do all it can to configure their institutions in the best way they can to make the local innovation ecosystem as attractive as possible.

The approach at the Triple Helix 2013 conference is to view our economies less in traditional division of labour terms - markets self-organising land, labour and capital into productive outcomes - but emphasising more the role of institutions in organizing production and related activity (markets, businesses, banks, universities, "skilling" institutions, government and public agencies). Institutions are more or less effective. We need to understand the interplay between these organizations and other institutions, emphasising an open innovation mind-set as the key to underpinning those relationships and unleashing growth. How organisations absorb each other's ideas and propositions and then co-shape actions to stimulate demand along with building the capacity to meet that demand is key to the co-creation process.²

Open innovation is thus the key to unleash the potential of the Triple Helix. By open innovation we mean close collaboration by all stakeholders in addressing a business and social opportunity or challenge. These opportunities range from the development of a new product or business model, through to larger socio-economic issues such as green growth, health, or the digital economy. Stakeholders clearly include businesses and citizens, but also universities, financial institutions, and other intermediate organisations, engaging with each other through multiple channels and pooling their internal resources; including knowledge, finance, people,

markets, and data. This approach to open innovation is more than simply sharing risk and reward, it encapsulates the integration of the entire innovation ecosystem, and is about co-innovating and co-creating new markets and more effective and more productive business models integrating supply chains which would not exist otherwise³.

IT'S THE INNOVATION ECOSYSTEM, STUPID

The performance of local organizations (businesses, banks etc) is too often understood in terms of traditional or blunt indicators (usually scale and turnover) that undervalue the contribution organisations make to the ecosystem through harder to measure metrics - for example the quality of their relationships, their convening power, their capacity to identify and manage risk. All organizations play an incredibly important, yet subtle and multifaceted role in our local ecosystems. It is a two way process. The better organisations understand their role - and their role is understood - the better they can underpin the ecosystem: equally the stronger the ecosystem, the easier it is for organisations to grasp and seize their role in its division of labour.

For any global region to continuously raise and reach its potential, major challenges within the innovation ecosystem need to be addressed.

There are a number of questions. How well does the ecosystem in global regions support innovation and entrepreneurship by nurturing innovative markets, places, and networks? Are there useful anchor points for particular capabilities or specialism? Could large firms be encouraged to become early adopters of innovative ideas, suppliers of equity capital, or by the offering of major market contracts?

For universities, how well do they and research centres connect with local entrepreneurial and business communities? Could there be better means of co-mapping risks, mitigating them, coaching entrepreneurs, and identifying promising scientific and technological developments?

² Andersen, B, Brinkley, I and Hutton, W. (2011) Making the UK a Global Innovation Hub. How Business, Finance and an Enterprising State can transform the UK. Big Innovation Centre report.

³ This approach is broader than the more narrowly defined version of the concept coined by Henry Chesbrough (2006, *Open Innovation: Researching a New Paradigm*, Oxford University Press), arguing that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their performance

LATEST NEWS

THXI CONFERENCE, 8-10 JULY 2013, LONDON, ENGLAND

www.tha2013.org

And what about the capital dimension? What is done locally to stimulate banking relationships and other forms of finance? What is offered in terms of particular access to funding networks? Might global banks raise the potential credit to fund innovative enterprises all over the world over the next five years?

Then there are the transformed business models which will be delivering the future products and services. What is being done to unleash the digital economy and revolution of Big Data and the 'Internet of things'? Companies, societies and nations that understand how to build and combine their data with other networks of both public and private data will hold the competitive edge. When combined, data and the Internet of things can change the way in which products and services are produced, stored, delivered, and consumed. It can reorganize the entire economic system of production, the entire system of science, and create new business models and ways of living. There are already great examples of big data contributing to the world economy and welfare, for example by increasing the quality of products and services in the healthcare or financial sectors, or by reducing energy waste in households, or street crime. Are we doing enough to harness the possibility of the digital economy?

Innovation ultimately depends on the skills and capacity of individuals within our economy to develop ideas and run organisations capable of bringing them forward. Does each global region need an elite group of business game changers: what is being done to identify, groom and coach them?

Finally, how well do our governments - national or regional - understand this agenda? What are they doing to create an innovation ecosystem which is sufficiently ambitious and supportive? What is their absorptive capacity for the new and innovative?

A RALLYING CALL TO 2013 TRIPLE HELIX CONFERENCE DELEGATES

So - come and be part of the process. Help to identify the policies, regulations and management structures for our universities, businesses, or financial institutional institutions,

which form part of the problem solving process. The themes for the conference include:

- How can the global challenges to the digital sphere, healthcare, the natural environment and other areas facing disruptive forces be turned into growth opportunities?
- How can the Triple Helix create a better mode of coordination to enhance productivity, output and innovation, and what are the challenges to universities, businesses and government?
- How can the Triple Helix build innovative markets, places and networks, and what are the challenges to open innovation, demand and business models?
- How can the Triple Helix build more innovation-friendly financial institutions, and what are the challenges to the business of banking in driving innovation and entrepreneurship, especially in SMEs?
- How can the Triple Helix enhance universities as interactive partners in our innovation systems, and what are the challenges to the absorptive capacity of academic knowledge within firms and by other users?
- How can the Triple Helix enhance skills for innovation, and what are the challenges to management and leadership skills for high growth firms?
- How can public action drive innovation in the private sector, and what are the challenges to public procurement, as well as intellectual property management and IPR policies?
- How can the Triple Helix enhance place-based innovations, and what is the role of local innovation systems and local key institutions to build and accelerate regional clusters?

IN CONCLUSION

We will try during the conference to practice what we preach, with the conference structured to deliver as many possibilities for open innovation interactivity as possible. There are not many opportunities during a working year for the kind of discussion and exchange on offer over the two days of the conference. So please seize the moment and participate to the full. The more you do, the more worthwhile for you - and for everyone else. Precisely the increasing returns to be won from open innovation!

PRE-CONFERENCE SPECIAL EVENTS

SUNDAY 7 JULY 2013

Marlborough Room
Oxford and Cambridge Club
71-77 Pall Mall, London SW1Y 5HD
<http://oxfordandcambridgeclub.co.uk/>
020 7920 5151 / club@oandc.uk.com

(Nearest Underground is Green Park, which serves Piccadilly, Jubilee and Victoria Lines)

Master Class on the Triple Helix with Henry and Loet

3:00-4:30pm

Come along to a Master Class with **Professor Henry Etzkowitz**, Stanford University, USA, and **Professor Loet Leydesdorff**, University of Amsterdam, The Netherlands, co-founders of the Triple Helix Movement.

This free event is sponsored by the Triple Helix Association, and is open to PhD students, first time Triple Helix delegates, and readers of the TH Newsletter, *Hélice*.

Joint Society (THA and UIIN) Workshop on University-Business-Cooperation US/Europe Studies sponsored by DG Education and Culture

4:30-6:00pm

Science Marketing
Science-to-Business Research Centre Germany



The free *University-Business Cooperation (UBC) workshop* run by the Science-to-Business Marketing Research Centre, the Triple Helix Association and the University Industry Innovation Network will shine a spotlight on the topic of University-Business Cooperation. Attendees will hear from and discuss relevant issues in cooperation between universities and business including entrepreneurship, collaborative research, commercialisation of research and development (IP) results, collaborative curriculum development, mobility and lifelong learning.

Increasing importance of UBC

With the creation of the Europe 2020, the European Union's growth strategy for the coming decade, and the higher education modernisation agenda, Europe is embracing the need to create a more connected and functioning relationship between government, business and universities in order to increase employment, productivity and social cohesion. UBC is increasingly recognised for its central role in creating jobs and growth within an economy

as well as an essential driver of knowledge-based economies and societies. By bringing together universities and business in a coordinated and complementary symbiosis with government and businesses, it is said that a 'knowledge economy' can be cultivated and thus, regional economic development fostered. The topic provides more direct benefits to the involved stakeholders:

- **For universities** – they have had their roles focussed to a greater extent on the need to contribute to society in a more meaningful way through knowledge and technology creation, transfer and exchange. By engaging with business, universities can access third-party funds and increase the relevance of their teaching and research.
- **For businesses** – 'innovation and new product creation', 'employee development' and 'entrepreneurial thinking' are seen progressively as a company's most important driver to gain and maintain sustainable competitive advantages in the new knowledge economy.

THA Members and Friends Champagne Reception

6:00-7:00pm

PRESIDENT'S CORNER

STRATEGY FOR SUCCESS: LEARNING FROM FAILURE AND AMBIVALENCE IN TRIPLE HELIX STUDIES



Henry Etzkowitz

President
Triple Helix Association

Human Sciences and Technologies Advanced Research Institute (H-STAR)
Stanford University

henry.etzkwitz@stanford.edu

University Business Cooperation (UBC) is a relationship in flux, reflecting issues of transition from an industrial to a knowledge-based society. UBC is undergoing a transformation from a dyadic university-business relationship, either to solve firm problems or source new products and provide an outlet for academic research that has evinced commercial implications, to a broader-university-industry government (UIG) relationship. UIG incorporates the older UBC relationships while expanding their purview to include societal concerns for economic and social development at the national, regional, and local levels, as well as meeting more specific firm and university needs.

Academic entrepreneurship has spread from a narrow focus on identifying venture capital-ready high growth potential enterprises to ventures that focus on expanding employment opportunities,¹ and even to the creation of organizations that provide essential services to communities where they are lacking. An early project in "Institution Formation Sociology," a precursor to Social Entrepreneurship, established the Bedford-Stuyvesant Community Cooperative Center during the 1960's, with retail businesses intended to support social services such as an infant daycare center.² These projects involved research, education and regional development, engineering and the arts, graduate and undergraduate education, and more. They also show a shift from interactions across discrete boundaries to boundaries themselves transformed, when hybrid entities are created that transcend UBC, making what was previously a boundary-spanning interaction the basis of a new set of organizational dynamics.

Hybridization of elements from different institutional spheres to create new types of organizations at the interface is a common strategy for economic development and intellectual advance. Thus, "The synthesis of new fields focused upon novel objectives, like bioinformatics, from elements of previous interdisciplinary syntheses, drives both the advancement and capitalization of knowledge in an ever-

increasing spiral"³. Boundaries, and their new dynamics as promoters of hybridization, are increasingly the source of creativity and innovation in the creation of new intellectual and organizational syntheses. In the following, we discuss the expansion of the Triple Helix framework to encompass hybridization and boundary-crossing synthesis and the loss that may entail from strict boundary maintenance in triple helix relations.

NEW DEVELOPMENTS IN THE TRIPLE HELIX

The Triple Helix model was designed to capture the essential elements involved in the emergence of a knowledge-based society, centred on the transition from the research to the entrepreneurial university as a carrier of innovation. Whereas the neo-evolutionist Triple Helix approach focuses on measurement of relations among institutional spheres performing their traditional roles, the neo-institutionalist Triple Helix emphasizes synthesis among organisational elements that transcend previous boundaries.

Thus, the topic of university-industry relations is transformed from University-Business I, focusing on boundary crossing mechanisms, to University-Business II, focusing on the invention of new hybrid organizations that are neither academia nor business but incorporate some of the elements of both in a novel organizational framework. Venture capital, the incubator, the Brazilian firm-in-a-lab, exemplifies organizational types that were synthesized from elements of more than one institutional sphere.

This new model does not imply that older organizational formats or relationships precipitously disappear. Rather, they will be modified by the emergence of hybrid organizations that fill the space in between these organizational spheres with their different values and norms. The results presented here illustrate instances of both processes as well as the transition between these two formats. The simultaneity of two contradictory models of

¹ Almeida, M. Mello, J and Etzkowitz, H. (2012) Organizational innovation in a developing country: invention and diffusion of the Brazilian Cooperative Incubator. *International Journal of Technology and Globalisation*.

² Etzkowitz, H and Schaflander, G. (1968) A manifesto for sociologists: institution formation - a new sociology. *Social Problems*, 15 (4).

³ Etzkowitz, H. (2013) When knowledge married capital: the birth of academic enterprise. *Journal of Knowledge-based Innovation in China*, 5 (1) p.24.

university-industry relations echoes Schumpeter's finding of a similar phenomenon (Mark I and Mark II). This duality occurred within the narrower universe of firms in the mid twentieth century, while the double image of university-industry relations is a contemporary phenomenon that is the subject of considerable controversy and debate over which path to follow.

TRIPLE HELIX INTERACTIONS: ENCAPSULATED OR CONTAGIOUS?

In addition to the focus on research that UBC has privileged for the past few decades, evidenced by the creation of a plethora of technology transfer and collaborative research modalities, there is also a return to an earlier focus on education and the role of students in university-business cooperation (which, of course, in some places never went away). Students, however, are involved in new ways, beyond traditional internship arrangements, at times creating ventures before graduation as part of entrepreneurial training and mentoring schemes.

Indeed, in the future we may see group as well as individual graduation ceremonies as organizations, as well as trained individuals, increasingly become the output of university education programmes. For example, the master's programme in Entrepreneurship at Chalmers University invites potential students to submit joint projects as part of the admissions procedure. If accepted, development of a proto-firm then becomes part of the degree programme. It is recognized that the project may fail or change in nature during the course and while a graduated firm is not a requirement for a degree, it may be a result.⁴

Moreover, a broader strategic level has emerged, both as an overlay on dyadic university-business cooperation schemes, but especially as a feature of university-industry-government relations; that is the creation of venues for discussion and development of projects for regional innovation that go beyond discrete sets of negotiations among the dyadic or triadic partners.⁵ In addition, the "business" side of UBC has broadened to include cultural, not for profit, and civil society organizations, while the academic side has expanded from engineering and medicine to the social sciences and the arts.

Finally, although some proponents reassure skeptics that these transgressive interactions are confined to a relatively small academic sector, leaving most of the academy untouched, recent developments suggest otherwise. For example, a proponent of the Cornell-Technion Graduate School for Engineering and Entrepreneurship assured potential critics of the project that there were "wide swaths" of the university that were untouched by pecuniary interests. (New York Times, 2013, 22 Jan).

While this particular project is narrowly focused on applied engineering disciplines, a potential flaw may be that it does not take advantage of the cultural and arts resources of New York City for hybridization and economic development. In this instance, too

much attention to the traditional MIT model, prior to the new media center, and too little attention to the existing engineering and arts ecosystem may lessen the impact of this project, which is designated for a relatively isolated site on an island in-between an upper east side residential neighborhood in Manhattan and an old industrial area of Queens, rather than Brooklyn with Pratt and Poly engineering schools and proliferating arts clusters.

HYBRIDIZATION AND SYNTHESIS

When resistance to change from University-Business I to University-Business II appears, a strategic research site is opened up. Thus, it is important to analyze the process of transition, rather than simply taking a snapshot at a single moment in time in order to best understand university-business relations, a field in flux. For example, the MIT Entrepreneurship Center intended to create an organizational training program for nascent firms but was held back from this step, and forced to only admit individuals, by proponents of University-Business I who felt training proto-firms within the university to be an inappropriate activity.⁶ Indeed, expectation of this resistance in part explains why StartX spun itself off from Stanford University into a "hybrid space" in between the university and industry, rather than growing within the university.

Case studies have been conducted in a variety of institutions: teaching and research, high and low status, urban and rural.⁷ Perhaps the most important inference to draw from the results is the breaking down of the traditional boundaries between universities and business. Most of the initiatives involve the creation of hybrid entities that exist in the space between "university" and "business" traditionally conceived or are designed to move members of the academic community outside the boundaries of academia.

The hybrid nature of some of the projects is difficult to encompass within traditional university-industry categories. For example, StartX, the student originated Accelerator project to mentor nascent firms emanating from academia, viewed as external to the university from a university-business framework, is said not to have an internship program. However, from a hybrid perspective, StartX itself provides an internship experience for groups of Stanford students in the Silicon Valley ecosystem, bundled as "start-ups". Rather than the internship for a single individual in an organization; the internship is for a proto-organization, a nascent start-up, within the entrepreneurial infrastructure of the region.

A theater festival, initiated during the 1930's depression in a town in Oregon with a tradition of hosting cultural activities dating to the late nineteenth century Chautauqua movement, grew into a theatre-arts and humanities cluster in the early twenty-first century. The Ashland case shows the impact that a seemingly modest project initiated by an academic who has aggregated significant business and political support can have over time, if it is

⁴ Author Interview with Mats Lundquist, Programme Director, 2006.

⁵ Etzkowitz, H and Ranga, M. (2012) "Spaces": a Triple Helix Governance Strategy for Regional Innovation. In Rickne, Lastadius and Etzkowitz (eds). *Innovation Governance in an Open Economy: Shaping Regional Nodes in a Globalized World*. London: Routledge.

⁶ Author Interview with Bill Aulet, Director of MIT Entrepreneurship Center, June 2012.

⁷ This piece draws, in part, upon the *University-Business Cooperation Study* (London: LSE Enterprise) of US and Canada sponsored by the Education DG of the European Union for some of its examples.

carefully renewed and improved, through the continued development of Triple Helix interactions. Although the festival took off beyond its academic origins, it has since renewed its ties to the university, and the university is building on the growing arts complex in the region to secure a unique identity as a regional humanities and arts based university, transcending its teacher training college origins.

Alfred, an institution originally developed to provide technical support to a local glass and ceramics industry that is currently in decline, is attempting to find a broader market for its technical services through a New York State supported Center for Advanced Technology CAT, the apparent successor to the Center for Glass Research (CGR), now closed. It would be useful to have an assessment of the strength of these new ties, whether the far away firms are simply looking to solve a particular problem, or whether they see an alliance with Alfred as significant to their future development. Interviews with the firm side of the relationship would be a useful next step in this natural experiment of whether a relatively small and specialized university can transcend its origins and find a viable role beyond its region.

The West Virginia case, on the other hand, is a test case of whether a relatively small university can have a significant impact in raising the technological level of a depressed region. While the signs are promising, it is clear that the effort must be considered as a long-term project that will require additional resources to transform a relatively modest university into an engine of regional development. Kansas City is another instance of a relatively modest university striving to have an economic impact. However, the potential resources that may be placed behind this effort, whether from the Kauffman Foundation, local business leadership and the state government, are significantly greater in Missouri than West Virginia.

Nevertheless, the West Virginia case shows the impact that even a single person can make in a local region, in this instance a university technology transfer office head, who played a leading role as an Innovation Organizer, in aggregating local resources to create an angel capital network. The Boulder Colorado Silicon Flatirons case, like StartX, shows how a missing link can move an already highly successful innovation system to a higher level. Both are examples of “bottom” up individual initiatives, one from a faculty member; the other from a student. Both initiatives leverage already existing local networks, rather than having to form those networks as in West Virginia and Kansas City. Their key contribution is to make those networks available to a broader range of people who are not yet inserted into local high-tech firm formation and support scenes.

The Fashion Institute of Technology (FIT) in New York City is an exemplar of what can be accomplished by a relatively small, specialized technical school, focusing primarily on training, in assisting the transition of a local industry to a higher value added future when its traditional model of production disappears. By raising its level of training to focus on design, rather than manufacture, FIT has provided the city's fashion industry, based on innovative design, the successor to the superseded garment industry, based on low cost manufacture, with a steady stream of fashion design boutique firms, emanating from FIT's collaborative

student training process.

Cogswell Polytechnic Institute is a small school in Silicon Valley, specialized in Digital Media with a close link to Lucas Films. Cogswell, an institution on the brink of bankruptcy was recently purchased by a for-profit educational entity that has folded Cogswell into its portfolio of schools. Cogswell is an analogue to the Throop Manual Training School in Southern California that was transformed into the California Institute of Technology, a world leading scientific and technological institution, in the early twentieth century by the business leadership of that region.

There is no sign of a similar development in Silicon Valley, a region that could easily support an additional front rank institution, and may be placing its leadership in knowledge-based economic development in the US at risk, given that the Boston region, which it had earlier surpassed, has been generating a broad group of leading universities (Boston University, Northeastern, Brandeis, Tufts etc) in recent years, well beyond MIT and Harvard. This comparison promises to be an interesting natural experiment testing the Triple Helix thesis of the key role of universities in a knowledge-based society.

LEARNING FROM FAILURE

It would be interesting to see more data from the business side, especially the emanation of hybrid organizations from industry that may be interacting with those emerging from academia. There is a need for greater focus on the lived experience of the participants in Triple Helix research projects, rather than a presentation of their organizational frameworks. There is little or no discussion of failure, although experience of failure is currently touted as one of the great benefits of participating in a venture that does not succeed. Most university-industry collaborations are presumed to be a success, but their closure due to irresolvable problems are rarely mentioned, let alone analyzed.

For example, the Berzelius Science Park at Linköping University, opened with great fanfare a decade or so ago, has since disappeared virtually without a trace. Indeed, an analyst who was writing about its foundation and growth hadn't checked back to update the paper and was unaware of Berzelius' closure. Apparently, it was a bridge too far for medical doctors to pursue entrepreneurship, in contrast to younger graduates who had been successfully spinning off software and electronics technology firms from the university. Embedded in hospital routines and already having family responsibilities, a “light touch” entrepreneurship support structure was insufficient to encourage a stream of medical devices firms to emerge from the university., but this may only be a surface perception.

Triple Helix guidelines for comparative analysis of cases are next on the agenda. One lesson to be learned is that even a successful model from one part of a university may not be effortlessly transferred to another, without taking different circumstances into account. The second lesson, of course, is not to assume the problem is unsolvable, but rather to learn from failure and identify the additional elements that might have to be added to the scheme to increase its chances of success the next time around. Thus, the most important lesson of failure is to analyze, regroup, and try again!

TRIPLE HELIX SCIENTIFIC NEWS

ENTREPRENEURIAL UNIVERSITIES: DETERMINANTS, IMPACTS, AND CHALLENGES



Maribel Guerrero

Entrepreneurship Department
Orkestra-Basque Institute of
Competitiveness and Deusto Business
School

maribel.guerrero@orkestra.deusto.es

David Urbano

Business Economics Department
Autonomous University of Barcelona

david.urbano@uab.cat



INTRODUCTION

Traditionally, universities tend to be large organizations that by nature are not very entrepreneurial in their focus; however, the incorporation of an entrepreneurial orientation into a university's mission could change this convention (Kirby et al, 2011). During the last ten years, our main research focus has been to understand the phenomenon of entrepreneurship within universities in different countries (e.g. Ireland, Spain, Mexico, Iran, etc). The core activity of universities has been universally recognized as teaching, but, as with other organizations, universities have undergone internal transformations in order to adapt to external conditions and to enhance their role in the economy. The main objective of this essay is to provide an insight into the determinants, impacts, and challenges of technology transfer and entrepreneurial universities. Following this brief introduction, we describe the main determinant factors of entrepreneurial universities taking economic, organizational, and individual perspectives. Then we provide insights into social/economic contributions of universities. Finally, taking into account the current economic scenario, we discuss challenges and implications.

DETERMINANT FACTORS OF ENTREPRENEURIAL UNIVERSITIES: INSTITUTIONAL ECONOMIC, ORGANISATIONAL, AND INDIVIDUAL PERSPECTIVES

Based on previous studies, the main determinant factors of entrepreneurial universities are grouped into: (I) the economic and institutional context of the country, (ii) the university's resources, capabilities, and organizational context, and (iii) the individual entrepreneurial characteristics of the university community.

Regarding *economic models and institutional contexts*, throughout economic history, institutions have established the rules

of society that shape human interaction (North, 1990). Using prior entrepreneurship studies as a reference, Audretsch and Thurik (2004) identified two different economic models as the political, social, and economic response to an economy dictated by particular forces: the managed economy, and the entrepreneurial economy. In the managed economy, the force is large-scale production, reflecting the predominant production factors of capital and unskilled labour as the sources of competitive advantage. In the entrepreneurial economy, the dominant production factor is knowledge capital as the source of competitive advantage, which is complemented by entrepreneurship capital, representing the capacity to engage in and generate entrepreneurial activity.

In each economic model, institutions are created and modified to facilitate the activity that serves as the driving force underlying economic growth and prosperity. From this point of view, the increased importance and significance of the university in terms of its impact on the economy is observed within the entrepreneurial economy (Audretsch, 2012). Consequently, one determinant of an entrepreneurial university is the stage of economic development in each society (i.e. it is explained by the institutional differences among the factor-driven economy, the efficiency-driven economy, and the innovation-driven economy – a classification based on Porter et al, 2012). For instance, evidence from North America, Europe, Asia, and Latin America, shows that the entrepreneurial stage of universities could be determined by the political, economic, legal rules¹ (called formal factors), and codes of conduct, values, attitudes, norms of behaviours, and culture (called informal factors) on knowledge's production, transference, commercialization, and entrepreneurship in each society (Guerrero et al, 2012; Guerrero and Urbano, 2012b; Urbano and Guerrero, 2013).

On the other hand, when adopting an organizational perspective, the factors that have contributed to create a sustained competitive

¹ In the United States, a good example has been the enactment of the *Bayh-Dole Act*, which is linked with the entrepreneurial and economic development activities of universities. As well, some Organisation for Economic Co-operation and Development countries have reformed their legislation related to academic entrepreneurship, and there are still several research opportunities at the systems, university, and individual levels (Grimaldi et al, 2011).

advantage are linked to **the university's resources, capabilities, and organizational context**. To facilitate the generation/transfer/commercialization of university research and help generate start-ups/new ventures, the entrepreneurial university has not only altered its core activities/routines, but also combined adequate organizational environments and resources (Guerrero and Urbano, 2011). For instance, some internal factors that all universities tend to "imitate" are flexible organizational/governance structures, or support measures such as centres of small-university businesses, research facilities, research groups or quasi firms, liaison offices, technology transfer offices, and incubators (Guerrero et al, 2011). But there are other internal factors such as leadership, talent, connections with stakeholders, traditions, and reputation that are unique in each university (i.e. for these reasons most of the studies have used a case-study methodology). Indeed, there are other environmental factors that play an important role, such as the university's policies and its culture which is reflected in the community members' favourable attitude toward entrepreneurship, and the existence/diffusion of university entrepreneurs demonstrating that entrepreneurial success is more than a theory (Guerrero and Urbano, 2012a).

Finally but equally relevant, at an individual level of analysis, are **the entrepreneurial characteristics of a university community**. In general, the university community is comprised of university leaders, academics, and students. Obviously not all university communities will have the motivation, knowledge, and intention required to become an entrepreneur (i.e. founder of a start-up), but it is expected that within an entrepreneurial university all their members at least develop entrepreneurial thinking. Undoubtedly, potential entrepreneurs could be identified within the academic and student groups. In the academic group, a potential academic entrepreneur is a researcher who develops his or her daily activities within a university to provide him or her with an adequate environment and resources to support the generation, transformation, and commercialization of knowledge and technology (Urbano and Guerrero, 2013). Particularly, a university tries to support the main academic entrepreneurs' challenges, which include: (i) differences in human capital emanating from the academic discipline base and business ownership experience, (ii) conflicts of interest regarding academic and entrepreneurial activities, and (iii) strong links with scientific networks (but not with commercial networks, which are agents that gain knowledge from one domain and apply it to another).

However, evidence suggests that only a few individuals recognize opportunities and act on them through entrepreneurial activities (i.e. spin-offs). A possible explanation is that the ability to recognize certain entrepreneurial opportunities may be more available to some academic entrepreneurs, while a different set of opportunities to other academic entrepreneurs, depending on specific knowledge, field, time, and place. Therefore, based on the nature of the organization, not all entrepreneurial universities can be intensive in knowledge generation and commercialization, but their spillover contribution is important. In the student group, university undergraduate and graduate students are the main focus for researchers involved in entrepreneurial intention studies. The main objective of entrepreneurial universities is to provide to society graduates with not only the theoretical knowledge but also the practical abilities (e.g. willingness to change, ability to learn; to

think entrepreneurial) required to become both talented job seekers and talented job creators (Guerrero and Urbano, 2011). Thus, the entrepreneurial university culture will exert a positive effect not only on students' entrepreneurial behaviour but also on students' "reference people" (i.e. friends, professors, and staff). Prior research provides evidence of the relevant role of entrepreneurial universities in the start-up intentions model because, surprisingly, the main challenge is that students who have a higher desire to be entrepreneurs will perceive the start-up process as easy and possible when helped by their university's support measures (Guerrero et al, 2008; Liñán et al, 2011). For all these reasons, universities need to adapt their "traditional policies" to the needs and concerns of society. Also, an entrepreneurial thinking-action of university managers is required in order to pay attention to "intangibles," such as intentions, role models, and leadership, which are especially important for any entrepreneurial action (Kirby et al, 2011).

CONTRIBUTIONS OF AN ENTREPRENEURIAL UNIVERSITY: A SOCIAL AND ECONOMIC PERSPECTIVE

To understand how an economy works, it is necessary to know the political, social, and cultural factors that establish its institutional dynamics; one way is to study its system of beliefs and decision-making processes (North, 2005). Following this perspective, the role of the university in the entrepreneurial society is considerably broader than simply to generate technology transfer in the form of patents, licences, and university-sanctioned start-ups. It is more fundamental to ensure that people thrive (i.e. creating entrepreneurial thinking, leadership, and action) in the emerging entrepreneurial society (Audretsch, 2012). More concretely, in the long term, the contribution of core activities of an entrepreneurial university (i.e. teaching, research, and entrepreneurial) could be transformed into the predominant production factors that contribute to social and economic development (Guerrero et al, 2012; Urbano and Guerrero, 2013). These are:

- *human capital* through the generation, attraction, and retention of job seekers and entrepreneurs (graduate students and entrepreneurs);
- *knowledge capital* with the generation, attraction, and retention of prestigious researchers who facilitate the innovation process and transfer of knowledge (academic entrepreneurs);
- *social capital* through enhanced inversion attraction and the promotion of partnerships in key regional clusters that identify and meet needs (spillovers); and
- *entrepreneurship capital* with the attraction and creation of new enterprises that promote competition and diversity.

As a consequence, these factors could produce several demographic, economic, infrastructure, cultural, mobility, educational, and societal challenges that later will be reflected in productivity, competitive advantages, regional capacities, regional networks, regional identity, and regional innovation (Guerrero and Urbano, 2011).

CHALLENGES AND IMPLICATIONS FACING THE CURRENT ECONOMIC SCENARIO

The role of the university has continued to evolve along with the underlying economic forces shaping economic growth and performance (Audretsch, 2012). Thereby, the worldwide economic downturn that began in 2008 represented a strategic game-changer for most economies. Severe resource constraints and unpredictable conditions created significant challenges for organizational survival, let alone growth through innovation and venturing activities. In this context, entrepreneurial universities face strong challenges: higher rates of unemployment within higher education, the reduction of education budgets, reduction in the demand of higher education studies, and so on. Unlike prior economic situations that affected only the most interconnected countries, the 2008–2009 global economic recessions affected all countries with different levels of intensity. Under this economic scenario, but with more emphasis in European context,² it is important to understand the role of universities and the main implications:

- Undoubtedly, today's universities are more proactive and more interconnected with their stakeholders than in previous decades. When public resources are scarce, universities not only need to compete for funding but must have a strong commitment to legitimize the economic and social benefits obtained with funding. This is not the time to turn back; technology transfer activities and knowledge spillover need to take the relevant role as determinants of economic development while using the scarce resources efficiently and transparently.
- Even before the economic crisis, the unemployment rate for recent college graduates and experienced bachelor's degree holders was increasing as the number of new university students was decreasing. Tuition costs were also rising (which further threatened students' ability and desire to attend college), but today's top universities are implementing novel strategies such as using social networks (i.e. free online courses) to attract students. Today's universities are also committed to providing students with the knowledge, capabilities, skills, and thinking required to be able to identify or create job opportunities in the market.
- Traditionally, university performance metrics are associated with the inputs (expenses/sources of funding) and outputs of teaching (profile of graduate and new students), research (researchers, publications, research contracts, patents, licenses, etc), and only a few entrepreneurial activities (e.g. spin-offs). Perhaps it is time to include other indicators to measure the performance/productivity of entrepreneurial universities (e.g. last year, Stanford University published a report on the economic impact of their alumni).

In summary, university authorities need to recognize their core role at this time, not only in building but also in reinforcing the university environment that nurtures entrepreneurial potential (incentives, new learning tools, role models). Universities need to stimulate skills, competences, and tools, that are most useful to create entrepreneurial mindsets that drive innovation (not only inside universities but also within the existing firms), thus becoming entrepreneurial organizations.

REFERENCES

- Audretsch, D B. (2013) From the entrepreneurial university to the university for the entrepreneurial society *The Journal of Technology Transfer* 1-9.
- Audretsch, D and Thurik, R. (2004) A Model of the Entrepreneurial Economy *International Journal of Entrepreneurship* 2 (2), 143–166.
- Grimaldi, R, Kenney, M, Siegel, D and Wright, M. (2011) 30 years after Bayh-Dole: Reassessing academic entrepreneurship *Research Policy* 40, 1045-1057.
- Guerrero, M and Urbano, D. (2011) *The Creation and Development of Entrepreneurial Universities in Spain: An Institutional Approach*. New York: Nova Publishers.
- Guerrero, M and Urbano, D. (2012a) Knowledge and Technology Transference: Best Practices of Spanish Entrepreneurial Universities. *Gestión y Política Pública*, XXI, 1, 107-139.
- Guerrero, M and Urbano, D. (2012b) The development of an entrepreneurial university *Journal of Technology Transfer* 37 (1), 43-74.
- Guerrero, M, Rialp, J and Urbano, D. (2008) The impact of desirability and feasibility on entrepreneurial intentions *International Entrepreneurship and Management Journal* 4 (1), 35-50.
- Guerrero, M, Toledano, N and Urbano, D. (2011) Entrepreneurial universities and support mechanisms: A Spanish case study *International Journal of Entrepreneurship and Innovation Management* 13 (2) 144–160.
- Guerrero, M, Urbano, D, Cunnigam, J and Organ, D. (2012) Entrepreneurial Universities: A case study comparison in two European Regions *Journal of Technology Transfer* DOI 10.1007/s10961-012-9287-2.
- Kirby, D, Guerrero, M and Urbano, D. (2011) Making Universities More Entrepreneurial: Development of a Model *Canadian Journal of Administrative Sciences (CJAS)* 28, 302-316.
- Liñán, F, Urbano, D and Guerrero, M. (2011) Regional variations in entrepreneurial cognitions: Start-up intentions of university students in Spain *Entrepreneurship and Regional Development* 23, 3-4, 187-125.
- North, D C. (2005) *Understanding the process of economic change*. Princeton, NJ: Princeton University Press.
- North, D C. (1990) *Institutions, Institutional Change and Economic Performance*. University Press: Cambridge.

² For instance, in North American universities:

- i) Addressing the Unprecedented Challenges Facing US Research Universities Today. <http://www.prnewswire.com/news-releases/addressing-the-unprecedented-challenges-facing-us-research-universities-today-160673585.html>;
- ii) College Majors, Unemployment, and Earnings. <http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/Unemployment.Final.update1.pdf>;
- iii) A new university funding model: Not bums in seats, but students who graduate. <http://www.theglobeandmail.com/news/national/education/a-new-university-funding-model-not-bums-in-seats-but-students-who-graduate/article10685085/>

Porter, M, Sachs, J and Arthur, J. (2002) Executive summary: Competitiveness and stages of economic development, In M Porter, J Sachs, P K Cornelius, J W McArthur, and K Schwab (Eds.), *The global competitiveness report 2001-2002*. New York: Oxford University Press.

Urbano, D and Guerrero, M. (2013) Entrepreneurial universities: Socio-economic impacts of academic entrepreneurship in a European region *Economic Development Quarterly* 27 (1), 40-55.

AUTHORS

Dr Maribel Guerrero is a researcher in the Entrepreneurship Department at Orkestra-Institute Basque of Competitiveness and Deusto Business School. She holds a PhD in Entrepreneurship and Small Business Management from the Autonomous University of Barcelona (Spain), where she obtained her Master's degree in Business Economics Research. Her research interests are focused on entrepreneurial activity inside public organizations (entrepreneurial universities, academic entrepreneurship,

entrepreneurial intentions), and private organizations (corporate entrepreneurship, entrepreneurial employees), as well as the impact of entrepreneurship on social and economic development. She has participated in various European and Latin American research projects. She has been a reviewer of referred international journals in the areas of business and management. She is a member of the regional research team (Basque Country) Global Entrepreneurship Monitor for Spain, as well as a member of the National Research System (SNI) sponsored by the Mexico's National Council of Science and Technology (CONACYT).

Dr David Urbano is a professor of entrepreneurship at the Business Economics Department of the Autonomous University of Barcelona (UAB), Spain. His PhD was on Entrepreneurship and Small Business Management (UAB, Spain and Växjö University, Sweden). His research is focused on the conditioning factors to entrepreneurship in different contexts using an institutional approach.

THE PROCESS OF THE FORMATION OF AN ENTREPRENEURIAL UNIVERSITY IN RUSSIA



Professor Nataliya Ivashchenko

Head
Innovative Economics Department
Lomonosov Moscow State University
Russia

Tatiana Pospelova

PhD student
School of Economics
Lomonosov Moscow State University
Russia



The prospects of social and economic development and the maintenance of high economic growth rates in Russia, with its great intellectual and industrial potential, are related to the realization of its potential, and to the development of sectors of high technology, while overcoming its dependence on the export of raw materials. The transfer to a science intensive economy is one of the main goals the Russian Government has set for society. In this new system, organizations producing new knowledge related to research and development, and those that spread knowledge and offer novel ways of their practical commercialization, play a key role. In Russia, such organizations include research institutions, universities, laboratories, scientific production units of companies, and small innovation companies. Along with this, the country's progress depends on the availability of new ideas and breakthrough technologies, and also on the speed, with which those technologies get commercialized to market, and are turned into new products.

Many recent research studies are devoted to the problem of the *new role of universities*, that are regarded as being among the key

tools for the support and the reinforcement of innovative development. In addition to *education and research* (which are the two primary functions of the university), the university is gaining a third function - an *entrepreneurial* one, related to the commercialization of products from research activities. The entrepreneurial university is the next step following on from the implementation of the research university model that will enable a balance between science, education and innovation. So far, Russia is at the initial stage of the formation of entrepreneurial universities.

During the last several years, the program of building entrepreneurial universities has been in the process of step-by-step implementation. At present, the preparation stage is completed, and as early as last year the stage of the implementation of the program was started. However, it is worth mentioning the existence of the first early results. The active participation of the State in the formation of the program

evidences its interest, thus enabling a long-term forecast on the success of the project.

STATE POLICY, AIMED AT THE FORMATION OF INNOVATIVE ACTIVITIES IN RUSSIAN INSTITUTIONS OF HIGHER EDUCATION, AS A STAGE IN THE ORGANIZATION OF ENTREPRENEURIAL UNIVERSITIES

This policy was initially brought about by the transfer of the country to the economy based on market relations, and was directed towards solving the problem in the area of creation and application of research and technology data. Higher education institutions were the principal and prime participants in the key state programs, aimed at the development of innovative entrepreneurship.¹

Since 2008, the Government of Russia has been paying more and more attention to the development of innovative activities in the country. Considerable attention to the problems of the formation of the innovative economy was demonstrated in the address of the President of the Russian Federation, D Medvedev, to the Federal Assembly in 2009. Specific actions, directed towards the development of the Russian economy, and related to the innovative growth, were specified in the "Conception of long-term social and economic development of the Russian Federation till 2020", approved by the Government of Russia. Thus, since that time, the foundations were laid at governmental level for the establishment of the integration between science, the State, and business communities, and for the emergence of higher education institutions as leading participants of this interaction process. The main trends of public policy, aimed at the formation of the industrial university in this area include the following:

1) *Change in the types of higher education institutions, identification of universities of governmental importance.*

The above-mentioned changes contributed to the creation of conditions for the higher education institutions to get involved in innovative activities, and to build on their basic centers of economic and social growth in the regions, and in certain sectors of industry. The key goal consists of the development of interaction between higher education institutions and industry and scientific organizations, as well as the development of research, scientific, and infrastructure basis of higher education institutions. Such estimated figures must undoubtedly encourage innovative activities, and contribute to the increase in innovative actions.

2) *Approval of federal law № 217-ФЗ of 2 August 2009 «On the application of amendments to certain legislative acts of the Russian Federation concerning the issues of the establishment of business companies by government-financed academic and educational institutions in order to practically apply (to introduce) the products of intellectual activity».*

The main purpose of the law mentioned above, is to provide actual adoption in products and services, of the results of research and technology activities, developed at the expense of state funds, and

legally belonging to government-financed institutions of science and education. The initiatives are rather substantial for the development of the processes of commercialization of the products of research and technology activities of higher education institutions. At present, Russian institutions of higher education have established over 1700 business companies,² complying with the criteria of this law.

3) *Governmental support for the development of the innovative infrastructure in federal educational institutions of higher professional education (by Decree of the Government of the Russian Federation №219 of 9 April 2010).*

The Decree stipulated governmental support for the development of the innovative infrastructure in educational institutions by means of the provision of funds from federal budget in the region of \$2.6 billion, including \$100 million in 2010, \$67 million in 2011, and \$100 million in 2012.

1)

State funds, allocated from the governmental support for the development of the innovative infrastructure in educational institutions are provided to cover the expenses for the improvement of the innovative infrastructure (business incubators, industrial parks, industrial park zones, innovation and technology centers, engineering centers, certification centers, centers of technology transfer, multiple-access centers, centers of research and technology information, centers of innovative consulting, and other elements of innovative infrastructure) and their equipment in modern facilities.

Thus, contemporary state policy is aimed at the innovation and implementation activities of Russian higher education institutions, which is a preparatory stage towards building entrepreneurial universities.

One of the results of the policy pursued led to an important event related to the formation of entrepreneurial universities in Russia is the establishment of the Association of entrepreneurial universities of Russia that was signed on 28 September 2011.³

The Association contributes to the promotion of Russia's foremost experience in entrepreneurship, to the formation of public policy; the active introduction products of intellectual activities into the processes of technology transfer and the commercialization, as well as in the development of efficient partnership between governmental bodies and businesses within the framework of the «Triple Helix» model.

PRINCIPAL TENDENCIES IN THE BUILDING OF ENTREPRENEURIAL UNIVERSITIES

For leading Russian universities, the implementation of the model of the industrial university is related to their strategic priorities and guidelines. For an industrial university, location and the level of maturity of innovative and technological policy in the regions are

¹ Ivashchenko, N P and Engovatova, A A. (2012). Contemporary tools of the innovative policy of the State as concerns Russian higher education institutions. MIR (Modernization, Innovation, Growth) (4):46-54, 2012. [<http://istina.msu.ru/publications/article/3412738/>].

² Based on the material of the Center of statistics and scientific studies, 2012.

³ Internet source: http://polit.ru/news/2011/09/28/jump_vuz_association/.

crucially important.⁴ As established historically, due to the large territory of the country, the greater part of higher education institutions are concentrated in its capital, the city of Moscow, while less are located in the regions, though still it is a whole system that embraces the whole country's territory. The building of an industrial university requires availability of large amounts of resources in, which most Russian higher education institutions lack. Therefore, it is necessary to learn how to unite with strategic partners, such as universities, technological platforms, state corporations.

- **Cooperation with Technological Platforms⁵**

Technological platforms need entrepreneurial universities as a source of project culture, a source of graduate students, who can handle several technologies simultaneously and develop designs. Technological platforms regard innovative territorial clusters as subsidiary support for the development of the patterns for project packages, and from the necessity of transfer of functions and rights of rule-making to project groups, working on the breakthrough technologies.

- **Cooperation with State Corporations**

The cooperation between entrepreneurial universities and governments is built on the basis of the "open innovations" model. In order for the sectors to pass to a new technological level, it is necessary to involve universities, since big companies cannot react to the changes in time. This leads to their lagging behind their international competitors. Therefore, corporations need to be able to access the research function of universities, and are capable of placing large orders on R&D.

- **Cooperation with Institutions of Development**

This is concerned with the formation of market relations. It is important, that universities actively introduce their leading scientific research data and intellectual property into the market. In Russia, Institutions are ready to work together with academic groups (professors and students) on the projects of mutual interest.

FIRST RESULTS: BUILDING OF ENTREPRENEURIAL UNIVERSITIES ILLUSTRATED BY TWO EXAMPLES OF HIGHER EDUCATION INSTITUTIONS

Lomonosov Moscow State University (MSU)

MSU is a first-rate university in Russia, established in 1755. The University represents an academic town, comprising fifteen research institutions, forty schools, over three-hundred departments, and six branches.⁶

The University was awarded the status of a 'university of state importance', which stimulated continuous improvement of innovative activities in the principal institution of higher education in Russia. Hereafter, we shall describe the first steps towards the implementation of the organization of an industrial university:

The Scientific Park of MSU⁷ is one of the first technological parks in Russia and has been functioning since 1990. The activities of the Park are aimed at encouraging innovative activities in the university, and at improving the welfare of MSU's academic staff, postgraduate students, and students, by means of the efficient and rational application of scientific, innovative, and human resources potential of the university.

Since 2004, the Scientific Park of MSU holds annual educational programs, aimed at the encouragement of students of various schools in the creation of innovative projects. The principal trends of the projects include: IT, bioengineering, pharmaceuticals, and medicine. The programs' finalists get an opportunity to take part in two-week educational training at MIT in the US, organized on the basis of Global Innovation Labs,⁸ where the participants have an opportunity to present their projects to international experts.

In 2010, a Business incubator was established on the territory of MSU within the framework of the university's program, aimed at the support of innovative entrepreneurship. In order to speed up companies' entering the market, the Business incubator functions according to the principle of a business-accelerator. The incubator provides residents with initial investments, access to the infrastructure of the university, help in the design of a business model, and, most importantly, an opportunity to turn an idea into a working business in four months.

The Science Park and the Business incubator started functioning not so long ago, however, they have already demonstrated their first results. Thus, the total turnover of resident companies of the Incubator for two years is over \$3 million. The amount of investments attracted is over \$3 million. Market evaluation of resident companies in the Business incubator of MSU is over \$11.5 million which is a good sign for the success of the institutions in the future.⁹

Tomsk State University of Management Systems and Radio Electronics (TUSUR). Regional experience

At present, TUSUR is one of the leading regional higher education institutions, that was among the first to achieve results as regards the formation of entrepreneurial universities. The main task of the contemporary industrial university in Russia is to actively participate in the economic development of regions and the country. The strategic purpose of TUSUR as an industrial

⁴ Kobzyeva, L V, Pudkova, V V and Uvarov, A F. (2012) Experience of the interaction between TUSUR and institutions of development of Russia. Innovative Russia, 11 (169).

⁵ Results of the Conference of the Association of Entrepreneurial Universities, 4-5 October 2012, Tomsk, Russia.

⁶ From the official site of MSU <http://www.msu.ru/info/struct/#inst>.

⁷ From the official site of the Scientific Park of MSU <http://www.sciencepark.ru/ru/about>.

⁸ From the official site of Global Innovation Labs <http://www.innovationlabs.net/>.

⁹ From the official site of the Business incubator of MSU, <http://inmsu.ru/ru/ob-inkubatore>.

university is to create a high-performance cultural, educational, scientific and innovative environment that will provide efficient training of specialists for science intensive high-technology sectors of the economy, and will actively apply innovations, while being capable of entrepreneurial activities. All this in cooperation with the whole innovative zone, with the ability to reach world level in the declared priority trends in science, engineering and technology development, thus making a real contribution to the process of the creation of the Center of education, studies and design in the Tomsk area, and in particular, to the transition of the economy of Russia towards an innovative way of development. The program of the strategic development of TUSUR as an industrial university has been successfully implemented, which is an important stage in the formation of the regional innovative system.¹⁰

The main strategy at TUSUR is aimed at working with the institutions of development, arranging systematic work with each of them, prioritizing the activity and providing the university's units with administrative and financial resources.

In addition, TUSUR takes an active part in international conferences (annual participation in the Triple Helix International Conference), cooperates with international associations (Triple Helix Association), and is a representative of the Triple Helix Association on the territory of the Russian Federation since 2012. In October 2012, TUSUR hosted a conference of the Association of entrepreneurial universities in Tomsk, devoted to the "Development of entrepreneurial universities as backbone elements of territorial innovative clusters "

DIFFICULTIES IN THE FORMATION OF ENTREPRENEURIAL UNIVERSITIES

Due to the lack of experience in investments in risky projects, which innovations in Russia often are, venture funds are not yet fully developed. The regulations of many existing funds are risk averse and aimed at minimizing risk, such that the success of the projects is seen as a secondary factor. In recent years, the tendency is changing, mainly due to the private-governmental partnership that is becoming popular in Russia.

The drawbacks may include the a lack of communications between the participants of the investment process. As a result, there are resources for the support of innovative activities in the regions. Annually, they provide about \$2.5 million from the regional budget. The amount of this financial support equals one single funding of the priority institutions.¹¹

Some difficulties with development appear as a result of the lack of institutions of development in the innovative regions. It is necessary to build a network of regional entrepreneurial institutions, the

cooperation of which will encourage the formation of entrepreneurial higher education institutions all over the country. The main reason is the non-uniform state of the development of different regions as regards their innovative infrastructure.

Thus, the presence of principles of interaction between network of universities will help to smooth the gaps, and decrease the concentration of resources in Moscow.

CULTURAL ASPECT

Due to the historical developments of the Russian Federation, entrepreneurship appeared in the country some 20 years ago. Therefore, the cultural aspect plays an important in the formation of the industrial university.

Another point here is the attitude to risks that predominates business in Russia. Here, it is worth mentioning, that Russian people are inclined to risk, but still there is a dangerous border called "Russian roulette".¹² Russian people may risk a lot, that may lead to reckless or unreasonable actions. In course of the last 20 years, the situation has been changing for the better, largely thanks to the foreign education of some Russian academics and entrepreneurs and to the formation of a new business-culture in the country.

Hence in order to expand the cultural horizons and develop open-mindedness in the students, (who create start-ups) the "Open University Skolkovo" program has been organised. This program sponsored by the Skolkovo Foundation is aimed at the recruitment, development and support of gifted young people with the purpose of improving the communities around the Skolkovo Innovative Center. Classes take place in Moscow, Saint Petersburg and Tomsk,¹³ and the program is aimed at teaching students to identify difficulties in innovation and develop the tools for their solution.

Further, it is necessary to take certain strategic steps for the formation of the entrepreneurial culture at the university. It is important that both professors and students understand the benefits offered through the commercialization of the intellectual property. It is necessary to change the lifestyle of professors, encouraging them to spare time for the participation in business projects in addition to participation in the educational process.

FUTURE STEPS TOWARDS THE FORMATION OF ENTREPRENEURIAL UNIVERSITIES

The Association of entrepreneurial universities has approved a program for the development of entrepreneurial universities up to 2020, the strategic trends of which are as follows:¹⁴

¹⁰ Kobzyeva, JI V , Pudkova, V V and Uvarov, A F. (2012) Experience of the interaction between TUSUR and institutions of development of Russia. Innovative Russia, № 11 (169).

¹¹ Kobzyeva, JI V , Pudkova, V V and Uvarov, A F. (2012) Experience of the interaction between TUSUR and institutions of development of Russia. Innovative Russia, № 11 (169), 2012

¹² Russian roulette, http://en.wikipedia.org/wiki/Russian_roulette.

¹³ From the official site of Skolkovo Open University, <http://community.sk.ru/opus/>.

¹⁴ Summary of the conference of the Association of entrepreneurial universities: 4-5 October , 2012 Administration of Tomsk area, Tomsk.

- Formation of a Russian concept of the «entrepreneurial university». It is worth mentioning, that this notion is new for Russia, and it takes time to introduce the concept both in regional institutions, and in legislative and political terms.
- Development of the legislative basis to provide the implementation of the model of the industrial university in Russia.
- Promotion of the model of entrepreneurial universities in Russia and abroad, by means of the publication of best practices, experiences and solutions to problem in the international journal « Innovation of the Triple Helix », published in Russian and founded by TUSUR and the Triple Helix Association.
- Development of the culture of technological entrepreneurship among professors and students.
- Holding an annual conference of the Association of entrepreneurial universities, with the purpose of the establishing the negotiation stand with ministries, innovative territorial clusters, state corporations, the development of types and criteria for the industrial university, the exchange of best experiences, and the analysis of the international experience.
- Establishment of Funds for initial investments in entrepreneurial universities of Russia, with an active participation of federal, regional and private resources. Establishment of a foundation, funding innovative projects proposed by professors and students at pre-competitive and initial stages. This is related to

the further growth of the innovative infrastructure of the universities, and of the competence in selection of projects, and their delivery «outside the university ».

The building of entrepreneurial universities is a topical task for the Russian Federation. The interest demonstrated by both higher education institutions and state authorities, as well as the instruments and funds provided for the establishment of entrepreneurial universities, gives a reason to assume that the given project will be successful for Russia in the long-term.

AUTHORS

Nataliya Ivashchenko is currently Head of the Innovative Economics department at Lomonosov Moscow State University, and a member of the Council of Experts of the Higher Attestation Commission of Russia on Economics. She also participates in Lomonosov Moscow State University's committee on scientific issues, and is the representative of the Moscow State University's School of Economics in Russian Union of Industrialists and Entrepreneurs

Tatiana Pospelova is a PhD student at the School of Economics of Lomonosov Moscow State University. Her main research activities are concentrated on the theory of Triple Helix and the possibility of the implementation of this concept in Russia. Tatiana is currently on training in California, where she is engaged in research aimed determining the machinery that contributes to the establishment of innovative clusters in Silicon Valley.

THE ROLE OF RESEARCHER IN DEVELOPING AN ENTREPRENEURIAL UNIVERSITY

Not all universities are full-fledged entrepreneurially organized. However, within those universities, some researchers are entrepreneurially-oriented. They may not necessarily be involved in spin-off activity; but in the tradition of the Triple Helix concept of combining the conventional activities (research, teaching, participation to the governance of the university, etc.), and new ones (interactions with industry, protection of their IP, spin-off activities, etc.). These academics may play a crucial role (Clark, 1998; Clark 2004) in influencing the evolution of a traditional university towards an entrepreneurial one by forming exemplary “entrepreneurial islands” that in turn encourage new activities by other academics. Understanding the activities they perform and

how they are interacting may provide interesting insight into the process of how a university and its community adapt to their changing environment.

When I was working as a Business Developer at the Technology Transfer Office of Université Libre de Bruxelles (ULB, Belgium), I observed two clear trends: increased difficulties met by academics to find sufficient funds to finance their activities, and at the same time the emergence (or the formalisation) of entrepreneurial outputs. From this observation, a specific question arose: how would the involvement in “new” activities impact fundraising activities of researchers?

Azèle Mathieu

Brussels Enterprise Agency (BEA-ABE)
Belgium

azele.mathieu@ulb.ac.be



It had been observed that a patent may be considered as a *result* from an externally-funded research project;¹ it may also be perceived as a knowledge transfer *mechanism*, because of its codified nature, conveying new knowledge to society similar to a publication. Does it also play a role in attracting external, competitive funds, or at the extreme opposite, given the time constraints on an academic, does it play a negative role in relation to fundraising activities? The same question arises when launching spin-offs.

In the following, analytical concepts context and the associated samples are first described; methodology and main results are then presented. Policy recommendations are finally addressed.

In what follows, analytical concepts context and the associated samples are first described; methodology and main results are then presented. Policy recommendations are finally addressed.

THE CONTEXT AND THE SAMPLE

The ULB is the second largest Belgian-French-speaking university² with a longstanding and strong tradition in research and a comparatively short history in entrepreneurial activity, starting at the beginning of the 90's.

Regarding competitive funds, academics may apply for (i) public funds: either regional funds (aimed at supporting applied research), or national funds (directed to more fundamental research)³, or for (ii) business funds

A unique sample of data was built, comprising data over intrinsic characteristics of academics (age, gender), traditional performances (publications, citations); extent of entrepreneurial outputs (patents, spin-off involvement) and the raising of competitive funds (regional, national and business).

The final dataset was composed of 7.829 business-funded contracts (encompassing consultancy, contract research and collaborative research), and publicly-funded contracts (regional and national), representing EUR 508 Million issued to 750 researchers⁴ working at ULB over the period 1998-2008.

Across the sample, seventy-nine researchers had been involved in at least one European priority patent application⁵ over the studied period, and twenty-two in the launching of a spin-off company⁶ over the period 1997-2008. In addition, around 25% of the inventors had also been involved in a spin-off company.

Regarding the sample, three main observations were made. The first was that the main source of competitive funding remained public, with 84% of all competitive funding stemming from public funds (47% of national funds and 37% of regional funds), and only 16% from business sources. The second major observation was that there were "serial" fundraisers: for instance, regarding business funds, 41% of the overall amount of business funds leveraged over the period was raised by only 4% of academics who raised business funds. A third observation was that as far as business source of funding is concerned, ULB is dependent on only a few companies: 3% to 4% of the business funders finance half of all business funding.

Regarding the sample, three main observations were made. The first was that the main source of competitive funding remained public, with 84% of all competitive funding stemming from public funds (47% of national funds and 37% of regional funds), and only 16% from business sources. The second major observation was that there were "serial" fundraisers: for instance, regarding business funds, 41% of the overall amount of business funds leveraged over the period was raised by only 4% of academics who raised business funds. A third observation was that as the business source of funding is concerned, ULB is dependent on few companies: 3% to 4% of the business funders finance half of all business funding.

METHODOLOGY AND MAIN RESULTS

The methodology used was a Count model with a negative binomial model specification. Some tests for reverse causality issue had been performed, given that any factor in the analysis can be considered both an input and an output of scientific research (Bonaccorsi and Daraio 2003, quoted by Meissner, 2010). Publications, patents, and involvement in spin-off companies, may increase the visibility of researchers and allow them to attract more funds; in turn such increased resources may lead to new publications, patents, and accrued active involvement in spin-off activities. In this case, there was no clear evidence of a severe causality issue. Results are summarized in Table 1.

The results show that, in general, the success of attracting large amounts of external funds, whatever the source, partly depends on **individual characteristics**. The academic's entrepreneurial orientation, the qualitative and quantitative scientific productivity, and age will positively impact on raised amounts of external funds.

If a distinction is operated between different types of funds, i.e. business, regional, and national funds, the influence of individual

¹ D'Este *et al.* (2005) observe a positive relationships between having been involved in consultancy and contract research with the industry and having a joint patent with the industry.

² In 2005, the ULB counted 19.762 students and followed the first main French-speaking University, the Université Catholique de Louvain (UCL), which counted 20.640 students. Source: Database of the *Conseil des Recteurs*.

³ European funds are available but not taken into account in this analysis, due to a lack of information.

⁴ ULB researchers are defined as permanently-hired academics (teaching professors and researchers) as well as temporarily-hired scientists. In February 2009, ULB counted 625 academics and 716 scientists (www.ulb.ac.be).

⁵ ULB Technology Transfer Office very rarely applies for a Belgian priority application. The majority of priority applications are made at the European Patent Office.

⁶ In this case, the researcher is often the director of a lab or a member of it who has actively supported the launching of a spin-off company. It does not imply that the researcher left the lab to join the company, even if it may sometimes be the case.

⁷ As the definition of a patent comprises the idea of finding something new to solve a specific technical problem for an industrial application.

Table 1. Impact of a researcher's characteristics on fund raising activities

	<i>Business funds</i>	<i>Regional funds</i>	<i>National funds</i>
Intrinsic characteristics			
Gender (M=1; F=0)	-	+	+
Age	+	+	+
Age square	-	-	-
Traditional performances			
Publications	+	0	+
Citations	0	0	+
Entrepreneurial orientation			
Patent	+	+	0
Spin-off	+	+	+

characteristics varies. The **entrepreneurial orientation** of academic researchers is mainly rewarded by funders directed to applied projects, such as the business sector and the regions. Regarding the **academic's start-up activities**-business funding relationships, the present results confirm previous findings. At the university level, Van Looy *et al.* (2011) observe a positive and significant relation between contract research and spin-offs, suggesting complementarities rather than trade-offs between both transfer mechanisms. Given the strong proportion of ULB biotech spin-off companies, it can also be stated, similarly to Zucker *et al.* (2002) that "star" scientists signal by being involved in spin-off launching spin-offs based on the commercial potential of their research results and this, in turn increases the probability of engaging in joint research with industry.

Similarly, **applying for a patent** signals to the business sector that the academic is sensitive to the finding of solutions to applied problems⁷ and to the commercialisation of research results (as a patent is a legal property title that gives a commercial exploitation monopoly to the one that holds it). Notwithstanding the discussion regarding the impact of the academic patent on traditional academic missions (a topic that is not addressed here), it can be underlined that, at least, involvement of researchers in patent applications allow them to attract larger amounts of business funds.

For all types of competitive funds, the positive impact of the variable **age** and the negative impact of the variable age square on the dependent variables show an inverted U-shape relationship between the age and the extent of leveraged funds. This means that the extent of leveraged funds will increase with the experience of the researcher, then decrease at some point. Surprisingly, it appears that being a man will play against leveraging large amounts of business funds.

The positive and significant influence of the **scientific productivity** on the extent of allocated national public funds denotes that federal public authorities play their role in supporting scientific excellence. To some extent, the results confirm previous findings as citation measures are associated with higher income (Cole, 1978; Diamond, 1986; Dasgupta and David, 1994; Stern,

1999). However the scientific productivity does not play in favour of attracting larger amounts of regional public funds. It stems from this observation, that the set of individual characteristics that play a role in the fundraising of regional funds is more similar to the one that allows leveraging business funds than to the one that allows attracting national funds. The distinction then is not so much between business funders and public funders, but more between funders of applied projects versus funders of fundamental projects.

CONCLUDING REMARKS

The policy implications derived from the present analysis are twofold. The first policy recommendation may be formulated as the need to keep on supporting the traditional academic mission of performing research. The positive and significant relationships between the amount of scientific publications and the extent of received funds, *whatever* the source of funding; ascertain that the role of universities in generating new knowledge is (still) valued. Even if some believe that frontiers between university and industry become blurred, the division of labour in knowledge generation and the innovation process, at least in this case, remains important and is somehow rewarded. More funds (from public and business sources) will be directed to academic researchers who fulfil their traditional mission, or who generate new knowledge, and make it publicly available. ***The traditional academic mission of performing research, further codified in publications, should remain supported and encouraged.***

The second policy recommendation may be formulated as considering and encouraging the use of the academic patent and spin-off knowledge transfer mechanisms (KTMs). Policy makers have strongly encouraged academics to be involved in entrepreneurial activities over the last decades. Considered out of their context, they rarely bring any direct value to the researcher. Instead, what is observed in this case is that "entrepreneurial" activities of researchers help them gain more funds while there is structural decrease of the financing of universities. ***Academic patents and spin-offs should not be considered as isolated "tools" in fostering innovation.*** Aside of their roles of "end in itself", and mechanisms to generate new knowledge, they play a

role in leveraging external funds. This positive “side effect” should further be taken into account by scholars, TTOs, universities authorities, and policy makers, when encouraging the use of new KTMs or when studying the impact of such new activities on traditional ones. New activities could coexist with the traditional without threatening the traditional role of universities; and that their indirect impact would be larger than their direct visible impact.

REFERENCES

- Bonaccorsi A and Daraio C. (2003) A robust nonparametric approach to the analysis of scientific productivity. *Research Evaluation*, 12 (1), 47-69.
- Clark, B R. (1998) *Creating entrepreneurial universities organizational pathways of transformation*, New York: IAU Press.
- Clark, B R. (2004) *Sustaining change in universities: continuities in case studies and concepts*, Maidenhead: Society for Research into Higher Education and Open University Press.
- Cole, S. (1978) Scientific reward systems: a comparative analysis. *Research in Sociology of Knowledge, Sciences and Art*, 1, 167-190.
- Dasgupta, P and David, P A. (1994) Toward a new economics of science. *Research Policy*, 23 (5), 487-521.
- D'Este, P, Nesta, L and Patel, P. (2005) Analysis of University-Industry Research Collaborations in the UK: Preliminary Results of a Survey of University Researchers. *SPRU Report*.
- Diamond, A M. (1986) What is a citation worth? *The Journal of Human Resources*, 21(2), 200-215.
- Meissner C. (2010) Can Industry Collaboration Change the Face of Science? Evidence from a Longitudinal Analysis. *Paper presented at the Brick, Dime, Strike workshop - The organization, economics and policy of scientific research, Turin, Italy, 23-24 April 2010*, 40p.

Disclaimer: this article is a short version of an extended paper, not yet published. Some shortcuts/summaries have been made. For more information, please contact the author: azele.mathieu@ulb.ac.be.

- Stern, S. (1999) Do scientists pay to be scientists? NBER Working Paper No 7410.
- Van Looy, B, Landoni, P, Callaert, J, van Pottelsberghe de la Potterie, B, Sapsalis, E and , K (2011) Entrepreneurial Effectiveness of European Universities: An empirical assessment of antecedents and trade-offs. *Research Policy*, 40, 553-564.
- Zucker L.G, Darby M R and Torero M. (2002) Labor mobility from academe to commerce. *Journal of Labor Economics*, 20 (3).

AUTHOR

Azèle Mathieu is currently working full-time at the Brussels Enterprise Agency (BEA-ABE), a public regional institution, supporting and stimulating entrepreneurship. She is a Business and Finance Advisor, providing support to entrepreneurs (innovative start-ups and established companies) for what relates to the setting-up of their business and financial plans and for the optimization of their access to financing sources. Aside of her full-time job, Azèle holds a position as a supply teacher at the Solvay Brussels School of Economics and Management for two courses: (i) “Technology Transfer”, Master degree, and (ii) “Business Planning (for entrepreneurial ventures)”, MBA degree. Previously Azèle worked as a Business Development Manager in a start-up company, Bone Therapeutics, and before that, as a Business Development Manager at the Technology Transfer Office of ULB. Azèle holds a PhD in Economics and Management, and a Master of Sciences in Management. Her main field of interest relates to the management and the support to innovation, and more specifically, the management and the commercialisation of university-based inventions. Her thesis was entitled “Essays on the Entrepreneurial University”.

THE ENTREPRENEURIAL UNIVERSITY WAVE¹

Professor Henry Etzkowitz

Human Sciences and Technologies Advanced Research Institute (H-STAR)
Stanford University

henry.etzkowitz@stanford.edu



INTRODUCTION

Entrepreneurship arose as part of a broad cultural and social transition, the break with tradition in all areas of human endeavor and the transition to modernity. The invention of new social and cultural formats, as well as new forms of business enterprise, may all be viewed through the lens of entrepreneurship. Rather than limited to the business realm, entrepreneurship can be identified in governmental, academic, and cultural spheres. For example, the

formation of new artistic schools breaking with older forms of artistic vision, the invention of new hybrid art forms, breaking the boundaries between the visual and performing arts and the rise of performance spaces, questioning the received authority of concert halls, opera houses and other traditional performing arts venues exemplify the various forms of arts entrepreneurship. A similar efflorescence of entrepreneurship can be identified in other areas of human activity and among diverse populations.

¹ This piece draws upon *The Anatomy of an Entrepreneurial University*, *Social Science Information*, forthcoming.

Entrepreneurship, the ability to take the initiative to organize a new activity or enterprise, has been presumed to be a cultural and psychological characteristic, more closely connected to and likely to occur among particular ethnic and religious groups. Max Weber, one of the founders of modern sociology argued that a consequence of the rise of Protestantism as a religion not tied to a central authority was its encouragement of the development of capitalism.² Robert K Merton followed up with an analysis of the emergence of science in seventeenth century England linked to the decline of religious authority.³ However, Werner Sombart argued that the Catholic merchants of Bruges were as entrepreneurial as their Protestant counterparts, vitiating the link of religion to entrepreneurial enthusiasm.⁴ Nevertheless, the examination of technical entrepreneurship in the 1960's was strongly influenced by Max Weber's Protestant Ethic hypothesis. Ed Roberts and his students at MIT conducted empirical studies of the ethnic and religious background of individual entrepreneurs in order to discern differences in their achievement motivation, but the effort was eventually given up when no clear-cut evidence could be discerned.⁵

The contemporary analysis of entrepreneurship arose from the debate over the relationship between technological and organizational change, associated with the emergence of the modern corporation. The relative role of individual versus organizational initiative was assessed in this venue. The insight that individual entrepreneurs are typically part of a collectivity made groups and organizations the prototypical entrepreneurs. As Schumpeter pointed out, "... the entrepreneurial function need not be embodied in a physical person and in particular in a single physical person".⁶ He identified the role of The US Department of Agriculture, in creating an agricultural innovation system from the late nineteenth century, as one such collective entrepreneur. Public entrepreneurship has since expanded to the Defense Department, and the National Science Foundation (NSF), among other agencies. The Defense Advanced Research Project Agency's (DARPA) role in creating the Internet and computer networking industries is well known;⁷ the public venture capital role of the NSF in founding the Small Business Innovation Research Program (SBIR) is less well publicized.⁸

University entrepreneurship builds upon traditional academic tasks of teaching and research, even as it incorporates them into

entrepreneurial practice.⁹ Thus, entrepreneurship has become an academic teaching and research discipline as well as an academic practice. Individuals and groups are trained in entrepreneurship through university education and apprenticeship schemes.¹⁰ Project Genesis at the Pontifical Catholic University of Rio de Janeiro, and the Masters Program in Entrepreneurship at Chalmers University in Sweden, have demonstrated that individuals of various cultural and social backgrounds, as well as groups, can successfully be trained as entrepreneurs.¹¹ The Swedish degree program accepts both individual and group candidates for its degree programs. Thus, whether persons grew up in the Swedish social welfare tradition, or in a Brazilian Catholic environment, a set of courses and practical applications can be organized that will set them on the path to firm formation. Entrepreneurship is thus integrated into the academic scene irrespective of whether or not there is an encouraging cultural environment. Indeed, it is often introduced into academia by policy measures to help create such an environment.

STAGES AND PHASES OF ACADEMIC ENTREPRENEURSHIP

There are three stages and phases to the development of the university as an entrepreneur, with each modality building upon the other, in a usual but by no means necessary order. In an initial phase (*University Entrepreneur One*) the academic institution takes a strategic view of its direction and gains some ability to set its own priorities, either by raising its own resources through donations, tuition fees, and grant income, or through negotiations with resource providers. This is the sense in which "entrepreneurial university is used by Burton Clark in his analysis of European universities extracting themselves from virtually total Ministry control down to the number of students that may be recruited in each discipline. European universities, that formerly received almost their entire income by government subvention, are undergoing the painful process of diversification, forming alumni associations to connect with their graduates and establishing fund raising offices, long a staple of US academia.¹³

In a second phase (*University Entrepreneur Two*) the academic institution takes an active role in commercializing the intellectual property arising from the activities of its faculty, staff, and students. In this phase, a university typically establishes its own technology transfer capabilities, in-sourcing them from firms to which they may

² Weber, M. (1930) *The Protestant Ethic and the Spirit of Capitalism*. London: Unwin and Hyman.

³ Merton, R. (1938) *Science, Technology and Society in Seventeenth Century England* Bruges: St. Catherines Press.

⁴ Sombart, W. (2001) *Economic Life in the Modern Age*. Reiner Grundmann, ed. New Brunswick: Transaction Books.

⁵ Roberts, E. (1991) *Entrepreneurs in High Technology: Lessons from MIT and Beyond* Oxford: Oxford University Press.

⁶ Schumpeter, J. Economic theory and entrepreneurial history In *Essays on Economic Topics* Port Washington NY: Kennikat Press Essays ([1949] 1951:255).

⁷ Hafner, K and Lyon, M. (1996) *Where Wizards Stay Up Late: The Origins of the Internet*. New York: Simon and Schuster.

⁸ Etzkowitz, H, Gulbrandsen, M and Levitt, J. (2000) *Public Venture Capital* New York, Harcourt.

⁹ Etzkowitz, H. (1983) Entrepreneurial Scientists and Entrepreneurial Universities in American Academic Science, *Minerva* 21 (2-3): 1573-1871.

¹⁰ Jones-Evans, D and Klofsten, M. (1997) *Technology Innovation and Enterprise: The European Experience* Basingstoke: Palgrave Macmillan.

¹¹ Etzkowitz, H, Mello, J and Almeida, M. (2005) Towards 'meta-innovation' in Brazil: The evolution of the incubator and the emergence of a triple helix *Research Policy* 34 (4): 411-424.

¹² Clark, B. (1999) *Creating Entrepreneurial Universities: Organizational Pathways of Transformation* New York: Pergamon.

¹³ The lack of experience with academic fund raising has opened up a market for consultants to role play asking for money with newly minted university fund raisers in the UK who are from a culture where such a question is considered to be impolite.

have been contracted, such as the Research Corporation in the US, or through devolution of system-wide offices, as in the State University of New York and the University of California, to individual campuses. Universities with significant intellectual property potential, like Stanford, received an immediate boost in income from having their own staff in more direct contact with the faculty. Similarly, research powerhouses, like Oxford, Cambridge and Imperial, in the UK, very quickly became leaders in technology transfer and firm-formation once they turned their minds to it. Universities with fewer research resources to commercialize, not surprisingly, take a longer time to ramp up. However, some schools with modest resources, like Arizona State and the University of Utah, that have made tech transfer and firm formation an equal priority with education and research, have achieved higher rates of valorization than many of their resource rich competitors.

In a third phase (*University Entrepreneur Three*), the academic institution takes a proactive role in improving the efficacy of its regional innovation environment, often in collaboration with industry and government actors. Although these phases were identified as taking place sequentially in the development of the Massachusetts Institute of Technology (MIT), non-linear and even reverse sequences may be identified, for example, in the experience of the Blekinge Institute of Technology in Sweden which took off from phase three.¹⁴ Regional government and business actors identified establishment of an academic institution as part of a strategy to make the transition from a declining industrial region to knowledge-based industry, in this case software. They successfully lobbied the national government and the Blekinge Institute of Technology was founded. Thus, the transition to the entrepreneurial university can take off from a teaching as well as a research-oriented school.

ACADEMIC INDEPENDENCE AND ENTREPRENEURSHIP

To be an entrepreneur, a university has to have a considerable degree of independence from the state and industry, but also a high degree of interaction with these institutional spheres. In academic systems following the Humboldtian model of close ties to the state, on the one hand, and professional autonomy guaranteed by civil service status, on the other, the university was an arm of the Ministry of Education with little ability to set its own strategic direction. The achievement of relative autonomy from the state, a process that was initiated in Europe relatively recently, occurred in the early nineteenth century in the US.

Academic independence from direct state control was secured in the US as an outcome of the Supreme Court decision in the Dartmouth College case of 1819. A schism at Dartmouth College left two groups struggling for control. One group reorganized as Dartmouth University, and tried to obtain control by having the state of New Hampshire revise the charter that had established the College. The representatives of the original College argued that the state could not revise a charter, once granted. In supporting

this position the Court defined universities as “private eleemosynary institutions” stating that trustees and professors were not public officers nor were they extensions of “civil government”. The case had broader implications in the extension of its general principles of institutional autonomy from charitable to business corporations, becoming the legal basis for increasing independence of corporations from state control.

The ability to take independent initiatives is based on the premise that the university is not a subordinate element of a hierarchical administrative structure such as a Ministry of Higher Education. If a university system operates as it formerly did in Sweden where the Ministry of Higher Education decided how many students would be admitted each year to each discipline, there is hardly a possibility to have sufficient autonomy on which to base an entrepreneurial university. It has been argued that universities did not come into independent existence in France until the 1970's in a devolution that occurred as a side effect of reforms made in response to the student movements of the 1960's. Until quite recently, the various faculties were directly linked to the National Ministry and universities hardly an organizational framework, let alone autonomy.¹⁶

To this day European Professors are often selected through national competitions, that make a strategy such as Terman's “steeple building” at Stanford, creating a critical mass of professors on a special topic, difficult if not impossible to realize. Terman's strategy was to identify a nascent field with theoretical and practical potential and hire several professors with research specialties in this area, in effect forming a proto center, while linking them to departments in which they would teach more broadly than their special research area. This strategy allowed the university to fulfill three missions simultaneously that otherwise might have been at odds with each other.

Paradoxically, the increased independence of the university is based on its enhanced relevance to government and industry in the transition to a knowledge-based society. The university's ability to identify and protect its essential interests is enhanced under these conditions. The dominance of industry over university, feared in industrial society, is superseded in knowledge-based societies, as knowledge embedded in intellectual property gives its holder significant bargaining power in setting the terms of its utilization. The question of who influences whom in university-industry interactions is always an empirical one, with the answer weighted towards the actor with the most highly valued good under varying societal conditions. A better understanding of an expanded role of the university in economic development can change fear into interest and lead to more support for the academic enterprise, not only from the general public and traditional government funding agencies, but also from other sources such as regional development authorities, ministries of enterprise and industry, regional, national and multi-national funding agencies, etc.

¹⁴ Author interview with Per Eriksson, Rector of Blekinge Institute of Technology, Stockholm 2000.

¹⁵ Chief Justice John Marshall's Opinion in the Dartmouth College Case, 1819 In: Hofstadter, R and Walter Metzger (eds) 1961. *American Higher Education: A Documentary History*. Chicago: University of Chicago Press p213-219

¹⁶ Musselin, C. (2004) *The Long March of French Universities*. London: Taylor & Francis.

As universities become entrepreneurial, tension emerges between this new role and that of teaching and research; just as there has been tension between research and teaching. As the university crosses traditional boundaries through linkages to industry, it must devise formats to make its multiple purposes compatible with each other. So far the university has been an ingenious innovator: mixing disciplinary departments with interdisciplinary centers; encompassing critical disciplines such as environmental science with economically relevant fields such as materials science. If past academic history provides any guidance, one era's controversial postulate may soon become another's taken for granted reality. Thus, academic scientists rejected proposals for federal funding of research during the 1930's depression calling it "tainted money", whereas the present generation knows no other mechanism of support and takes it for granted.¹⁷ During the intervening period, US scientists volunteered their contribution to weapons research during the Second World War, accepting research funds from government, and acceding to their continuation after the halt of hostilities under conditions that were amenable to influence, if not control.¹⁸

With the notable exception of a relatively brief war-time and early post-war era, characterized by rapidly expanding public resources for academic research, US universities have traditionally lived with the expectation of scarce resources, even at times when resources were obviously expanding. As Derek Bok, former President of Harvard University, noted "Universities share one characteristic with compulsive gamblers and exiled royalty; there is never enough money to satisfy their desires."¹⁹ Although federal investment in academic R&D increased during the 1990s, academic researchers strongly perceived a shortfall of resources during this period.²⁰ The explanation of this paradox lies in the expansionary dynamic inherent in an academic research structure, based upon a PhD training system that produces research as a by-product.

The contemporary university is an organizational mix of collegial and hierarchical patterns, shaped by academic, commercial, and social goals. An earlier generation of critics, among them Thorstein Veblen²¹ and Upton Sinclair²², argued that business forms of organization have shaped universities from the late nineteenth century. Despite some university presidents modelling themselves on corporate chief executives, the influence of faculty and students on academic decision-making has by no means disappeared. It may even have been enhanced since the passing of the era of autocratic academic leaders, exemplified by Nicholas Murray Butler at Columbia University, who brooked no interference in setting the conservative academic and political tone of his campus. The student anti-war movement forced Stanford to divest itself of the Stanford Research Institute and move secret research off campus

during the Vietnam era while anti-apartheid protests led universities to sell off their investments in corporations doing business in South Africa.

Although there are periodic hiatuses, the knowledge of how to organize a social movement appears to be embedded in the DNA of academic culture and the recent spread of social media tools has, if anything, enhanced bottom-up organizing capabilities. Thus, the entrepreneurial university also includes social entrepreneurship, and the generation of social movements as academic by-products as well as the university's contribution to firm-formation and regional development. The contemporary entrepreneurial university is the latest step in an academic progression in which the new task emanates as a controversial departure from previously accepted academic missions and eventually is integrated with the old and becomes accepted in its own right. These transitions are controversial. Thus, the introduction of economic and social development as an academic mission called into question the purpose of the university as a research institution, for some academics, even as the introduction of research as an academic mission disturbed the taken for granted assumption of the university as a single purpose educational institution.

¹⁷ Personal communication from Professor Eli Ginzberg, Columbia University, to the author, 1995.

¹⁸ Bush, V. (1945) *Science: The Endless Frontier*. Washington DC: US Government Printing Office.

¹⁹ Bok, D. (2003) *Universities in the Marketplace: Commercialization of Higher Education*. Cambridge: Harvard University Press Bok, p9.

²⁰ Even as the NIH budget doubled, increasing roughly a the rate of 15% each year to 27.7 billion, academic researchers and their advocates were troubled that the increase would slow down to a few per-cent increase per year expected in the near future. "If growth were cut to 2.5% it would be a disaster" John H Porter, lobbyist, former Republican Congressperson. Kaiser, Jocelyn 2003 "House Bill Signals End of NIH's Double Digit Growth" *Science* Vol 300 27 June p. 2019.

²¹ Veblen, T. (1918) *The Higher Learning in America*. New York: B W Huebsch.

²² Sinclair, U. (1923) *The Goose Step: A Study of American Education*, Self published, 1923.



CALL FOR PROPOSALS FOR FUTURE TRIPLE HELIX CONFERENCES

The Triple Helix International Conferences have established a well-earned track record of offering a keynote platform for the exchange of ideas and experiences on the interaction between government, industry and academia for sustained economic growth.

The Conferences attract leading academic thinkers, key policy makers, and decision makers, from across the globe; individuals who chart the progress of the field and lay the foundation for future directions of the subject.

Recent successful Triple Helix International Conferences have been held in:

Stanford, California	11-14 July 2011
Bandung, Indonesia	08-10 August 2012

The Triple Helix-XI International Conference will maintain the tradition in London on 07-11 July 2013, while Tomsk, Russia, will host the Triple Helix-XII International Conference on 10-12 September 2014.

Through this note the Future Meetings Committee of the Triple Helix Association now invites expressions of interest and proposals for holding future Triple Helix Conferences from **2015** onwards.

For further information on the format and contents of proposals please contact:

Tariq S Durrani
 Future Meetings Committee (Chair)
 Triple Helix Association
 (durrani@strath.ac.uk)

Note that proposals should be submitted no later than: **30 November 2013.**

Tariq S Durrani
 Chair, Future Meetings Committee

TRIPLE HELIX ASSOCIATION NEWS

LEADERSHIP OF SPANISH INNOVATION AGENCY VISIT STANFORD UNIVERSITY

In June 2013, members of the Centre for Industrial Technological Development (CDTI), Spain's business agency to promote technology and innovation, traveled to Silicon Valley seeking opportunity for innovation and entrepreneurship. The agency is launching and managing a private-public venture capital initiative, and plans to draw from the Silicon Valley experience in optimizing its operation. In the process, CDTI is also trying to explore coordinated mechanisms to cross-VC and joint investments.

CDTI's Director General, Elisa Robles, represented a leading team of multinational Spanish companies with a potential interest to invest in high-growth new entrepreneurship. She was accompanied by Javier Ponce Martinez, Director of Economics and Financial Affairs, and Juan Antonio Serrano, Head of the CDTI-USA office, located in Washington DC.

While in San Francisco, Ms Robles and her colleagues met with senior representatives of Stanford University to discuss issues



l-r: Henry Etzkowitz, Senior Researcher, H-STAR, Stanford University; Elisa Robles, Director General, CDTI, Madrid, Spain; Javier Ponce Martinez, Director of Economics and Financial Affairs, CDTI, Madrid, Spain; Juan Antonio Serrano, Head of the CDTI-USA office, Washington, DC.



l-r: Henry Etzkowitz; Robert N. Klein, President, Klein Financial Corporation, Palo Alto, CA; Juan Antonio Serrano; Elisa Robles; Javier Ponce Martinez; Mark Nelson, Researcher, Peace Innovation Lab, H-STAR, Stanford University; Margarita Quihuis, Director, Peace Innovation Lab, Stanford University.

related to the development of the Spanish National Strategy for Innovation and Entrepreneurship, and to discuss tentative avenues of collaboration. Their host was H-STAR Senior Researcher and THA President, Henry Etzkowitz. To get a sense of the overall entrepreneurial and venture capital programs of Stanford University, the group toured Media X, STVP (Stanford Technology Ventures Program), and StartX, Stanford's own entrepreneurial incubator.

The tour of Stanford concluded with a lunch at Cantor Arts Center's "Cool Cafe". Bob Klein, Founder of California Institute of Regenerative Medicine, and Stanford alumnus, spoke on his work with the California Stem Cell Agency. The group also met with Margarita Quihuis and Mark Nelson of Stanford's Peace Innovation Lab.

CDTI's goals are to provide incentives to business R&D with a primary focus on private-public-partnerships, entrepreneurship, and large collaborative R&D projects.

More information about the agency can be found at www.cdti.es.

TRIPLE HELIX HONOURED BY SWEDISH UNIVERSITY

Linköping University makes THA President Henry Etzkowitz PHD Hon (Faculty of Engineering)

On 17 May 2013, at a ceremony in the Grand Concert Hall of Linköping City, the University made six new honorary doctors in its faculties of Engineering, Medicine, and Arts and Sciences.

The 'promotor' of the Engineering faculty, professor Svante Gunnarsson gave Henry the golden ring as a symbol of fidelity, the university doctor's top hat as a symbol of academic freedom, and a diploma. Henry was nominated by Professor Magnus Klofsten for his service to Linköping University, his contribution to the university Helix Centre of Excellence, and his development of the entrepreneurial university and Triple Helix models. The nomination statement cited his work in innovation and entrepreneurship, areas of great strategic importance for the development of Linköping University.

Etzkowitz has been an inspiring source to the creation of the CIE (Centre for Innovation and Entrepreneurship), and the development of programs and activities for knowledge-intensive firms in the region. There has been an on-going exchange with Mjärdevi Science Park, the municipality, Park's leadership and firms, as well as the university.

The day before the ceremony, Henry gave a speech to the faculty entitled "The entrepreneurial university wave: Globalization of the second academic revolution". The University looks forward to continued collaboration with Professor Etzkowitz and the Triple Helix Association in furthering the development of the Triple Helix model, which it views as a foundational idea of its theory and practice as an academic institution.

The honorary degree shows the university's appreciation for his long time commitment to Linköping University and the wish to enhance future involvement with the university.



Professor Henry Etzkowitz (left) and Professor Magnus Klofsten, at the doctoral ceremony in the Grand Concert Hall of Linköping City, Sweden

BOOK REVIEW



INNOVATION: KEY TO AMERICA'S PROSPERITY AND JOB GROWTH

Tapan Munroe

Publisher: CreateSpace, 2012 - 147011142X, 9781470111427

The author, Tapan Munroe, is a well-known economist. He is a speaker, consultant, advisor, researcher, strategist and commentator on the innovation economy in the USA. His current research is focused on the economics of innovation, and the economy of innovation hubs such as Silicon Valley and High Tech San Diego.

In his 210-page book, published in English by CreateSpace Independent Publishing Platform in 2012, the author uses an easy to understand journalistic style to capture the essence of the economic challenge of sustainability in twenty-first century America and takes an enjoyable and very up-to-date look at some of the contemporary issues that are shaping the world economy (particularly that of the USA) and can foster enterprise and innovation.

Tapan believes that innovation occurs when new ideas are transformed into useful and/or improved artifacts, leading to new business and new companies that create new jobs and generate income for the country, thus making it the key to economic prosperity.

The author highlights the need in contemporary society to constantly apply the concept of the triple helix - determined by the relationship between universities, business, and governments, aimed at the economic and social development of the country, and shows that the structure of the economic and

social development of a nation depends exclusively on the training of the skills that are essential for innovative work.

The essays were written between 2008 and 2012 and were published in various newspapers where Tapan was a columnist. The collection of texts in the book is divided into two sections. The first is entitled "Innovation" and contains nineteen essays, and the second, under the heading "Jobs: Skills Gap and Workforce Readiness", contains fifteen.

These two sections could be summarized in two keywords: Innovation and Work, and the keywords are connected, over the course of the articles, by education, the author's major concern. It should be pointed out that the act of "educating" is mentioned in much of the thinking of the leading protagonists in the triple helix (universities, companies, government) presented in books, magazines, conferences, seminars, meetings, roundtables, and other forms of dissemination that have arisen around the world since the concept originated in the 1990s.

The author invited Raymond K Ostby to write an essay entitled "Innovation - Overview", for section I, and John O'Dea to write an essay entitled "Jobs-Skills Gap and Workforce Readiness - Overview", for Section II. Marty Beard was invited to co-author the essay "America's Exceptional Opportunity - the Mobility-Social Network Nexus", presented in section I.

At the beginning of the book, several people provide their impressions regarding the articles and refer to the book's importance in the present world economic context - of a knowledge and innovation based economy. The foreword was written by Thomas M Loarie, and the preface by Raul A Deju, while the editor, John Ahlquist, emphasizes how Tapan "is able to take difficult subjects and distill

their essence for the general reader".

The ideas put forward by Tapan in this book provoke the reader into critical and reflective analysis. They address business leadership, dreams, the workforce, education in entrepreneurship, technological education, skills-based education for the workplace, schools, students, job skills, competitiveness, the knowledge-based economy, local development, structural unemployment, incentives, the economy, networks, space, ecosystems, innovation habitats, public and private venture capital, the entrepreneurial university, research groups, quality of life, innovative companies, the business environment, partnerships, collaboration, consensus, and culture, among other matters.

In summary, and emphasizing certain important aspects of the American triple helix context that appear in the book, we find:

1. With regard to universities:
 - 1.1 There is currently a gap in US education that threatens the future of the country's economy: the skills available in the US labor market nowadays are not the ones needed to enable the country to compete in the twenty-first century global economy.
 - 1.2 The US economy needs continual efforts and investment in education, training, research and development, and to stimulate the identifying of innovative business and partnerships between government, universities and private companies that encourages innovation.
 - 1.3 The US educational system should be overhauled, to address the structural unemployment that currently exists in the country and prepare young people to take up jobs that will make the country competitive on a global

scale, thus bringing to an end the skills gap that currently exists in the fields of science, technology, engineering and mathematics.

2. With regard to government:

2.1 Governments must have a clear view of what needs to be done in the country and clearly define the challenges that the people have to face and the priorities that need to be determined in order to achieve innovation in all areas of knowledge, as well as pointing out how optimism is crucial to the nation's success.

2.2 A look at the country's history shows what can be studied and learned from: innovation has been key to economic prosperity and long-term competitiveness.

2.3 Public policy should provide citizens with a list of principles that enable them to think up and implement innovative action, at any moment, that could contribute to development.

3. With regard to companies:

3.1 There is no doubt that the revolutionary technological advances in electronics, transportation, communication and science are

creating new businesses and jobs that were previously hard to imagine, and are increasing productivity. However, this requires enterprise and the seeking out of talent in business.

3.2 Entrepreneurs and inventors should have access to abundant incentives, suitable tools and venture capital, as well as fast and reliable communications, the tolerance of society, and laws and regulations that facilitate, rather than repel, innovation and entrepreneurship.

3.3 The government needs to show optimism and leadership, in order to help guide the private sector towards a bright future for innovation.

Finally, the book sends out a warning to nations - the gap that currently exists between innovation and work is the result of the lack of skills-based education for the citizens who make up their country's workforce. Without a well-trained workforce, it is impossible to sustain an innovation-based economy.

Development strategies focused on innovation can only be successful if governments, universities, and businesses, are determined to set out policies that give priority to education based on the

development of skills that are critical for the jobs available in the present economy. Only continual investment in education, R&D and businesses can eliminate the skills gap in the labor market, represented by the structural unemployment that is now facing innovative companies in a knowledge-based economy.

In closing, Tapan's book is a timely call for a USA return to prosperity, as it provides useful ideas and gives specific examples of how the country can regain and maintain its position as world leader in innovation, against the competition from emerging markets like China, Brazil, and India.

Branca Terra, DSc

Professor in the Department of
Administrative Sciences

Faculty of Administration and Finance
(part of the Center of Social Sciences)
Rio de Janeiro State University - UERJ,
Brazil

Visiting Professor

Department of Technology and Society
College of Engineering and Applied
Sciences

Stony Brook University, USA

PUBLICATIONS



SOCIAL SCIENCE INFORMATION SUR LES SCIENCES SOCIALES

SAGE Publications, London and California

Vol 52, no 4, December 2013

Special issue: « *Silicon Valley: Global model or unique anomaly ?* »

Guest-edited by Henry Etzkowitz

THA MEMBERS LATEST PUBLICATIONS

Adams, J, Gurney, K, Hook, D and Leydesdorff L. International collaboration clusters in Africa. <http://arxiv.org/abs/1301.5159>.

Almeida, M C, Mello, J M C and Etzkowitz, H. (2012) Social innovation in a developing country: invention and diffusion of the Brazilian Cooperative Incubator', *International Journal of Technology and Globalisation*, 6, 206-224.

Etzkowitz, H and Zhou C. (2013) Developing venture capital systems beyond the economic capital concept. *Journal of Knowledge-based Innovation in China* Forthcoming, Vol. 4, No.3, p189-202.

Etzkowitz, H. (2012) Triple helix clusters: boundary permeability at university–industry–government interfaces as a regional innovation strategy. *Environment and Planning C: Government and Policy* 30(5) 766-779.

Etzkowitz, H. (2012) An innovation strategy to end the second great depression. *European Planning Studies* 20 (9).

Etzkowitz, H and Ranga, M. (2012) The great expectations: the innovation solution to the contemporary economic crisis. *European Planning Studies* 20 (9).

Etzkowitz, H, Ranga, M and Dzisah J. (2012) Wither the university? The *Novum Trivium* and the transition from industrial to knowledge society. *Social Science Information* 51(2).

Etzkowitz, H, Almeida, M and Mello, J. (2012) Organizational innovation in a developing country: invention and diffusion of the Brazilian Cooperative Incubator. *International Journal of Technology and Globalisation*.

Etzkowitz, H., Svensson, P and Klofsten M. (2012) A knowledge-based strategy for renewing a declining industrial city: the Norrköping Way. *European Planning Studies*. 20 (4) 505-525.

Hecksher, S, Ferraz, F T, Mello, J M C, Gomes, V, Pullig, T and Renault, T. (2012) The development of a methodology for innovation management at utilities companies at Brazilian Electricity Distribution Sector', *Procedia: Social and Behavioral Sciences*, 52, 226-235.

Ivanova, I A and Leydesdorff, L. Rotational symmetry and the transformation of innovation systems in a Triple Helix of University-Industry-Government relations; <http://arxiv.org/abs/1211.2573>.

Leydesdorff, L and Meyer, M. Technology transfer and the end of the Bayh-Dole Effect: patents as an analytical lens on University-Industry-Government relations, *Scientometrics* (in press); available at <http://arxiv.org/abs/1302.4864>.

Leydesdorff, L and Ivanova I A. mutual redundancies in inter-human communication systems: steps towards a calculus of processing meaning, *Journal of the American Society for Information Science and Technology* (in press); <http://arxiv.org/abs/1301.6849>.

Lengyel, B, Sebestyén, T and Leydesdorff, L. USPTO patent maps in Central Europe: can "Cathedrals" be built on the ruins of socialism? <http://arxiv.org/abs/1301.1757>.

Leydesdorff, L, Rafols, I and Chen, C. Interactive overlays of journals and the measurement of interdisciplinarity on the basis of aggregated journal-journal citations, *Journal of the American Society for Information Science and Technology* (in press); <http://arxiv.org/abs/1301.1013>

Leydesdorff, L., Wagner, C, Park, H W and Adams, J. (2013). International collaboration in science: the global map and the network. *El profesional de la información*. 22(1) (2013) 87-94 <http://www.elprofesionaldeinformacion.com/contenidos/2013/enero/07.pdf>.

Leydesdorff, L and Goldstone, R L. Interdisciplinarity at the journal and specialty level: the changing knowledge bases of the journal *Cognitive Science*, *Journal of the American Society for Information Science and Technology* (in press); <http://arxiv.org/abs/1212.0823>.

Leydesdorff, L and Strand, O, The Swedish system of innovation: regional synergies in a knowledge-based economy, *Journal of the American Society for Information Science and Technology* (in press); <http://arxiv.org/abs/1210.4396>.

Lim, Y S and Park, H W (2013). The structural relationship between Politicians' Web visibility and political finance networks: a case study of South Korea's National Assembly Members. *New Media and Society* 15(1), 93-108.

Nam, Y, Lee, Y-O and Park, H.W. (2013). Can web ecology provide a clearer understanding of people's information behavior during election campaigns? *Social Science Information* 52(1), 91-109.

Renault, T and Mello, J M C. (2012,) Entrepreneurial capabilities and organizational transformation: the case of the Coordination of Engineering Graduation Programs in the Federal University of Rio de Janeiro'. Paper presented at *10th Triple Helix International Conference*, Bandung.

Renault, T and Mello, J M C. (2012) Capacidade empreendedora e transformação organizacional: o caso da Coordenação de Programas de Pós-Graduação em Engenharia (COPPE) da Universidade Federal do Rio de Janeiro (UFRJ). Paper presented at the *Seminário Nacional de Parques Tecnológicos e Incubadoras de Empresas*, Foz do Iguaçu.

Rickne, A, Lastadius, S and Etzkowitz, H, Eds. (2012) *Innovation Governance in an Open Economy: Shaping regional nodes in a globalized world*. London: Routledge.

Uvarov, A and Perevodchikov E (2012) The Entrepreneurial University in Russia: from Idea to Reality. *Procedia – Social and Behavioural Sciences*, 52, 45-51, <http://dx.doi.org/10.1016/j.sbspro.2012.09.440>.

THA WORKING PAPERS

The Working Paper Series (WPS) is a new initiative of the Triple Helix Association. The idea is to promote and debate Triple Helix research beyond the standard Triple Helix international conferences. The WPS provides a forum for papers that are not yet ready for peer-review, but deemed good enough to generate debate and point to new directions. The aim is to provide insightful comments to author(s)) prior to the paper being sent for publication.

Interested authors should email their papers in a 'word document' file to Dr James Dzisah [james.dzisah@usask.ca] for review.

The papers must not to be cited without the express written permission of the author(s).

Triangulation of the Triple Helix: a conceptual framework (WP 1 2013)

This research aims to develop a conceptual model of triangulation of the triple helix explaining and understanding the importance of innovation and entrepreneurship within the dynamics interaction of the triple helix as a factor of competitiveness and regional development

A Sleeping Giant (sWP 2 2012)

In the present knowledge society, we are experiencing a convergence and crossing-over of three worlds which were previously separated: public research, business and governments; this convergence is represented by the Triple Helix model. It refers to a spiral model of innovation that captures multiple reciprocal relationships among institutional settings (public, private and academic) at different stages in the capitalization

Silicon Valley - The Sustainability of an Innovative Region (WP 1_2012)

An entrepreneurially oriented educational institution that transfers existing knowledge and/or creates new knowledge has the capacity to generate significant economic growth. This is the case of Stanford University, which had a key role in the development of Silicon Valley, reinforced by government support that made it possible for the region to become a world innovation

For further information, please visit:
www.triplehelixassociation.org/working-papers

ANNOUNCEMENTS

Latest results at the EGI Conference!

Take the opportunity to update yourself on the latest research results and practical experiences regarding innovation and growth from a social perspective!

The arena is the international conference "**Equality, Growth and Innovation - In theory and practice**" in Luleå, Sweden, 9-10 October 2013. The event will include presentations on recent research results, and workshops presenting practical experiences.

Highlights from the program:

- Introduction by Lars-Eric Aaro, CEO at the Swedish mining company LKAB;
- Keynote Speech on "Social innovation design" by Ezio Manzini, Professor of industrial design at Politecnico di Milano;
- Keynote speech on "From state feminism to market feminism?" by Judith Squires, Professor of political theory at University of Bristol, and Johanna Kantola, associate Professor in politics at University of Helsinki;

Register, as soon as possible, at <http://eventus.trippus.se/egi2013>, since the number of participants is limited.

Organizers: Luleå University of Technology, VINNOVA (Sweden's National Innovation Agency) , FAS (Swedish Council for Working Life and Social Research), National Secretariat for Gender Research, Includegender.org and European Social Fund's thematic groups Equality and Workplace Learning.

Both researchers and other actors are welcome to participate.

Website: www.ltu.se/EGlinenglish
Contact: egi@ltu.se

Conference on 'Innovation Systems and the New Role of Universities (COSIMUS) Oran, Algeria, 14-16 December 2013

Conference Theme: Exploring the importance of University-Industry interactions in the context of contemporary innovation systems

COSIMUS will take place at the Ecole Nationale Polytechnique D'Oran (ENPO-BPI 523 El M'Naouar-Oran (Algeria).

Website: www.uwe.ac.uk/bbs/conferences/cosinus, and www.enset-oran.dz/
Contact: mohammed.saad@uwe.ac.uk