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ENTREPRENEURIAL UNIVERSITIES

Conference Proceedings

Thomas Baaken, Arno Meerman, Marja-Liisa Neuvonen-Rauhala, Todd Davey, Matti Lähdeniemi, Timo Ahonen, Thorsten Kliewe (eds.)

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Science Marketing_
Science-to-Business Marketing Research Centre

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ENTREPRENEURIAL UNIVERSITIES

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FOREWORD

The Science-to-Business Marketing Research Centre and FINPIN jointly organised the Entrepreneurial Universities Conference in Münster. Being the 4th FINPIN conference, and the 11th Science-to-Business Marketing conference, the conference had a long history of successes to build upon. The aim of the conference was to create opportunities for lecturers, researchers and practitioners to meet and share their experiences, thoughts and knowledge on entrepreneurship and the entrepreneurial university. These conference proceedings entail a collection of papers based on presentations at the conference in Münster.

Through the promotion of entrepreneurship, innovations and the entrepreneurial university as a whole we have gathered a wide variety of authors willing to publish their findings in these proceedings. These papers address several key issues in entrepreneurship as well as the development of entrepreneurial universities. The proceeding papers cover several case studies as well as the latest research findings on entrepreneurship in higher education.

The next FINPIN conference is planned to take place in Finland in 2014, organised by Lahti University of Applied Sciences. The next Science-to-Business Marketing conference, labelled University-Industry Interaction will take place in Amsterdam in 2013, in cooperation with the VU University Amsterdam and the University Industry Innovation Network. This conference will focus on a broader view on University-Industry Interaction, entailing the entrepreneurial universities, however also topics such as IP management, collaboration in R&D and valorisation.

As the chairs of the Entrepreneurial Universities conference we would like to thank all the reviewers and the organisational committee that supported the conference and made it to be a success: Dr. Olli Mertanen (Turku University of Applied Sciences), Dr. Marja-Liisa Neuvonen-Rauhala (Kymenlaakso University of Applied Sciences), Dr. Carolin Plewa (The University of Adelaide), Anu Raappana (Lahti University of Applied Sciences), Prof. dr. Lydia Raesfeld (Universidad Autónoma del Estado de Hidalgo), Dr. Peter van der Sijde (VU University Amsterdam), Prof. Dr. Miemie Struwig (Nelson Mandela Metropolitan University), Prof. dr. Janusz Tezke (Cracow University of Economics), Dr. Nikolay R. Toivonen (National Research University ITMO), Dr. Lauri Tuomi (Haaga-Helia University of Applied Sciences), Timo Ahonen, Terhi Kuisma, Aino-Maria Pokela, Päivi Starckjohann (Lahti University of Applied Sciences/FINPIN), Todd Davey, Arno Meerman, Thorsten Kliewe, Kerstin Linnemann, and Frederik Rumpf (Münster University of Applied Sciences).

We would also like to thank all conference partners for supporting and promoting the conference and its topic 'Entrepreneurial Universities': Aalto University (Finland), Nelson Mandela Metropolitan University (South Africa), Energy2B (Italy), University of East London (United Kingdom) and Universidad Autónoma del Estado de Hidalgo (Mexico).

We hope for rewarding reading experiences and further ideas to develop out of these proceedings, for developing new practices in promoting entrepreneurship and innovation in higher educational institutions and look forward to your participation in our future conferences.

Prof. dr. Thomas Baaken

Director of the Science-to-Business Marketing Research Centre

Dr. Matti Lähdeniemi

President of FINPIN

INTELLECTUAL PROPERTY POLICIES: A STRATEGY TO ENFORCE THE ENTREPRENEURSHIP

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In order to contribute to regional competitiveness and sustainability, which depends largely on the ability of companies and institutions to develop and innovate, the Polytechnic Institute of Leiria (IPL) has taken a proactive role as a facilitator and booster of the entrepreneurship and knowledge transfer in its academic community and in the environment.

For this purpose, and along with other initiatives to promote and support entrepreneurship, the IPL has been focusing on Intellectual Property (IP) arising out of ideas, technical and scientific projects and research undertaken by its academic community and the environment. IPL believes that this way can promote the economic enhancement of knowledge and technologies developed in the region, providing the institution a return on the investments and efforts allocated to the developed and implemented projects.

With this goal, the IPL has been creating and developing a set of initiatives and procedures among the various research units and organic units (schools) placed in its internal organization, which facilitate both the boost and maintenance of the innovation generated within the academy (with all the issues as entrepreneurship, IP and university-industry collaboration) facilitating the transfer of technologies and products created.

This paper describes some of these procedures and an analysis of the impact of these procedures in the IPL is presented.

Keywords: Intellectual Property, Technology and Knowledge Transfer, Entrepreneurship

I. INTRODUCTION

It was during the last decade that Portuguese university patenting has grown and currently most applications which arrive at the National Institute of Industrial Property (INPI) come from academic institutions.

According to a study conducted by the Research Centre on the Portuguese economy and the Institute of Economics and Business Administration on the application for patents originating in Portugal, the above mentioned growth depends on global dynamics created at academia, namely universities, polytechnic institutes, other institutions of higher education or independent research institutes, where the patenting comes from research results. Based on the same study, main factors were identified for the university patenting growth, such as: (Godinho, Simões, Pereira & Rebelo, 2009, 14-44)

i) The proximity between the economic interests and the units of scientific and technological system. The industrial applicability of research results is becoming increasingly evident, and because of their growing potential for commercialization, there are more incentives for the protection of IP rights available for academia;

ii) The current crisis brought a period where the public funding for the units of scientific and technological system decreased, resulting in financial constraints for these institutions, which found in IP an additional source of funding.

iii) The process of knowledge diffusion has undergone changes as a result of the growing need for dissemination of academic research. Patenting is one of the ways by which knowledge is disseminated to information networks, especially of industrial base.

iv) At the political level, several national policies to encourage the academic patenting have been introduced, a trend similar to that of other countries. Bayle-Dole legislation, originated in 80's in the U.S.A., and used in different countries as an example, has allowed patenting by academic institutions the research results funded by public funds.

v) The institutions of scientific and technological system have increased concerns about the transfer of technology through the creation of offices of technology transfer (or similar), which have devoted particular attention to issues of industrial property.

Differences between academic and industry research are well established and many authors document this subject. As previously referred the academy is facing financial constraints and although in many cases financial support for university research comes from the government or not-for-profit organizations, the necessity for own funds leaded to a close connection with industry.

Academic research is mainly driven by individual academic research interests, while industry research is driven by potential market benefits and corporate decision processes. The scientific publications are the most common way for knowledge diffusion of academic research. On the contraire, an industrial research and development activity focuses on technology applications, which mark commercially usable technologies as their outcome.

However, over time, outcomes from academic research include in addition to the scientific publications, more and more commercial outputs such as patents, trademarks, and other intellectual properties. (Dai, Popp & Bretschneider, 2005, 579-598), (Bozeman, 2000, 627-655)

II. THE NATIONAL CONTEXT

Portuguese Polytechnic Institutes, according to its mission, keep a narrow relationship with the industry through their courses and the partnerships established for years in several joint projects. Over time the industry has recognized the value of use of new information, knowledge and technologies, resulting from R&D activities of internal or external sources (such as Universities/Polytechnics, Technological and Research Centres and Knowledge valorisation centres). (Alves, Silva, Ferreira & Pereira, 2008)
Most of the Portuguese Polytechnic Institutes are connected to the industry through four main vectors:

i) Providing services;
ii) Promoting and participating in thematic events, which are open and directed towards the general public or specifically for the industry;
iii) Establishing partnerships with the industry in the R&D and technical field;
iv) Promoting graduation, under graduation and post-graduation courses with syllabus that intend to answer the industry needs.

Among the national policies to encourage the academy-industry collaboration and academic patenting, two initiatives stand out. The first, which started in 2001, resulting from a partnership between the INPI and several national innovation system institutions, entitled GAPI - Support Offices for Promotion of Industrial Property. The second initiative was started in 2005, which was a project co-financed by EU funds and promoted by the National Innovation Agency, named OTIC - Technology and Knowledge Transfer Offices. With these new structures inside the higher education institutions commercialization and diffusion of technologies is enhanced and IP leveraged. Among all national higher education institutions, 22 national OTICs (8 in Polytechnic Institutes and 14 in Universities) were created and funded until 2008. The Polytechnic Institute of Leiria was one of the institutions that saw its new OTIC project approved. After this period, and to continue the work begun by OTIC, was statutory created CTC - Technology and Knowledge Transfer and Valuation Unit, organic unity of the IPL.

These initiatives were clearly preponderant in stimulating the application of IP, allowing, in particular within the academic community, to arise new inventions, contributing to a significant increase in academic patenting.

The international aim of innovation and technologies typical of advanced R&D resulting from academia, leads to a growing interest in IP protection by means of other than national application.

III. PROCEDURES OF ENTREPRENEURSHIP BOOSTING THROUGH THE INDUSTRIAL PROPERTY STIMULATION

The Polytechnic Institute of Leiria (IPL) is a young institution, created in 1980, where the entrepreneurial spirit of its academic universe flourished at an early stage. Taking into account the new role of the higher education institutions as social development mediators, the IPL felt the need to adopt a sustainable strategy to promote entrepreneurship. (Alves & Pereira, 2010)

The IP issues are closely linked with entrepreneurship. Therefore, the adoption of strategies to promote entrepreneurship comes together with the development of an IP culture in the academy. An effective way to develop this task is through the identification and

implementation of successful practices already existing and its generalization. It is highly advised that the industrial property techniques, methods, procedures, and methodologies that proved themselves efficient should be undertaken and, as much as possible, generalized at national level. (Sâvescu, 2000, 84-87)

In this context, the IPL defined an action plan concerning the development of internal industrial property which comprises the following operational systems (Figure 1):

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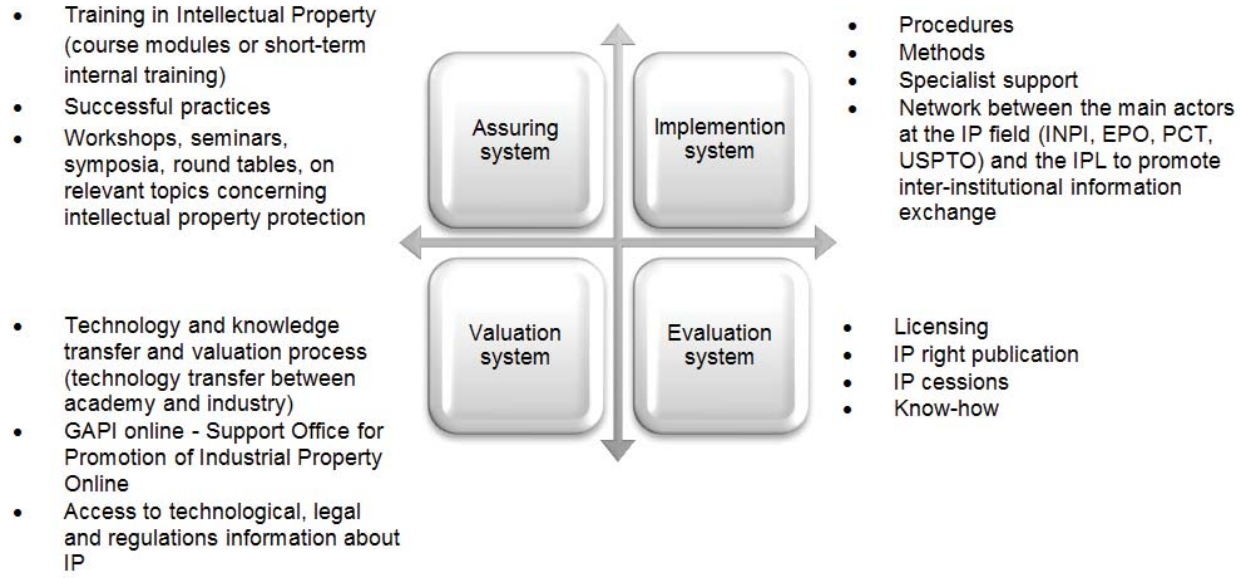

Figure 1 - Operational systems that constitute the action plan for internal industrial property promotion in IPL.

IV. INTELLECTUAL PROPERTY ACTIVITIES

Along with other initiatives to promote and support entrepreneurship, the IPL has been making a big bet on IP arising out of ideas, technical and scientific projects and research undertaken by the academic community, by itself and with the industry/external organizations. In order to sustain this commitment several initiatives are on-going:

i) Days of Industrial Property – this activity is implemented since 2009 in partnership with the INPI, and consists of thematic workshops focused in various subjects related to IP. The choice of content is made from a set of training KITs provided by the INPI, which are analysed by the Technology and Knowledge Transfer and Valuation Unit, and made available to those responsible for schools (direction) and research centers (coordination). These players of the process can choose the most suitable thematic according to the needs of its organic unit. After this process an agenda is defined in agreement with INPI. These Days of Industrial Property are opened for students and teachers.

ii) Training in Industrial Property - The IPL promotes during the school year short-term internal training actions on intellectual property for their students. These formations are mostly integrated into courses of graduated or post-graduated training taught in the main fields of actuation of IPL: Education and Social Sciences, Technology, Management, Fine Arts and Design, Maritime Technology, Tourism and Health Sciences.

iii) GAPI online - The Support Office for Promotion of Industrial Property Online is an established figure within the CTC/OTIC unit which has as the main objective of support the management of intellectual property of the IPL. This management support includes: i) The evaluation of what it wants to be protected in accordance with an IP right, the forwarding and the monitoring of the entire process until the granting (or denial) of such rights.;
ii) If the technology / idea is not susceptible of protection by IP, forwarding of the case to another form of protection as a trade industrial secret or copyright. In order for the inventor/creator to be in close contact with GAPI, the IPL has developed a set of web tools and internal procedures that allow this support office to be available online, anytime and anywhere. Here the inventor/creator can get all kind of documentation about IP, information on the

various internal procedures so that its idea/technology can be protected, and even to get monitoring and coaching on the best protection strategy to follow. The GAPI online also has available technical documents, surveys and forms that help the verbalization of technology and the analysis on which protection best suites to each invention/creation as well as a near real-time interaction with technical experts in IP of CTC/OTIC.

iv) IP Consultancy: Internal consulting for IPL's creators/inventors - After a first contact with CTC/OTIC by an investigator or an internal investigation unit presenting an intention of protect by IP rights an idea/project/technology, an inquiry is filled where the creator/inventor describes its stage of development. A screening process defines the most suitable IP right to be applied. In case of marks or design right, the process is immediately forwarded to INPI with the support of CTC/OTIC.In the case of patents or utility models, the first action is to assess the requirements of invention disclosure. When the creator/inventor is pressured for disclosure, a provisional patent application is submitted to INPI, followed by a conversion into national, community or international patent. On the other cases the inventor fills all documents required for a patent application and a provisional patent application is submitted to INPI. This procedure allows a preliminary search on state of the art according patentability criteria because the claims have been already included in the application. The search results can provide a robust basis for the assessment of internationalization of the right.

When an internal research unit has a considerable number of creators/inventors and/or applications for IP rights a scouter is defined, functioning as interface between the creators/inventors of this unit and the CTC/OTIC.

v) Consulting for the community – The IPL has recently created a consultancy service to external partners, e.g. industry.

V. DISCUSSION OF RESULTS

Since 2005 when the OTIC was created (later CTC/OTIC), the IP procedures systematization in IPL were notorious. To date processes were led by the creators/inventors. The result was the loss of information on the IP applications made and its course. Apart from a small number of IP application, some were made without information of institution or even its approval.

Currently, institutions of higher education are target of external assessments of their performance, which are based on analysis and evaluation of a wide range of indicators, some of which refer to IP issues.

Figure 2 presents an overview of the evolution of different types of applications for patents made by Portuguese inventors and applicants since 2000. It is worth noting the sharp increase in the number of published IP applications.

As expected, national applications are leader. This growth is mainly a result of points raised in Section 1, namely the GAPI Portuguese net creation (2001) and the implementation of national OTICs in 2006.

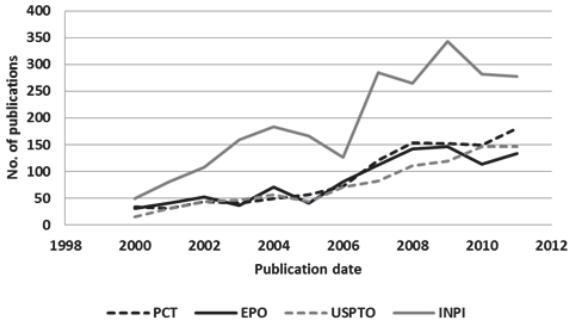

Figure 2 - Distribution of number of patent publications with Portuguese inventors and applicant in the period of 2000 to 2011.

According to a study developed by INPI about the national provisional patent applications and extrapolation can be made for the national patent applications (Armário, 2012, 31-34). The percentage of IP academic applications is about 20% to 25% when compared to the total of patent applications. The same range is achieved by the IP applications from industry. The majority of applications are individual (40% to 50%) and only a marginal range has origin on shared applications between industry and academia (1% to 5%).

The growing trend of IP protection by means of other than national applications reveals the influence of the international nature of innovation and advanced technologies typical of R&D resulting from academia. This effect can be seen in Figure 2 and is corroborated in Figure 3, which represents the evolution of the number of patent publications in the IPL.

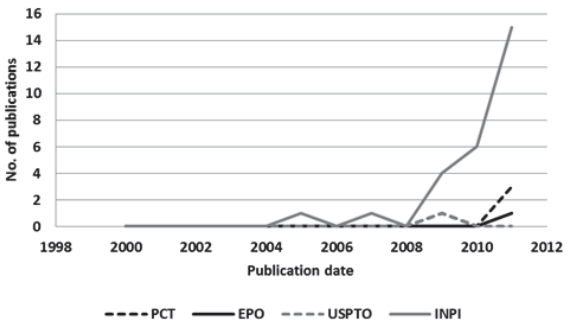

Figure 3 - Distribution of number of patent publications with Portuguese inventors and IPL as applicant in the period of 2000 to 2011.

A refined global vision is presented in table 1 where indicators relative to intellectual property applications are quantified.

Polytechnic Institute of Leiria						
	2006	2007	2008	2009	2010	2011
Applications						
Patents	-	-	3	30	25	18
National	-	-	3	23	18	9
Utility models	-	-	-	-	-	9
Internationals	-	-	-	3	1	-
European	-	-	-	-	1	-
USA	-	-	-	1	1	-
Other countries	-	-	-	3	4	-
Design	-	-	1	-	-	12
Trade Marks	1	-	1	-	-	1
Copy right	-	-	1	-	-	

Table 1 – Indicators from the Polytechnic Institute of Leiria between 2006 and 2011: intellectual property applications

VI. CONCLUSIONS

At this paper the main factors were identified for the university patenting growth.

Since industrial property issues are closely linked with entrepreneurship, the adoption of strategies to promote entrepreneurship comes together with the development of an industrial property culture in the academy. In this context, an action plan was defined in IPL concerning the development of internal industrial property which comprises four operational systems: i) Assuring system; ii) Implementation system; iii) Valuation system and; iv) Evaluation system.

Several initiatives that are on-going in order to promote and support entrepreneurship on the issue of IP were presented: i) Days of Industrial Property; ii) Training in Industrial Property; iii) GAPI online and; iv) IP Consultancy (Internal consulting for IPL's creators/inventors and Consulting for the community).

A global vision of indicators relative to IP applications is presented revealing a strong commitment of the Polytechnic Institute in developing essential skills, capabilities and attitudes on IP field inside the academic community.

VII. REFERENCES

Alves, M.L. & Pereira, N.A.M., Fostering entrepreneurship and technology transfer in the Portuguese higher education context, ICEIRD 2010 – International Conference for Entrepreneurship, Innovation and Regional Development, Novi Sad, Serbia, 27 - 29 May 2010.

Alves M.L., Silva P.C., Ferreira F.L., Pereira N.A.M., The University-Industry collaboration in the Portuguese Higher Education Subsystem – Polytechnic Institutes, 2nd International FINPIN Conference - Promoting Entrepreneurship by Universities, Hämeenlinna, Finland, 2008

Armário, S., 10th Statistical study on the Provisional Patent Application, INPI – National Institute of Industrial Property, 2012.

Bozeman, B., Technology transfer and public policy: A review of research and theory. Research Policy, 29, 627–655, 2000.

Dai, Y., Popp, D., & Bretschneider, S., Institutions and Intellectual Property: The Influence of Institutional Forces on University Patenting, Journal of Policy Analysis and Management, Vol. 24, No. 3, 579–598, 2005.

Godinho, M. M., Simões, V.C., Pereira, T.S. & Rebelo,G., Study of demand for patents originating in Portugal, CISEP/ISEG to INPI - National Institute of Industrial Property, Vol.6 - COLECÇÃO LEITURAS DE PROPRIEDADE INDUSTRIAL, 2009.

Săvescu, D., Some aspects regarding IP in universities (I), Communication and Management in Technological Innovation and Academic Globalization, 84-87, 2010

ENTREPRENEURIAL SELF-EFFICACY AMONG STUDENTS IN VOJVODINA

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Testing for entrepreneurial self-efficacy and gender differences among students in Vojvodina (Northern Province of Serbia) is the essence of the research that results in significant curricula recommendations. Inspired by the work of Wilson, Kickul and Marlino in 2007, Athayde in 2009 and Mueller and Dato-on in 2008 a questionnaire was conducted and distributed to 271 students in 5 different faculties in Vojvodina. In the research three hypotheses were tested:

H1: There are significant differences in communicated willingness to perform own business among students depending on their academic background.

H2: Students at the entering years of higher education are more likely to have higher tendency for self-employment after they finish faculty, than students at the exiting years.

H3: Students at engineering faculties are more likely to have solid business idea, solving particular problem, than non-engineering faculty students.

The result of this research will help detect most important entrepreneurial skills and abilities that are underprovided in students tested. Thus, research will help focus important fields lacking in present curricula. Students at higher educational levels must be offered courses encouraging and further developing soft skills, self-efficiency enhancement and fostering entrepreneurial culture.

Scrutinizing the likeliness of entrepreneurs among students, the results of the research provide the evidence that national policy and market incentives fostering entrepreneurship among youth are not enough, or are emerging late, as the most suitable policy would be providing students of all backgrounds with basic knowledge that would be demanded the moment they enter free market.

Keywords: entrepreneurial self-efficacy, students' entrepreneurship, self-employment tendency.

I. INTRODUCTION

Entrepreneurship is considered to be a key driver of economic development in recent years. Times of crises especially accent the need for greater entrepreneurial activity that is best described as recognition of the opportunity, its evaluation in terms of desirability and the feasibility and at last exploitation of the opportunity in order to gain economic and other benefits. As entrepreneurs are considered most apt for opportunity recognition their presence and increasing number are favoured in every economy. Entrepreneurship should not be thought of solely as an individual activity, especially in the time of global competition and accelerated high-tech advancement where innovations and entrepreneurial spirit are the cocktail for success.

Fostering entrepreneurial climate is recognized as fundamental policy instrument. Universities have an important role in educating future work force and special attention should be paid to encouraging young entrepreneurs to take necessary risks of their own ventures.

University of Novi Sad is the largest university in the Province of Vojvodina, enrolling nearly 50.000 students, with a population reaching approximately two million. With the significant influence of the University it is paramount that proper activities take place to generate higher number of entrepreneurs among students.

II. STUDENTS' ENTREPRENEURIAL SELF-EFFICACY AND FUTURE PROFESSION

The main focus of the paper is on entrepreneurial self-efficacy (ESE) among students. Entrepreneurial self-efficacy is probably the most commonly used instrument for predicting performance (Luthans 2002). Some research has proven that ESE has a positive and significant influence on performance (Baum, Locke & Smith 2001, Hmieleski &Baron). Individuals with high levels of ESE are more likely to demonstrate high persistence, concentration and satisfaction that lead to improved performance (Forbes 2005, Wilson, Kickul & Marlino 2007). Self-efficacy could be defined as self-confidence, believing one has the necessary knowledge and skills to create a business that will sustain and allow for pursuing a career of an entrepreneur. Measuring self-efficacy could be the problem. However, if self-efficacy is defined as a continuous construct, it could be measured by the number of average weekly hours spent working for the business (Kolvereid, L., Isaksen, E. 2006. P. 866). Previously stated proves the importance of recognition and measure of self-efficacy especially among students that are

the greatest potential base for future entrepreneurs.

The paper puts in focus differences among students concerning entrepreneurial self-efficacy depending on the future profession, or background. To test for chosen differences a questionnaire was given to 271 students with different backgrounds. Students from five different faculties were questioned: economics, natural sciences, medicine, agribusiness and engineers. A special attention was given to the year they are attending in order to gather information from all students at the undergraduate level (1^{st} – 4^{th} year of higher education) plus first year of Master degree, or 5^{th} year of higher education.

Testing for self-efficacy implies testing for self-confidence in the business oriented aspect of life. The questionnaire provided students with the possibility to state the willingness of self-employment after gaining university diploma in the form of percentage points, from 0 to 100. Testing students of different academic years and different background for differences was conducted in order to arrive to conclusions whether higher education progress and background, as a future profession, have an impact on self-employment aspirations.

Thus, a hypothesis "There are significant differences in communicated willingness to perform own business among students depending on their academic background" was tested.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F – ratio observed	P value	F critical
Between Groups	20043	4	5011	7.7456	7E-06	2.407

Table 1: Willingness for self-employment depending on the future profession

Tests to measure the differences between five samples, representing five different professions were conducted using analysis of variance (ANOVA). Analysis proved significant differences between tested groups of students as can be seen in table 1, as the observed F statistic is higher than critical F statistic (7.7456 › 2.407), or that P value is less than 0.05, or 5% that proves the change in students' self confidence level depending on the background or future profession.

The lowest mean was detected for students coming from the so called natural sciences (32.69), while the highest willingness on average was expressed by the students of economics and medicine (55.93 and 61.81 respectively). Students of the agribusiness and engineering faculties were more modest and their average willingness gravitates around 48.68 and 46.16 respectively.

The analysis represents an expected outcome, with the students of medicine showing higher tendency for self-employment, as it is the current development in transition countries to have an increased trend in private practice.

Result could have another implication. Students that showed the highest tendency toward entrepreneurship were from medical faculty that does not offer courses in entrepreneurship, or any business oriented courses at all. This potential is absolutely neglected and more strategically oriented approach is needed enabling students with necessary information for establishing their private practices and possibly enhancing their soft skills essential for enduring self-employment. As private practice requires more than one employee management oriented course should be offered as well.

On the other hand, students of natural sciences that showed the lowest willingness in entrepreneurship should be offered business oriented courses to better understand possibilities of applied science as this is clearly lacking in our schooling system.

III. STUDENTS' ENTREPRENEURIAL SELF-EFFICACY AND ACADEMIC ADVANCEMENT

Even a more important test is one regarding change in probability or self-perceived ability to manage entrepreneurial pressure depending on the academic advancement. The academic advancement was measured by the year of higher education the student was attending at the time of questioning. Thus, a hypothesis "*Students at the entering years of higher education are more likely to have higher tendency for self-employment after they finish faculty, than students at the exiting years*" was tested.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F – ratio observed	P value	F critical
Between Groups	26092	4	6523	10.62	6E-08	2.408

Table 2: Willingness for self-employment depending on the progress in education

Testing for the differences between five samples, representing five years of higher education ANOVA was used (4 years for majority of faculties representing undergraduate education and 5th year for students of most Master programs). The analysis proved significant differences among tested groups of students as the observed F statistic is higher than critical F statistic (10.62 › 2.408), or that P value is less than 0.05, or 5% that proves the change in students' self confidence level depending on the advancement in higher education as presented in table 2. Proof for existing differences in this case is not enough. The change itself in terms of increase or decrease is more important.

Academic year	No of students	Average response	Variance
1	45	60.72	480.79
2	43	63.58	605.92
3	42	52.67	678.37
4	49	38.57	533.50
5	75	40.83	714.90

Table 3: Variation of responses depending on the academic advancement

Presented in table 3 and figure 1 are average responses of students depending on the academic advancement. Decreasing responses are noticeable. Responses of students at the entering years, i.e. first two academic years are higher and as the time of crucial decision making of future employment approaches the responses visibly decrease.

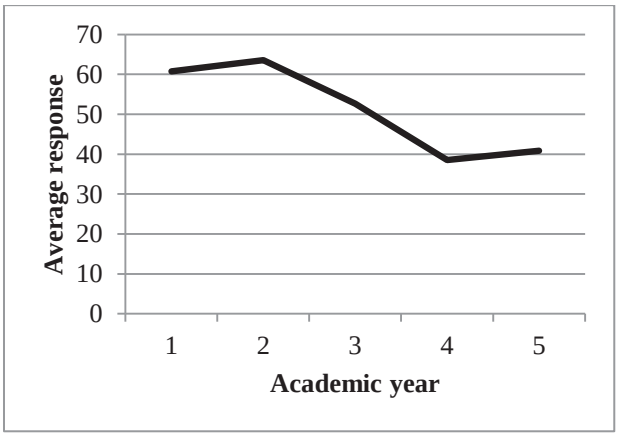

Figure 1: Variation of responses depending on the academic year

Students that postpone employment decision by enrolling at master courses show a slight increase in confidence, just proving the hypothesis that education process provides for more security, increasing self-confidence and thus artificial tendency towards self-employment is expressed.

The importance of this conclusion is twofold. Firstly, it enables teachers and lecturers at the university to adapt their subjects in order to foster an entrepreneurial climate and give more incentives in exiting years of higher education. Secondly, higher tendency towards self-employment in early academic years among students could be regarded as higher motivation for acquiring soft skills and entrepreneurial knowledge and should be used as a propeller to further advance skills they will need in future personal market endeavours.

IV. STUDENTS' IDEA DEVELOPMENT

The third hypothesis "Students at engineering faculties are more likely to have solid business idea, solving particular problem, than non-engineering faculty students" was tested in order to determine the highest innovative potential of students and its distribution. The statement that tested hypothesis in questionnaire was "During my higher education I have developed an idea that could be implemented" and a scale from 1 to 7 was offered, where 1 represents the answer "absolutely not" and 7 "definitely".

Table 4 presents test results, proving significant differences among tested groups, as the observed F statistic is higher than the critical F statistic (2.91 › 2.406), or that P value is less than 0.05, or 5%.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F - ratio observed	P value	F critical
Between Groups	30.38292	4	7.59573	2.909123	0.022131	2.405837

Table 4: Idea generation depending on the future occupation

However, when students from the engineering faculty are taken as one sample and all the other students as the second, t test rejects the hypothesis with the value of t statistics -1.7098 that is higher than 5% and the conclusion is that there are no significant differences among students.

Table 5 presents the average answers to provide for clearer image of the results. Based on the average response it is apparent that most students are not clear about the ideas they do or might have. However, contrary to the hypothesis, highest averages were provided by the students of medicine and agribusiness and the lowest by the students that should be closest to the market or applied science – engineers. As expected, students from business-oriented faculty did show lower tendency toward idea creation.

Future occupation	No of students	Average response	Variance
Economics	92	4.21	2.43
Natural sciences	40	4.40	3.12
Medicine	35	5.03	2.26
Agribusiness	49	4.80	2.62
Engineering	53	4.08	2.76

Table 5: Variation of responses depending on the academic background

The conclusion and the implication of this result could be the adaptation of curricula, especially at the faculties that should be oriented towards applied science, in a way that emphases market orientation of theoretical knowledge.

The second conclusion is that students of natural sciences do not show significantly less tendency toward idea generation while at the same time do not perceive themselves as potentially entrepreneurial. Much more incentives have to be offered for students of natural sciences as they have as much potential as any other students at the University of Novi Sad.

V. CONCLUSIONS AND RECOMMENDATIONS

Valuing ESE as the core characteristic of successful entrepreneurs a questionnaire, distributed to 271 students at the University of Novi Sad, offered prolific testing base. Focusing on influencing factors on ESE special attention was given to the future occupation and academic advancement, testing first two hypotheses. Subsequently, a third hypothesis was tested with a sole purpose of identifying business idea generation potential among students of different background.

Current curricula at the faculties of the University of Novi Sad does not offer entrepreneurial or business oriented classes at the faculties of medicine, natural sciences or engineering, except for some majors at the engineering faculty that are overlapping with business oriented classes, as is the case with agribusiness as well. Keeping this in mind, presented analysis was even more important as it proved the existence of solid business ideas among students and the necessity for classes that would satisfy unconscious and undetected need for knowledge and skills that will be of use after graduation.

Based on research several conclusions could be drawn and recommendations offered, as presented in figure 2.

Firstly, students of all faculties should be offered a class focusing on soft skills development or enhancement in the entering years (first two years of higher education) as this is the period when they have the highest motivation and feel more confident, thus higher self-efficacy is expressed.

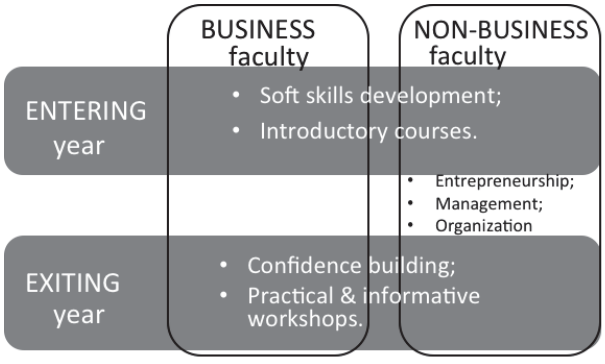

Figure 2: Recommendations for curricula improvement

Secondly, students of exiting years should be given the courses focusing on confidence building, as the time when decision-making has to take place and their courage plunges to the lowest. This period should not be followed with general knowledge classes, but with practical and highly informative workshops, making students more prepared for the market and future employment.

Thirdly, students of non-business oriented faculties should be introduced to several courses during their studies covering the area of

entrepreneurship, management and market strategies. As was presented in the analysis there is no significant difference in idea generation, thus there should be equal opportunity offered for all students to have their own business. The problem at the moment is that students of, for example natural sciences, do not see themselves as apt for such a venture. This prejudice must be corrected. Possible solution is a guarantee to every student that before attaining diploma courses of entrepreneurship, management and market strategy must be offered, as one class will not do miracles.

Acknowledged recommendations are merely supplement to current national entrepreneurship incentives that are not enough especially as they come tardy when personal believes are strongly developed, i.e. when students of non-business oriented majors are firm in belief that entrepreneurial activity is not for them. Putting more effort in developing soft skills necessary for self-employment, increasing consciousness of the importance of entrepreneurship and offering essential information will lead toward higher self-confidence level and hopefully higher entrepreneurial activity. Proposed university approach could enlarge entrepreneurial base significantly and thus create more jobs, leading to higher growth rates of the whole region.

VI. REFERENCES

Athayde, R. 2009. Measuring Enterprise Potential in Young People, Entrepreneurship Theory and Practice 2009; 33, 2, 481-500.

Baum, J.R, Locke, E.A, Smith K.G. 2001. A multi-dimensional model of venture growth. Academy of Management Journal 2001; 44, 292-303.

Forbes, D.P. 2005. The effects of strategic decision making on entrepreneurial self-efficacy. Entrepreneurship Theory and Practice 2005; 29, 599-626.

Hmieleski, K.M, Baron, R.A 2008. When does entrepreneurial self-efficacy enhance versus reduce firm performance? Strategic Entrepreneurship Journal 2008; 2, 57-72.

Luthans, F. 2002. The need for and meaning of positive organizational behaviour. Journal of organizational behavior 2002; 23, 695-706.

Kolvereid, L., Isaksen, E. 2006. New business start-up and subsequent entry into self-employment. Journal of Business Venturing 2006; 21, 866-885.

Kourilsky, M., Walstad, W. 1998. Entrepreneurship and Female Youth: Knowledge, Attitudes, Gender Differences, and Educational Practices. Journal of Business Venturing 1998;13, 77-88.

Mueller, S., Dato-on, M.C. 2010. A cross cultural study of gender-role orientation and its effect on entrepreneurial self-efficacy. USASBE Proceedings 2010; p. 198.

Ozgen, E., Baron, R. 2007. Social sources of information in opportunity recognition: Effects of mentors, industry networks, and professional forums. Journal of Business Venturing 2007; 22, 174-192.

Wilson, F., Kickul. J., Marlino D. 2007. Gender, Entrepreneurial Self-Efficacy, and Entrepreneurial Career Intentions: Implications for Entrepreneurship Education. Entrepreneurship Theory and Practice 2007.

SKILLS FOR ENTREPRENEURIAL HIGHER EDUCATION GRADUATES

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I. INTRODUCTION

This paper investigates the relationships between entrepreneurial skills and labor market outcomes of recent university graduates in 19 OECD countries. The major aim is to define clearly what are the entrepreneurial skills in an empirical framework and to gain a meaningful insight into how those skills affect major labour market outcomes such as wage, quality of job match and job satisfaction.

The recent economic crisis has caused a rapid growth of youth unemployment which does not spare even the best educated individuals in the most advanced societies. Meanwhile unemployment among youth with tertiary education in the US oscillated before around 3% it more than doubled by 2009. In the European Union, the youth unemployment among all the levels of education has risen from 15% in 2007 to over 21% in 2009. In 2011 the total youth unemployment rate in the EU area grew to over 5.5 million people, which is 23% of all active labour force. In total, only in the European Union, there are over 23 million unemployed workers willing to undertake gainful employment (European Commission 2009; Kiiver and Hijman 2010). These figures show how important the issue of youth unemployment is and it has become a prime question on political agendas worldwide (European Council 2012).

One of the primary solutions promoted by the major institutions is empowering the youth with entrepreneurial skills and creating of a fertile economic environment for creation of firms (Askun and Yıldırım 2011; European Commission 2009).

The idea of reducing unemployment through entrepreneurship has been proposed as early as in the beginnings of the twentieth century (Knight 1921). Knight was among the first to propose the idea of capitalist sustained economic growth through creative development which was strictly associated with entrepreneurial actions. The idea was further developed and expanded by Schumpeter (1950) and it entered the research agenda of neoclassical economics through papers of Kihlstrom and Laffont (1989) and Evans and Jovanovic (1989) among others (Kihlstrom and Laffont 1978).

Nowadays the literature on entrepreneurship is so vast that summarizing even the major research lines lies beyond the scope of this paper. Entrepreneurship as a socio-economic phenomenon has spread from economics (Parker 2009), through psychology (Moriano León and Gorgievski 2007; Zhao and Seibert 2006) to sociology (Thornton 1999).

This vast literature comes complimented with a growing body of literature on entrepreneurial universities as a way of producing entrepreneurial skills (Albert 2000; Chih-Chun 2011; Jones, Coviello and Tang 2011; Lindberg 2009; MartÍNez, Mora and Vila 2007; Powers and McDougall 2005). The concept has been analysed from various fronts especially institutional (Chih-Chun 2011; Powers and McDougall 2005) and cognitive perspectives (Carayannis, Evans and Hanson 2003; Lindberg 2009).

Using combined REFLEX and HEGESCO data set this paper analyses which skills typically claimed as important for entrepreneurship are abundant and which are scarce among higher education graduates in 19 European countries in years 2005 and 2008 (Garcia-Aracil and Van der Velden 2008).

In the following step a multilevel econometric framework is applied in order to tackle the issue how those unequally distributed entrepreneurial skills are being used in order to avoid a wide-spread phenomenon of over-education (McGuinness and Sloane 2010). In doing so, we take explicitly into account the diversity of institutional settings, teaching modes and cultural traits (Albert 2000; Askun and Yıldırım 2011; Carayannis, Evans and Hanson 2003; Carlsson et al. 2009). The initial analysis suggests that skills such as leadership, ability to negotiate, and ability to exert authority are in relative shortage among graduates and need further fostering through education techniques enhancing group working (Kirschner et al. 2011; Schoor and Bannert 2011; Strijbos and Fischer 2007). The paper aims to

achieve clear entrepreneurship-oriented educational policy recommendations.

The paper is organized as follows. The next section presents theoretical background and presents research hypotheses. The following section describes the data and provides insights into descriptive statistics of the combined REFLEX-HEGESCO sample as well as defines the econometric framework used in the paper. Results are presented section 4 and section 5 discusses and concludes the paper.

II. THEORETICAL BACKGROUND

Productive competencies of university graduates counted as part of their human capital stock (Becker 1993) are thought to facilitate their matching and increase their wages (Allen et al. 2007; Allen and Van der Velden 2009; Blundell et al. 1999; Chih-Chun 2011; Garcia-Aracil and Van der Velden 2008; Heijke, Meng and Ris 2003; Shaw 1987). There is an increasing understanding and consensus in the economic and sociological literature that higher stocks of productive skills are necessary in the growing advanced knowledge economies (Bassanini 2004; Craig and Gunn ; De la Fuente and Ciccone 2003; Freeman and Hirsch 2007; Iyigun and Owen 1999; Michelacci 2003; Pepper 2011; Powell and Snellman 2004; Volker 2009). Particular attention has also been paid to entrepreneurial skills as a motor of economic growth (Carlsson et al. 2009).

On the other hand an important concern has been raised whether educational expansion across Europe and other parts of the industrialized world may be accommodated sufficiently by the economy. Particularly a lot of attention has been paid to school-to-work transitions of young adults (Muller and Gangl 2003) and their subsequent careers (Allen and Van der Velden 2009; Gangl 2003; Verhaest and Van der Velden 2010).

One of the key elements of a relative labor market success or failure of university graduates, apart from their wage, is the quality of their education-job match (Garcia-Aracil and Van der Velden 2008; Groot and Massen van den Brink 2000; Van Smoorenburg and Velden 2000). This issue becomes even more salient given that the labour markets in the industrialized world are being thought to be biased towards high-skill technology jobs (Acemoglu 1998; Acemoglu and Pischke 1998; Blundell et al. 1999). This, in turn, comes coupled with the increased awareness of the need to enhance production of entrepreneurial skills within higher education institutions (Blanchflower and Oswald 1998; Etzkowitz 1998; Etzkowitz et al. 2000; Parker 2009; Philpott et al. 2011; Powers and McDougall 2005). Collaborations between public sector as a funding agent, universities and private firms are being proposed following the "triple helix model" developed by Etzkowitz (2000), whereby all the three economic agents join their forces in order to endow the graduates with skills and values necessary to start their own enterprises.

This paper looks at the quality of the vertical dimension of education-job match, namely over-education of recent university graduates with special attention to the level of influence of their entrepreneurial skills on the quality of this match. We hypothesize that entrepreneurial skills enhance the good matching of graduates and thus are a necessary item to be introduced into all higher education programs. Our research aims at filling the gap between the literature on entrepreneurial skills and competencies on the one hand and education-job matching on the other.

Much has been done in both strands of research so far. Entrepreneurial competencies have been thoroughly studied by economists (Parker 2009), through psychology (Moriano León and Gorgievski 2007; Zhao and Seibert 2006) to sociology (Thornton 1999). There seems to be a wide agreement among researchers that entrepreneurial skills enhance matching though mostly because entrepreneurs establish their own businesses. However, it is also important to recognize that only a small fraction of graduates endowed with entrepreneurial skills will establish their own companies. Majority of university graduates will tend to seek employment in other companies through labour market and therefore they are going to be exposed to mismatch situations mentioned above.

We want to study the situation where an entrepreneurial graduate has not established his/her business but rather works for someone else and see what the quality of their education-job match is. Furthermore we employ a multilevel econometric model in order to tackle the macro factors which might distort the results in the micro (individual) level.

We start off by defining the necessary set of entrepreneurial competencies which are very distinct from commonly known managerial skills. We define as entrepreneurial skill a combination of three factors following the conceptual scheme defined as "alertness" by Tang, Kacmar and Busenitz (2012). Their definition of entrepreneurial skills rests upon three major competency pillars: (1) scanning and search, (2)

association and connection, (3) evaluation and judgment. Our data permits us to approximate these three pillars with the following three variables, which combined define the necessary set of entrepreneurial competencies:

i) Alertness to new opportunities (scanning and search)
ii) Ability to come up with new ideas and solutions (association and connection)
iii) Willingness to question one's own and others' ideas (evaluation and judgment).

Entrepreneurial competencies as far as we are aware have never been proposed as a way of avoiding over-education. The most proximate paper to our idea is the one of Perotti (2007) who proposed that over-education in the Spanish labour market may be due to low investment in innovation of production processes through research and development in the Spanish industry. If the markets are not developing fast enough to accommodate the highly skilled labour the result is a growth in over-education and possibly also a crowding out effect of the less educated into unemployment (Aberg 2003; Thurow 1974). It must be, however, recognized that the idea of Perotti could be contested on the grounds of the skill biased technological change theory which posits that highly skilled workers may create their own businesses and thus generate demand for more skilled labour (Acemoglu 1998; Katz and Goldin 2008). In order to tackle this problem we include in our analyses a measure of the innovativeness of the economy as a proportion of R&D spending to the overall GDP of the country. Notwithstanding, the idea that having a large stock of highly skilled labour may result beneficial for the society has been criticized on the methodological grounds by Heckman and Krueger (2003) who affirm that investment in the initial development of youth must be sufficient in order to achieve the desired results in the labor markets. It is to say, that by observing a widening gap between highly skilled labour and their poorly skilled peers we are, in fact, observing a widening gap between sufficient and insufficient initial investments in human capital at early life stages of humans. This critique may have a potentially large distorting effect on our results. If individuals who get better matched happen to be also more able due to better initial investment in their human capital at their early life stages then our observations on entrepreneurial skills' impact on over-education may be at best flawed and often, in fact, false. Therefore to resolve this problem one must introduce into the analysis some measure of ability in order to rule out the problem of latent endogeneity due to ability (Morgan and Winship 2007). As a measure of ability we use tertiary level self-reported average grade of students which may suffer from unequal distribution of ability across fields of study. It has been widely demonstrated in the literature on over-education that fields of study contribute to explanation of the probability of over-education (Finnie and Frenette 2003; Frenette 2004; McGuinness 2003; McGuinness and Sloane 2010; McGuinness 2006; Ortiz and Kucel 2008; Robst 2008; Werfhorst 2002).

Finally as concerns the quality of match itself, understood in this paper as over-education, we introduce controls of gender, age and labour market experience at the individual level and employment protection legislation (EPL) strictness index, as well as unemployment measure at the country level. Meanwhile the EPL and unemployment are straightforward to understand in the matching (Jovanovic 1979) and job assignment (Sattinger 1993) contexts the gender and labour market experience issues are more subtle. Firstly, young workers lack adequate job experience and require training or on the job learning in order to be able to perform well in advanced job positions (Sicherman 1991; Sicherman and Galor 1990). Secondly, young women are prone to job interruptions due to fertility issues and thus the employers may discriminate them against acquiring higher level jobs fearing opportunity costs of their job interruptions (McGoldrick and Robst 1996). Another argument is that women self-select into particular types of education which is frequently associated with lower level jobs leading possibly to over-education (Borghans and Groot 1999).

III. DATA AND METHODS

Present research is based on two graduate surveys REFLEX and HEGESCO which used the same questionnaire and methodology and could be thus merged into one coherent dataset. The REFLEX survey has been conducted in 2005 on a sample of university graduates from Italy, Spain, France, Austria, Germany, Netherlands, United Kingdom, Finland, Norway, Czech Republic and Japan. Graduates included in the HEGESCO survey were interviewed in 2008 and come from Estonia, Slovenia, Turkey, Lithuania, Poland and Hungary.

We have excluded from the sample all individuals who were self-employed as we are interested only in those graduates who are not self-employed and who have reported their level of entrepreneurial skills. We have also dropped from the analysis all

those graduates who at the time of the interview worked less than 20 hours per week and those were older than 65 years-old.

The dependent variable, over-education, has been defined as a dummy variable indicating 1 when an individual considered that their job required a lower level of education than s/he possessed and zero otherwise (base category). From the base category, however, we have excluded all those individuals who considered themselves under-educated, namely who were holding jobs which they considered that required higher than their own level of education. The final sample size for the 18 countries included in our study sums up to 15.360 university graduates.

As a set of independent variables we include standard demographic controls such as gender and age and human capital controls, namely level of education higher than bachelor (master and doctorate) and work experience. As mentioned before fields of study stand in their own right as types of human capital (Kalmijn and Lippe 1997) and influence over-education (Finnie and Frenette 2003; Frenette 2004; McGuinness 2003; McGuinness and Sloane 2010; McGuinness 2006; Ortiz and Kucel 2008; Robst 2008; Werfhorst 2002). Furthermore a measure of ability approximated by self-reported relative grade at the time of graduation from the university is included in the regressions (Arcidiacono 2004; Arcidiacono, Hotz and Kang 2010). All independent and the dependent variable descriptive statistics are included in the Appendix A. Figure 1 depicts the relative distribution of over-education across the 18 countries included in the sample.

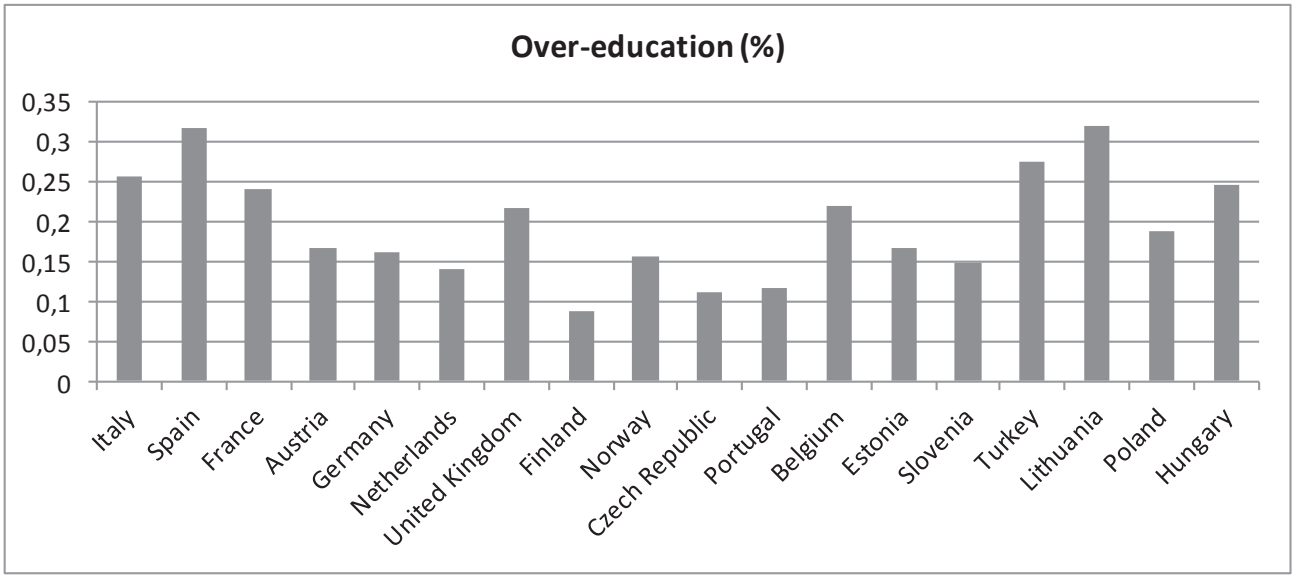

Figure 1: Over-education incidence across countries included in the sample

It is immediately observable that several countries such as Spain, Lithuania, Turkey, Italy, and France stand out in terms of over-education incidence (above 25%). On the other hand Finland, Norway and Czech Republic together with Portugal represent a group of countries with relatively low percentage of over-educated graduates (below 20%).

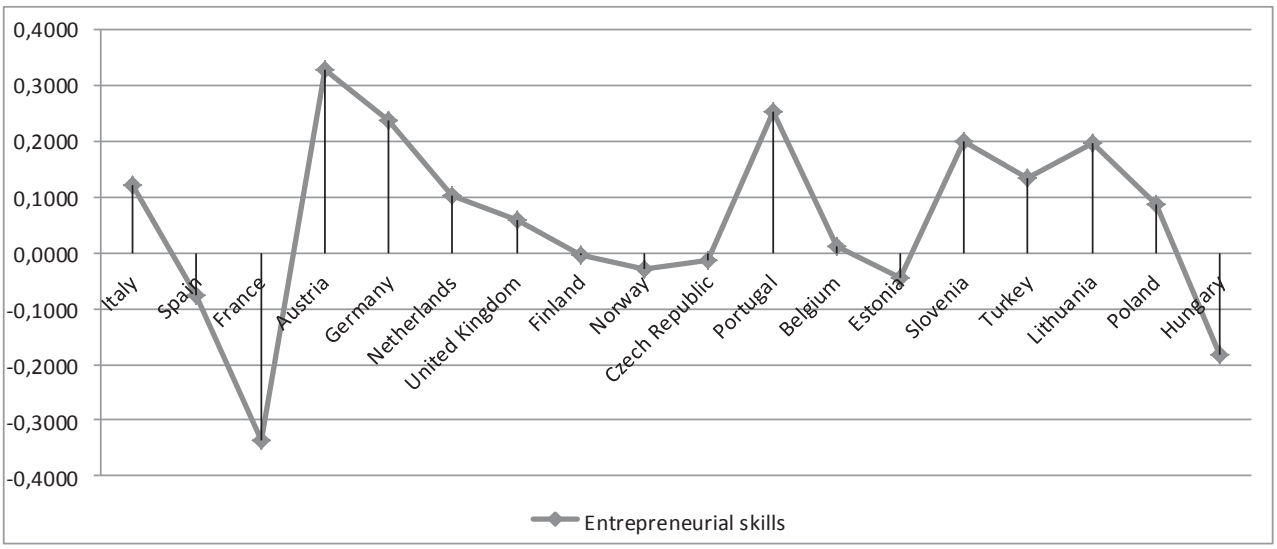

Figure 2: Mean levels of entrepreneurial skills across sampled countries.

A relative distribution of standardized entrepreneurial skills is represented in Figure 2.

Comparing Figure 2 with Figure 1 it is difficult to observe any clear tendency between mean levels of over-education and mean levels of entrepreneurial skills across countries. This could lead to a conclusion that there is no relationship between being entrepreneurial and achieving a good vertical education-job match after graduation from university. However, such conclusion would be wrong as we will show in our econometric analysis because countries in our sample differ significantly in terms of their technological development, their employment legislation, and their respective unemployment levels.

To model these initial differences and their respective differential influence on the probability of over-education it is necessary to refer to multilevel econometric framework.

A multilevel model is a type of econometric technique which permits to add a random factor to the intercepts of regression lines and if needed it is also possible to add random slopes to certain coefficients of interest – entrepreneurship in our case. A random slope model applied in our analysis can be defined as follows:

Let $y_{ij} = \begin{cases} 1 \text{ if } y_{ij}^* \geq 0 \\ 0 \text{ if } y_{ij}^* < 0 \end{cases}$ denote over-education dummy variable indicating presence of unobserved over-education latent variable y_{ij}^* which level is unknown to the individual, but who can indicate that s/he is or not over-educated.

We define a two-level random slope model for the latent over-education as:

$$y_{ij}^* = \beta_0 + \beta_1 E_{ij} + \mu_{1j} E_{ij} + \mathrm{B}_{ij}\mathrm{F}_{ij} + \mathrm{H}_{ij}\mathbf{Z}_{ij} + \mathrm{X}_j\mathrm{S}_j + \varepsilon_{ij} \quad (0.1)$$

where denotes the individual level of entrepreneurial skills, is the country invariant part of the slope for individual entrepreneurial skills and the is the random element of the slope for individual entrepreneurial skills. Vector denotes the fields of study which graduates chose in their university; is the vector of individual characteristics (such as gender, age, job market experience etc.); and vector stands for the country level variables such as EPL, unemployment level, mean level of entrepreneurial skills etc. The error term of this equation is denoted by which is measured at the individual level. Equation (1.1) can be estimated as means of a logistic model which is expressed by the equation (1.2):

$$\log\left(\frac{\pi_{ij}}{1-\pi_{ij}}\right) = \beta_0 + \beta_1 E_{ij} + \mu_{1j} E_{ij} + \mathrm{B}_{ij}\mathrm{F}_{ij} + \mathrm{H}_{ij}\mathbf{Z}_{ij} + \mathrm{X}_j\mathrm{S}_j + u_{0j} \quad (0.2)$$

with the error term $\boldsymbol{u} = \begin{pmatrix} u_{0j} \\ u_{1j} \end{pmatrix} \square\ MVN(\mathbf{0}, \boldsymbol{\Omega}_u)$ following multivariate normal distribution, where 0 is a vector of zeros and $\boldsymbol{\Omega}_u$ is the covariance matrix of the random effects. Equation (1.2) can be consistently estimated using maximum likelihood method with adaptive Gauss-Hermite quadrature approximation (Skrondal and Rabe-Hesketh 2008).

It is important to recognize here that by allowing the intercept to contain a random part per country we relax the assumption that it is the same data generating process which defines the average level of over-education across all sampled countries. Furthermore, given that the regression lines may vary in their relative position across the

countries, we go a step further and allow their slopes to vary as well. The substantive interpretation here is that different countries vary not only in their average level of over-education but moreover the impact of entrepreneurial skills for average individuals across those countries can be different. It is to say, that in country A given its average level of over-education entrepreneurial skills influence strongly the likelihood of avoiding this type of mismatch, while in country B given its own average level of over-education the impact of entrepreneurial skills on mismatch may be entirely different (more or less pronounced relatively compared to the other country). Relaxing the assumptions of fixed intercepts and fixed slopes we aim at explaining the important differences across countries visible in the comparison of Figures 1 and 2.

IV. RESULTS

In the theoretical section we have hypothesized that over-education can be explained through both individual and country level factors. In order to test this hypothesis we have applied multilevel random slopes logit model and estimated it for 18 countries in our sample. It can be assumed that the 18 countries included in our exercise are a random sample from a larger pool of countries (i.e. industrialized countries). In the first model we have regressed solely the intercept on the dependent variable: over-education. This way we have achieved the variance partition coefficient (VPC) which tells us how much of overall over-education variation can be attributed to unobserved differences between countries. The VPC for Model 1 is 0.052 which means that roughly 5% of overall over-education can be attributed to unexplained country differences. This fact can also be observed in Figure 3.

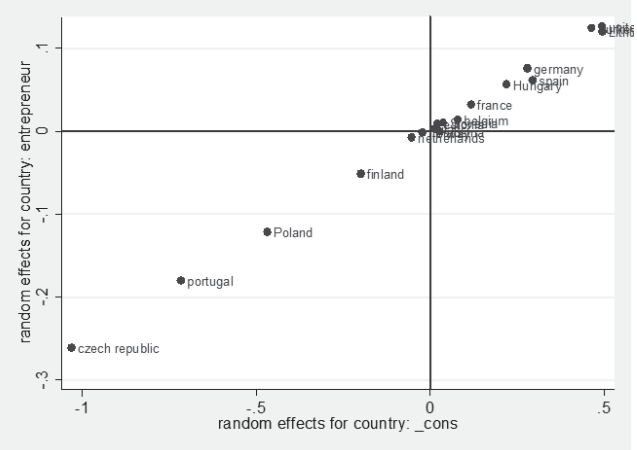

Figure 3: Country differences prediction taking into account random differences in intercepts and slopes.

From this graphic we can see that although many countries are similar (a large cloud of countries concentrated around the origin), there are some important differences: Czech Republic, Portugal and Poland have less over-education than average controlling for all the controls, and entrepreneurial skills affect more importantly over-education (decreasing it) in those countries. Instead, countries like the UK and Lithuania, where probability of over-education is higher than average, entrepreneurial skills seem to matter less for avoiding over-education. The likelihood ratio statistic of Wald test for significance of slopes has a $\chi 2$ distribution with 2 degrees of freedom and is significant at 5% confidence level. The positive covariance between intercepts and slopes implies that countries with high intercept (higher than average probability of over-education) tend to have a steep slope (strong negative relationship between being over-educated and having entrepreneurial skills).

As regards individual effects it is clear that entrepreneurial skills, labour market experience and higher ability (measured through average grade) decrease the individual likelihood of being over-educated. Entrepreneurial skills therefore are important in the matching process of graduates to jobs. On the other hand, however, humanities field of study contributes to over-education compared to the reference category: social science field. Health studies, on the other hand, reduce significantly the likelihood of over-education compared to social science.

With respect to the country level covariates, we observe that only the innovativeness of the economy, measured as a ratio of aggregate R&D spending to the GDP of the country diminishes the country level of vertical mismatch. This observation corroborates the earlier findings of Perotti (2007) who found that countries with low R&D spending tend to suffer more from over-education. Neither the average level of entrepreneurship, nor the strictness of the employment protection legislation seems to influence significantly the likelihood of being over-educated in our sample of countries.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Individual level variables						
Entrepreneurial skills		-0.236***	-0.238***	-0.239***	-0.239***	-0.261***
		(0.0276)	(0.0282)	(0.0283)	(0.0283)	(0.0387)
Female			0.0644	0.0542	0.0538	0.0563
			(0.0440)	(0.0469)	(0.0469)	(0.0469)
Age			0.00759	0.00783	0.00821*	0.00806
			(0.00492)	(0.00497)	(0.00497)	(0.00497)
Experience			-0.0179***	-0.0170***	-0.0171***	-0.0170***
			(0.00155)	(0.00156)	(0.00156)	(0.00156)
Relative grade			-0.222***	-0.224***	-0.224***	-0.223***
			(0.0305)	(0.0306)	(0.0306)	(0.0306)
Masters and Doctorate			0.851***	0.803***	0.798***	0.810***
			(0.0533)	(0.0547)	(0.0547)	(0.0545)
Reference field of study: Social sciences						
Education				-0.0914	-0.0940	-0.0933
				(0.0781)	(0.0781)	(0.0781)
Humanities				0.342***	0.346***	0.345***
				(0.0720)	(0.0720)	(0.0721)
Sciences				-0.0764	-0.0736	-0.0763
				(0.0743)	(0.0744)	(0.0743)
Engineering				-0.0902	-0.0905	-0.0889
				(0.0667)	(0.0667)	(0.0668)
Agriculture				0.183	0.181	0.174
				(0.131)	(0.131)	(0.131)
Health				-0.348***	-0.349***	-0.352***
				(0.0838)	(0.0838)	(0.0838)
Services				0.175	0.171	0.171
				(0.127)	(0.127)	(0.128)
Country level variables						
Entrepreneurship					-0.448	-0.349
					(0.633)	(0.489)
Unemployment					-0.0173	-0.0236
					(0.0512)	(0.0409)
Innovativeness†					-0.339**	-0.364***
					(0.139)	(0.113)
EPL‡					0.0863	0.0740
					(0.181)	(0.139)
Constant	-1.466***	-1.463***	-0.569**	-0.560**	-0.0957	0.00142
	(0.103)	(0.102)	(0.234)	(0.236)	(0.594)	(0.485)
N	15360	15360	15360	15360	15360	15360
Variance partition coefficients						
Country level	0.052	0.051	0.070	0.067	0.046	0.048
Individual level variance						0.0111

Model diagnostics: LR test for random slope: LR=9.8462*** has a χ^2 distribution with 2 d.f. and is significant at 5% confidence level.

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

†Innovativeness is measured as overall country R&D spending ration to its GDP (OECD Statistics 2005 and 2008)

‡EPL denotes Employment Protection Legislation index from the OECD Employment Outlook 2004

Given the robustness of the multilevel framework our conclusions can be extrapolated at some other countries. This is due to the fact that a multilevel framework treats the group of countries under study as a random sample from a larger pool of countries and thus the conclusions do not necessarily have to be restricted to the sampled countries.

V. CONCLUSIONS

From the above analysis it is clear that countries differ significantly with respect to over-education and entrepreneurial skills distribution. At first sight there is no clear pattern between over-education and entrepreneurial skills which might mislead policymakers.

With careful analysis applied in the multilevel framework we obtain that investment in entrepreneurial skills through spill overs between public sector, universities and private enterprises should be approached with caution and analysed at the individual country levels (Etzkowitz 1998; Etzkowitz and Leydesdorff 2000). A generalized policy, aimed at fostering entrepreneurial skills indistinctively from country specifics, may not bring the expected results as the countries in our sample prove to be very different in their impacts of those skills on over-education likelihood.

Some countries with high levels of over-education seem to enjoy much more strongly their entrepreneurial potential meanwhile other with low levels of over-education may lack entrepreneurial labour force. Our results suggest that countries with high levels of over-education seem to be more entrepreneurial at the individual level. However, at the same time, innovativeness of their economies is the key to successful use of their entrepreneurial labour. Our study demonstrates that not only it is important to invest in the entrepreneurial skills of university graduates because those reduce significantly their probability of being over-educated, but it is necessary to keep in mind which institutional setup the country is situated in.

Another contribution of our analysis is an observation that at least 5% of country differences in over-education remain unexplained even after accounting for entrepreneurial skills of individuals. This raises a question which should be the "right way" of investing in entrepreneurial skills at the university, and perhaps also lower levels of education.

In the era of rapidly growing skilled biased technology, entrepreneurial skills seem to be the key in avoiding pitfalls of bad education-job match. Well trained labour force has been shown to be necessary in successful economic growth (Michelacci 2003; Volker 2009). It is obvious that some small percentage of individuals will always be able to start their own businesses and innovate no matter the economic climate. However, large pools of university graduates will never become true entrepreneurs and thus attention needs to be paid to their respective labour market chances after finishing the university.

VI. References

Aberg, Rune. 2003. "Unemployment Persistency, Over-education and the Employment Chances of the Less Educated." European Sociological Review 19(2):199-216.

Acemoglu, Daron. 1998. "Why Do New Technologies Complement Skills? Directed Technical Change and Wage Inequality." The Quarterly Journal of Economics 113(4):1055-89.

Acemoglu, Daron, and Jorn Steffen Pischke. 1998. "Why Do Firms Train? Theory and Evidence." Quarterly Journal of Economics 113(1):79-119.

Albert, Cecilia. 2000. "Higher education demand in Spain: The influence of labour market signals and family background." Higher Education 40(2):147-62.

Allen, Jim, Yuki Inenaga, Rolf van der Velden, and Keiichi Yoshimoto. 2007. Competencies, higher education and career in Japan and the Netherlands. Dordrecht: Springer Verlag.

Allen, Jim, and Rolf Van der Velden. 2009. "Competencies and Early Labour Market Careers of Higher Education Graduates." Ljubljana: University of Ljubljana.

Arcidiacono, Peter. 2004. "Ability sorting and the returns to college major." Journal of Econometrics 121:343.

Arcidiacono, Peter, V. Joseph Hotz, and Songman Kang. 2010. "Modeling College Major Choices Using Elicited Measures of Expectations and Counterfactuals." IZA Working Papers No. 4738.

Askun, Bige, and Nihan Yıldırım. 2011. "Insights On Entrepreneurship Education In Public Universities In Turkey: Creating Entrepreneurs Or Not?" Procedia - Social and Behavioral Sciences 24:663-76.

Bassanini, Andrea. 2004. "Improving Skills for More and Better Jobs: Does Training Make a Difference?" Pp. 183-224 in OECD Employment Outlook: OECD.

Becker, Gary. 1993. Human Capital. A Theoretical and Empirical Analysis with Special Reference to Education. Chicago and London: The University of Chicago Press.

Blanchflower, David G., and Andrew J. Oswald. 1998. "What Makes an Entrepreneur?" Journal of Labor Economics 16(1):26-60.

Blundell, Richard, Lorraine Dearden, Costas Meghir, and Barbara Sianesi. 1999. "Human Capital Investment: The Returns from Education and Training to the Individual, the Firm and the Economy." Fiscal Studies 20(1):1-23.

Borghans, Lex, and Loek Groot. 1999. "Educational Presorting and Occupational Segregation." Labour Economics 6:375.

Carayannis, Elias G., Dan Evans, and Mike Hanson. 2003. "A cross-cultural learning strategy for entrepreneurship education: outline of key concepts and lessons learned from a comparative study of entrepreneurship students in France and the US." Technovation 23(9):757-71.

Carlsson, B., Z. J. Acs, D. B. Audretsch, and P. Braunerhjelm. 2009. "Knowledge creation, entrepreneurship, and economic growth: a historical review." Industrial and Corporate Change 18(6):1193-229.

Craig, John, and Andrew Gunn. Higher skills and the knowledge economy.

Chih-Chun, Wu. 2011. "High graduate unemployment rate and Taiwanese undergraduate education." International Journal of Educational Development 31(3):303-10.

De la Fuente, Angel, and Antonio Ciccone. 2003. "Human capital in a global and knowledge-based economy." in Employment and social affairs. Luxembourg: European Commission: DG for Employment and Social Affairs.

Etzkowitz, Henry. 1998. "The norms of entrepreneurial science: cognitive effects of the new university–industry linkages." Research Policy 27:823-33.

Etzkowitz, Henry, and Loet Leydesdorff. 2000. "The dynamics of innovation: from National Systems and ‘‘Mode 2’’ to a Triple Helix of university–industry–government relations." Research Policy 29:109-23.

Etzkowitz, Henry, Andrew Webster, Christiane Gebhardt, and Branca Regina Cantisano Terra. 2000. "The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm." Research Policy 29:313-30.

European Commission. 2009. "An EU Strategy for Youth – Investing and Empowering: A renewed open method of coordination to address youth challenges and opportunities." in 546, edited by Commission of the European Communities. Brussels.

European Council. 2012. "Towards Growth-Friendly Consolidation and Job-Friendly Growth." edited by Members of the European Council. Brussels: European Council Publishing Department.

Evans, David S., and Boyan Jovanovic. 1989. "An Estimated Model of Entrepreneurial Choice under Liquidity Constraints." Journal of Political Economy 97(4):808-27.

Finnie, Ross, and Marc Frenette. 2003. "Earnings differences by major field of study: evidence from three cohorts of recent Canadian graduates." Economics of Education Review 22:179.

Freeman, James A., and Barry T. Hirsch. 2007. "College Majors and the Knowledge Contents of Jobs." IZA Discussion Papers 2941:1.

Frenette, Marc. 2004. "The overqualified Canadian graduate: the role of the academic program in the incidence, persistence, and economic returns to overqualification." Economics of Education Review 23:29-45.

Gangl, Marcus. 2003. "The Only Way is Up? Employment Protection Legislation and Job Mobility among Recent Entrants to European Labor Market." European Sociological Review 19:429-49.

Garcia-Aracil, Adela, and Rolf Van der Velden. 2008. "Competencies for young European higher education graduates: labor market mismatches and their payoffs." Higher Education 55(2):219-39.

Groot, Wim, and Henriette Massen van den Brink. 2000. "Overeducation in the labor market: a meta-analysis." Economics of Education Review 19:149-58.

Heckman, James J., and Alan Krueger (Eds.). 2003. Inequality in America. What Role for Human Capital Policies: MIT Press.

Heijke, Hans, Christoph Meng, and Catherine Ris. 2003. "Fitting to the job: the role of generic and vocational competencies in adjustment and performance." Labour Economics 10(2):215-29.

Iyigun, Murat F., and Ann L. Owen. 1999. "Entrepreneurs, Professionals, and Growth." Journal of Economic Growth 4(2):213-32.

Jones, Marian V., Nicole Coviello, and Yee Kwan Tang. 2011. "International Entrepreneurship research (1989–2009): A domain ontology and thematic analysis." Journal of Business Venturing 26(6):632-59.

Jovanovic, Boyan. 1979. "Job Matching and the Theory of Turnover." THe Journal of Political Economy 87:972.

Kalmijn, Matthijs, and Tanja van der Lippe. 1997. "Type of Schooling and Sex Differences in Earnings in the Netherlands." European Sociological Review 13:1.

Katz, Lawrence F., and Claudia D. Goldin. 2008. The race between education and technology: Harvard University Press.

Kihlstrom, Richard, and Jean-Jacques Laffont. 1978. "A General Equilibrium Theory of Firm Formation Based on Risk-Aversion." Journal of Political Economy 87:719-48.

Kiiver, Hannah, and Remko Hijman. 2010. "Impact of the crisis on unemployment so far less pronounced in the EU than in the US: Latest developments appear more favourable in the US." in Population and social conditions. Brussels: Eurostat.

Kirschner, Femke, Fred Paas, Paul A. Kirschner, and Jeroen Janssen. 2011. "Differential effects of problem-solving demands on individual and collaborative learning outcomes." Learning and Instruction 21(4):587-99.

Knight, Frank. 1921. Risk, Uncertainty, and Profit. New Yourk: Houghton Mifflin.

Lindberg, Matti. 2009. "Student and early career mobility patterns among highly educated people in Germany, Finland, Italy, and the United Kingdom." Higher Education 58(3):339-58.

MartÍNez, Daniel, JosÉ-GinÉS Mora, and Luis E. Vila. 2007. "Entrepreneurs, the Self-employed and Employees amongst Young European Higher Education Graduates." European Journal of Education 42(1):99-117.

McGoldrick, Kim Marie, and John Robst. 1996. "Gender Differences in Overeducation: A Test of the Theory of Differential Overqualification." The American Economic Review 86:280-84.

McGuinness, S. 2003. "Graduate overeducation as a sheepskin effect: evidence from Northern Ireland." Applied Economics 35:597-608.

McGuinness, S., and Peter J. Sloane. 2010. "Labour Market Mismatch Among UK Graduates: An

Analysis Using REFLEX Data." Economics of Education Review.

McGuinness, Seamus. 2006. "Overeducation in the labor market." Journal of Economic Surveys 20:387-418.

Michelacci, Claudio. 2003. "Low Returns in R&D Due to the Lack of Entrepreneurial Skills*." The Economic Journal 113(484):207-25.

Morgan, Stephen L., and Christopher Winship. 2007. Counterfactuals and Causal Inference: Methods and Principles for Social Research (Analytical Methods for Social Research): Cambridge University Press.

Moriano León, Juan Antonio, and Marjan Gorgievski. 2007. Psychology of Entrepreneurship. Madrid: Publicaciones de UNED.

Muller, Walter, and Markus Gangl. 2003. Transition from Education to Work in Europe: Oxford University Press.

Ortiz, Luis, and Aleksander Kucel. 2008. "Do Fields of Study Matter for Over-education?: The Cases of Spain and Germany." International Journal of Comparative Sociology 49(4-5):305-27.

Parker, Simon C. 2009. The Economics of Entrepreneurship. Cambridge Cambridge University Press.

Pepper, David. 2011. "Assessing Key Competences across the Curriculum — and Europe." European Journal of Education 46(3):335-53.

Perotti, Loris. 2007. "Institutional Change in teh Spanish Higher Education System." European Journal of Education 42(3):411-23.

Philpott, Kevin, Lawrence Dooley, Caroline O'Reilly, and Gary Lupton. 2011. "The entrepreneurial university: Examining the underlying academic tensions." Technovation 31(4):161-70.

Powell, Walter W., and Kaisa Snellman. 2004. "The Knowledge Economy." Annual Review of Sociology 30(ArticleType: research-article / Full publication date: 2004 / Copyright © 2004 Annual Reviews):199-220.

Powers, Joshua B., and Patricia P. McDougall. 2005. "University start-up formation and technology licensing with firms that go public: a resource-based view of academic entrepreneurship." Journal of Business Venturing 20(3):291-311.

Robst, John. 2008. "Overeducation and college major: Expanding the Definition of Mismatch between Schooling and Jobs." The Manchester School 76(4):349-68.

Sattinger, Michael. 1993. "Assignment Models of the Distribution of Earnings." Journal of economic Literature 31:851-80.

Schoor, Cornelia, and Maria Bannert. 2011. "Motivation in a computer-supported collaborative learning scenario and its impact on learning activities and knowledge acquisition." Learning and Instruction 21(4):560-73.

Schumpeter, Joseph. 1950. Capitalism, Socialism, and Democracy. New York: Harper and Row.

Shaw, K. L. . 1987. "Occupation change, employer change, and transferability of skills." Southern Economic Journal 53(3):702-19.

Sicherman, Nachum. 1991. "'Overeducation' in the Labor Market." Journal of Labor Economics 9:101-22.

Sicherman, Nachum, and Oded Galor. 1990. "A theory of career mobility." Journal of Political Economy 98:169-92.

Skrondal, Anders, and Sophia Rabe-Hesketh. 2008. Multilevel and Longitudinal Modeling Using Stata. College Station: Stata Press.

Strijbos, Jan-Willem, and Frank Fischer. 2007. "Methodological challenges for collaborative learning research." Learning and Instruction 17(4):389-93.

Tang, Jintong, K. Michele Kacmar, and Lowell Busenitz. 2012. "Entrepreneurial alertness in the pursuit of new opportunities." Journal of Business Venturing 27(1):77-94.

Thornton, Patricia H. 1999. "The Sociology of Entrepreneurship." Annual Review of Sociology 25:19-46.

Thurow, Lester C. 1974. Generating Inequality: New York: Basic Books.

Van Smoorenburg, M. S. M. , and Rolf van der Velden. 2000. "The training of school-leavers. Complementarity or substitution?" Economics of Education Review 19:207-17.

Verhaest, Dieter, and Rolf Van der Velden. 2010. "Cross-country differences in graduate overeducation and its persistence." in ROA Research Memorandum. Maastricht.

Volker, Grossmann. 2009. "Entrepreneurial innovation and economic growth." Journal of Macroeconomics 31(4):602-13.

Werfhorst, Herman van de. 2002. "Fields of Study, Acquired Skills and Wage Benefit from a Matching Job." Acta Sociologica 45:287.

Zhao, Hao, and Scott E. Seibert. 2006. "The Big Five personality dimensions and entrepreneurial status: A meta-analytical review." Journal of Applied Psychology 91(2):259-71.

"WORKING FOR A DEGREE; A NEW ENTREPRENEURIAL STRUCTURE FOR 21ST CENTURY BUSINESS SCHOOLS".

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This is a conceptual paper, synthesising ideas on the relevance of business schools (and by extension of universities) with empirical research into student entrepreneurship. Current pedagogical provision lacks the agility to respond to rapid evolution of business models and to meet the learning needs of young entrepreneurs. Graduate employability is often considered to be an adjunct to be applied retrospectively or at least in the final stages of a degree programme.

The authors propose an innovative structure of university-directed businesses and professional practices that will employ students at all levels and share responsibility for their assessment at all stages of their higher education. It is likely that the best graduates will be given the opportunity to develop their careers further within this academic-commercial structure after their graduation.

The authors have applied their knowledge and experience of practical entrepreneurship to the design of this new paradigm to meet changing business patterns and demographics. They have empirically tested their principles of student-directed business through the SPEED (Student Placements for Entrepreneurs in Education) programmes, which they jointly proposed and developed in 2005 and which are still running. The increase in self-efficacy of student entrepreneurs on this programme has already been evaluated in conjunction with the Cambridge-MIT EHGI (Education and High Growth Innovation) programme and has demonstrated a statistically relevant correlation that indicates an increase in the entrepreneurial propensity of participants. This paper outlines a new pedagogical structure to prepare students for both employability and an entrepreneurial career in business creation.

Keywords: Business, enterprise, entrepreneurship, entrepreneurial, employability, relevance, REAL, SPEED

I. INTRODUCTION

The Schools of Economics, as predecessors of the modern Business Schools, were able to distance themselves from the more practical aspects of business and tended to produce more theorists than practitioners. By comparison, Business Schools are now expected to produce graduates who can make an immediate impact in the commercial environment. A US Business School dean wrote:

"We're being asked to produce graduates who can integrate, adapt, manage global diversity, work in teams and bring out the best in others, yet these are not the skills most doctoral candidates are asked to master as part of their training". (Heskett 2005)

To achieve this, Business Schools must ensure that their graduates not only possess a breadth of theoretical business knowledge, but also have the practical skills to implement this knowledge in the workplace at the earliest opportunity.

Sadly, the majority of business case studies on the library shelves of our business schools are based on medium to large enterprises. This lags behind the rapid change in the macro-economic climate over recent years that has resulted in the commercial sector being dominated by SMEs; mostly micro-businesses. In order to redress the balance, we must ensure that this new sector is populated with better and higher valued-added businesses that have the potential to become major players in the new economy.

Universities must provide the key human resources for the SME sector, who must have the necessary entrepreneurial attributes to make a positive difference. Such attributes are as much nurtured as taught and this work-related and enterprise-focussed approach would deliver the required skills. Based on the authors' experience, some 5% of graduates now have the will or wish to start up a business. Balance this against the 11% of the UK workforce that currently considers itself to be self-employed. Thus there is a clear gap that needs to be filled with better prepared entrepreneurs, who are comfortable working collaboratively and can blend their skill, knowledge and competency sets to raise the quality of SMEs.

This paper examines both current and innovative methodologies for achieving such outcomes, as well as examining both the relevance of current business education to employers. It has also been necessary to review the positioning of Business

Schools to attract the best students and achieve the optimum employment for their graduates. It is acknowledged that a proposal to create a School of Professional and Entrepreneurial Business [SOPEB] would involve radical change and that it would be likely to meet strong resistance to implementation were this applied in a single stage. However, the suggested paradigm offers scope for partial implementation, either through the creation of a stand-alone pilot programme or through incremental application of new structures.

Much has been written in recent years on the relevance of Business Schools to the business community, although this has been predominantly related to MBA programmes. Often cited is Bennis & O'Toole's "How Business Schools lost their way" in the Harvard Business Review (2005). This practitioner paper argues that business schools are guilty of applying scientific principles to what should really be considered as professional schools. It has also been asserted that "educators tend to focus too much on the hard analytical skills and not the 'soft-side' of management" (Van Ness & Melinsky 2008). The concept of the "professional school" was analysed as a real alternative to current structures for the Advanced Institute of Management Research's paper on future scenarios for UK Business Schools (Ivory et al 2006) and is a key part of the recommendation to Deans.

A professional school, such as Law or Medicine, prepares a student to practice their profession. That is their prime purpose and all other processes are ancillary to this. The final assessment of the success of such schools is the fitness of the graduate to practice their profession to the standard set by the profession's governing body. Whilst academic rigour reasonably suggests that such learning ought to be grounded upon scientific research principles, this is in reality a parallel process, whose distance should not ultimately affect the ability of the graduate to practice their profession. It should be noted that most future academics have followed this practical route to qualifying in their respective professions.

This paper therefore examines the theory that business schools ought to be re-structured to take into account the realignment of their aims in preparing students that are fit for the purpose of practising their intended (or associated) professions, employment or even self-employment, rather than simply preparing them for an academic teaching career. Employability of graduates is now a key issue and UK universities are increasingly espousing this cause, although without necessarily implementing an enabling structure.

It is not enough to provide a simple menu of qualifications. Employers expect graduates to bring relevant industry knowledge with them, rather than having to spend the first years of their employment gaining it. Employers are willing to train their staff, but prefer to build on relevant skills. Interestingly, some business schools see companies as their customers, rather than the students or their parents (Therin 2011).

However, the authors of this paper recognise that the barriers to such radical change in Higher Education are likely to withstand any attempt to impose an entirely new paradigm. It is therefore acknowledged that a more acceptable approach would be to create a SOPEB that would incorporate this proposed structure and curriculum and work in parallel, but independently from an existing business school. This would also provide a valuable comparison between the alternative pedagogies.

Employing these new professional methodologies, it is equally possible to develop an entrepreneurial mind-set in students. This would prepare them for both an enterprising approach to employment as well as providing the toolset and confidence for them to become self-employed in their own enterprise, either upon graduation or at a later stage in their careers.

II. Business Professions

In reality, a business school provides a group of professional schools rather than preparation for an individual profession. Equally, some professions exercise a weaker control on the activities of their members than others. This has resulted in different levels of recognition by the business community and the government of the professional status of their practitioners. A Chartered Accountant has an acknowledged status for the audit of corporate accounts, whereas it is not mandatory to employ a Chartered Marketer to prepare a corporate marketing strategy.

However, this should not remove the business or industrial elements from the learning equation, since they are integral parts of the commercial system and students need a clear understanding of their processes and functions and they in turn are the key employers of professionals.

III. Current Business School structure

UK business schools generally use a modular system for both teaching and assessing business subjects. Over a three year undergraduate

programme, the student will generally encounter three types of module. These are:

i) Core progressive – compulsory modules that progress through the programme, such as Principles of Marketing (Year 1), Marketing Management (Year 2), International Marketing or Strategic Marketing (Year 3).
ii) Core unique – compulsory modules that stand alone, such as Organisational Behaviour (Year 1), Operations management (Year 2) and a research project (Year 3)
iii) Elective – any non-compulsory modules the student elects to study to broaden their subject knowledge, including those outside the normal business disciplines.

The content of these undergraduate modules is likely to be similar in every HEI that offers business and management programmes. Differentiation of a Business School is achieved through a combination of the reputation of the academics underpinning the teaching through their research, the overall reputation of the HEI or the inclusion of "niche" modules in highly specialised topics. The first two forms of repositioning may generally only be achieved incrementally, through a gradual improvement in their measured or perceived quality in a given institution.

In practice, the existing structure is relatively straightforward to manage, with progression usually dependent upon a predetermined level of success at assessments. However, there is very little scope to include the "laboratory" or practical elements of study in this structure. The best enhanced learning opportunities the student can expect is probably attending guest lectures from practising business people, visits to industrial sites or possibly semi-practical workshop sessions. Although delivery is changing, Pfeffer & Tong are generally correct in stating that "…in relatively few instances in established business schools is there much clinical training or learning by doing" (2002). Opportunities to engage in programmes such as SPEED (Student Placements for Entrepreneurs in Education) are very recent and are still only available to a very limited number of students (Cook & Munro 2007).

IV. Proposed Structure of a SOPEB

There is strong evidence that sandwich degree programmes, which offer the student a placement or internship year, tend to affect positively the student's future employment prospects (Lucas, Cooper Ward & Cave 2009). This is reinforced by the evidence that "Skills modules, placements, PDP and employability awards have the potential to create linkages between different stakeholders and different parts of HEIs" (Pond & Harrington 2011). However, with the current financial demands on students, this is becoming a less attractive proposition, since most now prefer to shorten the period of financial drain during their tertiary education and to graduate into employment at the earliest opportunity.

Wee (2004) states that highly structured traditional learning demotivates students from learning and that they work simply to pass their examinations. Conversely it has been demonstrated that enterprise and self-employment projects such as SPEED create a marked improvement in self-confidence, provide a solid foundation for the student in commercial reality as well as improving the student's prospects for both employment and self-employment after graduation (Cooper, Daly & Good 2009). This latter point has been unequivocally demonstrated by the emphasis placed upon the experience gained on the SPEED programme by certain "blue chip" consultancies and their readiness to employ good graduates who have participated successfully in such experiential programmes. It is argued that there is a need for "a business education system that allows students to build on their individual diversity, including their strengths, personal background and career interests" (Mao & Kao 2010)

Employer attitudes towards the nature of the education provided by HEIs have shifted. Over the last half century Western industrialised society has experienced various trends and specifically the rise in consumerism has demonstrated that that the consumer no longer expects any offer based solely upon the choice and limitations imposed by the provider. The supply chain has moved from "push" to "pull" and this shift in emphasis has now been embedded in most commercial systems. Education has responded more tentatively, since such a change might appear to challenge its embedded principles of academic rigour. This is not necessarily so, since it is possible to introduce innovative and radical change to the learning process whilst still retaining a high level of quality through assessment. However, such assessment would certainly need to be based upon innovative processes.

The structure proposed in this paper would be more complex than that currently in place. It would be necessary to blend a pathway that included all the required learning elements for a

professional qualification with the broader context of entrepreneurialism, whilst ensuring that all graduates had mastered the essential elements of business, management and leadership.

However, the concept has an elegant simplicity. The students learn in a corporate environment, applying their knowledge as they gain it to the benefit of the various companies within which they are able to work, gaining feedback on their performance from colleagues (in reality, academic staff, commercial mentors and more advanced students).

These are real businesses, trading in a competitive marketplace. In fact, the creation of a conglomerate of related enterprises similar to a Japanese Keiretsu encapsulates the concept as the Related Enterprise Action Learning (REAL) programme. The students would have the opportunity to work in different sectors and disciplines as they progressed and thus gain a realistic insight into their own strengths and weaknesses. "It requires the creation of an uncertain and ambiguous context encouraging students to step outside taken-for–granted assumptions. Uncertainty in an educational programme replicates the circumstances in which an entrepreneur founds a business ([Gartner 1988] cited in Pittaway and Cope 2007)

Equating this experience to the current three year programme, undergraduates would progress through three phases:

- 1st Year Trainee
- 2nd Year Supervisor
- 3rd Year Manager

Whilst the standard progression would be over three years, this overall duration could be flexible if accepted by HEFCE as an average rather than an absolute. Since this model is predicated upon a student's ability to manage their own learning process, the rate at which they progressed ought also to be to some extent under their own control. It is important that students are given some control over their learning process, since "when students are relieved of any sense of responsibility for their learning and much involvement in the learning process, the evidence is that they learn much less" (Pfeffer & Tong 2001).

V. Learning and Teaching

It is acknowledged that this model would require pedagogical expertise to ensure that the required standard of academic quality is maintained, however the methodology is expected to be based upon:

- Self-directed learning
- Peer group learning
- Subject seminars on group demand
- Work-based learning
- Practitioner mentoring

VI. The Corporate Structure

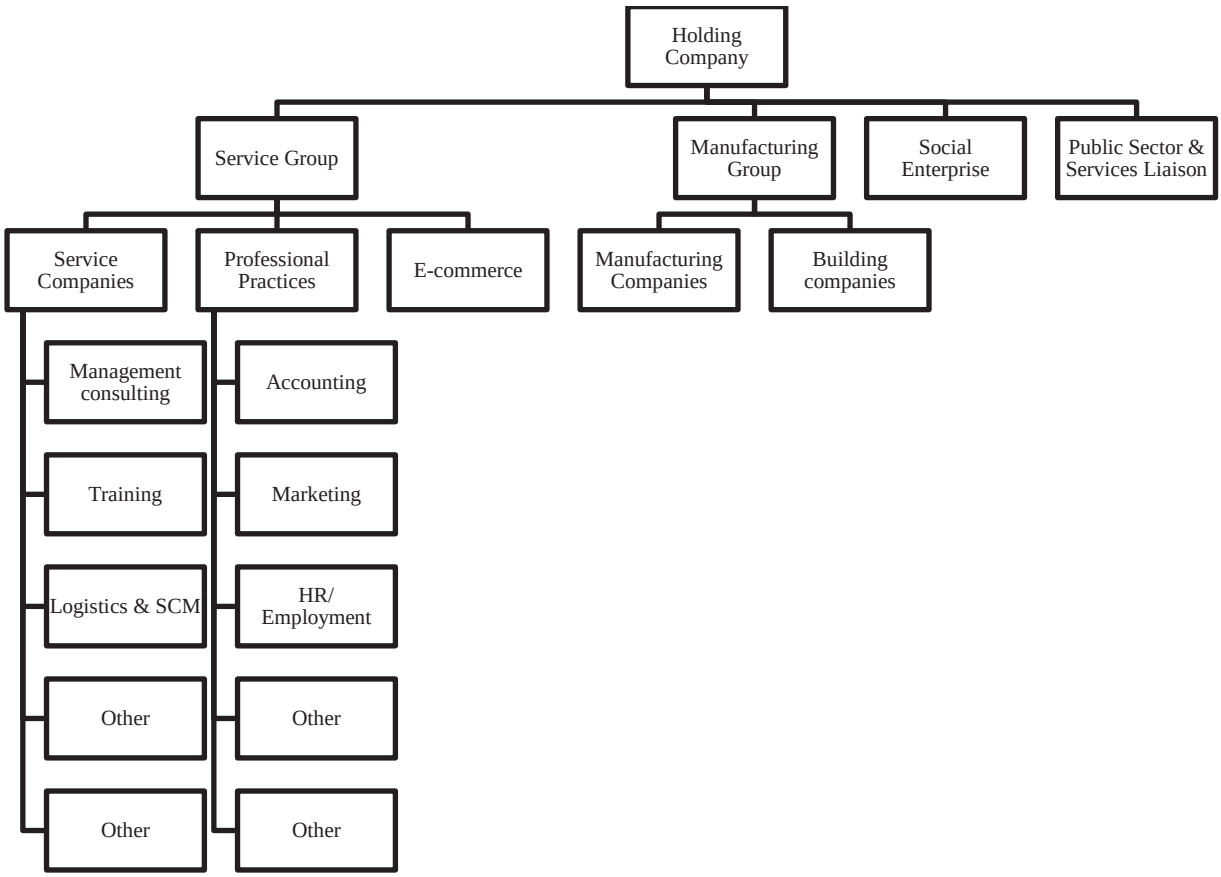
All internal companies would be of limited liability and subsidiary to a holding company wholly owned by the university. These subsidiaries would be grouped as service and manufacturing companies.

Service companies would have a very low cost of entry and overheads, since the main overhead of such businesses is their wage bill. It is hoped that the regulatory authorities would recognise their status as teaching entities and not apply such strictures as minimum wage regulations. This needs to be investigated.

A sub-division of the service companies would be the "Professional Practices", managed with the support of their respective professional bodies. However, students within the professional sector would also have the opportunity to work for periods within the wider commercial sectors.

Manufacturing companies have a much higher cost of entry, so serious consideration would have to be given to using or partnering with external manufacturing concerns, at least during the early phases of implementation. It may also be possible to develop such companies with the benefit of assets already owned by the university within technological Schools.

Below is an indicative model for a basic corporate framework. This has been simplified to demonstrate connectivity and relationships, since in practice it would need to be greatly expanded to provide adequate employment opportunities for a complete intake of undergraduates and postgraduates.



[Note that this is work in progress and that there are other viable structures that may be considered]

VII. External Partnerships

The high cost of entry into the manufacturing sector would suggest that it would be advisable, particularly in the early stages of development, to partner with external companies. This would certainly bring joint benefits to both the university and the partner companies, although there is a risk that there might be a conflict of interest with existing KTP (Knowledge Transfer partnership) programmes. However, this could be overcome through clear differentiation of the partnership structures between the university and the companies. These partnerships would provide a key element in new forms of business schools "to focus on the issues that businesses themselves consider relevant" (Worrall, Lubbe and Klopper 2007).

VIII. Assessment

Assessment should come from three sources:

- Summative assessment
  - Professional examinations
  - Seminar workshops
  - Synoptic examinations
- Formative assessment
  - Through self-directed learning media
- Peer assessment
  - Through group projects
  - From workplace supervisors

Again, as in the paragraph on Learning and Teaching above, it would be necessary to establish an assessment programme through consultation with both Academic and Educational Quality Boards.

IX. Implementation

The scale of implementation is a critical factor in this proposal. If a current business school were to be modified into a SOPEB, it would have to be implemented over at least a three year period to allow current students to complete the programme of study for which they had registered. During this period, current teaching would have to be phased out. However, the transition may well put additional stress upon academic resources in the short term.

If a "risk averse" alternative mode of implementation were to be adopted, REAL would be in the form of a limited pilot of the corporate structure, operated within the Business School in parallel to a reduced form of the current programme structure. This model might also require additional resources, although it might also be possible to run it with the support of external companies and a mix of practitioner and academic mentors. There may also be the

opportunity to attract external funding as a research project.

There is a possible third option. This would be the formation of a SOPEB that exists independently from the normal Business School, but runs in parallel. The obvious downsides are firstly, that it could create at least a perception of internal competition and secondly, that it might need to be staffed as an additional School or department. However, the alternative to this is to create a virtual faculty, drawing upon both internal and external expertise to meet the learning demands of students as and when requested.

X. Enhanced Research Opportunities

Researchers would benefit from opportunities for applied research with full access to a range of commercial companies and their complete trading data. This would accelerate the development of industry-specific expertise that should prove attractive to external commercial organisations and the public sector. It would also fulfil the need for a longitudinal study of integrated employability skills within a business school indicated by Pond and Harrington in their conclusion (2011).

XI. Student Benefits

Why do students invest their time and resources in university study? It is suggested in an article on the relevance of Business Schools that "students, like the schools, are also engaged in a utility-maximising approach. What matters generally is less the education content than the credential they receive and the dollars attached to that credential by desired future employers" (Teitelman 2011). Hopefully this rather cynical view is only partially correct, since university education provides considerably more benefit, even if unappreciated at times by its recipients. In their paper on graduate employability through internships, McDonald et al point out that "university learning undoubtedly delivers individual, societal and scientific benefits far removed from the employability agenda". (McDonald, Birch, Hitchman, Fox & Lido 2010).

However, employability is a key issue, if nothing else than to repay the cost of education. There ought also to be more immediate material benefits for the value of the student's contribution to the commercial interests of this learning model.

XII. Secondary Benefits

Another obvious benefit is that the companies would also provide opportunities for students and staff from other Schools and Faculties of a university. A university engineering company would not only need technical advice and input from the staff of an engineering department, it would also provide an enhanced learning environment for their students.

Perhaps an even more important factor would be the income derived from the trading activities of the companies and fed back as surplus to the university. Whilst the current economic situation is expected to be of a limited duration, there is little doubt that a large question mark hangs over future central funding of Higher Education. It is therefore essential that diligent HEIs create a broad-based platform for income generation, whilst ensuring that such activities remain compatible with their core educational mission. These criteria would appear to be met by this proposal.

Finally, there ought to be some means to reward the contribution of the students, if for no other reason than to demonstrate the value of their commercial input in the course of their studies. This could help offset burdensome student loans and would help to allow students to support themselves through activities relevant to their studies. It should also be possible to reward the contribution from academic staff made in excess of their normal workload.

XIII. Risks

- Internal approval
- Acceptance by existing academic staff
- Acceptance by prospective students
- HEFCE funding
- Company regulation
- EU competition law
- Commercial failures

Whilst all these risks are real, none would seem to be insuperable. There is also a good possibility that this proposal would find sponsorship from government, which would help to remove any regulatory barriers.

XIV. Caveat and future

This is a paper based upon a concept for the development of an innovative SOPEB. It was developed from the authors' belief that Business Schools, particularly those in post 1992 universities, need to be more responsive to commercial expectations and to prepare their graduates for employment in the 21st Century. Entrepreneurial learning is equally valid for graduates who may wish to form their own business or seek employment with others. It is a holistic education that is intended to impart a

breadth of knowledge, supported by an understanding of commercial responsibility and actual corporate working culture.

This paper advocates extreme and radical change, which it is acknowledged may not be acceptable within the risk-averse culture of Higher Education. It may be that it could only be approved for partial implementation, which would be a pity, since it would then only develop partial benefits. However, it is offered to meet a perceived need for repositioning or differentiating Business Schools and the authors would welcome the opportunity for an empirical trial.

XV. REFERENCES

Bennis W G & O'Toole J (2005) How Business Schools lost their way. Harvard Business Review. May 2005 Vol.83. Issue 5. p96.

Cook R and Munro J (2007) Widening Participation in Enterprise Education – an IDEAL Approach? Proceedings of Small Enterprise 20th Conference, Manukau City Auckland, New Zealand September 23-26th 2007.

Cooper S Y, Daly I and Good D (2009) SPEED Student Placement for Entrepreneurs in Education: Final Evaluation Report. Commissioned by University of Wolverhampton and HEFCE. Available for GED University of Wolverhampton.

Heskett J (2005) How Can Business Schools be made More Relevant? HBS Working Knowledge. July 4, 2005.Online.

Ivory C, Miskell P, Shipton H, White A, Moeslein K and Neely A. (2006). UK Business Schools: Historic Contexts and Future Scenarios. Summary Report from an EBK/AIM Management Research Forum.

Lucas W A, Cooper S Y, Ward T, Cave F (2009) Industry placement, authentic experience and the development of venturing and technology self-efficacy. Technovation 29 (2009) pp738-752.

McDonald J, Birch C J, Hitchman A, Fox P and Lido C. (2010) Developing graduate employability through internships: new evidence from a UK university. Proceedings of 17th EDiNEB Conference June 2010 at Thames Valley University, London.

Mao T and Kao D (2010) Meeting the Fundamental Objectives of Business Education: A Framework to Align Business Education with Changes in Global Competition. Proceedings of 17th EDiNEB Conference June 2010 at Thames Valley University, London.

Pfeffer J and Fong C T (2002) The End of Business Schools? Less Success than Meets the Eye. Academy of Management Learning and Education Vol. 1 No.1 September.

Pittaway L and Cope J (2007) Simulating Entrepreneurial Learning: Integrating Experiential and Collaborative Approaches to Learning. Management Learning 2007 Vol.38 (2) pp211-233. Sage Publications.

Pond K and Harrington A (2011). Models of Employability Development in Undergraduate Business Education – a critical review of current practice. A BMAF-funded research report accessed online8.1.2012.

Teitelman R (2011) The Relevance of Business Schools. In the Deal Economy April 26 2011. Online.

Therin F (2011) Institutions have a duty to provide a professional future for their graduates: should HEIs train students for life or give them skills for work? The Guardian Higher Education network. 23 August 2011. Online.

Van Ness R K and Melinsky K (2008) Collegiate Schools of Business: Losing Relevance? Review of Business research, 8 (5), 154-162.

Wee K N L (2004) A problem-based learning approach in entrepreneurship education: promoting authentic entrepreneurial learning. Int J Technology Management, Vol.28. Nos 7/8, pp685-701

Worrall L, Lubbe S and Klopper R. (2007) Academic Research and Management Practice: Is the Relevance gap Closing? Alternation 14, (2007) 292-316. ISSN 1023-1757

ENTREPRENEURSHIP AND INTRAPRENEURSHIP IN ACADEMIC CONTEXTS:

HOW STUDENTS RECOGNIZE BUSINESS OPPORTUNITIES

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This study focuses on recognition of business opportunity and business characteristics identification both in entrepreneurship and intrapreneurship. We hypothesize that using the same mental framework (prototypes) for both entrepreneurial and intrapreneurial business opportunities there will be different recognition patterns among business characteristics.

We induced a first entrepreneurial experience, using scenarios, to students with no entrepreneurial background and observed (a) what business characteristics they identified according to the prototypical dimensions and (b) what other business characteristics were identified. We performed a content analysis to participants' written responses and concluded that there were no differences in recognition for both intrapreneurial and entrepreneurial episodes when they used the business opportunity prototype. On the other hand more business characteristics were identified in the entrepreneurial scenario than in the intrapreneurial one. Finally, participants gave more management suggestions for the intrapreneurial opportunity than to the entrepreneurial one.

These results lead us to conclude that individuals with no entrepreneurial experience tend to be more cautious in intrapreneurial episodes, and are less risk averse in entrepreneurial episodes.

Our findings can contribute to understand how entrepreneurship may be viewed and taught from the early stages of a student's education, which is where universities may play a fundamental role.

Keywords: entrepreneurship, intrapreneurship; business opportunities.

I. INTRODUCTION

Recognizing a business opportunity is the most important stage of the entrepreneurial process. Baron and Shane (2005) proposed an explanatory model of this process and identified business opportunity recognition as the first stage. Thus, since there can be no entrepreneurship without business opportunity recognition it is of crucial importance to deepen our understanding of this fundamental stage. To explain and understand entrepreneurship requires that we not only know the individuals involved in the process, and recognize the particular characteristics that make them entrepreneurs (an individual centered approach), but we must also take into account the environmental characteristics entrepreneurs have to deal with when recognizing, evaluating and exploiting business opportunities (context centered approach) (Shane and Venkataraman, 2000).

A. Business Opportunity Recognition

Certain individuals possess particular cognitive structures, which they develop during life experience (Baron 2004), that enable them to organize useful information stored in their memory, and use it as a template for understanding connections between seemingly unrelated events.

The essential cognitive structures needed to perform this process are prototypes that mentally represent categories of objects and the common salient features often combined in an object.

Baron and Ensley (2006) conducted a study where they identified the dimensions of the business opportunity prototype in ten factors. The first five described the business idea: (1) solves customer's problems; (2) positive net cash flow; (3) manageable risk; (4) superior product; (5) industry change. The other five referred to the feasibility of business development: (1) overall financial model; (2) advice from experts; (3) unique product; (4) big potential market; (5) intuition (Baron and Ensley, 2006).

Analysing business opportunities within a framework such as a prototype, is useful from a cognitive perspective because it allows a faster and more accurate analysis of a given categorization process. However, the same can be said about that in a recognition process based exclusively on the business opportunity prototype, there are specific characteristics of a given business opportunity that are not considered in the analysis, which may be crucial to the success or failure of the business venture.

Nevertheless, this view on business opportunity recognition from a cognitive perspective, and based on experience, also underpins the idea that entrepreneurship can be taught, and that universities might play a crucial role in doing so. This idea, which has received support from several authors (e.g., Jack and Anderson, 1999; Warren, 2004), means that a deeper understanding of how business opportunities are recognized is fundamental in order to improve and develop better training programs.

Although recognizing business opportunity is dependent upon the individual characteristics mentioned earlier (mental structures), the actual existence of business opportunities is, however, subjective and depends upon conditions in the environment that influence the typology of opportunities. If we refer to the context in which a business opportunity is identified, there are two fundamental kinds: entrepreneurial and intrapreneurial. An entrepreneurial business, as Baron (2006) argued, arises from a complex pattern of changing conditions – technological, economic, political, social and demographic changes that previously did not exist. Business opportunities have three main characteristics: newness - creating new products or services that did not previously exist; perceived desirability – being what potential clients want; and profitability – capable of producing cash flow (Baron, 2006). An intrapreneurial business opportunity, on the other hand, is essentially different from an entrepreneurial one because it occurs within an organization (Antoncic, 2007). It is characterized by new business creation related to existing products or markets, self-renewal of an organization and proactiveness from a company. It generally occurs under the control of an employer seeking new opportunities in the market to expand the business (Parker, 2011, Rathna and Vijaya, 2009).

B. Entre(Intra)preneurship: Similarities and(or) differences?

Matthews, Schenkel, Ford and Human (2009) supported the idea that although both entrepreneurial and intrapreneurial initiatives yield new ventures, services or products, they can be significantly different in their impact on subsequent venture performance. Following on from that, several recent studies have tried to compare entrepreneurs and intrapreneurs and also some attention has been given to entrepreneurs' first sale (for example, Rehme and Svensson, 2011, Rathna and Vijaya, 2009, Honig, 2001, Matthews et al, 2009, Woodilla, 2003). All of these studies pointed out significant differences between entrepreneurs and intrapreneurs, which show how important it is to understand both types of opportunity. However, none of them described the differences that may occur at the recognition stage of an entrepreneurial or an intrapreneurial business opportunity. Since both take place and are developed in completely different environments, and given that there are differences between entrepreneurs and intrapreneurs, it makes sense that there would also be differences when recognizing business opportunity. When using the business opportunity prototype there will probably be a match for both within the framework, since both are business opportunities. There are other characteristics unique to each, however that will not be taken into account.

The aim of this study is to understand how individuals with neither entrepreneurial nor intrapreneurial experience, recognize and evaluate their first business opportunity. More specifically, our goals are (a) to observe how individuals with no entrepreneurial experience use the business opportunity prototype to recognize either an entrepreneurial or intrapreneurial business opportunity for the first time; and (b) to observe what other business characteristics individuals with no entrepreneurial experience can identify in an entrepreneurial and an intrapreneurial opportunity.

Based on cognitive theory insights, we hypothesize that (1) there will be no differences in business opportunity recognition using the prototype for both entrepreneurial and intrapreneurial business opportunities and (2) there will be differences when identifying other characteristics of the entrepreneurial and intrapreneurial business opportunities.

II. METHOD

A. Participants

108 university students, aged between 18 and 28, participated in this study. Most participants were female (66%), and the average age was 20 years old. The participants were from different fields of study (e.g., sociology, psychology, among others, none of them related to entrepreneurship). The majority (74%) were undergraduates, and the remaining 26% were doing a graduate degree.

Each individual participating had never launched a business venture or had any entrepreneurial background.

Due to non-responses (e.g., not perceptible, not adequate to the question), we only analysed 93 cases.

B. ***Instruments***

Several studies in various research fields have used scenarios to evaluate the individual decision-making process, perceptions, and risk perception (Palich and Bagby, 1995; Burmeister and Schade, 2007; Doff, 2008; Wasieleski and Webber, 2008; Doyle, Hughes and Summers, 2009; Ng, White, Lee and Moneta, 2009).

We used two scenarios that were specifically designed for this study. Since the purpose was to present individuals with a first entrepreneurial experience, using a scenario was an appropriate way to induce this experience. Each of the scenarios was based on a real business story. Scenario A suggested the entrepreneurial opportunity to create a low-cost airline company (Rae, 2007). Scenario B suggested an episode of intrapreneurship, describing a potato farm producer considering transforming his business into a gourmet potato chip production company (Rae, 2007).

The mental framework referred to in the literature on business opportunity recognition is the business opportunity prototype presented by Baron and Ensley (2006). We manipulated different information based on the dimensions of the prototype for each scenario. Therefore, the scenarios had three conditions according to three different business characteristics: (1) solves customers' problems, (2) positive net cash flow and (3) manageable risk (conditions 1 – Customers Satisfaction; 2 – Cash Flow; 3 – Controllable Risk). These characteristics matched three dimensions of the business opportunity prototype proposed by Baron and Ensley (2006).

The present study was a 2 (scenario A and B) X 3 (1- Customers satisfaction; 2 – Cash Flow; 3 – Controllable Risk) design plan, with a total of six independent groups in analysis.

C. ***Procedure and data analysis***

We used a questionnaire to collect data, recruiting participants at a university campus. They were asked to fill in the questionnaire uninterruptedly and individually. Participants were told that their involvement was voluntary and their data confidential.

Before presenting the scenario, we gave some instructions to participants: they should carefully read the following story imagining themselves as the subject. After reading the scenario, they were asked: 'Describe the business idea suggested by the previous story' and had to write down their answers.

In order to examine the participants' written responses, we performed a content analysis using software Atlas.ti, a methodology also used in other entrepreneurship studies on business opportunities recognition (e.g., Correia Santos, Curral and Caetano, 2010). The aim of this analysis was to scrutinize the expressions used by participants when describing the business opportunity.

Responses were analysed according to two types of codes: before the analysis (a priori, based on literature) and after the analysis (a posteriori, emergent from responses) (Krippendorff, 1980).

The first referred to expressions similar to the ones used by Baron and Ensley (2006) to describe the dimensions of the business opportunity prototype. After the analysis according to these codes, we created other and, consequently, new family-codes also: other characteristics identified, referring to other features of the business opportunity that participants considered important (e.g., intelligent, accessible, appealing); management suggestions, referring to individuals' proposals on how to manage the business (e.g., parallel services should be created); and business idea identified, which refers to the business recognized by participants (e.g., low-cost airline company; gourmet potato chip).

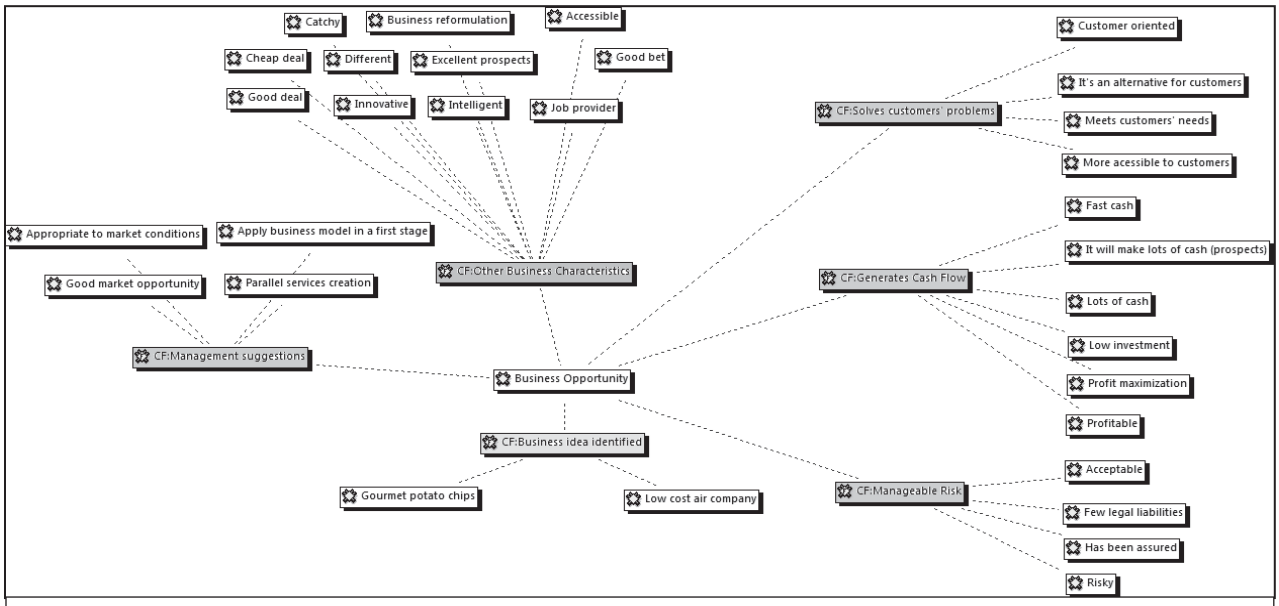

Figure 1 – Codes and family-codes obtained during analysis.

III. RESULTS

Results are presented according to two different types of business opportunity analysis: recognition based on prototypical dimensions of business opportunity and other business characteristics identified.

A. Business opportunity recognition according to the prototype dimensions

Table 1 shows the frequency of codes associated with prototypical dimensions of business opportunities by condition.

		Scenario A – Entrepreneurial episode			**Scenario B – Intrapreneurial episode**		
	Conditions	1 – Customers Satisfaction	2 – Cash Flow	3 – Controllable Risk	1- Customers Satisfaction	2 – Cash Flow	3 – Controllable Risk
	n=	17	19	16	12	15	14
Family code: Solves customers' problems	It's an alternative for customers	3	2	1	0	0	0
	More accessible for customers	0	2	1	0	0	0
	Customer oriented	2	2	1	2	0	0
	Meets customers' needs	4	0	1	1	0	0
	Total	9	6	4	3	0	0
Family code: Generates Cash Flow	Low investment	0	5	2	0	5	1
	Lots of cash	0	4	0	0	4	0
	Profitable	0	6	3	1	3	1
	Profit maximization	1	2	3	1	3	2
	Fast cash	0	3	0	0	0	0
	It will make lots of cash (prospects)	0	0	2	1	0	1
	Total	1	20	10	3	15	5
Family Code: Manageable Risk	Acceptable	1	0	4	0	1	1
	Risky	0	2	0	1	0	1
	Has been assured	0	0	3	0	0	0
	Few legal liabilities	0	0	1	0	1	1
	Total	1	2	8	1	2	3

Table 1 – Business opportunity characterization according to prototypical dimensions (absolute frequencies)

In condition 1- Customers satisfaction, participants used expressions related to customers and their satisfaction to describe the business opportunity more frequently, for both scenarios. In this condition, participants used a total of 9 expressions related to customers in scenario A, and 3 expressions in scenario B. Some examples of quotations are 'its aim is to think about the customer only' (customer oriented) and 'it meets people's needs' (meets customers' needs). The other two conditions (2 – Cash Flow; 3 – Controllable Risk) in scenario A show fewer expressions related to customers (6 and 4, respectively) and in scenario B none is presented.

In condition 2 – Cash Flow, participants used expressions associated with profit and cash flow to describe the business opportunity more often, for both scenarios. Participants used a total of 20 expressions in scenario A and a total of 15 in scenario B to describe the business opportunity as able to generate cash flow. They used expressions such as 'it requires a low investment' (low investment) and 'it will bring profit very quickly' (fast cash). For the other two conditions (1- Customers satisfaction and 3 – Controllable Risk) in scenario A and B, there were fewer expressions related to profit and cash.

Finally, in condition 3- Controllable Risk, participants used expressions associated with risk management more frequently to describe business opportunity. Participants used a total of 8 expressions in scenario A and a total of 3 expressions in scenario B to describe the business opportunity as having a manageable risk. Some examples are 'has demonstrated it is good' (has been assured), 'will be desired' (acceptable) and 'is legally simple' (legal liabilities).

The other two conditions (1- Customers satisfaction; 2 – Cash Flow) in scenario A and B, had fewer expressions related to risk.

The data shows that the manipulation of the prototype was performed successfully, because in each condition, the manipulated characteristics show higher frequencies than in the others (e.g., condition 1- Customers satisfaction shows higher frequencies of expression in relation to customer needs satisfaction). It also shows us how individuals describe business opportunities within a given framework: the business opportunities prototype. What the data point out beyond that, lets us know what individuals with no entrepreneurial experience observe in their first entrepreneurial experience.

*B. **Other business characteristics***

Table 2 shows the frequencies of other characteristics identified by participants for describing business opportunities.

		Scenario A – Entrepreneurial episode				**Scenario B – Intrapreneurial episode**			
	Conditions	1 – Customers Satisfaction	2 – Cash Flow	3 – Controllable Risk	Total	1 – Customers Satisfaction	2 – Cash Flow	3 – Controllable Risk	Total
Family code: Other Business Characteristics	Accessible	1	0	0	1	0	0	1	1
	Good bet	0	2	0	2	0	0	1	1
	Good deal	1	3	3	7	1	0	1	2
	Catchy	1	2	0	3	0	0	0	0
	Job provider	0	0	1	1	0	1	2	3
	Different	0	2	3	5	0	2	0	2
	Excellent prospects	1	0	0	1	2	2	0	4
	Innovative	1	3	2	6	3	0	1	4
	Intelligent	1	2	0	3	0	1	0	1
	Cheap deal	0	1	0	1	0	0	0	0
	Business Reformulation	0	0	0	0	4	5	1	10
	Total	6	15	9	30	10	11	7	28
Family code: Other Management suggestions	Parallel services creation	2	0	1	3	0	2	2	4
	Appropriate to market conditions	0	0	0	0	0	0	1	1
	Good market opportunity	0	2	0	2	2	0	0	2
	Apply business model in a first stage	0	1	0	1	0	0	1	1
	Total	2	3	1	6	2	2	4	8

Table 2 – Other business characteristics identified and management suggestions (absolute frequencies)

Whatever the condition, we can see that the participants used other characteristics such as: it's a good deal, innovative and business reformulation more frequently to describe the business opportunity. It is in scenario A that more characteristics are identified (total = 30). Scenario A is more associated with innovation (e.g., 'innovative business idea'), as being different (e.g., 'it's different'; 'there's nothing like it in this country') and as being a good deal (e.g., 'it is a good business'). On the other hand, scenario B was most characterized as being a reformulation of an existing business (e.g., 'it is a strategy of reformulation and adaptation'). This shows that entrepreneurial and intrapreneurial business opportunities were successfully identified and distinguished.

We can also observe that for both scenarios, more characteristics were identified in condition 2 – Cash flow; for scenario A, participants used 15 expressions referring to other business characteristics, and in scenario B, they used 11 expressions. In both scenarios, the condition with the next highest number of expressions is condition 1- Customers satisfaction.

With regard to management suggestions, we can observe that independent of the condition, scenario B has more expressions giving advice (8 expressions in scenario B against 6 for scenario A). There are differences between the two scenarios, however, in the condition where more management suggestions were given. More specifically, for scenario A it is in conditions 1- Customers satisfaction and 2 – Cash Flow (with 2 and 3 expressions, respectively), whereas for scenario B it is in condition 3 – Controllable Risk that more suggestions were put forward (4 expressions).

I. CONCLUSIONS AND RECOMENDATIONS

The present study aimed to present a first entrepreneurial experience to participants in order to observe how they recognize and evaluate business opportunities. We used two scenarios: one describing an entrepreneurial business opportunity and the other an intrapreneurial business opportunity. Individuals' written responses were analysed according to two criteria: expressions based on the business opportunity prototype (Baron and Ensley, 2006) and other expressions used by participants to describe the business opportunity.

From the analysis based on the business opportunity prototype, we can draw three main conclusions: (1) the manipulation of the prototype dimensions succeeded; this means that it is possible to induce and fully manipulate an entrepreneurial experience in individuals; (2) there were no differences in the way participants made use of the business opportunity prototype between the two stories and (3) with regard to other business characteristics and management suggestions there were clear differences in the way they evaluated those business opportunities. This is explained not only by the characteristics of the opportunity itself, but also by the cognitive recognition mechanisms used by individuals. Prototypes help individuals compare ideas of new products or services to their prototype of business opportunity and if a match is possible they will recognize and categorize them as a business opportunity (Baron 2004). In this sense, all business opportunities can be recognized according to a prototype, which is why participants found no differences between business opportunities within this framework. And, as well, they were limited to the manipulated characteristics. However, the participants in this study had no entrepreneurial experience, which means that their business opportunity prototype may not be clear yet (Baron and Ensley, 2006) and thus they identified other characteristics that were different depending on the content and nature of the business opportunity. If we recall the content and nature of both stories this can be explained. As scenario A describes an entrepreneurial business opportunity, it is more associated with innovation and differentiation, whereas scenario B, being an intrapreneurial business opportunity focused on an existing business model, is more associated with business reformulation. Thus, participants in scenario B were able to put forward more management advices because the business model is known and described.

This study highlights important aspects of entrepreneurial reasoning and business opportunity recognition. First, it shows that it is possible to induce and manipulate entrepreneurial experiences in an experimental design, which not only throws important light on the field of entrepreneurship research, but can also provide useful clues for improving entrepreneurial learning and training. Second, this study shows that the business opportunity prototype is useful for identifying business opportunities and successfully evaluating their main characteristics. It does not, however, help differentiate diverse business opportunities and the nature of them. Finally, this study on entrepreneurship versus intrapreneurship concludes that individuals with no entrepreneurial experience tend to be more cautious in intrapreneurial episodes, giving more

management advices in order to avoid harming the existing business, but are less risk averse in entrepreneurial episodes.

Understanding how a first entrepreneurial experience occurs, allows for the creation of follow-up activities with nascent entrepreneurs, and for training programs to be developed that can help enhance entrepreneurial activity and ensure its success. The contribution is also relevant with regard to management practices in human resources. At a more proximal level of analysis, these results can contribute to how entrepreneurship may be viewed and taught from the early stages of a student's education, which is where universities may play a fundamental role (Anderson and Jack, 2008). This study demonstrates the importance of 'thinking outside the box' even when that box is a mental framework. When participants were asked to identify other characteristics of business opportunities beyond the prototype, their analysis was richer and more specific. In this sense, and in accordance with the work of other authors on entrepreneurship education (e.g., Jack and Anderson, 1999; De Faoite, Henry, Johnston and van der Sijde, 2003; Fayolle, Gailly and Lassas-Clerc, 2006) these findings may contribute towards enriching the evaluation of training initiatives on how to teach entrepreneurship.

Some limitations to this study should be pointed out. For instance, a larger sample (N=180) would produce more robust results. Future research should develop similar studies with larger and more varied samples. And there may be other business opportunities with different characteristics that are also worth studying.

II. REFERENCES

Anderson, A. R. & Jack, S. 2008. Role typologies for enterprising education: the professional artisan? Journal of Small Business and Enterprise Development 2008; 15. 259-273.

Antoncic, B. 2007. Intrapreneurship: a comparative structural equation modelling study. Industrial Management & Data 2007; 107. 309-325.

Baron, R. & Ensley, M. 2006. Opportunity recognition as the detection of meaningful patterns: evidence from comparisons of novice and experienced entrepreneurs. Management Science 2006; 52.1331 – 1344.

Baron, R. & Shane, S. 2005. Entrepreneurship – A process perspective. Canada: Thomson.

Baron, R. 2004. The cognitive perspective: a valuable tool for answering entrepreneurship's basic ''why'' questions. Journal of Business Venturing 2004; 19. 221 – 239.

Baron, R. 2006. Opportunity recognition as pattern recognition: how entrepreneurs 'connect the dots' to identify new business opportunities. Academy of Management Perspectives 2006; February. 104 – 119.

Burmeister, K. & Schade, C. 2007. Are entrepreneurs' decisions more biased? An experimental investigation of the susceptibility to status quo bias. Journal of Business Venturing 2007; 22. 340-362.

Correia Santos, S., Curral, L. & Caetano, A. 2010. Cognitive maps in early entrepreneurship stages: From motivation to implementation. International Journal of Entrepreneurship and Innovation 2010; 11. 29-44.

De Faoite, D., Henry, C., Johnston, K. & van der Sidje, P. 2003. Education and training for entrepreneurs: a consideration of initiatives in Ireland and The Netherlands. Education & Training 2003; 45.430 – 438.

Doff, R. 2008. Defining and measuring business risk in an economic-capital framework. The Journal of Risk Finance 2008; 9. 317-333.

Doyle, E., Hughes, J. & Summers, B. 2009. Research methods in taxation ethics: developing the Defining Issues Test (DIT) for a tax-specific scenario. Journal of Business Ethics 2009; 88. 35 – 52.

Fayolle, A., Gailly, B. & Lassas-Clerc, N. 2006. Assessing the impact of entrepreneurship education programmes: A new methodology. Journal of European Industrial Training 2006; 30. 701-720.

Honig, B. 2001. Learning strategies and resources for entrepreneurs and intrapreneurs. Entrepreneurship Theory and Practice 2001; Fall. 21-35.

Jack, S. & Anderson, A. R. 1999. Entrepreneurship education within the enterprise culture producing reflective practioners. International Journal of Entrepreneurial Behaviour and Research 1999; 5. 1-12.

Krippendorff, K. 1980. Content Analysis. An introduction to its methodology. Thousand Oaks: Sage Publications.

Matthews, C., Schenkel, M., Ford, M. & Human, S. 2009. Comparing nascent entrepreneurs and intrapreneurs and expectations of firm growth. Journal of Small Business Strategy 2009; 20. 53 – 80.

Ng, J., White, G., Lee, A. & Moneta, A. 2009. Design and validation of a novel new (?) instrument for measuring the effect of moral intensity on accountants - propensity to manage earnings. Journal of Business Ethics 2009; 84. 367-387.

Palich, L. & Bagby, D. 1995. Using cognitive theory to explain entrepreneurial risk-taking: challenging conventional wisdom. Journal of Business Venturing 1995; 10. 425-438.

Parker, S. 2011. Intrapreneurship or entrepreneurship. Journal of Business Venturing 2011; 26. 19.

Rae, D. 2007. Entrepreneurship from opportunity to action. London: Palgrave.

Rathna, K. & Vijaya, T. 2009. Competencies of entrepreneurs and intrapreneurs: a comparative

study. South Asian Journal of Management 2009; 16. 28-60.

Warren, L. 2004. A systemic approach to entrepreneurial learning: an exploration using storytelling. Systems Research and Behavioral Science 2004; Jan/Feb. 3- 16.

Wasieleski, D. & Weber, J. 2008. Does job function influence ethical reasoning? An adapted Wason Task Application. Journal of Business Ethics 2008; 85. 187-199.

Woodilla, J. 2003. From intrapreneurship to entrepreneurship: Is technical expertise sufficient? – A case study. New England Journal of Entrepreneurship 2003; 6. 55-61.

ON ENTREPRENEURIAL UNIVERSITY: PROFESSORS´ ATTITUDES IN THE CROATIAN AND SPANISH CASE

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This paper presents an effort to identify the types of professors by their attitudes towards entrepreneurial university. We largely extend the original concept of entrepreneurial orientation by exploring the attitudes of university professors, to finally assess the possible existence of different types of supporters among the university human capital.

A survey was conducted among a non-probability purposive sample of faculty members in Croatia and Spain. A combined technique of factor analysis and a subsequent cluster analysis of cases were applied. The attitudes are grouped into four factors: department orientation, industry collaboration, unconventionality and university policies. Three types of professors (clusters) have been identified. They are characterised in the paper for discussion.

The "unsatisfied - disaffected professors" are a first group, who perceive a lack of institutional support for their ideas and present a risk of possible resignation in their entrepreneurial attitude. A second group is the "team-working professors", who act in terms of the best for the group, being rather satisfied with their university and department policies for entrepreneurialism, although they think some policies need improvement. The third group are "the engager-professors", who are thinking "outside the box" to overcome institutional limitations and are the key drivers of university-industry collaboration.

The existence of "unsatisfied – disaffected" professors indicates a deficient functioning of the entrepreneurial university that must be faced in short. The mixture of the "team-working" and "engager" professors might be understood as a healthy university environment for strengthening the involvement of university in the economic growth and progress.

Keywords: entrepreneurial university; attitudes; entrepreneurial orientation; department orientation; industry collaboration; university policies; unconventionality.

I. EVOLUTION ON ENTREPRENEURIAL UNIVERSITIES RESEARCH: WHAT AND WHY

This paper presents an effort to identify the types of professors by their attitudes towards the concept of "entrepreneurial university". Different approaches have been followed on the increasingly interesting research of entrepreneurial universities. In the very early beginning, the main discussion was focused on providing a still unsolved unique definition and conceptualisation of what an entrepreneurial university (EnUn, henceforth) must be. In spite of this, a consensus seems to exist concerning the need of a shift in most of universities to become more entrepreneurial. As stated by Todorovic *et al.* (2011: p. 129) *"[…] large organisations can benefit from doing things in an entrepreneurial manner[…]"*, large organisations such as universities are.

Subsequently efforts were made to find out key metrics to conveniently measure an EnUn. Most of them measure outcomes an EnUn must achieve. Some other research includes inputs and resources to be applied in becoming a more EnUn, or even they measure the entrepreneurial orientation of a department and, by extent, of a university (several attempts are collected in Todorovic *et al.* 2011). However, there is still a need for further research on what we think it is the key in every change on large organisations: the human capital.

We should understand human capital as it is usually conceptualised by most of the research on intangible management (Roos et al. 1997): the value created by key human resources of the organisation, the experts. With such conceptualisation, we may convey that professors should be considered as an essential element of the human capital of any university. Moreover, they are called to be the key agents for such required shift.

Therefore our main aim is to deepen in the very insights of those key individuals when speaking about EnUn: the attitudes of university professors. Hence, the remainder of the paper is organised as follows. In the next section we introduce the metrics of the model used. There, we also explain the combined statistical procedure followed: a factor analysis with a subsequent cluster analysis of cases. This has allowed us to find out three

different types of attitudes among university professors, which are then enounced and characterised. In a final section, we introduce our conclusions for discussion, which may imply an advance in gaining the change towards a more entrepreneurial university.

II. CONCEPTUALISATIONS ON ENTREPRENEURIAL UNIVERSITY ORIENTATION

Firstly, authors would like to mention the lack of a unique definition of what the entrepreneurial university means. Although main authors share similar underlying concept here: to be entrepreneurial is mainly an attitude, an Ethos in the very Etzkowitzanian sense.

On one hand, some of the key definitions are focused in the presumable outcome of an EnUn. Some examples are the "creation of new business ventures" stated by Chrisman (1995), a university characterised by "teaching, research and economic development of enterprise" claimed by Etzkowitz (2000), or the University "directly involved in the exploitation of research results, more intense collaborations with industry and involvement in regional economic development" pointed by Sporn (2001). There is an underlying background of what professor-researcher must do to become a more EnUn in these definitions.

On the other hand, the culture and the human capital is underlying in some other key definitions which also includes goals-oriented definitions. Some examples are Clark, (1998) who stress what EnUn seeks, "a substantial shift in organisational character so as to arrive at a more promising posture for the future", i.e. a shift is required in the organisational level, a different posture and overall attitude of the whole organisation in which authors, and we think University human capital may play a leading role.

Kirby (2002) claims that "as at the heart of any entrepreneurial culture, Entrepreneurial Universities have the ability to innovate, recognise and create opportunities, work in teams, take risks and respond to challenges". This is usually the most accepted definition of an EnUn by university professors, arguably because it tries to provoke a (needed) cultural change among the university community: it addresses a key issue on the university mission statement rather than a definition by itself. Kirby´s conceptualisation includes key words such as entrepreneurial culture, innovations, opportunities, or response to challenges. Undoubtedly, it is unlikely that the present way of functioning of universities under the state umbrella, without cooperation with the industry, will be sustainable in the long run (Dabic & Svarc, 2011).

An evolving definition is provided by Etzkowitz (2003) where he considers that EnUn is "a natural incubator, providing support structures for teachers and students to initiate new ventures: intellectual, commercial and conjoint".

The key background subject is what the shared (organisational) culture and mission of an EnUn should be. However, little is known about the key agents of the required organisational change: the human capital. Therefore we must focus the research on the attitudes of what the authors, we think are the main agents to get involved. It is very likely that university professors do not bear in mind the same idea when asked on what they think about "entrepreneurial university" because there is not a unique definition. Likewise, we think that university professors do not either share the same attitudes to address the consequences behind an EnUn.

Thus, we could suggest that entrepreneurial university concept is a proxy indicator of the existing organisational culture in the current university. A second reading here, it is that the majority of empirical research usually tends to treat professors as a unique group, when probably they are not. Although they were supportive of EnUn concept, it seems that some constraints may affect the willingness of more university-industry collaboration. Ponomariov (2008) shows that academic quality of universities is negatively related to interaction with firms. Therefore, high academic performance seems to reduce the likelihood of high performance in transferring, because researchers are too focused in creation but not in fostering the knowledge spill overs effect.

That is the final aim of this paper: to present some evidences on what type of professors are hindered among those who show their support to entrepreneurial university. The reason is that although all of them are supporters of the EnUn concept, perhaps they do not share the same attitudes. This is a very relevant issue to manage the human factor and to foster the required shift in these organisations.

The majority of the empirical research on EnUn has been conducted under some kind of entrepreneurial orientation. Different scales have been used to measure entrepreneurial orientation. Perhaps the most fruitful is the Entre-scale and their subsequent adaptations. The scale was first built by Khandwalla (1977). Subsequent research by Miller and Friesen (1978) identify up to eleven

dimensions while Miller (1983) first operationalize the construct of entrepreneurial orientation. We must stress the unit of analysis is not the individual entrepreneur but the whole organisation in this scale. However, its application scope is usually focused onto firms-like organisations but not onto institutions.

Hence, Todorovic *et al.* (2011) develop their own scale (ENTRE-U) focused on measuring the entrepreneurial orientation of a university department, as the explanatory variable of patents and spinouts results. This means the unit of analysis is the department framed by its university. Finally, they find four key dimensions of the entrepreneurial orientation of the department and, by extent, the university: research mobilisation, unconventionality, collaboration with industry and university policies. Nevertheless, such dimensions are the result of a factor analysis operationalized over 47 variables where only 23 ones demonstrated to be finally significant for the purpose of explaining patents and spinouts results.

Bearing in mind the validity of those dimensions for such purpose, our aim is to straightforward a step beyond to find out whether professors who claim to be supporters of an EnUn are one unique group or whether university and department managers are addressing different types of supporters according to their attitudes. Therefore, we have used the same ENTRE-U scale which is further explained in Todorovic *et al.* (2005) and with excellent outcomes as reflected in Todorovic *et al.* (2011). We explain our operationalization in the next section.

III. EMPIRICAL WORK: TESTING DIFFERENT ATTITUDES TOWARDS AN ENTREPRENEURIAL UNIVERSITY

A. ***Procedures***

To prove whether or not different attitudes exist behind supporter professors of EnUn concept, we have conducted a survey among Croatian and Spanish universities, between March and July, 2011. We have obtained an equalled distributed sample between both Croatian and Spanish universities, with a control group of 90 supportive professors. Both countries seem to be in a different type of development stage as regards to university entrepreneurial outcomes. This might grant the possibly universal validity of our results, because we have tested it in two different cases, reinforcing the arguable idea that this results may not depend on the development stage of the universities in the country.

We have undertaken a two-stepwise statistical procedure. An initial factor analysis was conducted to find out how the 47 variables were grouped into factors optimally. We have saved factor loadings into new variables. Subsequently, we have developed a cluster analysis to find how many different groups of cases might exist. Surveyed were asked to assess that set of variables in a Likert scale (1=strongly disagree; 7=strongly agree). Where appropriate, reverse coded variables was used to avoid routine responses. However, none of such variables were finally retained according to the procedures explained in this section.

Accordingly to statistical procedures used in Todorovic *et al.* (2011: 131-133), an initial analysis of correlations among the 47 variables were conducted. SPSS (v. 15.0) was the software used. Corrected item-total correlations were calculated. Initially, the items with at least 0.5 item-total correlations were selected. Bivariate correlations matrix was checked to assure none was in excess of 0.9, thus avoiding a possible problem of multi-collinearity. In this case, 18 items were retained. Such items best group into four factors of attitudes, using a method of principal component analysis: department orientation, industry collaboration, unconventionality and university support. Names of factors are design according to extracted communalities of the variables (see Table I).

As far as our aim was not to measure the department orientation as the explained construct but to seek different types of cases, we have saved the factor scores to undertake a subsequent discriminant analysis of cases (i.e. cluster analysis). Hence, department orientation is one among the factors found. In the next subsection we introduce the results for discussion.

B. ***Results for discussion***

Firstly, we must prove the reliability as well as the rationale of the factors. Secondly, we must provide information which may lead us to admit the existence of the different groups of cases (i.e. professors´ attitudes). Table I shows the final variables included in each of the four factors as well as the reliability of the latter. As shown, factors accomplish with usual parameters of convergence and validity.

FACTOR AND RELIABILITY INDICATORS	Extracted Communalities	Final variables included
F1: DEPARTMENT ORIENTATION Conbrach´s alpha: 0.920 Total Variance explained: 75,83% Kaiser-Meyer-Olkin index: 0.838 Bartlet´s test of sphericity: 321.86 (p<0.000)	0.842	• Our department is highly regarded by industry
	0.767	• We are recognized by industry or society for our flexibility and innovativeness
	0.760	• Compared to other similar departments in our province, our department has a reputation for its contribution to industry or society
	0.714	• Our graduate students often secure high quality industry positions
	0.709	• Compared to other similar departments in this province, we are good at identifying new opportunities
F2: INDUSTRY COLLABORATION Conbrach´s alpha: 0.899 Total Variance explained: 71.25% Kaiser-Meyer-Olkin index: 0.882 Bartlet´s test of sphericity: 245.27 (p<0.000)	0.771	• We encourage industry involvement in the research activities of our faculty members
	0.734	• We support our faculty members collaborating with non-academic professionals
	0.703	• Our faculty members often seek research opportunities outside the traditional university environment
	0.702	• We try to generate off-campus benefits from research projects
	0.652	• Many of our faculty members conduct research in partnership with non-academic professionals
F3: UNCONVENTIONALITY Conbrach´s alpha: 0.842 Total Variance explained: 68.14% Kaiser-Meyer-Olkin index: 0.792 Bartlet´s test of sphericity (137.21 (p<0.000)	0.701	• Our department encourages "thinking outside the box" even at the risk of failure
	0.692	• Our faculty members are willing to take unconventional approaches when working on research problems
	0.667	• Compared to other similar departments in this province, we act quickly in response to new opportunities
	0.666	• We are often the first to introduce new methods of teaching, courses, or degrees that other universities subsequently adopt
F4: UNIVERSITY SUPPORT Conbrach´s alpha: 0.880 Total Variance explained: 73.72% Kaiser-Meyer-Olkin index: 0.833 Bartlet´s test of sphericity: 182.62 (p<0.000)	0.779	• We feel that university-wide policies at this university contribute substantially towards our department achieving its goals and objectives
	0.773	• Our university policies are best described as developed "bottom-up" using feedback from all levels of the university
	0.769	• Compared to most other universities, our university is very responsive to new ideas and innovative approaches
	0.627	• Our university rewards faculty members for their entrepreneurial attempts

Table 1: Final variables included in each factor from attitudes scale

Extraction method: Principal component analysis, Varimax rotation with Kaiser normalisation

We must say that Todorovic *et al.* (2011) prefered a Promax rotation method with Kaiser normalisation. This was because they need an oblique rotation to allow factors to share variance and, hence, finally best explain spinouts and patents results, losing the least information as possible. This is not our case. Our aim is not a regression but trying to disclose types of cases. Therefore, an orthogonal rotation will help for sure in detecting and best explain the cluster of cases with efficiency in the number of factors used (parsimony). Therefore we decide to use a Varimax rotation.

Once saved the scores for each factor, we have undertaken a principal component analysis to find out whether different groups of professors (cases) exist. Eigenvalues above 1.0 shows the possible

existence of three different types of cases. Common tests were developed to assure their validity. The Wilks´ Lambda tests the equality of group means. The values obtained by each group for each of the four constructs allow confirming the validity of the mean within the group. The Box´s tests of equality of covariance matrices contrast the null hypothesis of equal population covariance matrices in the three clusters of cases. The test reject the null hypothesis (p-value = 0.268), therefore, covariance matrices are different for each cluster.

The procedure extract two canonical discriminant functions, the first cumulate the 83% of variance while the second cumulate 17%. Using Fisher´s linear discriminant functions, the first cluster contains 24 cases, the second one contains 37 and the third one has 27 cases. This data shows the balanced number of cases in each cluster and hence the validity of the method to cluster cases. Additionally, a Kruskall Wallis test was developed to assure the existence of mean differences among the three clusters. The asymptotical significance of the chi square confirm the validity of the three clusters, because the variables used to measure attitudes obtain a p-value below 0.000 in the test.

With such values, it seems that there are three different types of attitudes towards entrepreneurial orientation in the Croatian and Spanish universities. That means that different perceptions of the reality coexist in the same institution. Table II shows the different means for each variable within the correspondent factor.

After reaching these results, we have conducted some interviews to validate the groups´ profile, which has allowed us to refine the background of the questions dealt with here. This is introduced in the next section

FACTORS	**VARIABLES**	**cluster 1 MEAN**	**cluster 2 MEAN**	**cluster 3 MEAN**
Factor 1: Department orientation	Compared to other similar departments in this province, we are good at identifying new opportunities	3.00	5.51	4.78
	We are recognized by industry or society for our flexibility and innovativeness	2.25	4.86	4.04
	Our graduate students often secure high quality industry positions	2.46	4.95	4.11
	Our department is highly regarded by industry	2.08	5.08	4.44
	Compared to other similar departments in our province, our department has a reputation for its contribution to industry or society	2.83	5.27	5.07
Factor 2: Industry collabo-ration	Many of our faculty members conduct research in partnership with non-academic professionals	2.33	4.92	4.07
	We support our faculty members collaborating with non-academic professionals	3.13	5.68	5.44
	We try to generate off-campus benefits from research projects	2.92	5.57	5.04
	Our faculty members often seek research opportunities outside the traditional university environment	2.58	5.24	5.41
	We encourage industry involvement in the research activities of our faculty members	2.08	5.14	5.00
Factor 3: Uncon-ventionality	Compared to other similar departments in this province, we act quickly in response to new opportunities	2.63	4.68	4.44
	We are often the first to introduce new methods of teaching, courses, or degrees that other universities subsequently adopt	2.88	4.97	3.95
	Our department encourages "thinking outside the box" even at the risk of failure	2.38	4.65	3.89
	Our faculty members are willing to take unconventional approaches when working on research problems	2.96	5.03	4.89
Factor 4: university support	We feel that university-wide policies at this university contribute substantially towards our department achieving its goals and objectives	2.96	5.24	2.67
	Compared to most other universities, our university is very responsive to new ideas and innovative approaches	3.04	5.49	3.22

	Our university policies are best described as developed "bottom-up" using feedback from all levels of the university	2.71	4.46	2.52
	Our university rewards faculty members for their entrepreneurial attempts	2.21	4.54	2.37

Table 2: Breakdown of attitudes means by type of cluster

Likert scale: 1=strongly disagree; 7=strongly agree

IV. KEY FINDINGS: UNDERSTANDING THE PROFESSOR´S ATTITUDES TOWARD THE ENTREPRENEURIAL UNIVERSITY

The aim of the paper is to try to find out whether or not different group of professors exist when speaking about the entrepreneurial university concept. Most of the research on this theme seems to assume the existence of a unique "supportive" group of professors, apart from the non-supportive ones.

The university professors are called to be the key agents to address the required shift to become a more entrepreneurial university, i.e. the essence of the change, the human capital of university. Therefore, knowing the attitudes of such individuals may help university and department managers to implement the properly actions trying to engage every target, such as more industry collaboration, better employability of students and bearing in mind the triple function of professors: teaching, researching, transferring.

According to the characteristics of each cluster (see Table II) we may assume that three different types of professors exist among those who support the concept of an EnUn.

Professors in cluster 1 are characterised by a relevant negative perception of the current entrepreneurial orientation of their university. They feel their department has a very low degree of entrepreneurial orientation (the lowest of the three groups). They also think there is a lack of industry collaboration, while the university policies seem to help nothing. Despite the latter, they consider that there is too much conventionality in their institution. All these values seem to point out a more than possible existence of a dissatisfaction feeling among them. As far as they really support the idea of an EnUn, that dissatisfaction from unsatisfied expectations may lead them to potential conflicts. Here the conflict may arise. In fact, the lowest value (2.08) is given to the lack of encouraging industry involvement in the research activities. If one thinks an imbalanced relationship exists then it is very likely one start searching for ways to obtain what he/she deserves, leaving the organisation aside because it does not contribute at all. They may be called the "unsatisfied-disaffected professors", as they support the EnUn concept but they confer the lowest values to every item (all of them below the neutral point 4 in a Likert scale from 1 to 7).

In the opposite side, the professors categorised in Cluster 2 assess each item with the highest values. They think their department has a good entrepreneurial orientation. They also consider their university supports their activities quite enough. It seems they usually engage enough industry collaboration in their activities. They are also the professors who most seek for unconventional ways of addressing the work. As far as this kind of work is usually undertaken in working groups, they may be called the "team-working professors". They seem to think more in terms of group instead of individually, maybe because the individual goals are aligned with group as well as department ones. Perhaps they are the professors who show to have the most entrepreneurial attitudes with a clear idea of how things must be done to achieve the best performance, accordingly to the known game rules.

Finally, the Cluster-3 group seems to be the two faces of a coin. On one hand, the assessment of department orientation and industry collaboration items are not quite high, although very close to Cluster-2 values. For instance, they feel the department orientation is not high enough, very close to neutral value (4), i.e. still improvable. On the other hand, unconventionality items are pointing that some kind of problem may exist in finding alternative ways accordingly to the known game rules. And this is very likely to be caused by the lack of university support they feel, because every value here is embracing 3.6 (in a scale from 1 to 7). Special attention must be drawn to the rewarding system must be drawn to the rewarding system because, in opinion of these professors, it does not encourage entrepreneurial attempts. Governance should be also reviewed, accordingly to this type of professors, because top-down policies are not the most suitable for an entrepreneurial orientation.

V. Conclusions and recommendations: from theory to practice on entrepreneurial university research

From the three groups of professors´ attitudes found, we may suggest that several risks and threats are coming in the short-time. If properly managed, these three groups are called to be the hinges by means of which the required shift to become a more entrepreneurial university may happen. However, we must not forget that a fourth group also exists: the non-supportive professors.

From theoretical perspective, the findings of our research may open future research avenues, such as the dynamic approach to a cycle life of entrepreneurial orientation in universities. It seems professors´ attitudes may evolve through different stages. Likewise will-be entrepreneurs pass through different phases (i.e. intentions, opportunity recognition, resources collection and exchanging with market), we could suggest some kind of transition according to the interaction between professors and organisational actions (from both department and university). Here, further research is required to theorize around which phases and how to manage them. That is how to deal with professors´ attitudes and perceptions of what is done in the department and university levels to reconcile individual and organisational goals, avoiding any kind of clash. Concerning the human capital, key questions are how to deal with group goals while scorecards undervalue the group outcomes. We should also remark that achieving the excellence in every function (teaching, researching, transferring) is a group task rather than individual.

A next challenge is how to promote the shift among those professor who do not support the idea of entrepreneurial university, which seems to be essential to socioeconomic and technological progress. This does not imply, by no means, that only transfer activities must be promoted. Nothing so further from our intention, as far as basic research and development is the key for future advances and innovation by itself. Thus, new ways of industry engagement into initial stages of new knowledge creation must be sought.

A subsequent challenge is how to deal with the internal changes needed in university policies, as they seems to be one of the most relevant constraints in the evolution towards a third generation of universities. From some more radical point of view, the traditional Humboldt-type University is facing a collapse and is not able to function properly (Wissema 2009). It has grown into a complex institution overloaded with various functions such as teaching, research and publications, providing services to society, cooperation with industry, patenting and technology transfer. At the same time it is subjected too much to administrative and bureaucratic interventions of public administration (Decter, Bennettand Leseure 2007). Therefore the new concept of a third generation universities (Wissema 2009) emerges, seeking to reconcile the conflicts of the present university and to establish itself as a centre of education and the commercialization of research at the global level. The success of such universities depends on their international competitiveness in order to attract the best students, professors, and contracts with industry.

From a practical perspective, research on entrepreneurial university seems to lead university professors to an obligation to teach, to research and to transfer at the same time. Nothing so further from our intention, as our findings suggest that this is a team-working question, hence we claim it must be understood that way. So, we should remark that human capital is a very difficult force to be properly managed when facing changes in large organisations where different individual, group, department and university goals converge.

Those actions, as regards university professors, must offer a mix of department orientation, industry collaboration as well as unconventional ways where appropriate, to become a more entrepreneurial university. Furthermore, university managers should recognise the failure of some measurement systems, as well as the shift needed in the way how university professors, we develop our policies, with more bottom-up approaches.

As seen, human capital is called to be the key agent in the EnUn. The basic starting point, because both relations and knowledge pivot on people. But new challenges arise as regards the structural capital of universities (procedures, goals, scorecards, policies…), which seems to be actually the less developed. And here, the entrepreneurial ethos in the Etzkowitzanian sense may help a lot.

VI. References

Clark, B.R. 1998. Creating Entrepreneurial Universities: Organizational Pathways of Transformation. Issues in Higher Education. New York, NY: Elsevier Science Regional Sales.

Chrisman, J.J., Hynes, T. & Fraser, S. 1995. Faculty entrepreneurship and economic development: The

case of the University of Calgary. Journal of Business Venturing. 1995; 10 (4). 267-281.

Dabic, M. & Svarc, J. 2011. About the Concept of Entrepreneurial University: Is There an Alternative? (in Croatian), Društvena istraživanja. 2011; 20 (4). 991-1013.

Decter, M., Bennett, D. & Leseure, M. 2007. University to business technology transfer--UK and USA comparisons. Technovation. 2007; 27 (3). 145-155.

Etzkowitz, H. 2003. Research groups as 'quasi-firms': the invention of the entrepreneurial university. Research Policy. 2003; 32 (1). 109-121.

Etzkowitz, H., Webster, A., Gebhardt, C. & Terra, B.R.C. 2000. The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm. Research Policy. 2000; 29 (2). 313-330.

Khandwalla, P.N. 1977. The Design of Organizations. New York, NY: Harcourt Brace Jovanovich, Inc.

Kirby, D. 2002. Entrepreneurship . McGraw-Hill.

Miller, D. 1983. The correlates of entrepreneurship in three types of firms. Management Science. 1983; 29 (7). 770-791.

Miller, D. & Friesen, P.H. 1978. Archetypes of strategy formulation. Management Science. 1978; 24 (9). 921-934.

Ponomariov, B.L. 2008. Effects of university characteristics on scientists' interactions with the private sector: an exploratory assessment. The Journal of Technology Transfer. 2008; 33 (5). 485-503.

Roos, J., Roos, G., Dragonetti, N.C. & Edvinsson, L. 1997. Intellectual capital : navigating the new business landscape. Basingstoke MacMillan, 1997: MacMillan Business.

Sporn, B. 2001. Building Adaptive Universities: Emerging Organisational Forms Based on Experiences of European and US Universities. Tertiary Education and Management. 2001; 7 (2). 121-134.

Todorovic, Z.W., McNaughton, R.B. & Guild, P. 2011. ENTRE-U: An entrepreneurial orientation scale for universities. Technovation. 2011; 31 (2-3). 128-137.

Todorovic, Z.W., McNaughton, R.B. & Guild, P. 2005. Making university depart ments more entrepreneurial: the perspective from within. International Journal of Entrepreneurship and Innovation. 2005; 6 (2). 122.

Wissema, J.G. 2009. Towards the third generation university: managing the university in transition. Cheltenham, UK: Edward Elgar Publishing.

DEVELOPING A SOCIALLY ENTREPRENEURIAL UNIVERSITY

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Higher Education in the United Kingdom is facing unprecedented change. The key drivers of this change are the squeeze on public sector funding, new pricing structures and increased competition from new entrants. In addition the coalition government aims to change the relationship between government, citizens and civil society. Within this context the University of Northampton has put in place a very ambitious strategy which puts social enterprise at the centre of its development. The strategic development of the University comes at a time when people are asking questions about the societal role of Universities. This is a continuation of a debate that has been taking place over many years with an increasing emphasis being placed on employability, entrepreneurship and the need to develop new approaches and new business models; requiring an increasing collaboration between Universities, public, private and third sector organisations. The paper will explore the genesis of the strategy, its key components and the elements that were needed to change the University into a socially entrepreneurial University and the opportunity this provides for the University to become part of a socially innovative region.

Keywords: Social, Enterprise, Innovation, Community, Engagement

I. INTRODUCTION

This paper is a case study that focuses on the University of Northampton and its developing strategy around social enterprise located in a changing position of higher education and also in an altering national, European, economic and political context. The University is a relatively small institution with a student population of approximately 14,000 students.

The Changing Position of Universities

Since 1963 the market for higher education in the U.K. has changed from an elite system to a more open system. The financing of Universities also changed in 2011 with the withdrawal of Government financial support for many subject areas resulting in students taking on the full cost of higher education - becoming consumers rather than passive receivers of knowledge, facilitating changing relationships both within institutions and externally. The rise in student fees has understandably led to considerable debate about the purpose of higher education and questions of its relevance in a period of economic turmoil and rising unemployment; particularly severe amongst young people. However, University's position in society has gained in significance in areas as diverse as places to enhance social mobility, centres of research, knowledge transfer and enterprise. Universities are also seen as increasingly important in regional economic development; the European Union, for instance, in its aim to be "the most dynamic and competitive knowledge- based economy in the world" sees the role of Universities as being "…to exploit the so-called "knowledge triangle of research, education and innovation"…" (Boulton, G. and Lucas, C. 2008: 5)

While Universities are still primarily seen as educational and research institutes there is a third strand that has been articulated; the so called third mission of community engagement. John Goddard argues that "Engagement has to be an institution wide-commitment, not confined to individual academics or projects." (Goddard, J. 2009: 4). However, despite their size and economic contribution to their locality, Universities can so often be separated from their local neighbourhoods, being viewed as elitist and not relevant to the lives of the majority of residents in towns and cities where they are located; yet they are part of social, community and entrepreneurial networks who can be innovative and transformational, breaking through traditional barriers. Working in partnership with residents, local councils, private sector businesses and not for profit organisations allows us to become a more active part of the community, ensuring that typical short term approach taken by so many is no longer an option and the construction of integral relationships binding each partner together becomes the norm.

We have to realise, however, that one size does not fit all and that communicating directly with our local communities and more importantly offering support and guidance in solving complex social issues requires commitment. Operationally we need to ensure a learning environment that nurtures talent within the institution as well as engaging with our communities and neighbourhoods whilst connecting us with other local, regional, national and international networks.

II. RAISING THE BAR

Being a relatively new Higher education institution, it is important that the University distinguishes itself from its competitors –we cannot, and do not want to, compete with the older established more traditional universities, and as the marketization of higher education continues there needs to be a defining feature that would attract new students.

The University's new Vice Chancellor (appointed in 2010), developed a plan for organisational change, a strategy putting social enterprise at the centre of its approach for transformation, community engagement, and survival. The University has had to play to its strengths and develop a 'unique selling point' with particular fortes in a variety of areas including health, social sciences, creative industries, education, business and enterprise. The ambitious corporate strategy 'Raising the Bar' was launched formally in June 2011 with the overriding aim to create a University that is the 'No. 1 Higher Education Institution (HEI) for social enterprise in the United Kingdom.

The strategy is, we believe, unique in that the university has set itself an institutional wide agenda which integrates social enterprise into:

- The student offer;
- Teaching, learning and research;
- Corporate and Community engagement,
- Delivering public service improvements that are scalable and sustainable within Northamptonshire and beyond.

Nearly two years on, the social enterprise key driver unites work carried out in all Schools of the University and many of its Departments; it has enhanced the University's commitment to enterprise promotion, community interaction, and regional engagement; widening participation, third sector partnership, student volunteering and employability.

The whole arena of social enterprise is, however, fraught with definitional problems. The one used by the UK government is the following:

"a social enterprise is an organisation 'with primarily social objectives whose surpluses are principally reinvested for that purpose in the business or community, rather than being driven by the need to maximise profit for shareholders and owners". (Cabinet Office 2006: 10)

This new way of doing business comes from the socially innovative approaches being adopted, social innovation in this context being defined as:

"… new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations." (Bureau of European Policy Advisers, European Commission 2010: 9).

As there is no legal definition of social enterprise, the danger is it becomes too focused on starting up new organisational forms, including everything from community self-help to corporate social responsibility and all in between. The University, therefore, adopted a definition that enabled it to focus its attentions on specific activities whilst allowing flexibility to explore potential new ground as the opportunities arose. The University definition of Social Enterprise is an organisation that:

"Uses market disciplines to achieve a social outcome driven by social values"

The University in turn shows its commitment to social enterprises that deliver:

i) An enhanced student experience;
ii) Values of social inclusion, social impact, social innovation and change, and
iii) Entrepreneurial, innovation and enterprise skills.

It is these values that provide the parameters for engagement with students, staff and surrounding communities; an agenda that if it is to succeed needs to be value and mission driven. What can be seen in this developing strategy is a major repositioning and through the focus on social enterprise and social innovation a reconnection with our constituency and local communities.

This definition has the advantage that it ensures a number of key elements are addressed through the social enterprise activity:-

- People can be socially enterprising / innovative whilst not being formally constituted as an organisation.

- Traditional businesses can become more socially enterprising, often as a result of a widening Corporate Social Responsibility agenda that is innovative and value based.
- Grant dependent organisations can become more business-like, entrepreneurial and sustainable.
- Is linked to the student experience thereby enhancing and adding value through teaching, learning and research.
- Provides a strong base for our civic, community and business engagement.

The strategy for year 1 (2011) consisted of three elements:

i) New student offer (all students are able to work in, volunteer, start or explore social enterprise as part of their degree course);
ii) Integration of teaching, learning and research with social enterprise, and
iii) Support for and development of the social enterprise sector in the county, the region, nationally and internationally

A series of initiatives were developed and launched during this initial phase:

i) A Social Enterprise Development Fund - training, advice, mentoring and start up grants of between £3,000 and £20,000 for students and staff.
ii) InSpirE Northants- An initiative delivered in partnership with public sector organisations, businesses and social enterprises throughout the county. It supports new and existing social enterprises, and community and voluntary organisations by:
    a. Facilitating change within the third sector through new working arrangements
    b. Providing them with training and development material;
    c. Engaging them more effectively with businesses and local authorities, and
    d. Enabling volunteers in the county (including University staff and students) to easily find an organisation in which they can utilize their skills and enthusiasm.
iii) The Social Entrepreneur in Residence (SEiR) - A joint project developed with the Young Foundation. The SEiR's role is to work with staff, students and local communities as a talent scout, spotting potential entrepreneurs and ideas that will transform into new cost effective services – services that have social impact, are sustainable and have potential to scale. The SEiR works to develop new services that emerge from and are embedded within new partnerships bridging academic, public and civil sectors.
During his first year the SEiR has launched two initiatives. The Big Ideas Bonanza is a joint venture between the Young Foundation and the University that invites people to submit their ideas on how to tackle social inequalities; enabling Northamptonshire communities to get involved in social enterprise development and gain University support. In addition the 'We Do Ideas' project is a new way for students to share and develop their ideas into viable, income generating social ventures. With a series of events and an I do ideas 'app' that has been developed with the telecoms company Orange, this has enabled all students to get involved in social enterprise idea generation and development. Such an approach is being used by a number of academics in their teaching broadening the curriculum from a 'mere' focus on strategy to the development of socially entrepreneurial ideas.
In addition the SEiR has trained Social Enterprise ambassadors across all schools. Out of this initiative over 300 ideas have been received and 20 are being worked up with students into potential venture concepts.
iv) An asset based community development methodology has been adopted in a number of areas including research and teaching which is being used to measure, develop and optimise the strengths of neighbourhoods. Initially we partnered second year undergraduate Social and Community Development students with residents to analyse the strengths and expertise of two adjoining neighbourhoods; students transferred their skills and knowledge, engaging with residents who set the agenda. This was the start of developing a long term relationship with communities, using evidence gathered to help residents develop coherent and deliverable action plans. Out of this we are helping to develop the residents' ideas into sustainable projects and social enterprises; linking to wider government policy agendas around localism and Neighbourhood planning. This provides students with a richer learning experience and benefits local residents; developing students' creative, innovative and

entrepreneurial skills that are transferable to all sectors of the economy.

Phase 2 of the strategy builds on 2011 results and consists of four elements:

i) Inspire2Enterprise – launched in December 2011 the University has developed a 'one-stop-shop' for social enterprises – on line, by telephone, and face to face – support, expert legal and financial advice, training, mentoring etc. for new and existing social enterprise.

Inspire2Enterprise also supports the public sector to understand the potential social enterprise delivery models have in delivering public services at a local level. This includes support in service externalisation, social enterprise supply chain development, impact measurement, and support for intrapreneurial activity. It also engages large corporate and small and medium size enterprises to develop collaborative working with the Social Enterprise and voluntary and community organisations, as well as helping them to target Corporate Social Responsibility spend to maximise benefits for local communities.

ii) Investment in external social enterprises: The first investment was made in December 2011 in Northampton based Goodwill Solutions. Goodwill Solutions enables ex-offenders and people with drink and drug issues to get back into mainstream society through work programmes, either employing them directly or preparing them for jobs with others.

The University's investment in Goodwill Solutions, for instance, will enable it to develop its business, to gain new customers and thus employ more ex-offenders. In addition, the organisation provides placements for our students who could be running the information technology, marketing, design, finance and human resource parts of the business.

iii) Evolution of support functions to social enterprise models: The support functions in the University are being enabled to consider new ways of organising and working, for instance we are in the process of externalising the facilities management Unit and developing it into a social enterprise that will generate social value whilst also being economically sustainable.

iv) Applying social enterprise models to major social problems: In addition to the developments taking place through the work of the social entrepreneur in residence we are working on other initiatives:
   a. Early attachment – Helping parents to bond with their babies and bring them up to succeed, and
   b. Serial offending – Working with the Police focusing on the fact that the vast majority of the crime committed in an area, is committed by a tiny minority of people.

These investments give unique opportunities to our students and researchers e.g. we have a new post-doctoral student working on developing a business case for the Government on investing in early attachment therapies.

We are beginning to focus on changing the curriculum, adopting pedagogic practices that are cross school / cross discipline and incorporate more fully, problem based and work based learning, providing creative spaces for students and staff to connect to the socially innovative networks both within the University and local communities. This will require staff and students to think differently with less focus on individual schools but on interdisciplinary, innovative and entrepreneurial networks, for example, design students are working with Age U.K. to develop aids for older people in their homes; providing practical experience for the students whilst potentially reducing peoples' time in hospital.

What is crucial if this strategy is a need to focus on socially innovative processes and not just on developing projects; albeit we acknowledge that project development is important because they provide opportunities for engagement and focused research on such things as social impact. However, enhancing the student experience requires us to provide creative spaces both physically on campus and virtually through such things as virtual learning environments. We are using the Socially Innovation cycle (an action research approach) as a tool to embed in a changing pedagogical approach to teaching that will start with ideas generation within a societal context moving through the cycles of the development that could (but may not) lead to the setting up of a social enterprise; an approach that requires a student to be proactive, reflective, socially entrepreneurial and community engaged and requires the lecturer to be more facilitative than 'traditional' in an approach to teaching.

III. THE WIDER SOCIO POLITICAL CONTEXT

One of the strengths of the U.K. system has been its ability to produce creative, imaginative and innovative graduates who are not constrained by

rigid disciplinary or cultural frames of reference thereby responsive to the needs of a changing society.

The changes that are taking place in the University in part reflect many of the changes taking place in all sectors of the economy, with the traditional boundaries between the private, public and the not for profit sector blurring.

Through the developing strategy we are addressing societal issues, enhancing the student experience through the medium of social innovation that clearly connects the University to its surrounding communities. If this is to succeed this also has to be firmly rooted in the developing policy agendas both within the U.K. and also in the European Union, where there is an increasing recognition of the importance of social innovation in addressing societal problems. (Bureau of European Policy Advisers, European Commission 2010: 18- 19)

In our approach the University is working with all sectors of the economy, for instance we are working with private and public sector organisations to develop a regional enterprise zone with social innovation and social enterprises being at the heart of this development. This initiative is also part of a wider regional collaboration that connects all the Universities of the south east midlands together, recognising that while we are competitors, we also need to be strategic regional partners.

Although the coalition government's primary policy driver is to cut the public sector deficit, the wider social policy agenda is very much around 'empowering' local communities and encouraging local authorities to look at new ways of delivering services. In the area of health and social care, for instance, there is a need to reassess the type of services needed and to engage with the actual consumers and users to co design and co-produce new and socially innovative services. This requires student and staff to have a good understanding of policy, community development and work in multidisciplinary and participatory frameworks

IV. CONCLUSION

The University of Northampton has put in place a very ambitious strategy which puts social enterprise right at the centre of its development. This development has come at time when universities have to demonstrate their commitment to being creative, entrepreneurial and innovative, working collaboratively and openly within wider society; requiring a wholesale change in the mechanism that currently sit within most Universities. As Delanty (Delanty, G. 2001) states "the great significance of the university is that it can be the most important site of connectivity in the knowledge society (and) a key institution for the formation of cultural and technological citizenship (and for) reversing the decline of the public sphere". We believe the University is in a unique position to become a catalyst for social innovation, not only in Northamptonshire, but nationally and internationally. To maximise this potential we need to create an environment in which social innovation is encouraged, supported, financed and mainstreamed.

V. REFERENCES

Boulton, G. and Lucas, C. (2008) 'What are universities for?' League of European Research Universities http://www.unige.ch/international/etudageneve/gisp/prog/Readings/Haessig_Universities.pdf (accessed 28/2/2012)

Bureau of European Policy Advisers, European Commission (2010) Empowering people, driving change Social Innovation in the European Union http://ec.europa.eu/bepa/pdf/publications_pdf/social_innovation.pdf (accessed 28/2/2012)

Cabinet Office (2006) Social enterprise action plan Scaling new heights. Office of third Sector. London: Her Majesty's Stationery Office http://www.cabinetoffice.gov.uk/media/cabinetoffice/third_sector/assets/se_action_plan_2006.pdf (accessed 28/2/2012)

Delanty, G. (2001) 'Challenging Knowledge: the University in the Knowledge Society'. Buckingham: SRHE / Open University Press – cited by Goddard, J. (2009) Reinventing the Civic University London, NESTA.

Goddard, J. (2009) Reinventing the Civic University London, NESTA, http://www.nesta.org.uk/library/documents/Reinventing-Civic-Uni-v2.pdf (accessed 28/2/2012)

MASTER OF BUSINESS CREATION OR MASTER OF ADMINISTRATION: A CASE FOR PRAGMATISM AND A GREATER FOCUS ON INNOVATION AND ENTREPRENEURSHIP?

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In the current economy, shortage of entrepreneurs has been considered as a hinder for growth in terms of job creation and GDP. The Nordic countries are generally recognized as an interesting environment with better than average requisites for technology start-ups. However, growth through new business creation has been slow with an often-discussed discrepancy between theoretical education and research investments and emergent business and employment growth in small and medium-sized enterprises (SMEs). This has been relevant also for the area of medicine and the biosciences. The life science professional often lack the education and know-how of business creation, which may be an important factor that may hamper the incentive to create innovations and start-ups. The educational degree Masters of Business Administration (MBA) has traditionally supplied a steady stream of candidates to fill the deficiencies in business creation.

The paper addresses the question whether or not MBAs have educated with the right curriculum and learning experience to deal with venture creation in the life science industry. We also examine the characteristics that define the need of companies in the current economy.

Based on the data we have outlined available Master educations in the Life Sciences with a focus on business start-up and management. We also report our own experiences from a biomedical business creation master program, and further outline the arguments for Universities and academic institutions in favour of a generic Master of Business Creation program that is distinguished by a combination of formal theoretical teaching and informal tacit learning and vocational training.

I. INTRODUCTION

In today's business education, many stakeholders voice an escalating distrust in theoretical education, in the form of the traditional MBA or PhD degrees (Byrne 2010, Trunk 2010, Cyranoski et al 2011, Editorial 2011, Fiske 2011). According to a study on MBA students' preferences the interest in entrepreneurship is valued content in the curriculum and what candidates seek from a business school and the MBA program (EFMD et al 2011). Respondents in the study said their most valued subjects are Strategic Management, Leadership and Managing People and Organizations; the same three as last year's study. However, the new entrant to the top five is Entrepreneurship which last year only featured in the top five of candidates from Africa and North America (EFMD et al 2011). Additionally, there is growing interest and a recognized career advantage in choosing a specialized MBA or Masters in Science-MBA (Association of Business Schools, 2012).

The current trends indicate that students not only voice an escalating distrust in theoretical education as a personal job-creating strategy, but also that they more of innovation and entrepreneurship content, i.e. more of tacit/vocational training as compared to theoretical contents in their post-graduate education and training (Hedner et al 2010, Hedner 2011). According to a numerous studies the Nordic countries have today and even historically the best starting point for creation of technology-based businesses (see Freeman and Soete 1997, Helpman 2006, Lundvall 1992, Marklund et al 2009, North 1993). Still, the growth expected from new businesses has not materialized expected, which is often referred to as the "European paradox".

In the medical research arena the absence of entrepreneurs has been noted as a particular hinder for building new companies (see Hedner 2012). Researchers, PhDs, doctors and masters students with deep and detailed information about a medical and care problem or a research subject are over represented and produced constantly without creating more growth by means of new companies and innovations. As the burden of health care becomes higher and higher innovative solutions introduced to the market the entrepreneurs with new innovations are heralded

as the solution to both employment and lowering costs.

According to a study by Ernst and Young (2010) on successful entrepreneurs, to create sustainable growth and a successful entrepreneurship both previous employment and higher education are the most critical factors for success. The life science professional, a concept encompassing all the professionals working in the life science area find themselves professionals in a very specific niche area while entrepreneurs are often a facilitator and are very broad in their knowledge and skills. According to most researchers, entrepreneurship is characterized by vocational learning rather than being a trait that successful entrepreneurs are born with (ref). In the medical field, entrepreneurial educational programs in higher educations could facilitate the needed experience and tools to act as a catalyst for the medical professional to increase their willingness to enter the commercial market as an entrepreneur. Despite the obvious advantages of educating more entrepreneurs and the creation of new businesses, policy makers and decision makers within higher education have continued to put priority on the traditional educational model of a theory based Master in Business Administration. In contrast, we argue that a successful curriculum of Masters of Business Creation should be based on innovation and entrepreneurship, which is much about praxis (in tacit dimension entrepreneurship education (see e.g. Hedner et al. 2010, Hedner 2011).

This paper compares the current traditional higher education pedagogical models also called Master in Business Administration and an experienced based business creation model called Masters in Business Creation (MBC).

II. THEORETICAL BACKGROUND

The modern academic concept of academic entrepreneurship teaching was born in the 1940ies but the most significant growth period can be found in the mid 1970ies where around one hundred business schools had started courses primarily in new venture creation (Ronstadt, 2008). Nearly a half a decade later there is still a focus on academic teaching and aspiring entrepreneurs attending such school will usually find theoretical simulations or cases based on ventures rather than curricula where the students are guided by experienced entrepreneurs to actually start-up a business. The tacit/vocational and real life business start-up and venture creation training itself is expected to take place after graduation (Hedner 2011). The overwhelming majority of entrepreneurial programs are tied business schools and the Master in Business Administration curriculum. While the MBA has diluted its original brand of having a focus on producing administrators with numerous specializations the emerging MBC has a focus on innovation and entrepreneurship real life training and actual business creation (Hedner et al 2010, Hedner 2011). Today, several educational Master programs struggle to find its own identity and avoid following the path-dependency of the typical MBA platform. The traditional MBA curriculum is designed and educated to produce managers of existing organization, in essence administrators, with a core in management, accounting and administration. In contrast the emerging MBC platforms seem to focus on business creation in a curriculum of essential informal learning, tacit experience and vocational skills during actual business creation.

Experience centered business creation model is based on the philosophical school of pragmatism that links practice with theory. Most notably within the area of action oriented entrepreneurial learning one can draw on 'tacit' skills (Marsick and Watkins, 1990) who recognize that entrepreneurs experiment, discover and use intuition which is experience based. Further Rae and Watkins (2000) point out the importance of learning to achieve and learning from achievement in the process of entrepreneurial formation. Therefore, there are reasons to argue that the pedagogic foundations of academic entrepreneurship curricula should be based on a philosophy of educational pragmatism (Taatila 2010).

This line of reasoning builds on the theories of the duality of entrepreneurial knowledge, being formal and theoretical as well as informal and tacit (see Pragmatism Wikipedia 2012). Thus, the theoretic component relates to explicit knowledge, i.e. knowledge that can be easily codified, systematized, formalized, and communicated to others by oral or written means. In contrast to this, the tacit/vocational component is informal and personal, i.e. a context specific knowledge that cannot readily be transferred to other individuals by written or verbal means.

Although the benefits of the type of learning has a strong proponents and there is an increasing interest in higher education. Most biomedical schools have not introduced or created a curriculum to facilitate possibilities for formation of entrepreneurs through venture creation educational model. Most experienced based

programs that are case based and/or connected to existing companies.

III. Methodology

To identify higher education institutions in the medical arena with experience based entrepreneurial educational elements we used web-searches that delved into course description and extracurricular activities. These two were identified to contain the praxis based educational elements that outlines the MBC education. The MBC was defined by a benchmark the theoretical background, current literature in praxis based education and Master in Business Creation and Entrepreneurship in Biomedicine from the Gothenburg University. Other Master Programs in Entrepreneurship with tacit based education were also investigated to verify the benchmarked program. The results were used to create a curriculum for siphoning praxis based medical-entrepreneurial curriculums from the traditional MBA curriculums.

We have researched the current medical schools business related curriculums, and although practical learning within the sciences is well established; curricula related to entrepreneurial learning are rare.

We did the siphoning or data mining by collecting resources from database and search engine EBSCOhost Business Source Premier and Google as well as Google Scholar search engines. The search was constrained from 2008 forward in order to have the most recent input of curriculum and student feedback after the worldwide credit crisis hit countries economies. The theoretical background of pragmatism was used to narrow down searches of entrepreneurial curriculum for MBC with search words such as "tacit", "business creation", and "start-up parallel to masters" no not a few. The MBAs were investigated for entrepreneurial elements with searches such as "MBA Curriculum entrepreneurship medical" and "MBA business creation". However, the most effective searches for curriculum were done by MBA and Masters education databases, such as mbaprograms.org/entrepreneurship, topMBA.com and mbaPrograms.com, which led to program descriptions which often mentioned a praxis based education. These program search results were further verified by navigating to the course structure and course descriptions on the course website to map out what level of learning was experienced in relation to informal tacit learning. The same was done to identify the MBC programs. The MBC programs and biomedical MBA programs were then compared to each other by curriculum to recognize the level and intensity of tacit experience. The level and intensity are further discussed in the discussion section of this paper.

The first phase was to investigate the Swedish output of MBAs compared to MBC graduates to gain a better comprehension of supply of tacit based educated entrepreneurial graduates. The second phase was to identify tacit based characteristics and formulate yes/no questions to identify more of the programs in Europe and USA. This verified the benchmark and validated the siphoning procedure to further relate vocational training and informal tacit learning to entrepreneurial competencies. Finally a model for entrepreneurial education is suggested.

IV. Results

The distinction of MBC from the traditional models of entrepreneurial education is the tacit based education and vocational training. The tacit based teaching methods today range from business cases, thesis work within a SME, internship in an SME, projects, venture simulation and business creation. As entrepreneurial education is by large considered learning by doing or from what has been done before the general educational method has been cases simulating entrepreneurial situations and lecturers or guest lecturers with entrepreneurial experience. However, tying the education to an idea with commercial potential that is developed during the education period suggest a learning environment closer to the optimal learning and teaching method of learning by doing.

Approximal annual graduations of MBA and MBC students in higher education institutions in Sweden

A survey of 664 of the 2900 higher education institutions (HEIs) involved in entrepreneurship shows that venture simulation and business creation is practiced by one third of the institutions (European Commission, 2008). That is 221 HEIs who have are educating students with a tacit based MBC style curriculum in Europe. As an example to illustrate the mismatch of the great demand of MBC style education and supply of the same one can compare Sweden's two tacit based entrepreneurial masters educations and only one in the medical arena with less than a dozen students while there are 13 MBA programs with an around 400 students graduating each year (Civilekonomen.se, 2009).

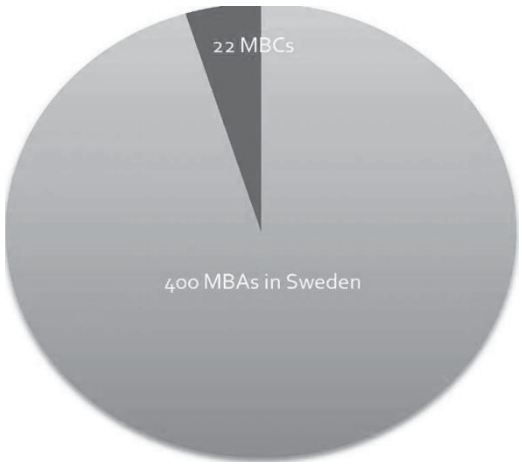


Figure 1. What do Master student programs in Sweden focus on - Business Creation or Business Administration?

We found that only a few academic innovation and entrepreneurship programs existed with a practical learning element. Innovation and entrepreneurship with a clear informal tacit learning and vocational training curricula were generally seen as a new and interesting opportunity but only implemented to a degree in Swedish Entrepreneurial education.

1. Does learning often takes place in professional practice outside the formal educational establishment or in normal life?
2. Is learning following a specified curriculum and is it professionally organized?
3. Is learning often originates accidentally or sporadically, sometimes in association with change of requirements and cases?
4. Is learning typically pedagogically planned by participants, or systematically aware by subjects?
5. Is learning unconsciously incidental holistically problem-related, and related to common life situation management?
6. Is learning is usually experienced as a "natural" function of everyday life?

Table 1. Characteristics of informal tacit or pragmatic learning and vocational training will be evaluated in the curricula of typical MBC and MBA programs. The characteristics of the venture creational education based on tacit are shown below (from Hedner et al. 2010).

Bygrave and Hofer (1991) put forward the importance of the dynamic and holistic dimensions of the entrepreneurial process; start-up projects and businesses evolve over time (dynamic dimension) and this is due to a system of interacting variables (holistic dimension) (Bygrave and Hofer 1991).

Entrepreneurial competences: a taxonomic approach		
	Competencies	
Level of learning	**The individual**	**The context**
KNOW-WHY: attitudes, values, motives,	Self-awareness, achievement motivation, perseverance, risk acceptance	Entrepreneurial spirit, availability of mentors and role models
KNOW-HOW: skills	Vocational skills	Complex occupational and business structures
KNOW-WHO:social skills	Network capability	Production and social networks
KNOW-WHEN: insight	Experience, open minded and intuition	Industrial traditions and market maturity
KNOW-WHAT: knowledge	Encyclopaedic knowledge, institutional facts	Information networks, vocational training and a varied cultural life

Table 2. The vocational training and informal tacit learning lead to competencies for the entrepreneurial individual with specific advantages in the venture context shown below adapted from Johansson (1991).

Identifying tacit based entrepreneurial master programs using criteria and methods described in this paper was conducted to assemble the most common elements of tacit oriented curricula.

MBC Program	University
New Business Creation	University of Gloucestershire
Master in Science in Business Creation	Univeritetet i Tromsö
Biotechnology and Technology Entrepreneurship	Chalmers Technical University
Master in Business Creation and Entrepreneurship in Biomedicine	Gothenburg University
Diploma in Entrepreneurial business Applications Airdrie Alberta	University of Alberta
Master of Enterprise Technology	University of Salford
Masters in Bioscience Enterprise	Cambridge University
Executive MBA in Innovations and Business Creation	Technical University in Munchen
Masters in Entrepreneurship	Oklahoma State University
Master Programme in Entrepreneurship	Lunds univeristitet
Hec-Ulg Master in Management Science	University of Liege
MSc in Entrepreneurship and Innovation for a Sustainable World	Skema Business School

Table 3. Some identified Innovation and Entrepreneurship Master educations involving varying aspects of more explicit tacit/vocational educational components

The curriculum was then compared to the MBA with entrepreneurship curriculum to identify the differences. These were cross-referenced to what companies, governments, and students have identified as characteristics that are important for an employee to have.

MBA PROGRAM	
Programme (name)	**University (organisation)**
MBA/MA in Medical Science	Boston University, School of Management
MBA/MD	Boston University, School of Management
Combining Expertise and Leadership: MD/MBA Program	Harvard University Business School
Biomedical Enterprise Program (BEP)	jointly administered by the Harvard-MIT
MS Bioengineering/MBA MD/MBA	Stanford University, Graduate School of Business
MD-MBA Joint Degree	Yale University
MBA/PhD with Yale Graduate School of Arts and Sciences	Yale University
Master of Science in Biotechnology/MBA	Johns Hopkins University
Joint Honours programme	Imperial College London
Darthmouth PhD/MBA Program	Darthmouth College
PhD/MBA Program	Wake Forest University
PhD/MBA Program	University of Connecticut Health Center

Table 4. Some of evaluated MBA programs with entrepreneurial elements

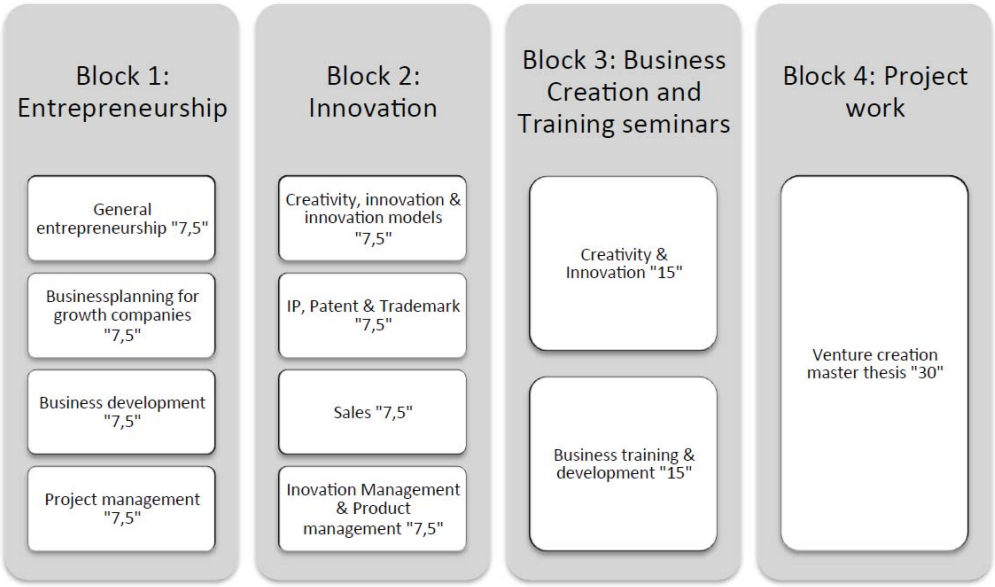


Figure 2. Overview outline of a curriculum in a Master education in Innovation and Entrepreneurship with a tacit/vocational focus.

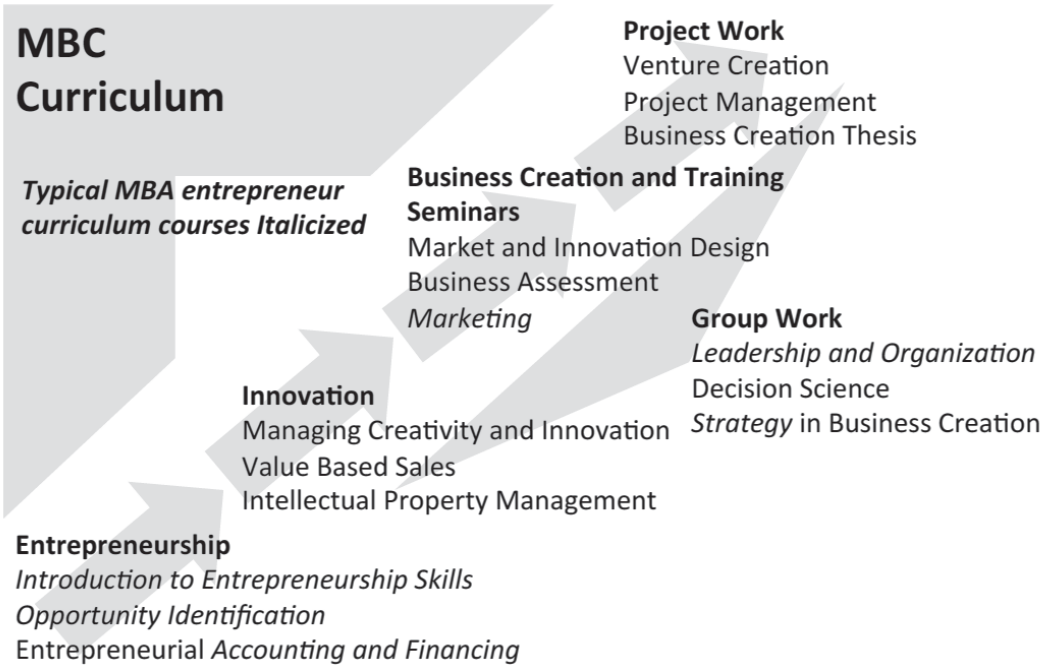


Figure 3. MBA and MBC Curriculum comparison

V. DISCUSSION

The traditional MBA has evolved from making management more efficient to a faculty centered, individualistic and ethnocentric, with a quantitative and financial focus. One of the reasons for the current economic disparity is described in the similar terms. The emerging MBA still rates Ethics and Corporate responsibility to a low degree (EFMD, APS and CarringtonCrisp 2011). However there is a movement towards a learning focus related to people skills and an analytical focus.

Entrepreneurship is now considered to be one of the top five most valuable curriculum
Rated as most valuable course content among prospective MBAs is Strategic Management, Leadership and Managing People and Organizations.
Today, prospective MBA students want blended learning rather than traditional academic terms and office hours. Only in North America more than 50% of the students wanted a traditional 2 year MBA program.

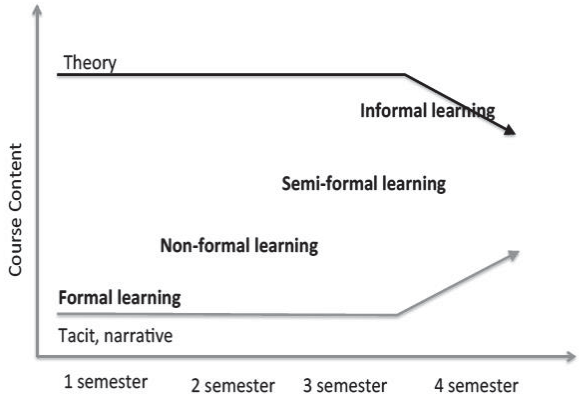
Table 5. Views on MBA curriculum content by prospective MBA students

Based on a survey study of 476 prospective MBAs in 79 countries. From; Tomorrow's MBA - Enter the Entrepreneur; EFMD, APS and CarringtonCrisp 2011)

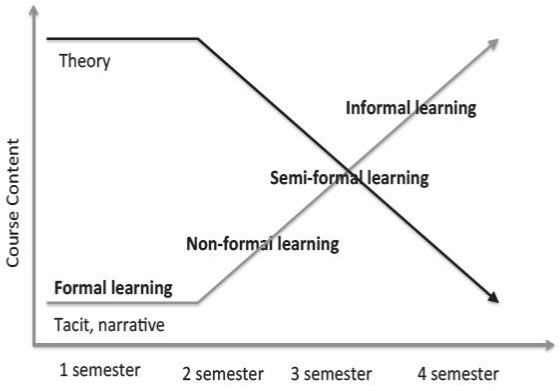
Recent surveys on MBA programs (Ruiz-Calderon 2011) indicate that MBA graduates more quickly embark into venture creation than holders of other academic degrees. They also more readily join start-ups. These trends tend to more clear over the recent years, and for example, in 2011 7 % of Harvard MBA graduates selected an entrepreneurial career, which was up from 3% in 2008.

Also business school and other alumni, who are taking one or more entrepreneurship courses, are influenced to become entrepreneurs not only immediately following graduation, but also long afterwards. Also, this Babson College study, which surveyed 3,755 alumni graduating between 1985 to 2009, demonstrated that such graduates also were more likely to become entrepreneurs later in their business career since the percentage of alumni entrepreneurs increased over time, the survey found. In numerical terms, it seemed like it took an average of just over 13 years for MBA graduates to become entrepreneurs.

Our results may help to support Universities to introduce structured educational innovation and entrepreneurship programs blending theoretic education and vocational training for life sciences students. Such programs may motivate students and researchers at Medical Schools to contribute to the creation of entrepreneurial life science ventures. Further our results introduce a masters education which provides industry an additional way to deal with the changing economy and create new value for companies and society. We propose the current economy needs more creators than administrators and future economies will be better prepared with employees who are able to be open to change and innovations.



Timeline of master MBA program, Penn State MD-MBA Joint program



Timeline of master MBC program – Gothenburg University MCEB program

In a recent study carried out in 2009 - 2010 (EFMD, APS and CarringtonCrisp 2011), an analysis was made of what views prospective MBA students expected from their business school experience. Although entrepreneurship is not new to the MBA, the students' responses suggested a strengthening of such parts of the curriculum, a view that was especially voiced by students in Asia.

In a European wide survey more than half of the Europe's students at higher educational level do not even have access to entrepreneurial education. This means 11 million students have to opportunity to engage in in- or extra-curricular activities that can stimulate entrepreneurship. The results of the survey show that 5 million out of the total of 21 million students in Europe are currently engaged in entrepreneurship education in some form. However, specialized higher education institutions such as medical programs and life science in general are lagging behind when it comes to entrepreneurial education (European Commission, 2008).

The need for entrepreneurs skilled in business creation rather than business administration has culminated by the recent events in the life science industry as the global economy was hit by an economic downturn 2008 and pipelines have been drying out with no reoccurrence of blockbuster drugs flowing the market in the near or distant future Hedner et al 2012). The pharmaceutical industry consolidation and acquisitions of small nimble biotechnology ventures further proves the point how the human resources are saturated by administrators while the real need is business creators and in a broader sense entrepreneurs. The traditional educational model of business administrators lacks the essential tools and skills of change and value creation that entrepreneurship offers.

However, the emerging MBA is developing the core of the educational objectives is business administration looking to be more effective which entails management and leadership. The problem is that the MBA is searching for its identity as recognized by Kedia and Harveston (2002) where the administrator is now shifting from what can I do better for the shareholders to what can I change or implement to become better. Some studies hail the evolving MBA now serving numerous industries as a universal tool that can be tweaked with the plethora of concentrations. However, Blass and Weight (2005) argue that the MBA is becoming more diluted and worn down to a concept losing its identity and confusing its customers the employers. A sailing ship effect (Ward 1967) can be observed by the numerous specializations and electives introduced to the education.

MBC Curriculum - Tacit learning cycle and entrepreneurial competencies

MBC Curriculum	Tacit learning cycle	Level of learning	Competencies	
			The individual	The context
Group work and leadership	Socialization – individuals **share** tacit knowledge through learning by doing	KNOW-WHY: attitudes, values, motives,	Self-awareness, achievement motivation, perseverance, risk acceptance	Entrepreneurial spirit, availability of mentors and role models
Entrepreneurship educational platform	Externalization – Individuals **link** tacit knowledge to explicit knowledge	KNOW-HOW: skills	Vocational skills	Complex occupational and business structures
Innovation	Combination – Individuals **combine** different explicit ideas to create knowledge	KNOW-WHO: social skills	Network capability	Production and social networks
Business creation training and seminars	Internalization – Individuals **extract** knowledge from newly created organizational tacit and explicit knowledge through learning by doing	KNOW-WHEN: insight	Experience, open minded and intuition	Industrial traditions and market maturity
Project Work	Implementation – Individuals use tacit knowledge and **create** tacit knowledge in the process	KNOW-WHAT: knowledge	Encyclopedic knowledge, institutional facts	Information networks, vocational training and a varied cultural life

Figure 5. An MBC curriculum matching tacit learning cycle modified from Nonaka and Takeuchi (1995), competencies and characteristics by Johansson (1991) with a focus on business creation

The tacit learning cycle from created by Nonaka and Takeuchi (1995) is valuable model for businesses that develop new knowledge that provides competitive advantage. Both explicit knowledge and tacit knowledge are necessary to generate innovations. Another area of business in which the cycle can come into play is the development of company culture (Sherman and Martinoff, 2003). The tacit learning cycle has been further developed with an implementation step that is essential to gain a higher level of knowledge and to realize value in a business. In the implementation step itself tacit knowledge and value is created and realized.

Many governments are today bracing for the next economic decline caused by disproportionate debt burden and authorities are looking for ways to facilitate the creation of new ventures heralding a new period of growth. Interestingly Sean Rickard, director of the full-time MBA program (2006-2011) at Cranfield School of Management explains in MBA Entrepreneurship study (QS Global 200 business school study, 2012): "Governments have come to the view - rightly or wrongly - that their influence on their economies is greatly weakened in a globalizing world and now put great emphasis on business start-ups and entrepreneurship to generate jobs and growth. Not surprising therefore that entrepreneurship has a higher profile in business schools." Similarly, companies who before shied away from entrepreneurially educated graduates today value their business creation skills. In fact the same study show how top MBA programs find

entrepreneurship as the second most popular MBA specialization.

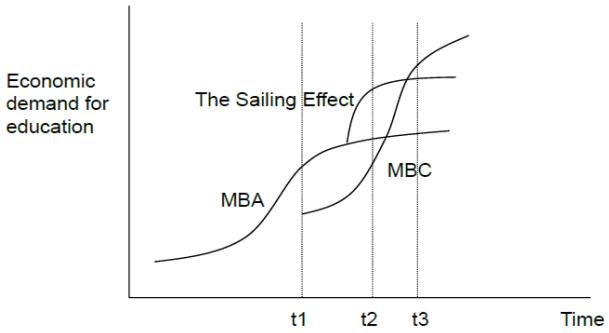


Figure. 6. Applied from Utterback, Mastering Dynamic of Innovation showing MBA sailing effective and disruptive education of MBC

VI. REFERENCES

Blass, E. and Weight, P. (2005) The MBA is dead - part 1: God Save the MBA! On The Horizon. 12, (4), 229-240

Byrne JA (2010). Meet the enemy of the MBA. http://money.cnn.com/2010/10/04/pf/jobs/business_school_waste.fortune/index.htm

Coombs P.H., Prosser C. and Ahmed M., (1973). New Paths to Learning for Rural Children and Youth, New York: International Council for Educational Development.

Cedefop Glossary (2001) Retrieved from http://www.cedefop.europa.eu/EN/about-cedefop/projects/validation-of-non-formal-and-informal-learning/european-inventory-glossary.aspx

Cyranoski D, Gilbert N, Ledford H, Nayar A, Yahiba M (2011). The PhD factory. Nature, 472, 276¬279 doi: 10.1038/472276a

Editorial. The disposable academic: why doing a PhD is often a waste of time. The Economist (6 December 2010). Available at http://go.nature.com/qu7c8z

Editorial (2011). Fix the PhD. Nature 472, 259-260 (21 April 2011) doi:10.1038/472259b

EFMD, ABS and Carrington Crisp (2011). Enter the entrepreneur. Tomorrow's MBA. http://www.carringtoncrisp.com/tomorrows_mba

Fiske P (2011). What is a PhD really worth? Nature, 472, 381 doi:10.1038/nj7343-381a

Freeman, C. och Soete, L. (1997), The Economics of Industrial Innovation (3 suppl.), The MIT Press, Cambridge, Mass.

Hedner T, Edgar B, Maack K and Abouzeedan A. (2010). Innovation and Entrepreneurship curricula at Swedish Universities - Theoretical, tacit and narrative learning aspects. In "Innovation and Entrepreneurship in Universities", Ed Marja-Liisa Neuvonen-Rauhala, Proceedings of the 3rd International FINPIN Conferences Joensuu, Finland, pp 150 - 162. A publication Series of Lahti University of Applied Sciences, Series C, Part 72; ISSN 1457-8328; ISBN 978-951-827-112-6

Hedner T. (2011) How to implement an innovation and entrepreneurship curriculum. EFMD Global Focus, 5 (2); 28 - 31

Hedner et al Lakartidningen (2012).

Hedner T (2012). Change in the Pharmaceutical Industry. Aspects on Innovation, Entrepreneurship, Openness, and Decision Making. Linkoping Studies in Science and Technology, Dissertations, No. 1393. ISBN: 978-91-7393-082-6

Helpman, E. (2006), Tillvaxtens mysterier, SNS Forlag, Stockholm. Lundvall, B.-A., (red) (1992), National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning, Pinter Publishers, London.

Ikujiro Nonaka and Hirotaka Takeuchi, The Knowledge-Creating Company, (New York: Oxford, 1995).

Johansson, B. (1991) University training for entrepreneurship: Swedish approaches. Entrepreneurship & Regional Development, 3, 67-82

Kedia, B.L. and Harveston, P.D. (2002), 'Transformation of MBA programs: meeting the challenge of international competition', Journal of World Business, 33 (2), 203-17.

Marklund, G., Vonortas, N.S. och Wessner, C. W. (red) (2009), The Innovation Imperative - National Innovation Strategies in the Global Economy, Edward Elgar, Cheltenham/Northampton, USA. New Nature of Innovation (2009), utgiven av FORA, OECD med flera. (http: //www. newnatureofinnovation.org/full_report. pdf)

MBA programs.org (2012). Online MBA programs in entrepreneurship and Campus-based Entrepreneurship MBA programs. Accessed at February 29 2011. http://www. mbaprograms. org/entrepreneurship/

North, D. C. (1993), "Economic Performance through Time", Prize Lecture, Lecture to the memory of Alfred Nobel, December 9, 1993. (http://nobelprize.org/nobel_prizes/economics/laureates/1993/north- lecture.html)

Pragmatism. Wikipedia (2011). http://en.wikipedia.org/wiki/Pragmatism, Accessed February 29, 2012.

Rondstadt, R. (1990) Entrepreneurship Education. Current Developments, Future Directions. The Educated Entrepreneurs: A New Era of Entpreneurial Education is Beginning. Chapter 5 p 69

Trunk P (2010). Why an MBA Is a Waste of Time and Money. http://www.cbsnews.com/8301-505125_162-45040152/why-an-mba-is-a-waste-of-time-and-money/

Troutwine C (2010). Why you should persue an MBA. Wall Street Journal. http://blogs.wsj.com/hire-education/2010/07/27/why-you-should-pursue-an-mba/

Sherman, S. and Martinoff, J. (2003) Learn from Experience. A four-step process for communicating business ethics. Graziado Business Review. 6, (1), 472-478

Ward, W. H. (1967) The Sailing Ship Effect. Institute of Physics and The Physical Society

Werquin, P. (2007) Terms, Concepts and Models for Analyzing the Value of Recognition Programmes: RNFIL - Third Meeting of National Representatives and International Organizations. Retrieved from http://www.oecd.org/dataoecd/33/58/41834711.pdf

NEW LEARNING CONCEPTS IN POST-DISASTER DEVELOPMENT: LEARNING FROM SOCIAL ENTREPRENEURS IN NORTHERN HAITI

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This research studies social entrepreneurship as a development tool. Currently the value of entrepreneurship as part of the development efforts of countries in transition is barely considered and poorly understood. The motivation stems from the low ability of the hundreds of international organizations to provide tangible solutions for a better life for the local population in the post-disaster situation. The question raised is how social entrepreneurs can support the development of post-disaster Haiti. Social entrepreneurship seems a promising way to acknowledge social opportunities, while applying business practices in a sustainable manner. The purpose of the research was to analyse whether the activities of social entrepreneurship can be supported in future post-disaster scenarios.

Through an ethnographic study in-depth data has been collected – partly via videography. In collaboration with Earth Aid Finland the work of two social entrepreneurs has been studied. The empirical data has been analysed through a practice theoretical lens with a critical realist epistemology. An edited film shows the results of the data analysis by following the model of the effectuation logic.

The findings indicate that action-oriented social entrepreneurs are effective in addressing and solving the local social obstacles, because they are well embedded in the environment. They primarily follow effectuation logic to exploit the opportunity. However the international community follows a rational logic that offsets the effect. This study suggests a shift in development policies towards a stronger commitment and capability support of local entrepreneurs, instead of continuing with the linear and sequential opportunity process. To achieve a greater impact the entrepreneurs require a stronger effectual stakeholder commitment.

Keywords: Social entrepreneurship, videography, effectuation

I. INTRODUCTION

A spectre is haunting Europe – the spectre of infinite money transfer from richer countries to the poorer ones. Our governments invest billions of Euros into a financial system that is beyond any human's comprehension to avoid even heavier social disruptions. The common claim is that the drastic measures – the billions of Euros – are necessary for our society's survival. By contrast the vast majority of governments fail to contribute 0.7% of their Gross Domestic Product to improve the situation of half of the world's population that live in poverty or extreme poverty. If we, as a society, are not able to meet a pre-agreed target transfer in compensation for all the benefits we receive from the poorer countries, but instead mobilize billions of Euros to rescue the common currency, then our inability to eradicate poverty can hardly be monetary in nature.

As societies evolve, new concepts emerge in academia. In recent years there has been a growing interest in academia on the concept of social entrepreneurship (SE). As governments fail to address public needs and as multinational enterprises are unable to slow down the widening gap between the rich and the poor, social entrepreneurs have stepped up to create unique business models aligning social and economic needs. "Social entrepreneurship encompasses the activities and processes undertaken to discover, define and exploit opportunities in order to enhance social wealth by creating new ventures or managing existing organizations in an innovative manner" (Zahra et al., 2009: 522). Seelos and Mair (2005) demonstrated that a growing number of social enterprises have successfully implemented effective models that compete with traditional for-profit organizations, and at the same time, trigger a series of welfare effects. Yet, SE remains to be perceived as a concept adapted in cases of unidentifiable and unclear structures and practices of the business as claimed by Mair & Martí (2006). Dacin et al. (2010) are convinced that the future of SE research is within the common entrepreneurship frame.

In the following thesis I argue that this is too simple a view and that, on the contrary, SE addresses the apparent gap to find new solutions for the existing challenges of the globalized world. Without refuting the concept of the homo

economicus – rational actors pursue efficiency-based processes – some researchers (e.g. Bornstein, 2007; Trivedi & Stokols, 2011) have highlighted the growing need to push the human society into the centre of decision-making. SE intends to provide solutions to the existing social problems with an emphasis on the human agency. While in the past the duty of social justice has been a task of the government, which has most often created unsatisfactory results, the society itself, including social enterprises, increasingly accepts this challenge themselves. In developed nations the prosperity impact has been acknowledged by society and academia. However, particularly in economically peripheral areas – as are major parts of the developing world – the leading economic theories have failed to create prosperity. Therefore it is worthwhile to further investigate their socio-economic conditions and a new set of successful business models – such as SE.

II. STRUCTURE OF FULL PAPER

The objective of this thesis is to better understand the role of SE as a concept for societal development. It is widely claimed that traditional development assistance has failed to achieve the desired impact (Collier, 2007). Moyo (2009) further claims that it might even reverse the national development efforts, rather than exploring the fortune at the bottom of the pyramid (compare Prahalad, 2010). A general concern is that creating solutions for the poor should not be perceived as a charity task, but as a long-term strategic business investment (Yunus, 2003). For centuries donor countries have provided conditional development assistance, sometimes simply transferring Western solutions to different societies and imposing these societal model on them, which Riddell (2007) concludes led to low aid effectiveness. Instead of relying on foreign aid, societies have to be empowered and assisted in the pursuit of solving their inherent social, environmental and economic challenges. The empowering impact of SE is addressed in this research.

Pro-poor development is reaching into the mainstream media whenever a disaster happens. While this leads to a short-term extension of development assistance, it undermines the long-term sustainable development efforts. With the current structures in place, a developing nation depends heavily on the foreign cash inflow for its internal development (GoH PDNA, 2010). The temporary multiplication of these monetary resources alleviates the disaster effects, though, creates a greater dependence for the coming years (Office of the Special Envoy for Haiti, 2011). When those resources are subsequently reduced the country is an even greater slump than before the disaster. Thus, this type of aid distorts incentives and undermines the long-term development. However, local SE focuses on root of the problem, the omnipresent social obstacles, instead of the symptoms of a disaster (Nicholls, 2008). In order to investigate the impact that SE can have on the post-disaster development efforts, Haiti has been chosen for this study. In January 2010 Haiti has experienced a devastating natural catastrophe disrupting a fragile social system and pushing major parts of the population towards the edge of existence. This context is perceived as representative for a post-disaster society of a developing country that has fundamental social injustices to be solved.

In general, the objective of this study is to find sustainable development mechanisms for a developing country emerging from disaster. In this matter, the particular question this study intends to contribute to is: How can Social Entrepreneurship support the development of post-disaster Haiti? In order to answer that question, a secondary one is raised: How to better integrate business activities and adapt them to the post-disaster conflict? Thus, the objective of the study is to investigate how SE can work under the post-disaster circumstances of a developing nation in crisis. In order to empirically research the questions raised, the focus is to present the work of social entrepreneurs in this context.

A. Theoretical Framework

SE is a loosely defined concept lacking a coherent set of commonalities in academia. It comprises two highly ambiguous words – ‘social’ and ‘entrepreneurship’ – that are understood differently by various people including researchers (Mair & Martí, 2004). So far no consensus has been reached on the domain entrepreneurship (Shane & Venkataraman, 2000) and the term social is a value-laden prefix (Zahra et al., 2009). It is often associated with activities contrary to commercial ones. Zahra et al. (2009) discovered that at least 20 diverse, and hardly intersecting, definitions are used in the latest publications. Dacin et al. (2010) claim even 37 distinctive definitions. Overall, the small number of empirical cases shows that best practices cannot be claimed yet and that concepts remain at the conceptual and theoretical level (Mair, 2010).

The strength of the SE concept is its dynamic flexibility and the little isomorphic pressure it experiences. While some authors criticize the lack of clarity and coherence, others perceive the

definitional flexibility as the main value of the concept (Nicholls, 2008). According to Nicholls (2008), the remarkable variety of organizational contexts and differences in organizational models prevents a narrow classification. Respectively, without appropriate metrics social entrepreneurs cannot be evaluated as effective or ineffective (Zahra et al., 2009). Even though, the extraordinary impact of SE is the loose definitional constraint (Nicholls, 2008), for the purpose of this study the following definition has been applied: "social entrepreneurship encompasses the activities and processes undertaken to discover, define and exploit opportunities in order to enhance social wealth by creating new ventures or managing existing organizations in an innovative manner" (Zahra et al., 2009: 522).

In SE research three different schools of thought exist that differ in geographical distribution as well as in their thematic analysis (Bacq & Janssen, 2008). All three vary in the way they perceive SE, the social enterprise and the social entrepreneur. Two of them have emerged in the US, though, researching phenomena from distinct perspectives. The first one, the Social Innovation School focuses on the social entrepreneur and its feature. The second, the Social Enterprise School emphasizes the necessity for the social enterprise to create a profit to finance the social impact. The third one, the European approach – the EMES network – accentuates the specific legal forms required for this type of venture. These schools of thought perpetrate the thematic criterion different, wherefore it is insufficient to claim purely a transatlantic divide as sometimes denoted. In short, one school focuses on the agent – the social entrepreneur – and two highlight the agency – the organization –, yet the interlinking element – the process – is merely acknowledged and not accentuated.

Firstly, SE differs significantly from commercial entrepreneurship, in particular, the mission and context driven forces in and for SE (Austin et al., 2006; Trivedi & Stokols, 2011). As Trivedi and Stokols (2011) argue, the point of inception for a social enterprise is to solve long standing unsolved social problem. At the heart of the social entrepreneurial activity is the opportunity recognition (Austin, 2006; Corner & Ho, 2010), however the window-of-opportunity has different temporal punctuations (Light, 2009). Secondly, with regard to the development context, the lack of inclusiveness is one of the inhibiting forces (Trivedi & Stokols, 2011) that make social progress an international development matter rather than a community activity. In direct connection, thirdly, a unique network positively influences the ability for resource mobilization (Miller & Wesley II, 2010). For instance, Gronbjerg et al. (2000) discovered that the grantor-grantee relationship is a better determinant of grant obtainment than screening the plain proposal. For some researchers, social enterprises are a novel form to convert the financial resources into social ones (Murphy & Coombes, 2009).

Moreover, the entrepreneur cannot be neglected as entrepreneurship is the most agent-centred discipline in management sciences (Mole & Mole, 2010). He is uniquely positioned to influence the success of the venture. Zahra et al. (2009) have identified three broad categories of social entrepreneurs – the Social Bricoleur, the Social Constructionist, and the Social Engineer. In their study they distinguish the types of entrepreneurs based on their opportunity discovery approach, their impact on the broader social system, the resource configuration and their unique ethical philosophies. Additionally, in resource-poor environments, social bricolage is used to analyse entrepreneurs (Di Domenico et al., 2010). The concept comprises of "making do", "refusal to enact limitations" and "improvisation" (Ibid.). Making do refers to the entrepreneur combining the resources at hand.

The theoretical analysis suggests integrating the individual, the organizational and societal element. It is not enough to focus exclusively on the structure and the agency. It is rather the interplay between them that demands our special attention. The discussion on the process leads to the conclusion that the organization and the entrepreneur have to be understood embedded in the environment – in relation to the society. Thus for the empirical study, the findings suggest focusing on the relationship between three elements: the organization, the individual and the society (see Figure 1). Investigation is needed on the network constellation (society – organization), the interplay between the constituents (individual – society), as well as the interplay between the structure and agency (individual – organization). Following Zahra et al.'s (2009) definition, in addition to the social element, it emphasizes the significance of opportunity recognition and exploitation. It permits investigating the opportunity of SE by studying the dynamics between the individual, organizational and societal layer.

Figure 1: Conceptual framework for Social Entrepreneurship

B. Methodology

For this research a qualitative study was chosen. Through a critical realist ethnographic design, an in-depth understanding of the environment can be revealed (Mir, 2011). The call for novel approaches in entrepreneurship research (Neergaard & Ulhoi, 2007) was acknowledged and carefully configured into the data collection and analysis. For the data collection and analysis part, videography as an ethnographic research method has been integrated (Belk, 2006; Borghini et al., 2010; Kozinets & Belk, 2006; Martin et al., 2006). the focus of the data analysis is to reveal the social practices to achieve analytical generalizations by retrospectively identifying a series of elements that led to the development of the social enterprise in its current form (see Figure 2). The idea of this method is to show processes in action and to retrospectively make sense of the relationships. Taking a practice theoretical lens, the emphasis of the critical realist ethnographic study was on analysing causal relations in the local context. As an ethnographic study, the task is to make descriptions as thick as possible (Sharpe, 2004). Therefore, the richness of the data has been conserved into an edited film.

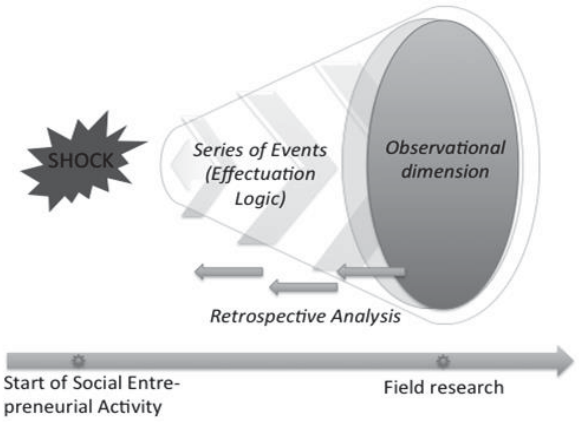

Figure 2: The methodological model of this study

As a suitable context for this investigation, post-Earthquake Haiti has been chosen. The post-disaster is the context for the study, while Haiti represents the society element of the conceptual model (see Figure 1). Haiti is a fragile state, with a complete absence of functional markets. These are used as a tool of patronage, to control the population. SE has to step up not to fill a market failure, but to achieve an impact despite the market absence. Additionally, due to the high number of influential international parties, the severity of poverty and the impact of the earthquake, it is a prime example for a post-disaster developing country context.

C. Findings

This study supports the idea that no panacea exists that will solve the development problems (Banerjee & Duflo, 2011). Studying the interplay provided new insights on the practices of social entrepreneurs in a post-disaster developing country. Foremost, the decision-making logic differed between the international community and the entrepreneurs. Also the logic of effectuation is present between the entrepreneur and the organisation. This is no new insight as it has been part of the effectuation framework and research from the inception. However, the insight is to note that the individual and the enterprise follow the same logic towards making the decisions with the society. It is rather to say that they apply this logic despite the society as they are a disturbing factor inhibiting the progress – no functional markets exist, no monetary support, no legal justice nor fair competition. It is this interplay that is dysfunctional and constraints the effectuation logic to be applied.

Similarly, the logic of rationality applied by the international community and the effectuation logic applied by the entrepreneurs hardly co-function. Regarding the opportunity exploitation, these explained practices of the two systems are to a great extent incompatible. A key finding is that local social entrepreneurs primarily follow an effectual approach at which the opportunity recognition or identification is interconnected with the evaluation and the exploitation phase. Through the leverage of failure not its avoidance they progress (Sarasvathy, 2008). The unstable post-disaster environment and the low functionality of a financial infrastructure in a developing country impose a more short term framework, so to say day-oriented behaviour

III. CONCLUSION AND RECOMMENDATIONS

This study is an attempt to create synergies between the post-disaster context and the current

entrepreneurship research. This necessity has not been seen for a long time. It took a Peace Nobel Prize to open the eyes of the world. Still, research has remained marginal in this area even though the significance of it is steadily increasing. In the future the world is likely to see a rise of catastrophes, natural ones, such as the Haiti Earthquake of 2010, social ones, such as the democracy movement in the Arab world, or a combination of social-natural, such as the post-tsunami Japan of 2011. Whether due to climate change of the evolution of communication, governments are already spending unimaginable amounts on societal evolution as a consequence of those shocks. Entrepreneurship is perceived as a key factor in the 21century globalized world. Therefore, strengthening the research efforts on this matter should be in the interest of everybody. This study mainly contributes to the discussions in three ways:

1. It pinpoints a necessary shift in pro-poor development strategies

2. It calls for a greater appreciation of the concept of social entrepreneurship at the centre of future policy-making in the development aid sector

3. It suggests emphasizing the commercial aspect of the concept in order to reach sustainability

The first finding addresses the continuous failure in development strategies in general as in the post-disaster context. Contrary to the common opinion, the post-disaster situation provides an enormous opportunity for societal change. Unfortunately each disaster destroys many individual lives, and leaves a deep scar within the society, but at the same time triggers collective action. With the current mind-set the international community engages primarily in "re-activities", such as rebuilding, reconstructing. The "re" indicates the focus on establishing a situation similar to the one before. Even though not being mentioned explicitly, the researcher witnessed this mind-set in all the international projects and the foreigners who he engaged with during the field trip. With all respect in mind for the individual tragedies that have occurred, restoring the status-quo bypasses the great opportunity of the situation. Change-agents, turnaround experts in commercial enterprises intend to shake-up the people and create acceptance for change in order to upheave the company. A similar mind-set in the development work would benefit the long-term prosperity of the affected communities to a greater extent than healing the wounds. For the future of development assistance in post-disaster situations, the study proposes a stronger positive attitude for societal change as a meta-goal.

As a direct implication of this attitude, and a second contribution of the investigation, several implications evolve for policy makers. First and foremost, the objective of the international community is to support local initiatives. Societal change is an endogenous process that cannot be induced by foreign agents, nonetheless, can be facilitated. Second, the transition of direct help, mainly in form of aliments and textiles, has to occur faster towards indirect help. The long cycles of free aid lead into market disequilibria with unfair competition. Thousands of local producers loose the basis for production and withdraw as a result of the artificially sustained disequilibrium. Thus, a quicker transition from humanitarian relief to development assistance should be favoured. Third, temporary solutions have to be reconsidered. Currently transitional concepts, for instance temporary shelters, turn into permanent installations and impact the development of more radical and locally adapted solutions that benefit to the community in a sustainable way. Instead, the overall goal could be to support social entrepreneurs and related activities that embrace the spirit of helping the people to help themselves.

As this study has demonstrated, SE struggles to be a sustainable approach, in particular in the development context. The third claim builds up on the early perception that SE is a charitable idea rather than a real business concept. In fact, it has the right fundaments for conducting business in the 21st century wherefore it requires compelling arguments that it is sustainable in every aspect. One result of the video graphic film is that commercial aspects should be integrated into the conceptualization of social entrepreneurial activity. Therefore international networks and technology transfers are wanted to bring in the best available technology. This claim can support the evolution and global acceptance of the concept and trigger necessary investments to maximise the impact. Yet it remains to be exercised carefully as the risk exists that it will turn into just another form of commercial entrepreneurship and eventually become the new version of green-washing.

This study recommends the following areas for further research: (i) applying quality criteria for videography as a research method, (ii) investigating a better understanding where value is created in the post-disaster societies, (iii) studying the connection of effectual decision-making between the organization and the society

factors, and (iv) researching the opportunity process for social entrepreneurship.

IV. REFERENCES

Austin, J., Stevenson, H. & Wei-Skillern, J. 2006, "Social and Commercial Entrepreneurship: Same, Different, or Both?", Entrepreneurship theory and practice, vol. 30, no. 1, pp. 1-22.

Bacq, S. & Janssen, F. 2011, "Structuring the field of social entrepreneurship: A transatlantic comparative approach" in O.J. Borch, A. Fayolle, P. Kyrö & E. Ljunggren (eds.), The entrepreneurship research in Europe: Evolving concepts and processes, Edward Elgar Press, Cheltenham, UK, pp. 153-188.

Banerjee, A. & Duflo, E. 2011, Poor economics: a radical rethinking of the way to fight global poverty, Public Affairs, USA.

Belk, R.W. 2006, "You ought to be in Pictures: Envisioning Marketing Research", Review of Marketing Research, vol. 3, pp. 193-205.

Borghini, S., Carù, A. & Cova, B. 2010, "Representing BtoB reality in case study research: Challenges and new opportunities", Industrial Marketing Management, vol. 39, no. 1, pp. 16-24.

Bornstein, D. 2007, How to change the world: Social entrepreneurs and the power of new ideas, 2nd Ed, Oxford University Press, USA.

Collier, P. 2007, The Bottom Billion, Cambridge Univ. Press.

Corner, P.D. & Ho, M. 2010, "How opportunities develop in social entrepreneurship", Entrepreneurship Theory and Practice, vol. 34, no. 4, pp. 635-659.

Dacin, P.A., Dacin, M.T. & Matear, M. 2010, "Social entrepreneurship: Why we don't need a new theory and how we move forward from here", The Academy of Management Perspectives, vol. 24, no. 3, pp. 37-57.

Government of Haiti Post Disaster Needs Assessment 2010, Haiti Earthquake PDNA: Assessment of damage, losses, general and sectoral needs, Government of Haiti, Haiti.

Grønbjerg, K.A., Martell, L. & Paarlberg, L. 2000, "Philanthropic funding of human services: Solving ambiguity through the two-stage competitive process", Nonprofit and Voluntary Sector Quarterly, vol. 29, no. supplement 1, pp. 9-40.

Di Domenico, M.L., Haugh, H. & Tracey, P. 2010, "Social Bricolage: theorizing social value creation in social enterprises", Entrepreneurship theory and practice, vol. 34, no. 4, pp. 681-703.

Kozinets, R.V. & Belk, R.W. 2006, "Camcorder Society: Quality Videography in Consumer Research" in R.W. Belk (ed.), Handbook of Qualitative Research Methods in Marketing, Edward Elgar, Cheltenham, UK, pp. 335-344.

Light, P. 2009, "Social entrepreneurship revisited", Stanford Social Innovation Review, vol. 7, no. 3, pp. 21-22.

Mair, J. 2010, "Social Entrepreneurship: Taking Stock and Looking Ahead" in A. Fayolle & H. Matlay (eds.), Handbook of research on social entrepreneurship, Edward Elgar, Cheltenham, UK, pp. 16-33.

Mair, J. & Martí, I. 2006, "Social entrepreneurship research: A source of explanation, prediction, and delight", Journal of World Business, vol. 41, no. 1, pp. 36-44.

Mair, J. & Martí, I. 2004, Social Entrepreneurship: What are we talking about? A framework for future research, IESE Business School, (Working Paper #546). Barcelona, Spain.

Martin, D.M., Schouten, J.W. & McAlexander, J.H. 2006, "Reporting ethnographic research: bringing segments to life through movie making and metaphor" in R.W. Belk (ed.), Handbook of qualitative research methods in marketing, Edward Elgar, Cheltenham, UK, pp. 361-370.

Miller, T.L. & Wesley II, C.L. 2010, "Assessing Mission and Resources for Social Change: An Organizational Identity Perspective on Social Venture Capitalists' Decision Criteria", Entrepreneurship Theory and Practice, vol. 34, no. 4, pp. 705-733.

Mir, R. 2011, "Blurring the boundaries between case analysis and ethnography: Reflections on a hybrid approach to researching multinational corporations" in R. Piekkari & C. Welch (eds.), Rethinking the Case Study in International Business and Management Research, Edward Elgar Press, London, pp. 301-322.

Mole, K.F. & Mole, M. 2010, "Entrepreneurship as the structuration of individual and opportunity: A response using a critical realist perspective: Comment on Sarason, Dean and Dillard", Journal of Business Venturing, vol. 25, no. 2, pp. 230-237.

Moyo, D. 2009, Dead Aid. Why Aid is Not Working and How There is Another Way for Africa, Allen Lane, London.

Murphy, P.J. & Coombes, S.M. 2009, A model of social entrepreneurial discovery, Journal of Business Ethics, vol. 87, pp. 325-336.

Neck, H., Brush, C. & Allen, E. 2009, "The landscape of social entrepreneurship", Business Horizons, vol. 52, no. 1, pp. 13-19.

Neergaard, H. & Ulhøi, J.P. 2007, Handbook of qualitative research methods in entrepreneurship, Edward Elgar Publishing.

Nicholls, A. (ed) 2008, Social Entrepreneurship: New Models of Sustainable Social Change, Oxford University Press, Oxford.

Office of the Special Envoy for Haiti 2011, Has Aid Changed? Channeling Assistance to Haiti before and after the Earthquake, United Nations Office of the Special Envoy for Haiti, New York, USA.

Prahalad, C.K. 2010, The fortune at the bottom of the pyramid: eradicating poverty through profits, Wharton.

Riddell, R. 2007, Does foreign aid really work?, Oxford University Press, USA.

Sarasvathy, S.D. 2008, Effectuation: Elements of entrepreneurial orientation, Edward Elgar Publishing, Cheltenham, UK.

Seelos, C. & Mair, J. 2005, "Social entrepreneurship: Creating new business models to serve the poor", Business horizons, vol. 48, no. 3, pp. 241-246.

Shane, S. & Venkataraman, S. 2000, "The promise of entrepreneurship as a field of research", The Academy of Management Review, vol. 25, no. 1, pp. 217-226.

Sharpe, D.R. 2004, Contributions of Critical Realist Ethnography in researching the Multinational Organisation. Stream 4: Critical Perspectives on Researching and Theorizing the Multinational Organisation, Theoretical Paper, Monmouth University, USA.

Trivedi, C. & Stokols, D. 2011, "Social Enterprises and Corporate Enterprises", Journal of Entrepreneurship, vol. 20, no. 1, pp. 1-32.

Yunus, M. & Jolis, A. 2003, Banker to the poor: Micro-lending and the battle against world poverty, Public Affairs.

Zahra, S.A., Gedajlovic, E., Neubaum, D.O. & Shulman, J.M. 2009, "A typology of social entrepreneurs: Motives, search processes and ethical challenges", Journal of Business Venturing, vol. 24, no. 5, pp. 519-532.

BEYOND TUITIONS AND GRANTS: EXPLOITING NEW REVENUE SOURCES FOR HIGHER EDUCATION INSTITUTIONS: THE CASE OF SAXONY ANHALT

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The cultural turn from the 'administrated' university to the entrepreneurial university involves new opportunities to exploit new revenue sources for Higher Education Institutions (HEIs). The exhaustion of these new sources requires new ways of thinking at the HEIs' administration used to be subordinate to the ministerial bureaucracy. The paper's empirical base consists of an exploratory study of HEIs in Saxony-Anhalt, Germany with regard to their preconditions and potentials to create new revenue sources derived from their knowledge competencies. After a check of the legislation in Saxony-Anhalt concerning its universities, four fields of action are scrutinized: Knowledge and technology transfer, exploitation of patents and other inventions, science-business cooperation, and the field of continuing education/advanced vocational training. The analysis shows that Saxony-Anhalt still has to face some disadvantages compared to the West German Laender as a state newly founded in the course of the German unification. For its HEIs a special opportunity lies in the option to screen in which ways their knowledge stocks correspond with specific needs in vocational training by established and newly developing firms and industries of the regional economy. Activities like these go beyond the primary mission to offer bachelor and master courses for younger students. As additional activities they can be priced and sold if they meet special demands in their region. This holds especially true for universities of applied sciences.
Keywords: Revenue sources; Universities; Saxony-Anhalt; Continuing education; Advanced vocational training

I. INTRODUCTION

In the past 15 years the German universities were exposed to substantial challenges regarding their ability to reform themselves. Apart from the transformation from the 'diploma' to the Bachelor/Master studies scheme this applies particularly to the change of their managing and financing modalities. This process can briefly be described as a *turn from the 'administered' to the entrepreneurial university*. In the course of the associated changes new options for strategic and autonomous action emerged: breaking new ground, in part used by some university managers already routinely, but in part also being regarded sceptically and explored by 'trial and error'.

In financial terms, the turn from the "administered" to the entrepreneurial university has replaced the yearly 'top down' governmental allocation of funds by university contracts and agreements by objectives. By means of such agreements between ministerial and university level governments seek to enforce and secure certain performance standards in the universities. For the universities, the agreements open up new possibilities to redirect funds allocated in the form of global budgets in order to achieve the goals agreed upon. The change in financing mode frequently came together with a reduction of the basic funds (Grundmittel). Thus for the affected university managers the question came into mind how to tap additional and new sources for extra revenues in order to secure the continued operation of its subunits. For the universities in the financially weak New Länder, as compared to West Germany, this question seems to be particularly virulent, since in this decade a still stiffer reduction in government finances (tighter debt limits in future, removal of the Solidarity Pact, further reduction in EU funding) looms on the horizon.

In the sections to follow the institutional framework, consisting of new deregulatory university laws, higher autonomy and reduced basic funding, will be checked for options for universities to open up further revenue sources beyond tuitions and grants. The empirical case is the East German Land Saxony-Anhalt, an East German Land with a shrinking population of 2.3 million residents and a differentiated HEI infrastructure.

II. THE TURN FROM THE 'ADMINISTERED' TO THE ENTREPRENEURIAL UNIVERSITY

Universities have gained attention and entered the stage of public debate, because their output in an upcoming "knowledge society" or "knowledge based economy" is considered as essential for product and process innovations (Franz et al., 2007). This new focus has also led to a more

critical view of the established structures of HEIs and raised doubts as to whether they provide enough flexibility to meet the desired increase in the number of graduates and in knowledge production. These doubts and the political will to redefine the societal role of universities have been reflected in the last 15 years in multiple amendments of the Higher Education Acts of the German Laender. In the course of these amendments the vision of a new university management has emerged that is labelled in this paper as a model of the entrepreneurial university. This model consists of several components, which are outlined briefly below. Some of these components may be accentuated in one Land a bit stronger, in another one somewhat weaker, but overall they operate as a common denominator.

- *Deregulation:* Based on the observation that the output potential of public facilities will remain suboptimal being faced with excessive top-down regulation, several steps have been made in recent years to increase their autonomy. Universities have realized autonomy increases especially in managing their budgets, in recruiting their staff and developing human resources, in the creation of new courses of studies and in managing their physical resources (buildings, infrastructure).
- *Introduction of corporate control instruments*: In the context of the introduction of elements of the "New Public Management" in parts of the public administration, in universities too diverse instruments came into use. This includes in particular the cost-benefit calculation, management by objectives and various forms of quality management. The use of these instruments is aimed mainly to detect poor performance in certain areas and to deliver criteria for the distribution of the global budget to the sub-units of the universities.
- *Active marketing of self-produced knowledge*: The reformed Higher Education Acts lay stress on the knowledge transfer function of HEIs. They offer also legal conditions for the exploitation of patented and non-patented knowledge, for R&D cooperation with private firms and for HEIs' engagement in spin-off companies.
- *New self-image of the university as a brand and regional location factor:* A new "entrepreneurial" self-consciousness finds its expression with respect to the heightened attention for the external image of the university and for its equity as a brand. Universities engage in image-promoting actions with the goal to attract new students and staff as well as in the participation in regional marketing activities for regional economic development. In addition to this universities are encouraged and expected to hold a central node position as actors in regional innovation systems in different studies (see Rosenfeld et al, 2005;.. Fritsch et al, 2007).
- *Promotion of entrepreneurial activities of academic staff:* The entrepreneurial orientation of a university also means that the preconditions for entrepreneurial activities of graduates and scientists in the context of entrepreneurship courses are taught. In addition, several universities strive to create an infrastructure for entrepreneurship within their campus.

Since visions have primarily orienting and not a mandatory character, the actors who are trying to implement the vision of the entrepreneurial university by strategic action make different progress. The process of implementation is also affected by conflicts over the legitimacy of the mission statement of the entrepreneurial university: Interventions of this kind are in some cases perceived as menacing the old familiar system in the sense of an established and stable environment. Thus, for example in North-Rhine/Westphalia, the new options incorporated into the 2006 'Academic Freedom Law' were initially blocked by lawsuits from unions and staff representatives of the universities (Franz, 2008, p 115). Then there is the criticism of several scientists who see no benefit or even dis-advantages of higher education reform steps (see for example Keupp, 2007; Dörre and Neis, 2010, Munch, 2011). This criticism cannot be easily dismissed as it refers to quite persistent problems such as the tension between knowledge as a public good and knowledge as a privately exploitable resource.

III. THE CASE OF SAXONY-ANHALT

A. The Financing of Saxony-Anhalt's Universities: A Comparison

The numbers of table 1 give evidence for the disproportional burden of Saxony-Anhalt's budget for its universities. While the continuing basic funds in 2009 amounted to 7.9 ‰ of its GRP, this proportion ran up to 7.0 ‰ in the other East German Laender, to 6.1 ‰ in the West German Laender and to 6.4 ‰ for Germany in total. This also holds partially true for the amount of basic funds per resident, where Saxony-Anhalt (€ 169.5) ranks above the other East German

Laender (€ 151.1), but below the West German comparative figure (€ 184.3).

Continuing basic funds	1995	2000	2005	2009
Saxony-Anhalt				
Total (m €)	343.5	377.3	377.5	399.4
Per resident (€)	125.4	144.3	152.9	169.5
Percentage of GRP (‰)	8.9	8.7	8.0	7,.9
East German Laender (Berlin excluded)				
Total (m €)	1,775.7	1,920.8	1,992.7	1,954 ,.8
Per resident (€)	125.3	138.7	149.3	151.1
Percentage of GRP (‰)	8.5	8.2	7.7	7.0
West German Laender (Bremen and Hamburg excluded)				
Total (m €)	8,733.0	9,458.8	10,441.0	11,610 .0
Per resident (€)	141.3	151.0	165.0	184.3
Percentage of GRP (‰)	5.9	5.7	5.8	6.1
Germany (Berlin, Bremen and Hamburg included)				
Total (m €)	12,455. 7	13,079. 0	14,190.8	15,285 .8
Pero resident (€)	152.2	159.0	172.1	186.9
Percentage of GRP (‰)	6.7	6.3	6.3	6.4

Table 1: Source: Pasternack and Erdmenger (2011); author's compilation.

B. Stages and Goals of the Higher Education and Science Policy in Saxiny-Anhalt

The HEI basic structure in Saxony-Anhalt consists of two universities (Halle, Magdeburg), one university of art and design (Halle), five universities of applied sciences and two smaller specialized universities managed by the Lutheran Church. Noteworthy is the fact that the country is the only German Land that has no privately funded university (Stifterverband, 2011). This means, firstly, that there is no competitive situation between publicly and privately funded universities in Saxony-Anhalt, and secondly, that in the land the learning model 'privately run and funded university' does not exist.

Indicator	1995	2000	2005	2009
Number of students	27,167	38,128	50,879	52,606
Number of study entrants	4,823	8,271	8,765	9,394
Basic funds per student (€)	15,850	12,170	8,710	8,830
Research grants (m €)	45.9	58.4	74.1	95.1
Research grants per professor (€)	-	92,860	116,910	160,840

Table 2: Source: German Federal Statistical Office; author's compilation.

Since the German unification in 1990 only one more university location (Stendal) has been added; this means that the Higher education policy was not directed to expansionism. This stands in contrast with the number of students enrolled at the HEIs in Saxony-Anhalt. Between 1995 and 2005 its universities showed the steepest rise in the number of students compared with the universities in the other German Laender (Table 2). In 2012 there are 54,900 students enrolled in Saxony-Anhalt. Because of the shrinking population in Saxony-Anhalt this growth trend can only be continued if in the future a substantial number of students from West Germany can be attracted. This growth oriented policy is supported by a Federal program called 'University Pact 2020' (Hochschulpakt 2020). The core of this program consists of a contract between the Federal government and the Land for financial support if a certain threshold of university entrants (8,765 annually in 2007-2010, 7,933 from 2011 on; Hochschulpakt 2020, 2009) could be exceeded. As the number of study entrants for the year 2009 in table 2 shows this goal could be arrived.

For the above-mentioned active image marketing as a feature of the entrepreneurial university the 'University Pact 2020' plays a role, as the Federal government also supported an advertising and image campaign for the East German universities in the old Laender ('Studying in the Far East'), thus paving the way for the use of this instrument (GWK, 2011, pp. 41f.). Between the participating 44 East German universities a 'best practice' competition for the best image and marketing concept helped to intensify networking ties between these HEIs.

A further step towards the entrepreneurial university is the decision of the Land government to set up an own initiative for excellence called 'campaign to encourage networks of scientific excellence'. After the introduction of such a competitive element at the federal level, the universities of Saxony-Anhalt were not able to compete successfully in this regard. The initiative for excellence is endowed with 40 million € (2007-2010), in order to support seven selected projects at the two universities Halle and Magdeburg (König, 2010, pp. 92f.). An agreement on the continuation of national excellence initiative for the period 2011-2015 has been signed between the government and seven universities in December 2010.

C. Regulation and Deregulation in the University Act of Saxony-Anhalt

The University Act (HSG LSA; most recent version dating from 14 December 2010) contains some basic settlings (e.g., no fees for the first studies leading to a graduate degree, § 111) and the goal to enlarge the autonomy of the universities (§ 57). With respect to financial autonomy the universities are granted the right to keep fees and remunerations for themselves (§ 111) and to keep profits from granted research projects (§ 25) for own use. These possibilities of using fees and grants for own purposes are completed by the settling in § 109, where universities are entitled to set up own assets and to use yields from these assets for university purposes. Regarding assets in the form of real estate the University Act provides that real estate property by the Land can be passed (on request) into the possession of universities (§ 108). § 113 refers to economic activities of universities. The new options (1) to offer own services in return to payment by third parties, (2) to found own profit-oriented firms and (3) to hold shares of private firms stand in strong contrast to former restrictions.

Altogether the new University Act corresponds in many parts to the model of the entrepreneurial university (see Erhardt et al., 2008). The law opens up a variety of options to develop new revenue sources. This is true in particular with regard to the facilitation of business activities (§ 113). Simultaneously these new options also are a challenge for the administrative units of the HEIs: In the past their staff was adapted to handle a budget in a cameralistic way and to be subordinated to the ministerial bureaucracy of the Land. Now it has to master the task to explore and to internalize the new possibilities to act.

Potential Revenue Sources for HEIs

1) Knowledge and Technology Transfer

In § 3 of the University Act the knowledge and technology transfer is defined as a central task for the universities. If the implementation of this task contains a greater income potential is questionable. In the past transfer offices at universities were usually managed as a cross-section institution, equipped with university staff as intermediaries between scientists and interested business representatives. The efficiency of such institutions has been critically evaluated repeatedly (see, eg, Reinhard and Schmalholz, 1995, Fritsch et al, 1997;. Wissenschaftsrat, 2007). With respect to the transfer of codified knowledge the main criticisms referred to the necessarily limited overview of the transfer staff compared to the more sophisticated search options in the web. With regard to the transfer of new, partially tacit knowledge evaluation studies noticed the lack of direct contact of interested clients with the producers of knowledge at the university (Franz, 1999, pp. 126f.). In this respect a strongly declining demand for services of the 'classical' intermediate-driven knowledge transfer is expected. The presentations of the transfer staff at fairs and exhibitions seem to be more important for the image and marketing policy of HEIs as for transfer issues (Wissenschaftsrat, 2007, p 55).

Those universities with departments in natural science and engineering have significantly more favorable preconditions to earn income from the transfer of knowledge and technology. Their research skills and knowledge pools are attractive to private companies in general and can be elicited through direct contacts between companies and university scientists. According to the University Act, there is the possibility to outsource such a sub-discipline or a narrower field of research focused expertise in the form of a separate service company with more entrepreneurial and market freedoms. The activities of such a company would probably strongly overlap with efforts to exploit university inventions (Section C.2) and to initiate science-business cooperation (Section C.3).

2) Exploitation of Patents and Licensing

The legal situation of universities in the exploitation of patented inventions has changed significantly since 2002. Up to this point in the 'Act on Employee Inventions' (Arbeitnehmererfindungsgesetz, dating from 1957) the 'professor's privilege' was in force, allowing university scientists to dispose free of their inventions, "even when parts of their research were developed at the university

"(Schmoch 2007, p.1). In the face of an increased number of patent applications of university staff and a school making new law in the United States (Bayh-Dole Act ' since 1980) the German government recognized a need for action in this regard. Therefore in February 2002, a revised version of § 42 of the Act on Employee Inventions was put in force, where the 'professor's privilege' was replaced by an obligation to report an invention to the employer. The university as employer has the right to decide to appropriate and claim the invention for itself, or to leave it to the inventor for free disposal.

An essential prerequisite for an active role of universities in the patent licensing business was the building of a suitable infrastructure. To this end, in the wake of the amendment a nationwide network of patent and exploitation agencies (PVA) was established. In Saxony-Anhalt the "ESA patent agency of Saxony-Anhalt GmbH" was founded. Since the founding of the PVA network in Germany in 2002 898 patents were issued and 870 license agreements were made by mid-2011 (Bundestag printed paper 17/7759, 2011). The ESA patent agency in Magdeburg accounted for 21 of these 870 license agreements (ibid.). Overall, since 2004, this license revenue sums up to the amount of € 11.4 million and another increased in the amount of approximately € 9,7 million resulted from the sale of 646 protected property rights (an average of € 15,000 per property right) (ibid.).

Country	2004	2005	2006	2007	2008	2009	2010
Saxony-Anhalt	18	23	25	20	27	25	23
Saxony	114	89	106	111	97	138	108
Thuringia	51	44	54	51	52	54	56
Brandenburg, Mecklenburg-Western Pomerania	26	34	51	34	28	44	31
Berlin	26	25	27	40	34	29	25
Schleswig-Holstein, Hamburg	39	32	32	32	28	28	38
Lower Saxony, Bremen	27	51	58	52	58	59	77
North-Rhine/Westphalia	55	71	82	79	67	97	81
Hesse	31	49	35	46	44	44	39
Rhineland-Palatinate, Saarland	21	26	27	13	18	10	20
Baden-Württemberg	75	114	81	77	77	72	77
Bavaria	36	46	67	61	68	72	88
Total	519	604	645	616	598	672	661

Table 3: Source: German Patent and Trade Mark Office (2011, p. 91).

These numbers may not distract from the fact that the universities of Saxony-Anhalt belong to the category with relatively low patenting activities. The yearly amount of patent applications remains in a range of 20-25, as Table 3 shows. For a better assessment of the functionality of the infrastructure built up by the Land to exploit university patents and other inventions, more information about the usage of the ESA patent agency in comparison with other patenting channels would be necessary. The Federal government subsidized the ESA patent agency between 2002 and 2010 with an amount of € 1,590,000 million. For the period 2011-2013 further subsidies of €480,000 from zhe federal government and € 575,00 from Saxony-Anhalt are set aside (Bundestag printed paper 17/7759, 2011). For the period after 2013 no further support is planned (ibid.).

The overall picture shows that the opportunities for HEIs in Saxony-Anhalt to gain revenue from the exploitation of patents and licenses so far kept within narrow limits. The decision to set up in the country a single specialized and competent agency as a service to the university seems to be justified. low number of patent applications from science appears the strategy to support the exploitation of patents justified prima facie. But since the PVA has no monopoly, for the university staff various channels are open in order to protect their inventions. With regards to the growing number of Fraunhofer R&D centers in Saxony-Anhalt the likelihood increases that these institutions with usually high patenting dynamics will use their own established channels for patent applications. International experience shows that a more profit-oriented patent policy and technology transfer cannot contribute to a substantial rise in revenue for HEIs. Nevertheless can successful examples of university patenting

and licensing be used for marketing and image campaigns of the universities.

3) Science-Business Cooperation

R&D collaborations with private companies are a direct source of income for universities if it is agreed that companies pay for the use of university facilities and/or give a share of the R&D project's economic success to the universities. This direct monetary effect often falls short of *additional multi-functional effects* of such contacts. Collaborations of this type are often the prerequisite for (a) the common application for research grants, which is bound to the eligibility criterion of an existing collaboration between industry and academia. Beyond that, such collaborations in various cases represent the first stage of a confidence-building process, in the course of which for students and graduates open up opportunities for (b) internships, (c) master and doctoral theses, and (d) a career entry. At an advanced stage from such a process can, for example, result (e) the funding of an endowment chair or (f) a 'Deutschlandstipendium' by the cooperating company, or (g) an application for a joint invention as a patent.

For these effects (a)-(g) to occur, a certain level of quality of business-science cooperation is required. Especially in Saxony-Anhalt with a business landscape dominated by small and very small companies with frequently low absorption capacity for the knowledge produced at the universities, cooperation with frequently much more mundane purposes seems to be adequate: Departments and institutes often dispose of laboratory and measure equipment and facilities which a company because of its small size and financial limits cannot hold itself, but is in need for R&D purposes or quality tests. In this context, universities can realize income opportunities through utilization fees for the interested companies. Such contacts may represent the first step for future R&D cooperation.

As mentioned briefly in Section B above, the University Act of Saxony-Anhalt allows the founding of and the investment in private firms. Information about entrepreneurial interests of universities in Saxony-Anhalt are not available for this study. More common are in Saxony-Anhalt interests of universities in infrastructure supporting entrepreneurship (e.g., technology parks), but these do not see profit as their primary objective.

4) Continuing Education and Advanced Vocational Training

The complex of continuing education takes up a prominent position in the University Act of Saxony-Anhalt. Continuing education and vocational training is initially established as one of the universities' central tasks (§ 3). In another section educational objectives are outlined and the structure of training opportunities and the access to them is outlined (§ 16). In addition to that the whereabouts of the fees charged by the universities are settled (§ 111). These conditions offer various options for the design of an extensive supply of training courses.

In Saxony-Anhalt especially some universities of applied sciences have engaged in the field of advanced vocational training. Recently all HEIs active in this field have undertaken steps to systematize their offers and to improve its visibility by means of the web. In addition, some internet platforms have emerged informing about and facilitating the search for continuing education offered by HEIs. Despite the overall increasing number of continuing education courses offered and the improved visibility, the options in this field of action to be still appear far from being exhausted. For this reason, the chance to gain revenue from this field of action makes it worthwhile to have a closer look to its arrangements in the following section IV.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. Summary

The analysis undertaken shows that in recent years the legislation for HEIs in Saxony-Anhalt allowed more freedom for universities to develop strategies for generating revenue in addition to the basic state funding. In reviewing various fields of action it becomes clear, however, that the universities are located in an unfavourable starting position to benefit from the income potential available to a greater extent.

- As a limiting factor for generating revenue proves the fact that, compared to other German Laender, Saxony-Anhalt does not dispose of strong universities strong in patenting and there seems to be no upward momentum in this respect. A limitation of this finding is that it concludes from patent numbers on revenue, but there are no direct data on direct revenue from patents and licenses for universities.
- The relative patenting weakness also reduces the number of occasions where the universities in Saxony-Anhalt might start a business of its own or might hold shares of a private company.

– The post-1990 business landscape resulting in Saxony-Anhalt with a multitude of small and micro enterprises complicates the search for cooperation partners for universities and therefore reduces the potential for income arising from such collaborations.

The study presented in this paper has primarily checked how far the *institutional* preconditions have been established in Saxony-Anhalt to put the "entrepreneurial university" model into action. However, it missed to test if this model already has reached the heads of the leaders managing the universities and increased their willingness to act in accordance with it. Beyond that the real numbers for the universities' diverse revenue sources could help to substantiate the statements for each of the four fields of potential revenue sources explored more narrowly.

If one attempts to weigh the various fields of action introduced in the sections III.C.1-4 according to the question 'Which revenue potential can be realized best by universities?', much speaks for the action field of continuing education and vocational training. This is also supported by the diagnosis of future labour shortages in East Germany, which - in addition to attract skilled workers from other regions - requires increased requalification of available workers and professionals. In addition, several colleges have already developed extensive activities in this area and are working to distinguish themselves through their continuing education offered. The subsequent recommendation therefore focuses on this subject and tries out options for action.

B. ***Political recommendation***

A political recommendation pleading for an expansion of courses in continuing education has to keep in mind the resources of the regional HEI system. In spite of its prominence in the university law continuing education does not belong to the primary tasks of universities. Up to now, Saxony-Anhalt's universities dispose of only a small staff or even only a single manpower for activities in this field. Many of the courses offered by the HEIs in continuing education and vocational training can be traced back to the engagement of members of their teaching staff. In most cases this effort is made unpaid and in addition to one's regular duties.

Attractive and up-to-date training courses are characterized by the fact that it is (a) composed of several modules whose lecturers demonstrate a high degree of specialized expertise, and that (b) the different modules can be combined in various ways according to the needs of the trainees. While task (b) can be dealt with 'from the arm chair', task (a) involves time-consuming intermediate steps: Respective experts for a conceptualized course have to be searched, contacted, motivated and convinced to arrange with fellow experts in order to achieve the learning objectives strived for. Frequently the required competencies will not be available in the own university, but have to be recruited from other universities or from non-university institutions. The inclusion of experts from other institutions is coupled with additional contacting, coordinating and convincement efforts. Thus a central task consists in linking the diverse competencies situated in different units of the HEI system for the creating and designing specific courses expanding the university's range in continuing education. This task shows some parallels with applications for additional grants in the context of initiatives for excellence, where also links between different universities and/or universities and non-university research institutions are required in order to demonstrate a critical mass of expertise and competencies in a certain research area. These working steps can be seen as preconditions for the establishment of a high-quality and demanding profile in continuing education, but the achievement of this goal requires a certain 'overhead' funding for universities beyond their basic funds. The question if the staff financed by such additional 'overhead' means should work in a central office or be split up to the individual universities is a matter of discussion. In the case of a centralized solution the marketing of continuing education in Saxony-Anhalt could be practised under the umbrella brand 'Erxleben College', reminding to the first female student in Saxony-Anhalt being admitted in 1754 to a doctorate in medicine at the University of Halle at the age of 39.

In the short term the expectations to earn a substantial income from this stratgy should be lowered. The fees paid by students for the courses in continuing education have to cover part of the 'overhead' costs, but also the costs for hiring qualified expert teachers (e.g., from non-university institutions). However, universities will obtain a lasting profit from the increase in reputation should they be able to generate a high demand for their high-quality courses in continuing education and vocational learning.

V. REFERENCES

Bundestags-Drucksache 17/7759 2011: Antwort der Bundesregierung auf die Anfrage ‚Sachstand zur Verwertung öffentlich finanzierter Forschungsergebnisse durch

Patentverwertungsagenturen im Rahmen des Förderprogramms SIGNO Hochschulen‘ http://dipbt.bundestag.de/dip21/btd/17/077/1707759.pdf (accessed at 02.02.2012).

Dörre, K.; Neis, M. 2010: Das Dilemma der unternehmerischen Universität. Hochschulen zwischen Wissensproduktion und Marktzwang, Berlin: edition sigma.

Erhardt, M.; Meyer-Guckel, V.; Winde, M. (eds.) 2008: Leitlinien für die deregulierte Hochschule. Kodex guter Führung, Essen (Positionspapier des Stifterverbands für die Deutsche Wissenschaft).

Franz, P. 1999: Innovative Milieus als Extrempunkte der Interpenetration von Wirtschafts- und Wissenschaftssystem. Jahrbuch für Regionalwissenschaft, 19(2), 107-130.

Franz, P.; Günther, J.; Jindra, B. 2007: Innovationen als Treiber der Wissensgesellschaft. Begriffserläuterungen und aktuelle Erklärungsansätze. Wirtschaft im Wandel 13(9), 330-336.

Franz, P. 2008: From University Town to Knowledge City: Strategies and Regulatory Hurdles in Germany, in: T. Yigitcanlar/K. Velibeyoglu/S. Baum, (eds.), Knowledge-Based Urban Development: Planning and Applications in the Information Era, Hershey/PA: IGI Global, 101-115.

Fritsch, M.; Bröskamp, A.; Schwirten, C. 1997: Öffentliche Forschung im Sächsischen Innovationssystem – Erste empirische Ergebnisse. Freiberg (Freiberger Arbeitspapiere 97/2).

Fritsch, M.; Henning, T.; Slavtchev, V.; Steigenberger, N. 2007: Hochschulen, Innovation, Region. Wissenstransfer im räumlichen Kontext, Berlin: edition sigma.

German Patent and Trade Mark Office 2011: Jahresbericht 2010. München.

GWK – Gemeinsame Wissenschaftskonferenz 2011: Hochschulpakt 2020. Bericht zur Umsetzung 2009, Bonn (Materialien der GWK, Heft 20).

HSG LSA - Hochschulgesetz des Landes Sachsen-Anhalt (Fassung vom 14.12.2010); http://www.landesrecht.sachsen-anhalt.de/jportal/?quelle=jlink&query=HSchulG+ST&psml=bssahprod.psml&max=true&aiz=true; (accessed at 24.01.2012.

Hochschulpakt 2020 2009: Verwaltungsvereinbarung zwischen Bund und Ländern über den Hochschulpakt 2020 (zweite Programmphase); http://www.bmbf.de/de/6142.php (accessed at 26.01.2012).

Keupp, H. 2007: Unternehmen Universität. Vom Elfenbeinturm zum Eventmarketing, Blätter für deutsche und internationale Politik 10, 1189-1198.

König, K. 2010: Zwischen institutioneller Autonomie und Bundespolitik. Hochschulsteuerung in Sachsen, Sachsen-Anhalt und Thüringen, in: P. Pasternack (ed.), Relativ prosperierend. Sachsen, Sachsen-Anhalt und Thüringen: Die mitteldeutsche Region und ihre Hochschulen, Leipzig: Akademische Verlagsanstalt, 66-108.

Münch, R. 2011: Akademischer Kapitalismus. Über die politische Ökonomie der Hochschulreform, Berlin: Suhrkamp.

Pasternack, P.; Erdmenger, T. 2011: Hochschulen, demografischer Wandel und Regionalentwicklung. Der Fall Sachsen-Anhalt, Wittenberg (WZW-Arbeitsberichte 2/2011).

Reinhard, M.; Schmalholz, H. 1995: Technologietransfer in Deutschland – Stand und Reformbedarf. Ifo-Schnelldienst, Nr. 33, 16-24.

Rosenfeld, M.; Franz, P.; Roth, D. 2005: Was bringt die Wissenschaft für die Wirtschaft in einer Region? Regionale Innovations-, Wachstums- und Einkommenseffekte von öffentlichen Hochschulen und Forschungseinrichtungen am Beispiel der Region Halle, Baden-Baden: Nomos.

Schmoch, U. 2007: Patentanmeldungen aus deutschen Hochschulen, Karlsruhe (Studien zum deutschen Innovationssystem Nr. 10-2007).

Stifterverband für die Deutsche Wissenschaft (ed.) 2011: Privater Hochschulsektor. Ein Vergleich der Bundesländer nach Anzahl der privaten Hochschulen, Studierenden und Einnahmen, Essen (Ländercheck Lehre und Forschung im föderalen Wettbewerb); http://laendercheck-wissenschaft.de/archiv/index.html; (accessed at 24.01.2012).

Wissenschaftsrat 2007: Empfehlungen zur Interaktion von Wissenschaft und Wirtschaft. Köln (Drs. 7865-07)

DEVELOPMENT PATH AND INFLUENCING FACTORS IN PROMOTING ENTREPRENEURSHIP AT THE MUNICH UNIVERSITY OF APPLIED SCIENCES

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Entrepreneurship today is a firm component of learning and education at the Munich University of Applied Sciences. In a leading role, the Strascheg Center for Entrepreneurship as a not-for-profit business organisation affiliated to the university, delivers best practice entrepreneurship education and start-up support in a suite of innovative formats that have evolved over one decade of constant development, reflection and improvement. This paper reviews this development path development path of entrepreneurship support at the Munich University of Applied Sciences for the period 2002-2012 in four main areas: institutional anchoring and embeddedness, internal organisational set-up and external collaboration, financial resources, and human resources. Whereas overall the influence of internal factors, such as the people providing entrepreneurship support, students or other target groups, and university governance matters overweighs, external factors, the influence of private sector, public funding and partnerships can be significant for tailoring university entrepreneurship support.

Keywords: development path, entrepreneurship support, influencing factors, entrepreneurship at universities

I. INTRODUCTION

The role of universities has changed towards meeting the requirements and expectations of a knowledge society. This has implications for how universities conceptualise and organise education and research, and how they prepare students for future job careers. At the same time, entrepreneurship has found its way into higher education. Enhancing the attitudes and skills students need to become successful entrepreneurs – that is as people who are actively concerned with the discovery, development and societal dissemination of novel products, production methods, inputs or organisational forms of economic activity – is practiced by an increasing number of universities worldwide (Volkmann et al. 2009) in order to meet students' expectations in education as a means to satisfy their search for newness, novelty, uniqueness and practicality.

Entrepreneurship, in view of its education nexus, can be understood as a process in which recognition, assessment and utilisation of commercialisable knowledge are three interlinked stages (Sailer and Gillig 2009). It is an individual-based process which is supported and nurtured within an organisation, in this case the university. We will show at the example of Munich University of Applied Sciences (MUAS), that university entrepreneurship support is exposed to, and shaped by several influencing factors. These factors, which either exist already from the outset on or emerge over time, can be categorised as factors external or internal to the organisation. Public financing, private sector collaboration, and partnerships with other universities and business support organisations are the three external factors discussed in this paper, and people involved in entrepreneurship support, students benefitting from it, and issues related to university organisation and governance are considered as internal factors that influence how entrepreneurship support is organised and delivered.

For tracing back the development path of entrepreneurship support at MUAS from 2002 until today, we use a framework developed by the OECD as an instrument to "help those designing and those in charge of entrepreneurship support in universities to self-assess and re-orient their work" (OECD 2010a, 10). We employed this framework as guideline in semi-structured interviews with two informed university staff members.

The paper is organised as follows. Subsequent to a short institutional overview of the university and its entrepreneurship centre, we review the institutional anchoring and embeddedness of entrepreneurship support, its internal organisational set-up and external links, financial resources, and human resource development. For each of these, main external and internal influencing factors will be analysed. The paper ends with a summary of the findings.

II. INSTITUTIONAL OVERVIEW

The Munich University of Applied Sciences was founded in 1971 and has today approximately 16.500 students, around 500 professors, 750 lecturers and 660 staff. The course offerings are multifaceted: 14 departments in the areas of technology, economy, social studies and design provide teaching in over 60 bachelor, master and diploma programmes. The university is led by the president professor Kortstock, who strongly believes in the idea of entrepreneurship, three vice-presidents and the chancellor. The MUAS puts great emphasis on what is referred to in the literature as applied entrepreneurship education (Cooney and Murray 2008, Walter and Walter 2008), which is based on personal contact between lecturers, and students administrative staff following the guiding principle of "transforming knowledge into know-how and learners into leaders".

The Strascheg Center for Entrepreneurship (SCE) was established in 2002 by Falk F. Strascheg, a venture capitalist and successful entrepreneur. The goal of SCE is to teach and foster entrepreneurial thinking and action at MUAS. As a non-profit company with limited liability, SCE's goals are not dictated by profits and all services are offered free of charge to the students. SCE's demanding training programmes are team-based, interdisciplinary and practical. SCE does not implement any business ideas itself, but instead concentrates on assisting motivated teams, start-ups and new companies (Sailer 2011).

A. Framing and organising entrepreneurship support

International benchmarks (e.g., Gibb 2005, NCGE 2006, EC 2008, OECD 2010b) suggest that establishing entrepreneurship support effectively within a university is based upon the presence of a clear vision and strategy, which set out the goals, the targets, the approaches for achieving these, and the rationale for university involvement. Such a vision and strategy will need, in turn, a firm anchoring inside the general university strategy in order to promote entrepreneurship across the institution. This will need to be complemented, over time, by clear incentives and rewards for professors, researchers, students, and administrative staff to get involved. The latter, although not a straight forward target group, if we assume that given the choice of employment the likelihood of starting up a business is low, are however crucial for promoting entrepreneurship as they have a lever for alleviating administrative burdens (c.f. Phan in OECD 2010b).

We analyse the development path of entrepreneurship support at the Munich University of Applied Sciences for the following dimensions:

- institutional anchoring and embeddedness
- internal organisation and external collaboration
- financial resources, and
- human resources.

Table 1 provides an overview of the dimensions and their criteria and anticipates findings that will be presented in the next section. The table was produced in the following way. From the information gained from the interviews for each of the two time points (2002 and 2012), scores were assigned on a 0-4 scale, where 0 stands for inexistent and 4 for fully achieved. For each of the criteria the difference over time is explained in terms of the influencing internal and external factors. For those criteria where internal factors – people in entrepreneurship support, students, and university organisation and governance – are predominantly influencing the result (i.e., the score reflecting the situation in 2012), more '+' are listed than for external factors, that is, public financing, private sector collaboration, and partnerships with other universities and business support organisations. For each difference in scores two '+' were set to be assigned for influencing factors. For example the change of three scores in anchoring entrepreneurship support results in the university vision and strategy leads to six '+'. In this case, the change was more the result of internal factors (++++) then of external factors (++), whereas the two-score change in activities targeted at generating attitudes, behaviour and competences is entirely explained by internal factors (++++).

Dimension	Criteria	0	1	2	3	4
Institutional anchoring, embedded-ness	Entrepreneurship support is anchored in the university vision and strategy	2002	internal (++++) external (++)			2012
	Activities are targeted at generating attitudes, behaviour and competences		2002	internal (++++)		2012
	Openness for and reflection of new approaches		2002	internal (+) external (+++)		2012
Internal organisation, external collaboration	Existence of a entrepreneurship dedicated structure for viable cross-faculty collaboration		2002	internal (++) external (++)		2012
	Close co-operation with and referral to external support organisations	2002	internal (+) external (+++)		2012	
Financial resources	Adequate long-term financing of entrepreneurship support staff from university's budget	2002	internal (++) external (++)		2012	
	Self-sufficiency as a goal	2002	internal (++) external (++++)			2012
Human resources	Existence of incentives and rewards for entrepreneurship promoters	2002	internal (++++)		2012	
	Entrepreneurship sensitive recruitment and career development of academic staff	2002	internal (++++)		2012	
	Entrepreneurship relevant regular training	2002	internal (+++) external (+)		2012	

Table 2 Development path and influencing factors in the period 2002 and 2012

Legend:
0= inexistent; 1= first signs visible; 2= partly achieved, but no further efforts underway; 3= partly achieved and further efforts underway; 4= fully achieved.
For each difference in scores two '+' were set to be assigned for factors of influence. A maximum difference of three scores thus results in six '+' to be assigned to either internal or external factors.
How these criteria are reflected in the organisation and delivery of entrepreneurship support and what have been the dominant influencing factors for the period 2002-2012 is discussed below.

B. Institutional anchoring and embeddedness

One important pre-requisite for the development path in the direction of an entrepreneurship university is the support of the university management (NCGE 2006). The president of the university committed himself to the guideline that the MUAS and the SCE offer – together with other internal and external partners – interdisciplinary, practical and team-oriented programmes, which foster independent and responsible thinking and acting. Additionally the programmes must teach participants the process how to get from an idea to an innovation and accompany them on their way to successful realization of their business ideas. Despite several obstacles the management of MUAS and SCE demonstrated strong leadership and consequently pursued the implementation of their vision.

The understanding of entrepreneurship promoted at MUAS is process oriented and covers various contexts such as business start-ups, existing firms and public sector organisations. When launching a new venture, the entrepreneur can either have a (somewhat) precise idea in mind, or, instead, a set of competences, skills, resources, and contacts to dwell on. Moving from an either-or situation to a greater concurrence of ideas and competences is what entrepreneurship education at MUAS aims to achieve. Ideally, entrepreneurs, firstly, know who they are, what they know, and whom they know. They are, secondly, aware of their own traits, tastes, and abilities, and thirdly they have realised the knowledge corridors they are in and the social networks they are a part of. For Sarasvathy (2001) the entrepreneur that possesses all of these "three categories of means", is an effectuation entrepreneur. She or he is less likely to use traditional types of market research (such as carefully designed surveys), but reverts to "seat-of-the-pants marketing" and selling alliances. Instead of long-term planning and net-present-value analyses, preference is given to short term planning, and hierarchical structures based on power-related procedures are replaced by strong participatory cultures nurturing the entrepreneur's relational capital. Finally, despite the greater likelihood of failure, effectuation entrepreneurs are more likely to effectively manage failures, to re-start, and to create more successful firms in the long run.

Entrepreneurship support in universities is from our point of view still an evolving field of action with concepts in formation. We are therefore on a steady search for new and improved approaches to best support the learning of entrepreneurship as a process. In the new service development process at the Strascheg Center for Entrepreneurship, the absorption of external knowledge and know-how

plays a crucial role. Today we organise the intake basically in two ways: firstly through institutionalised partnerships with other universities, and secondly through contacts made at events, such as academic conferences and practitioner meetings around university entrepreneurship support. The institutionalised links have developed gradually – both quantitatively and qualitatively – over time, starting from a closer co-operation with the other universities in the Munich area. Today, the other Munich universities are the main partners. However, there is an increasing trend to build partnerships with universities elsewhere in Germany and worldwide.

C. Internal organisation and external collaboration

Entrepreneurship support at MUAS is bundled in the Strascheg Center for Entrepreneurship. It started in 2002 as a small centre with two professors and two researchers. Today it has the status of an An-Institut, that is, a non-for-profit company affiliated with the university. Two-third of the 26 staff is employed by the university as researchers or administrative staff. The choice of organising the entrepreneurship support at MUAS in this form has been the preferred option over the establishment of a single entrepreneurship chair. Whereas this approach has facilitated interdisciplinarity in entrepreneurship support, the An-Institut choice brought with it a problem of distance to central university management. Overcoming this has required constant strategic action to building and nurturing close links with the university management.

Both public and private sources of financing played a role in establishing an entrepreneurship support infrastructure at MUAS. The initial financing from the Strascheg Foundation in 2002 helped to establish the SCE and prepared the ground for the institutional establishment of entrepreneurship support at the university. Yet, anchoring and embedding have been the result of one decade of cohabitation and collaboration, both facilitated by the competitive awarding of public financing. Of particular importance was the success of the SCE-MUAS partnership in acquiring German federal government funding in 2007 and in 2011. The awarding of public funding thus had an important trigger function in broadening the university-internal acceptance and support for entrepreneurship support and the above mentioned strategic anchoring. It allowed mainly for the expansion of human resources involved in the actual education and start-up support activities and investment in incubation space, which increased presence and visibility inside the university.

The investment of the Strascheg Foundation was a main enabler for the establishment of further private sector links. Today, the SCE is a well-established part of Munich's business community with a growing number of stable links to large (multinational) corporations, high growth firms as well as (traditional) small and medium sized firms. In this way, entrepreneurship support, particularly entrepreneurship education activities, are conceptualised and delivered in close proximity to the 'world of business'. This has helped to generate entrepreneurial intentions and capacities in an environment, which is close to entrepreneurial action.

That MUAS established itself as one of the core players in the local academic entrepreneurship support ecology in Munich can be attributed to internal as well as external factors. Initially co-operation between the four higher education institutions in Munich, actively involved in promoting entrepreneurship, was entirely dependent upon individuals and their personal networks. Although exchange of information worked in this constellation since people 'knew each other', it was difficult for students to 'move' between the four universities in search for interesting education activities and formats or start-up partners and subsequent support. Deciding what has been more influential is not an easy task, as success in acquiring private and public external financing is likely to raise the attractiveness of MUAS as a partner. However, the continuous desire of people engaged in entrepreneurship support at MUAS and in SCE to introduce new approaches was more influential in positioning MUAS in the local academic entrepreneurship support ecology.

Today the MUAS, the Technical University of Munich, the Ludwig-Maximilians University of Munich and the University of the Federal Armed Forces in Munich form a consortium called 4Entrepreneurship, which regularly meets to exchange information and to jointly develop new formats in education, coaching and mentoring. Examples of this co-operation are the jointly organised International Summer School, and the newly established Social Entrepreneurship Academy.

D. Financial resources

In 2002 entrepreneurship support activities had a budget of less than EUR 50 000, fully funded from the university. This budget has grown by

2007 for more than ten times, and has been more than doubled since then.

The university budget provides long-term funding for entrepreneurship support, which is complemented by the resources put at disposal by the Strascheg Foundation. The latter has had a multiplier function – both in terms of complementing the university budget resources for entrepreneurship, as well as in attracting further private sector funds.

Since 2007, public grant funding provided a significant contribution. However, on the long run, increasing revenues from industry collaboration in the form of fees, sponsorships and funding of research collaboration are expected to form the basis of a multi-source financing of entrepreneurship support at MUAS.

E. Human resources

Entrepreneurship support in universities, in particular entrepreneurship education, is demanding the reinforcement and development of existing human resources and employing new staff. Today at MUAS there are five full professors, who teach and research entrepreneurship, ten contracted lecturers to deliver curricula and extra-curricula entrepreneurship education, and one of the three vice president positions is dedicated to entrepreneurship.

We see the primary role of professors and teachers in supporting entrepreneurship in offering a first introduction, and, ideally, accompanying the entrepreneurship process. This is a different understanding of a teacher's role and mission in education and learning compared to the pure transfer and inculcation of theoretical knowledge. To achieve this, a symbiosis is needed between MUAS and the SCE. Every faculty is looked after by one or two SCE staff members. These so called "Fakultätspaten" maintain regular contact with faculty members and students, inform about the SCE offer, and scout entrepreneurial opportunities linked with research and student activities.

The introduction of a reduction of teaching hours as a reward for professors who share their research for entrepreneurial purposes with students and/or act as their start-up mentors is on its way. This has been the result of long negotiations between the managements of the SCE and the university. It can be assumed that increased student take-up of extra-curricula activities was influential for this. The former can be considered as an indicator for increased entrepreneurial intentions because participation signals that students have either an interest in additional exposure or a demand for support that goes beyond the curricular offer. Hence, providing incentives are needed for professors to play a more active role in idea scouting and realisation. Besides the above mentioned reduction of teaching loads, systematic training opportunities for people involved in entrepreneurship support are under discussion.

III. CONCLUSION

In this paper we presented the development path of entrepreneurship support at MUAS for the period 2002-2012 in four main areas – institutional anchoring and embeddedness, internal organisational set-up and external collaboration, financial resources, and human resources. Overall, considering all four dimensions of entrepreneurship support at MUAS, the internal factors, that is, people involved in the support, students, and university governance, have been more influential that the external factors.

However, external factors in the form of private sector influence, public funding and partnerships, have been dominant in two dimensions: (i) internal organisation and external collaboration, and (ii) financial resources. The private financial investment set the first building block for entrepreneurship support at MUAS and facilitated success in receiving competitive public grant funding. It also had an important trigger function in broadening the MUAS-internal acceptance and support for entrepreneurship.

We only looked at two points in time and applied no further differentiation of the factors, which could be criticised as is too general to fully capture dynamics and to reveal cross-dependencies between internal and external factors. However, applying the OECD framework to review the development path and distinguishing between internal and external factors was useful to understand what has been achieved and where there is potential to advance entrepreneurship support in terms of its organisation and connectivity.

IV. REFERENCES

Clark, B. R. (1998), 'Creating Entrepreneurial Universities. Organisational Pathways Of Transformation', Pergamon: IAU Press.

Cooney T. and Murray T. (2008), 'Entrepreneurship Education in the Third Level Sector in Ireland', Report presented to the National Council for Graduate Entrepreneurship, August 2008.

European Commission (2008), 'Entrepreneurship in higher education, especially within non-business studies', European Commission, Brussels.

Gibb, A.A. (2005), 'Towards the Entrepreneurial University. Entrepreneurship Education as a lever for change'. NCGE Policy paper series, online accessible at www.ncge.org.uk.

NCGE (2006), 'The Entrepreneurship Foundation – Annex 4', National Council for Graduate Entrepreneurship, Royal Society of Arts, Ewing Marion Kauffman Foundation.

OECD (2010a), 'Universities, Innovation and Entrepreneurship: Criteria and Examples of Good Practice', OECD Local Economic and Employment Development (LEED) Working Papers, 2010/10, OECD Publishing.

OECD (2010b), 'From Strategy to Practice in University Entrepreneurship Support: Strengthening Entrepreneurship and Local Economic Development in Eastern Germany: Youth, Entrepreneurship and Innovation', OECD Local Economic and Employment Development (LEED) Working Papers, 2010/9, OECD Publishing.

Sailer, K. (2011), 'Motivation and Responsibility: the MORE Project at the Munich University of Applied Sciences', in H.F.O. Kortzfleisch (ed.) Scientific Entrepreneurship. Reflections on Success of 10 Years EXIST, EUL Publishing.

Sailer K. and H. Gillig (2009), 'Gründungsförderung. Erfolgsfaktor Entrepreneurship für Studierende. Wissenschaftsmanagement, 3/09, pp. 14-21.

Sarasvathy S.D. (2001), 'Causation and Effectuation: Toward a Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency. The Academy of Management Review, Vol. 26, No. 2 (Apr., 2001), pp. 243-263.

Volkmann, C., K.E. Wilson, S. Mariotti, D. Rabuzzi, S.V. Vyakarnam, and A. Sepulveda (2009), 'Educating The Next Wave Of Entrepreneurs: Unlocking Entrepreneurial Capabilities To Meet The Global Challenges Of The 21st Century. A report of the Global Education Initiative, World Economic Forum.

Walter, S. G. and Walter, A. (2009), 'Personenbezogene Determinanten von Unternehmensgründungen: Stand der Forschung und Perspektiven des Fortschritts. Zeitschrift für betriebswirtschaftliche Forschung 61 (2), 57-89.

WHY ENTREPRENEURS FAIL AND HOW TO FIGHT IT?

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In the early phase of the exploration of the entrepreneurial process, about 50 % of the new ventures stop the business. Partly the exit is avoidable and assigned to the personal characteristics and the environment of the entrepreneur; Entrepreneurial Failure. A lot of money is spend for support systems, attributed to the success of an entrepreneur. It seems to be very fruitful to know more about why entrepreneurs fail and how to prevent starting entrepreneurs from failure. This article wants to shed light on the reasons why starting entrepreneurs fail and what could be done in support systems, like educational programmes, to reduce the avoidable entrepreneurial failure. In a literature research the most common reasons for entrepreneurial failure are put together. With this, in a survey among educational and entrepreneurial experts, prevention measures are determined that could be effective against the most common reasons for avoidable entrepreneurial failure. The findings of the survey shows that there are possibilities to overcome the most common reasons for avoidable entrepreneurial failure. This opens possibilities to reinforce the design of support systems of starting entrepreneurs. It is strongly recommended to apply these measures in the design of support systems for young starting entrepreneurs.

I. INTRODUCTION

Early in the last century, Joseph Schumpeter (1934) pronounced a positive relationship between economic growth and entrepreneurship. An anchor for fostering entrepreneurship can be found in the person of the entrepreneur (e.g. (Stewart & Roth, 2007), (Judge & Ilies, 2002) and Kirton, 1976) and in the process of entrepreneurship (e.g. Shane & Venkataraman, 2000, Gartner, 1985 and Shapero, 1982). The entrepreneurial process is not complete when the exit phase is excluded from this process (D. R. DeTienne, 2010).

Among other scholars (e.g. (Gries & Naudé, 2009; Wennekers & Thurik, 1999), the Organization for Economic Cooperation and Development (OECD) posit that entrepreneurship makes a major contribution to economic growth of countries and regions (Ahmad & Seymour, 2008). Research by the OECD (IMHE / OECD, 2007) shows that higher education can be a boost to regional development. According to the model of the OECD, the increase of entrepreneurship can be achieved by the increase of ventures and entrepreneurs (Ahmad & Hoffmann, 2008). Research shows that the majority of the entrepreneurs do not survive the first five years (Parsa et al, 2005, Hayward, Shepherd & Griffin, 2006, Bangma & Snel, 2009, Verhoeven et al, 2005; Meijaard et al, 2007). For the last decades, many support systems for nascent and academic entrepreneurs established (Hammer & Thuijs, 2012). The output of these programs shows a different score on Entrepreneurial Failure. The University of Twente, for example, reports in the 25 years that they accompany spin-offs in the TOP program, a dropout rate of 25%, while unaccompanied spin-off companies have a drop of 40% (University of Twente, 2005). Furthermore, it is assumed that entrepreneurial support systems are designed on the elements who lead to success, instead of the prevention for elements of failure, as is common for support systems. McGrath (1999) argues that although failure is neither painless nor desirable, researchers have to overcome their bias in failure analysis, because understanding entrepreneurial failures allows for the discovery of valuable information, not just for society at large but for entrepreneurs in particular. McGrath (1999, p16) "by the continued denial of the Entrepreneurial Failure are many important lessons lost on the Entrepreneurial Failure and will not anticipate the negative consequences." "Careful analysis of failure, rather than put the focus on success rates researcher's systematic progress towards analytical models for value-based entrepreneurship (McGrath, 1999, p 28). Therefore it seems to be fruitful to investigate the expected impact of failure reduction elements in support systems. To start with this investigation, first a clear definition of Entrepreneurial Failure will be indoctrinated in the first paragraph. In the second paragraph the literature is searched for the causes of Entrepreneurial Failure. From the causes, among educational and entrepreneurial experts, a survey was held to identify prevention measures which could be proposed to improve support systems by reducing Entrepreneurial Failure. After the conclusions, recommendations are made.

II. Definition of Entrepreneurial Failure

In this paragraph an overview of the understanding of Entrepreneurial Failure from the literature is given, after which a definition is argued. According toD. R. DeTienne (2010), every venture will once exit this entrepreneurial process. The literature distinguishes two ways of entrepreneurial exit: (i) quit because of good performance (also called desired failure or Entrepreneurial Exit) (D. R. DeTienne, 2010; Wennberg, Wiklund, DeTienne, & Cardon, 2010), or (ii) because the performances are not good (also called unwanted outages or Entrepreneurial Failure) (Headd, 2003; Samuels, Joshi, & Demory, 2008; Wennberg, 2011). About half of the cases of entrepreneurial drop out refers to situations which are not desirable (Wennberg et al, 2009) and in which the entrepreneur (e.g., Simon et al , 2000, Ottesen & Grønhaug, 2005, Hayward el al, 2006) and its environment (Vaillant, 2007) have a role in the cause. According to Cardon, about half of the cases of Entrepreneurial Failure, the failure seems to be avoidable, because the failure was based on mistakes (firm internal attributes) (Melissa S. Cardon, Stevens, & Potter, 2011). There is no clear research known to what extend the half of 'not desirable' is similar to the half of 'avoidable'. Research shows that the relationship between Entrepreneurial Exit and Entrepreneurial Failure, after the first seven years, is roughly equal (Wennberg et al, 2008). Melissa S. Cardon et al. (2011) divide Entrepreneurial Failure further into two categories: tough luck and mistakes by the operator. Within the entrepreneurial literature, many different meanings to the word 'failure' are used. An often used and small framed definition is that of 'bankruptcy' or 'insolvency' (Zacharakis, Meyer and DeCastro,1999). Other scholars add elements as 'personal limitations of venture participants' (Singh, Corner & Pavlovich, 2007) or 'do not yield enough added values for a reasonable income' (Everett & Watson, 1998). In accordance with the taxonomy of exit routes (Wennberg et al., 2010), the 'Distress Sale' and 'Distress liquidation' seem to fit to the purpose of this research. To obtain clarification on an assembly of reasons for venture cessation, a more general definition of failure would be most helpful. In line with often-cited scholars on this topic, failure will be defined as 'the termination of an initiative that has fallen short of its goals' (e.g. Mc Grath (1999), Cannon & Edmondson (2001). To put this general definition of failure in an entrepreneurial perspective and addressing the role of the entrepreneur, the definition of Entrepreneurial Failure, used in this paper, will be 'the termination of a venture creation that has fallen short of its goals'.

III. Causes of Entrepreneurial Failure

From literature, the main causes of Entrepreneurial Failure will be discussed and summarized. According to the above-argued definition of Entrepreneurial Failure, the causes can be found either inside or outside the venture. It is argued that internal causes arte the far most reason for Entrepreneurial Failure (Wennberg, 2011), where one third of the small businesses are affected by exogenous factors (Everett & Wattson, 1998) as can be allocated to external factors. Because of the fact that small businesses barely can influence the exogenous factors as economic recessions, shortage of raw materials and the appearance of substitution products (FEE, 2004), in this paper only the internal causes are discussed. Among mistakes, according to Melissa S. Cardon et al. (2011), issues such as business, mismanagement, unrealistic expectations, pride, finance and innovation mentioned. Other literature indicates that Entrepreneurial Failure is related to strategic resources (Michael & Combs, 2008), planning strategies (van Gelder et al, 2007; pride (Hayward et al, 2006), not able to cope with uncertainty (McGrath, 1999) and over-optimism and overconfidence (Muir, 2007). Research by Wickham (2003) shows that cognitive aspects of decision-making affects what Entrepreneurial Failure strengthened. Baron (2000) and Simon et al (2000) propose, in a more general manner, that a biased point of view has a negative impact on entrepreneurs, which can lead to Entrepreneurial Failure. Within literature, a study of Melissa S Cardon and Potter (2003) shed light on the main courses of Entrepreneurial Failure. They studied over 500 citing's of news articles, addressed with entrepreneurial failure. They found that about 54% was caused by mistakes and 45% by misfortune. Focussing on the mistakes, 16% of the citations were caused by mismanagement and 18% by 'Conceptualizing a business and planning out its goals and the method by which to accomplish them…' (Cardon and Potter, 2003, p11). The European Federation of Accountants (FEE, 2004) defines more financial causes of Failure. In their paper, the FEE supplies a 10-item list of internal business failure for SME's: Poor management, deficit in accounting, poor cash flow management, inappropriate sources of finance, dependency on customers or suppliers, impending bad dept., overtrading, poor marketing research and fraud / collusion. In accordance with many scholars, no clear framework of causes

could found. Peek out through the leading scholars, from the many causes of Entrepreneurial Failure the next classification is proposed: mismanagement, poor concept and personal traits. On forehand it is obvious to the author that scholars may doubt on this categorisation; e.g. mismanagement can be moderated by personal traits (van Gelder et al., 2006).

IV. PREVENTION MEASURES

Based on the above-proposed classification of causes of Entrepreneurial Failure, a preliminary survey held on a group of entrepreneurial and educational experts, to identify possible prevention measures in support systems. In this paragraph first the methodology will be stated were after the results are presented. The conclusions and recommendations are given in the final paragraph of this paper. The chosen methodology for the survey was predominantly quantitative. From the three classified groups of causes, a questionnaire is designed to identity the prevention measures. By semi structured interview conducted at a limited number of experts, the questionnaire was tested. The main complaint of the responders was that it was difficult to identify causes, based on an open question, because the absence of a context. They also questioned the value of the proposed answers. From the questions asked, the answers would be to general for application. Suggestions were made to let the respondents answer in the setting of a prescribed context. Based on this feedback, the survey was modified. For this research the survey consists of three case descriptions from failed entrepreneurs. Every case consists of one of the characterised causes of Entrepreneurial Failure. The respondent was asked to determine the cause in the given context and to identify what could be possibly done (before the failure) to avoid it. The survey set out single blind by email of in person to the experts. Some experts contacted the author for clarification. In table 1, the results of this survey are given.

Situation	Identified cause	Prevention measure
1 poor management	Lack of financial knowledge	- teach accounting - identify cost-consumers
	No partners involved	- learn networking - do not start
2 poor concept	No clear focus on added value	- do marketing research - consult a senior entrepreneur - use business development tools
	No paying customer group identified	- make realistic business planning - stop starting a venture, keep in the laboratory.
3 personal traits	Taken to much risk (overconfidence)	- let experience failure early - teach accounting and hire accountant
	Hesitating too much on decisions	- stop starting a venture (select in the program) - learn decision-making tools.

Table 1, the integrated results of the survey

From the ten placed surveys, six returns fully completed and four completed partly or did not respond at the moment of the publication of this paper. In the results, only the completed survey are reported in the results.

V. DISCUSSION

The results show that there are some similarities between the identified prevention measures. With these results, it is worth to do some experiments on support systems to identify the effects. Some of the proposed measures are not often seen in support programs and therefor an effect could be expected. On the other hand, the sample is very small. The effect of the different cases presented to the respondents is clearly visible. The result do not release if the effect infinite. There could be a possibility that the failure situations are limited and therefore the ‘map of prevention measures’ is limited, when classified. To extend the research in this way, a complete overview can be given and a systematic reduction of Entrepreneurial Failure among starting entrepreneurs can be realized.

VI. CONCLUSIONS AND RECOMMENDATIONS

Considering the preliminary character, the results of the research show that there might be possibilities to reinforce the support systems to fight Entrepreneurial Failure. When the failure

would be categorized as ‘mismanagement’, specific educational tools can be implemented, although some are already implemented. When the failure would be categorized as ‘poor concept’, business development tools and ‘investor pitching’ were indicated as helpful instruments. When the failure would be categorized as ‘personal traits’, within a support system the nascent entrepreneur should not be stimulated to start, when tests indicate the risk of this failure type is realistic. Although the quantitative character of the research, it is recommended to test the purposed prevention measures in practice. For further research, it is recommended to take a bigger sample for the survey. It might be interesting to distinguish the respondent groups. As discussed at the prevention measures, it is recommended to research the effect of the context on the purposed causes. There could be a possibility that a different approach on Entrepreneurial failure classification is needed to overcome the context bias.

VII. REFERENCES

Ahmad, N., & Hoffmann, A. N. (2008). A framework for adressing and measuring entrepreneurship. Paris: OECD.

Ahmad, N., & Seymour, R. G. (2008). Defining Entrepreuneurial Activity:: Definitions Supporting Framwork for Data Collection. Paris: OECD.

Bangma, K. L., & Snel, D. (2009). Bedrijvendynamiek en werkgelegeneheid, periode 1987-2008 (pp. 74). Zoetermeer: EIM.

Cardon, M. S., & Potter, R. (2003). Are Failures Blamed on Misfortune or Mistakes? Entrepreneurial Failure Attributions in US Newspapers. Paper presented at the Kauffman Entrepreneurship Research Conference (BKERC), Babson College.

Cardon, M. S., Stevens, C. E., & Potter, D. R. (2011). Misfortunes or mistakes? Cultural sensemaking of entrepreneurial failure. Journal of Business Venturing, 26(1), 79-92.

DeTienne, D. R. (2010). Entrepreneurial exit as a critical component of the entrepreneurial process: Theoretical development. Journal of Business Venturing, 25(2), 203-215.

DeTienne, D. R. (2011). Entrepreneurial Exit. In L. P. Dana (Ed.), World Encyclopedia Of Entrepreneurship. Cheltenham: Edward Elgar.

FEE. (2004). Avoiding business failure; a guide for SME's (pp. 37): Fédération des Expert comptables Européens.

Gries, T., & Naudé, W. (2009). Entrepreneurship and regional economic growth: towards a general theory of start-ups. [Article]. Innovation: The European Journal of Social Sciences, 22(3), 309-328.

Hayward, M. L. A., Shepherd, D. A., & Griffin, D. (2006). A hubris theory of entrepreeurship. Management Science, 52(2), 160-172.

Headd, B. (2003). Redefining Business Succes: Distinguishing between closure and failure. Smaal Business Economics, 21, 51-64.

IMHE info April 2007. (2007, 04 01). OECD. Retrieved from http://www.oecd.org/document/6/0,3343,en_2649_35961291_38248134_1_1_1_1,00.html

Judge, T. A., & Ilies, R. (2002, Vol. 87, No. 4). Relationship of Personality to Performance Motivation. Journal of Applied Psychology, 797-807.

McGrath, R. G. (1999). Falling forward: Real options reasoning and entrepreneurial failure. Academy of Management Review, 24(1), 13-30.

Michael, S. C., & Combs, J. G. (2008). Entrepreneurial Failure: the case of franchisees. Journal of Small Business Management, 73-90.

Ottesen, G. G., & Grønhaug, K. (2005). Positive illusions and new venture creation: Conceptual issues and an empirical illustration. Creativity and Innovation Management, 14(4), 405-412.

Parsa, H. G., Self, J. T., Njite, D., & King, T. (2005). Why restaurants fail. Cornell Hotel and Restaurant Administration Quarterly, 46, 304-322.

Samuels, L. B., Joshi, M. P., & Demory, Y. (2008). Entrepreneurial failure and discrimination: lessons for small service firms. Service Industries Journal, 28(7), 883-897.

Schumpeter, J. A. (1934). The Theory of Economic Development: An inquiry into Profits, Credit, Interest and the Business Cycle (R. Opie, Trans.). Cambridge: Harvard University Press.

Shapero, A., & Sokol, L. (1982). Social Dimensions of Entrepreneurship The Encyclopedia of Entrepreneurship (pp. 72-90). Englewood, Cliffs: Prentice Hall.

Simon, M., Houghton, S. M., & Aquino, K. (2000). Cognitive biases, risk perception, and venture information: How individuals decide to start companies. Journal of Business Venturing, 15(2), 113-134.

Stewart, W. H., & Roth, P. L. (2007). A Meta-Analysis of Achievemnet Motivation Differences between Entrepreneurs and Managers. Journal of Small Business Management 45(4), 401-421.

Vaillant, Y., & Lafuente, E. (2007). Do different institutional frameworks condition the influence of local fear of failure and entrepreneurial examples over entrepreneurial activity? Entrepreneurship and Regional Development, 19(4), 313-337.

van Gelder, M., Thurik, R., & Bosma, N. (2006). Succes en Risk Factors in the Pre-Startup Phase. Small Business Economics(26), 319-335.

Verhoeven, W., Gibcus, P., & de Jong- ´t Hart, P. (2005). Bedrijvendynamiek in Nederland: goed of slecht? (pp. 26). Zoetermeer: EIM.

Wennberg, K. (2011). Entrepreneurial Exit. In L. P. Dana (Ed.), World Encyklopedia of

Entrepreneurship (pp. 170-177). Cheltenham: Edward Elmar.

Wennberg, K., Wiklund, J., DeTienne, D. R., & Cardon, M. S. (2010). Reconceptualizing entrepreneurial exit: Divergent exit routes and their drivers. Journal of Business Venturing.

Wennekers, S., & Thurik, R. (1999). Linking Entrepreneurship and Economic Growth. Small Business Economics, 13(1), 27-56.

AN ENTREPRENEURIAL MODEL FOR INTERNATIONALISATION OF HIGHER EDUCATION: THE CASE OF CITY COLLEGE, AN INTERNATIONAL FACULTY OF THE UNIVERSITY OF SHEFFIELD

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Entrepreneurialism and internationalisation have been one of the main drivers for change in the higher education sector. In this paper, we present our experience and elaborate on the case of CITY College based in Thessaloniki-Greece, as a model for international development. The case has the unique characteristic that it has evolved as an International Faculty of the University of Sheffield not co-located with the other Faculties of the University. We also show how the College's organisation structures and entrepreneurial culture across the institution facilitates the implementation of fast moving, market oriented, cross boundary operations in South Eastern Europe. These operations include the distributed delivery of postgraduate and undergraduate programmes through a "flying faculty" model, which we briefly describe. Finally, we present the outline and the results of the strategic plan which led to this successful education business model for internationalisation of higher education.

Keywords: internationalisation of higher education, entrepreneurial university, innovative university, international faculty, South East Europe.

I. INTRODUCTION

The term "entrepreneurial university" has raised a wide debate as to what it means, how it can be accomplished as well as whether such a transformation of traditional higher education (HE) providers is desirable or not. Clark (1998) in "Creating Entrepreneurial Universities" that highlighted the concept of the entrepreneurial university. In this paper, we will debate no further; we start off by clearly supporting that the universities should be adaptive to a changing environment, undertake a new enhanced role towards the society with flexible strategies and by carrying out research that reaches the market to impact people's lives. We strongly believe that academic integrity and quality should be maintained but combined with entrepreneurial culture across all levels of a university's organisation and processes.

Internationalisation as a concept is well studied and widely desired by universities. Expanding and diversifying activities abroad could be a sign of entrepreneurial behaviour but also a driver for internationalisation. Internationalisation may be closely linked to entrepreneurialism.

II. AIM, METHODOLOGY AND STRUCTURE

The aim of this paper is to present the case of CITY College in Greece and its entrepreneurial model for internationalisation. CITY College is the International Faculty of the University of Sheffield being the sixth faculty with the other five located at Sheffield, UK. This is a unique model of academic collaboration, allowing the full academic integration but at the same time securing financial autonomy and governance independence.

The methodology used to develop the case of this paper is primarily based around two aspects: (a) a literature review in order to identify similar cases of entrepreneurial universities and their specific models, and (b) utilization of internal resources.

For the first aspect, we identified a number of scientific journals and successful cases studies published in several European Union reports. More analytically, the first part of the paper which contains a critical view and discussion on key terminology, such as entrepreneurial university, internationalisation, third mission, etc. is based on the highest cited articles. Additionally, the arguments are strengthened by citing recent policy papers and EU technical reports. Most of the reviewed papers reside within EU countries and focus on the regional aspect (the case studies) as well as the national aspect (the quantitative papers).

As far as the internal resources are concerned, a number of documents we used, such as the College's profile, its strategic vision and future plans, internationalisation experience reports, entrepreneurial strategies reports for both

inter/outer college, quality assurance guidelines, etc. These were primarily used to pinpoint CITY's place in the university entrepreneurship realm. Additionally, the advice and experience of key staff involved in internationalisation and academic entrepreneurship activities have been also included.

The latter were used to formulate the case study of CITY College, which possesses certain innovative characteristics.

The paper is structured as follows: In the first two Sections we provide a review of entrepreneurial models and internationalisation in HE. In the next section we discuss the characteristics of HE in South East Europe (SEE) and briefly refer to the process that was followed by the University of Sheffield. Then, we discuss the development and the implementation of the College's vision and strategy plan. The organisational structures and entrepreneurial culture within the International Faculty facilitates the implementation of fast moving, market oriented approaches, cross boundary operations in SEE, a region with special characteristics. Finally, the key conclusions from the paper are summarised in the last section.

III. ENTREPRENEURIAL HE

Entrepreneurship can be defined as the process of discovering, exploring and creating opportunities through implementing change when launching innovative ideas in an uncertain/risky and lately, international environment (McDougall and Oviatt 2000, 902).). The main characteristics of the entrepreneurial university are: innovation; risk-taking; steady state of change; and market shaping. A number of universities have reconsidered their missions due to the increased competitive pressure. Such change has naturally led to a revision of their internal structures which were developed to meet the expectations of more market oriented services (Chan and Lo 2007, 305-310). Entrepreneurial universities, apart from teaching and research, have changed their structures in order to deliver the "third stream mission", a transition that generates income by favouring business values, economy and society (Vorley & Nelles 2009, 284; Etzkowitz 2003, 109 & Marginson and Considine 2000, 2-19). This is accomplished by shifting themselves from traditional HE providers and knowledge generators to institutions that commercialize knowledge towards the development of the private sector in the local, regional or international setting (Etzkowitz et al. 2000, 315-316).

Such a shift is by no means effortless. Universities faced a number of challenges that often debated the consistency between academia and entrepreneurialism. The universities which managed to adopt such hybrid mission and effectively incorporate the latest market needs were driven by the so-called "Triple Helix" model in which university; industry and government are integrated with technological innovation and economic competitiveness as outcomes (Bernasconi 2005, 247 & Etzkowitz 1998, 823-824).

One of the main factors that can enable entrepreneurialism is the internal university governance. As a central pillar for change, the structure of the organisation is critical and can influence either way all the initiatives taken. Changes in the university structure elements, to look like a corporation, are necessary in order to adapt to the current needs of commercialisation (Middlehurst 2004, 267). The new university is no longer a pure academic institution but a "stakeholder organisation" and a "republic of scholars" **(**Bleiklie & Kogan 2007, 477). The internal management structures of traditional universities seem to be a burden for academics. In contrast, the new universities management is rather a "sign of status, authority and responsibility". Several ways are presented by Middlehurst (2004, 272-273) to help strengthen the university's "steering core" that would lead to market oriented results.

According to Bramwell and Wolfe (2008, 1175-1176) entrepreneurial universities should develop new roles which emerge from entrepreneurial attitudes and an enhanced strategic vision. The latter should infuse entrepreneurial attitudes towards research and teaching approaches, should enable the effective knowledge transfer and establish consistent support for staff in order to be able to attract income to support research or other university activities (Etzkowitz 2003, 112). Accordingly, the mission of universities should balance both traditional and entrepreneurial roles, without, however, losing control over its academic mission or sacrificing academic freedom (Rothaermel 2007, 739).

It is therefore implied that a traditional university needs to undergo a series of transformations, despite the persistent resistance to change or the continuous strong debate among academics about the traditional role of HE institutions. Such transformations can last for years or decades until results may be visible (Clark 1998, 8):

- Steering core should become stronger, effective ambitious, quicker, flexible and more focused to changing demands.
- Modern management and traditional academic values should be reconciled effectively. "A non-bureaucratic management style must be an essential feature of an entrepreneurial university with an 'enriched academic heartland' " (Shattock, 2003, 149).
- Research plans should include more project oriented, inter-disciplinary activities. Cooperation with industry can become a key factor, as universities are better at basic research and industry at commercializing its outcomes (Rothaermel 2007, 707).
- Diversified funding base must be assured.
- The basic academic, administrative and operational units of the university need to become entrepreneurial, with staff embracing change and being engaged more and more in entrepreneurial culture. The transformation then emerges as a collective entrepreneurship resulting from synergies within the university (Clark 1998, 4).

Entrepreneurialism includes risk taking with often uncertain outcomes. Although the structural reform implies a certain level of autonomy, success is not guaranteed. However, this would not be a preventing factor for developing flexible, aggressive and market oriented approaches, since autonomy is the first step that grants the freedom of undertaking entrepreneurial actions.

IV. INTERNATIONALISATION IN HE

The process of internationalisation is accumulative and not linear. The process combines various international activities with organisational features such as systematic strategies that incorporate a wide range of ideas, risks and results.

According to Martinez and Kitaev (2009, 122) there are two approaches to internationalisation: one places internationalisation activities in a framework of market competition and the other in a more traditional framework of networking and collaboration. Internationalisation activities can be an appropriate and successful approach for a university towards becoming entrepreneurial. Generally, internationalisation is viewed as means of accomplishing and extending the third mission of universities (Bryant Lewis 2007, 18-22 & Vorley & Nelles 2009, 288-289). However, a successful entrepreneurial roadmap through internationalisation with well established structural and governance implications is not yet available.

Internationalisation is considered as the process that a university applies in order to infuse its teaching, research and service functions with international or inter-cultural dimensions (Harman 2004, 103). Internationalisation is triggered by globalization which eases mobility and access to information, thus access to education (Burnett 2010, 117-120). More specifically, internationalisation is usually seen as a means of broadening cultural awareness and of responding to the educational market demands (Altbach & Knight 2007, 290).

Universities develop internationalisation strategies in a variety of ways which are summarised in Table 1.

Means of Internationalisation	**Description and Authors**
Articulation programmes	Students usually pursue only for a limited amount of time (one – two years) their studies in a foreign university with transferable credits (Bernardo 2001, 26 & Burnett & Huisman 2010, 134).
(Foreign) Branch campuses	Universities directly create a campus in another country (Burnett & Huisman 2010, 134). However, according to (Bernardo 2001, 26) this could become problematic for the reputation of the university in case that the local administration is not reliable. Also debated by (Martinez and Kitaev 2009, 136).
Curriculum internationalisation	It implies mostly the inclusion of foreign languages or international liberal studies in universities' curricula in order to sustain in the globalizing economy (Bernardo 2001, 26 & Burnett & Huisman 2010, 134).
Distance education	The studying process is done remotely though the use of media services (Martinez and Kitaev 2009, 137). The adequacy of this approach is still debatable (Olsen 2000, 16 & Bernardo 2001, 35).
Faculty exchange and development	Staff move for short periods of time to other universities (usually from different countries) (Bernardo 2001, 8 & Martinez and Kitaev 2009, 132).
Franchising agreements	Franchising educational programmes implies license granting for offering degree programmes under certain conditions (Bernardo 2001, 20 & Burnett & Huisman 2010, 134).

International inter-university networks	The main purpose is to enhance the economic and cultural development among regions/countries. Some very popular programs, especially in the EU, are ERASMUS and SOCRATES (Bernardo 2001, 34).
International dissemination	It is about international dissemination of research results: conferences, seminars, publishing, citations, etc. (Burnett & Huisman 2010, 134)
International student mobility	Students move to foreign countries for educational purposes (Martinez and Kitaev 2009, 129) and has grown the most in the recent years (Sadlak 1998, 100-102 & Burnett & Huisman 2010, 134). However, according to (UNESCO 2005, 6), this mobility is mostly directed towards economically developed countries, creating thus, certain knowledge imbalances among countries. Finally, this method is driven by market considerations rather than international cooperation (Bernardo 2001, 17).
Mixed distance education	Similar to distance education, it refers to the situation where the student has certain access to a local partner that delivers parts of the required studies (Bernardo 2001, 17)
(Joint) Post-graduate training programmes	They aim to deliver up-to date and market oriented educational training for specialists, especially for academics (Burnett & Huisman 2010, 134 & Martinez and Kitaev 2009, 132)
(Joint) Research collaboration	This is very useful for promoting research among different countries (Bernardo 2001, 33 & Martinez and Kitaev 2009, 134) and more specifically, according to (Salmi, 2000) this action also helps the effective use of knowledge which is vital for gaining competitive advantage.
Twinning programmes	Degrees of one university are delivered in two locations (Bernardo 2001, 18 & Burnett & Huisman 2010, 134): the provider (main university) and the host (usually in other country). The main beneficial aspect of this approach is first of all financially (both for the universities and for the students) and cultural/regional development through better quality higher education.
Activity	Refers to curriculum internationalisation, student and faculty exchange, technical assistance and international students (Knight 2003, 10 & Porsteinsson 2010, 8)
Competency	Refers to development of new skills, knowledge, attitudes and values by students, faculty and staff (Knight 2003, 10 & Porsteinsson 2010, 9)
Ethos	Refers to the creation of a culture or climate on campus, which promotes and supports international and multicultural (Knight 2003, 10 & Porsteinsson 2010, 10)
Process	Integration or infusion of an international/intercultural dimension into teaching, research and service (Knight 2003, 10 & Porsteinsson 2010, 11)
Internationalisation at home	Refers to internationalizing the curriculum, creating trans-national university networks relying on IT platforms, or creating credit transfer mechanisms, rather than student/staff mobility (Crowther et al. 2000, 1-3 & Porsteinsson 2010, 22)
Others	Teaching and learning in a foreign language Joint and double degree programmes Export of programs International office /service unit International summer schools Hosting international researchers (Porsteinsson 2010, 22-23 & Martinez and Kitaev 2009, 132-134)

Table 1: Means of Internationalisation

Towards an attempt to standardize such practices, the General Agreement on Trade Services – GATS has established four main modes that the services delivered trough internationalisation can take place (Knight 2003, 3):

- cross-border supply by distance education and e-learning;
- consumption abroad with the consumer moving to a foreign country in order to benefit of all the education offered by an institution;
- commercial presence through branch campuses or franchise agreements; and
- physical presence of people travelling to foreign countries for certain periods to deliver educational services.

In the context of UK universities, a number of drivers for internationalisation have been identified (Bryant Lewis 2007, 7-15):

- the strive for internationally recognised research;
- the provision of international opportunities to all students;
- the on-going support for international students;
- the recruitment of international students in UK;
- the offer of financial incentives to support mobility of students;
- the development of networks between like-minded institutions; and finally

- the establishment of international research collaborations.

In related literature one can find three main types of studies. The first refers to universities that develop strategies for international teaching programs, partnerships, research activities and student and staff exchanges (Martinez and Kitaev 2009, 132-137) as well as development of new interdisciplinary fields, customer focus, marketing skills and technological enhancement and investment (Taylor 2004, 168). The second type consists of universities that choose international partners to build strategic cultural, political, economic and educational alliances. This strategy reflects the entrepreneurial capability of universities that should wisely choose the right market to perform their activities (Poole 2001, 395). Finally, the third category reflects issues and advantages of internationalisation that impact on the design and implementation of the process (Ayoubi and Massoud 2007, 345-346) such as financial, cultural differences, regional development issues etc.

Through the years a number of typologies of entrepreneurial HE have been emerged. These are summarised in Table 2.

Authors	Typology/Manifestation
(Barnett 2005, 57)	Civic entrepreneurialism • Soft, innovative, proactive, open markets. Hesitant entrepreneurialism • Soft, innovative, proactive, closed markets. Unbridled entrepreneurialism • Hard, adaptive, self-reliant, open markets. Curtailed entrepreneurialism • Hard, adaptive, self-reliant, closed markets.
(Barnett & Phipps 2005, 6-7)	Geographical • Physical relocation of academics. Epistemological • Changing knowledge domains. Ontological • Taking a widened sense of one's self.
(Clark 1998, 146-148)	Focused university • The entrepreneurial response allows universities to redefine their reach through better knowledge inclusion, flexibility and through building organisational identity.
(Clark, 2004)	• Adaptive university • Proactive university • Innovative university.
(Mora and Vieira 2009, 98-99)	• Entrepreneurialism through satellites o Suitable for universities not able to change their structures but which create satellites around the university capable of becoming entrepreneurial • Entrepreneurialism though individuals.
(Rinne and Koivula, 2005)	• Private/Public university • For-profit/Not-for profit university.
(Shattock 2009, 200-206)	• Externally funded research university • Regional outreach/impact.
(Williams 2009, 14-32)	• New private HE institutions • New developments in public universities stimulated by governments • Major institution-wide initiatives by public universities • Smaller scales departmental, faculty and centre ventures • Freelance teaching, research and consultancy.

Table 2: Typologies of Entrepreneurial Higher Education

V. CHARACTERISTICS OF HE IN SEE

The case of CITY College that is presented below truly incorporates local and cultural dimensions (Collins and Wakoh 2000, 213) and takes into account the economic context of the region in which it operates, that is, South East Europe (SEE).

Entrepreneurialism concerns mostly developed economies where some universities succeeded to become entrepreneurial. There is little being said on transitional economies, such as the ones in SEE.

On the other hand, internationalisation strategies based on service delivery models and policies are well established. However, little emphasis is put into the impact of internationalisation at regional level (Wong et al. 2007, 943) and much less on an effective model of internationalisation in SEE. Transition economies are in need of a 'knowledge-rich' workforce.

There are specific characteristics related to HE in SEE. First of all of the majority of universities are public and state funded (Kwiek 2008, 3-11). According to Bernasconi (2005, 247), knowledge production targeted to economic development is mostly done in conditions of entrepreneurship in HE and especially in private institutions which are market driven and which are able to provide choice or diversity.

The second characteristic is that universities within the top 500 of the world can hardly be found in relevant lists[1 2]. This implies hysteresis in high quality education which leads towards a drain of students to countries with more developed and better quality higher educational systems. Finally, because of the persisting old regime in the majority of universities in most of these countries, academia remains stagnant to the rigidities of the past. Such traditional universities are too resistant to a bottom-up approach, which means that they are not flexible and agile enough to be able to rapidly change their focus and market orientation, thus impeding the fostering of entrepreneurial practices. The main ideological concept of the old university, with weak steering, does not fit to the market's needs (Clark 1998, 1-10).

VI. The Case of City College

6.1 History and evolution

CITY College is a private college of HE founded in 1989, in Thessaloniki, Northern Greece[3]. In 1993, following a formal academic evaluation, the University of Sheffield[4], UK, and CITY College signed a formal agreement for collaboration, according to which the College assumed the responsibility of running a series of University's programmes in Thessaloniki. The University of Sheffield validated all the undergraduate and postgraduate courses offered at the college and awards its Bachelor honours and Masters degrees. The high academic standards and the establishment of mutual trust led to the official recognition of CITY College as an Affiliated College of the University of Sheffield in 1997. The recognition represented a concrete manifestation of the existing conditions and prospects of the CITY-Sheffield partnership. It was the first time that the University of Sheffield has awarded Affiliation status to an academic institution outside the UK. In 2008, the College and the University of Sheffield agreed to cement the future of this collaboration and their relationship.

Since 2009, CITY College has become an International Faculty of the University of Sheffield, its sixth Faculty with the other five located at Sheffield. This means that CITY College is academically merged to the University and its academic organisational structure, but it keeps its own independent financial autonomy and governance. The evolution of this relationship from delivering franchised/validated programmes to becoming an integral part of the University is unique and by itself constitutes an extremely interesting case study which, however, falls out of the context of this paper.

The College has been audited numerous times as a collaborative provision by the QAA[5] and has been awarded a number of accreditations from BSC[6], AMBA[7], BAC[8], CMI[9] and others.

6.2 The College in numbers

There are three academic departments, namely Business Administration & Economics, Computer Science and Psychology as well as a Humanities & Social Sciences Division, including an English Language Support Unit. There are also two centres: the Executive Education Centre responsible of the delivery of the Executive MBA programme and the South-East European Research Centre (SEERC). Figure 1 depicts the organisation of the College in terms of Departments, Divisions, Centres and Offices.

Currently, the academic departments offer six different undergraduate and ten postgraduate programmes, all leading to a University of Sheffield degree. SEERC is an associated Research Centre and apart from conducting funded research it also offers a Doctorate programme.

The College academic staff consists of 70 members, most of them full-time staff, few flexible contract adjunct staff and a number of visiting professors from British Universities. Another 40 people form the administration and support staff.

Only 1/3 of the students is of Greek Nationality with the rest coming from countries of SEE. Approximately 65% of all CITY College students study in Thessaloniki whereas the remaining 35% study in other locations in which programmes are delivered (as described in further detail below). Out of the total number of 900 students, 40% are undergraduates whereas 60% are postgraduate students.

In 2000, the number of international students was 15% (around 100 students) of the student body. In 2012, this number went up to 65% in total numbers (around 600 students). Before 2000, the total research funding, doctoral students, scientific events, partnerships collaboration with other legal entities and projects that contribute to regional development were almost not existent. Through the application of the strategic plan, in 2012 the relevant numbers went up by 320%, 142%, 880%, 250% respectively compared to 2006. The research publications went up by 350% compared to 2000 and 160% compared to 2006.

These results in student numbers and diversification along with the expansion of programme portfolio and the successful evolution of the College into a Faculty of a UK Russell Group University demonstrate the effectiveness of the College structures and strategic plan which will be highlighted below.

6.3 Structures and Operations

As a Faculty of the University of Sheffield, CITY College's academic structure follows the norm with committees and boards ranging from open staff forum to teaching and learning committees and Departmental academic boards.

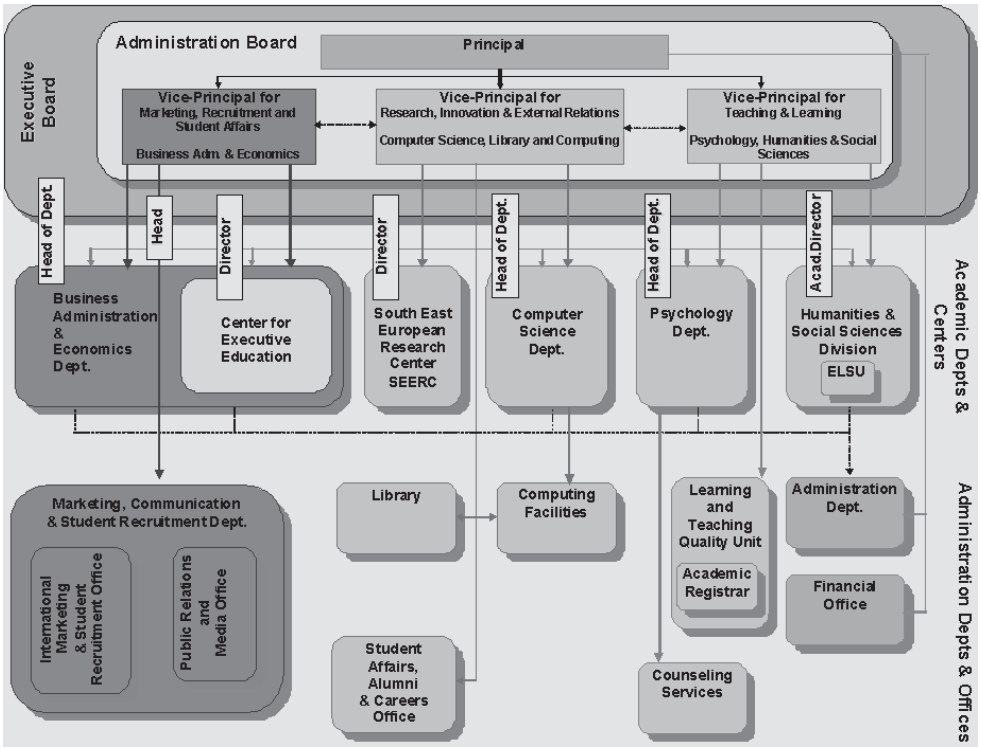

Figure 1: Organisational Structure in Departments, Division and Centres.

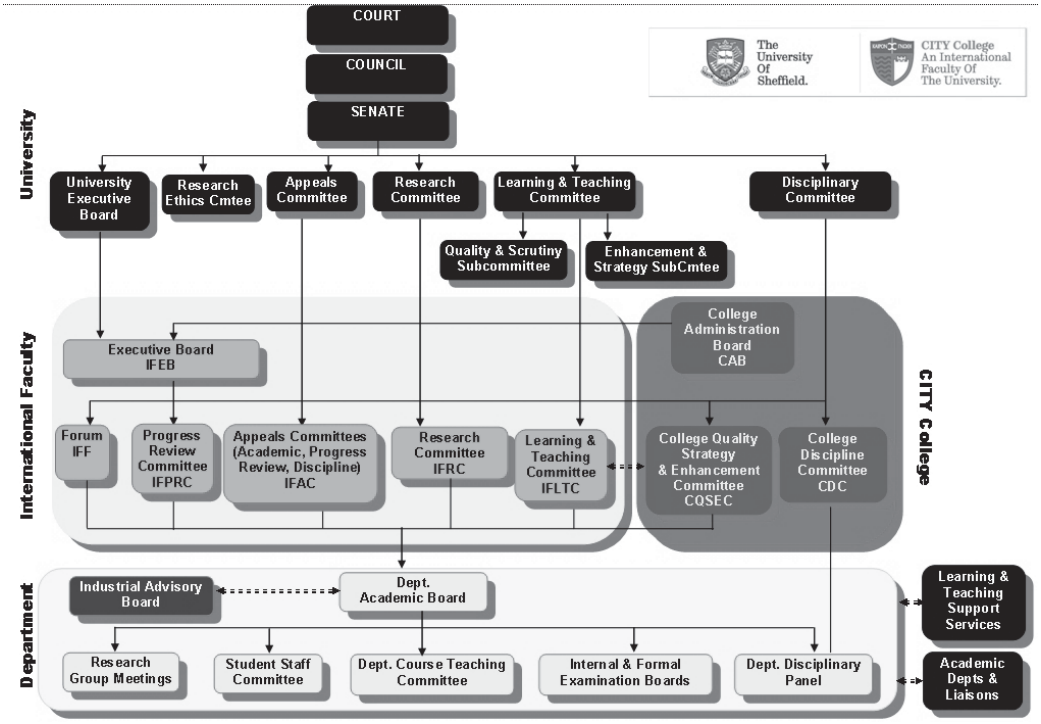

Figure 2: Board and Committee Structure at University, Faculty, College, Departmental level.

In the context of its operations and growth, it is essential to note that, due to its financial autonomy, the College has a flexible management structure (Administration Board and Executive Board in Figure 2). Its characteristics are:

A strong steering core with clear distinction of roles: a principal/general director and three vice-principals for (a) marketing, recruitment and student support, (b) research, innovation and external relations and (c) teaching and learning; involvement of all Heads of Departments and Directors of Centres in the executive board; decentralised decision making with calculated risk taking but at the same time centralised, College level financial management; strong entrepreneurial culture among the members of the executive board; mostly informal, fast moving flow of information both bottom-up and top-down, without rigid procedures such as waiting for scheduled formal meetings; and combination of democracy with hierarchy.

As a private institution, the accomplishment of the third stream mission (actually second stream in the absence of public funding), is among the top strategic priorities. Long before the emergent economic crisis and recession in Greece, the College strategic plan included items on increasing third stream income, internationalisation and entrepreneurialism.

The clear distinction between academic and operations management (International Faculty structure and CITY College structure in Figure 2) facilitated fast decision making. For example, the creation of the Executive Education Centre made the delivery of the MBA programme in other countries possible. Since 2006, the programme is delivered to another four cities: Belgrade, Bucharest, Kiev and Istanbul in addition to Thessaloniki.

6.4 The "Flying Faculty" model

These programmes are delivered in a "flying faculty" model (Kefalas 2012, 9) with staff from Thessaloniki or UK travelling over long weekends to deliver courses in the aforementioned cities. This is classified under the flexible and distributed provision models (QAA, 2010). The logistics involved in such a model are increasingly complex and require to be managed by dedicated administration staff.

The model also resembles the twinning programmes where degrees of one university are delivered in two locations (Bernardo 2001, 18 & Burnett 2010, 134). Twinning arrangements are partnerships with local providers that facilitate knowledge transfer between foreign and local institutions. In the case of CITY College, the staff members who deliver the course in all locations are the same with physical presence according to GATS (Knight 2003, 3). This is an asset to quality monitoring and assurance because it guarantees to a great extent that the quality of teaching, learning and assessment is equivalent in all locations. Under specific circumstances, depending mainly on the host partner, an equivalent overall learning experience is maintained too.

To support this, there are employed ways to enhance the overall learning experience. For example in the Executive MBA, all students from all cities meet twice during their studies, once for a week in Sheffield-U.K, and once for a week in Thessaloniki-Greece. These meetings provide excellent opportunities for networking as well as common extra-curricular activities, such as professional seminars, workshops, company visits etc.

Furthermore, the use of enhanced Learning Technologies as complementary to face-to-face contact proved to be absolutely essential for providing the desired quality of learning experience (Kefalas, 2011). Staff and students were trained and became familiar with learning technologies that facilitate everyday contact between teachers and learners. On-line or off-line communication through teleconferencing collaboration or wikis and fora respectively are comfortably employed as best practice.

Having acquired experience with the Executive MBA programme, another three part-time Master programmes in Marketing & Advertising, Backing & Finance and Entrepreneurship & Technology were launched in Sofia and Tirana in 2010. These programmes run under the same model and proved to be successful and very much demanded by students as well. Students do not move from their home cities, do not suspend their employment and can study in a rather flexible mode.

In 2011, a full-time four years in Business Studies and Computer Science Bachelor's programme was launched in Sofia. The first three years will be taught in Bulgaria while, during the last year, students will move to the International Faculty in Thessaloniki to attend their final year of studies. This employs partly the same distributed provision "flying faculty" model but also involves a private University in Sofia as well as a number of selected local academics who teach on the programme. The operation is fairly new and the

International Faculty, CITY College is not yet able to report on the outcomes.

Due to financial viability on the one hand and respect to local knowledge and expertise on the other some of the ventures are carried forward in collaboration with local institutions. It is, therefore, evident that the choice of the partners who facilitate the operations is crucial. Local HE institutions are audited and selected on the basis of specific collaborative criteria established by the University. Under the specific characteristics of this case, an appealing issue to be addressed is whether a well-established public university or a fairly newly established private university with similar mentality and culture could make a better choice for establishing a partnership.

6.5 Strategic Vision

The way for the International Faculty of the University of Sheffield to achieve an eminent presence in the region is the development and closely monitoring of the strategic plan of the College. The vision is *"to be a leading International Institution, achieving excellence and making a difference in South East and East Europe with bases, presence, activities and impact in all countries of the region contributing to growth and development".* For more than one decade, the last three strategic plans include, apart from the usual strategic goals related to teaching, learning, assessment, support, research etc., goals directly focused on internationalisation and entrepreneurialism. Our strategic goals for the years 2010-15 are the following:

- develop total entrepreneurialism;
- sustain excellence in learning and teaching;
- enhance student experience;
- develop research further;
- grow and expand internationally;
- develop services of outstanding quality;
- reach out and engage more with business and the wider community;
- empower, engage and develop our high quality people; and
- ensure financial sustainability and growth.

6.6 Entrepreneurialism

The executive board of the college approved a roadmap towards the development of total entrepreneurialism. The main objective is to promote and encourage a collective culture of innovation, risk taking, market-orientation and constant change across all members of staff. This can be achieved through a number of actions briefly outlined below.

First of all, the strong central senior management group should be entrepreneurial not bureaucratic with effective and fast decision making. But most important all staff needs to be inculcated with what we call "the CITY entrepreneurial way for HE", thus making them part of and owners of a modern, aggressive, quality-driven way for 21st century HE. The executive board is responsible to spread the entrepreneurial spirit all across the College. A significant role should be attributed to each member of the staff. Each one should be empowered, motivated and gradually involved in brainstorming and decision making processes on issues at college or departmental level. Thus, involvement of staff in entrepreneurial activities is more visible. Staff workload and promotion is governed through a precise academic resource and evaluation model that encourages excellence in teaching, research, administration and professional standing. Staff is urged and expected to take risks and therefore should be allowed to experiment and maybe in some cases fail.

Heads of departments and academic directors escape from their traditional academic role and accept a new role that accommodates the involvement in strategies for outreach, marketing, recruitment and promotion of their department. In turn, Heads and Directors are responsible, apart from academic management, to create a departmental staff community that would be able to cope with creation of new markets, further exploitation of old ones as well as with implementing ideas for reaching the public and increase student recruitment.

Another important aspect is training and support of staff in order to develop entrepreneurialism in teaching and learning as well as in research and technology transfer. The role of the SEERC is catalytic in such actions. SEERC can lead the promotion of an entrepreneurial culture across the SEE region in collaboration with the industry as well as other organisations and institutions. The industrial boards associated with each academic department would be an additional interface to the business community.

Finally, an entrepreneurial spirit among students is cultivated. The establishment of a students' entrepreneurial club as well as support and encouragement for entrepreneurial ideas is central to this goal. Specialized courses in all disciplines are designed and delivered. Students are encouraged to participate in competitions that focus on idea generation. Extra-curricular

activities are designed to have an entrepreneurial dimension.

6.7 Internationalisation

As pointed out in the previous sections, internationalisation has a number of dimensions related to mobility of staff and students, institution collaborations, research etc. CITY College, through its strategic plan identifies a number of these and lists actions with which it can address them. There is a well-developed customer orientation, particularly in respect of relations with corporate clients. The Industrial Advisory Board composed of leading executives and managers from across the region regularly reviews the programme for relevance within the region and throughout the world. In addition, priority is given to the enhancement of the role of the College as an International Faculty of the University of Sheffield in SEE region, through activities, research projects, presence in regional workshops, conferences and symposia, partnerships, networking and strategic alliances. To this extent, a number of actions have been implemented which led to the gradual development of the College's presence in the region and a number of agreements signed with the private and public sector as well as with governmental bodies of the states of the region. Future goals include the markets of East Europe and Middle East.

The promotion of the growth and diversification of our international student and staff body is a key objective. Firstly, the international and local students are integrated in an environment that supports and encourages a regional as well as a wider international "flavour" in programme curricula, syllabi and extra-curricular activities. Secondly, the possibility for student and staff exchanges with other institutions in the region is sought. Finally, the quest to recruit high calibre international staff is continued. Staff development includes, mentoring of new staff, staff appraisals, sabbaticals and career development. International and regional academics are more often invited to take part in the College's activities and events.

Finally, the internationalisation strategy includes the goals related to the development of relationships and cooperation with organisations and companies in the whole region of SEE to provide theoretical and practical input for education, run common projects and place students and graduate in job positions. The latter together with the exchanges mentioned above are the main actions that will increase the international experience of students. The International Faculty seeks to strengthen further the relations with academia in the region and through this to expand the provision of the flexible mode programmes to more countries in the wider region.

VII. THE EMERGENT MODEL

The case of CITY College presented above could be summarised in an entrepreneurial model for internationalisation in higher education. Such model would contain a number of component attributes, many of which also characterise other successful entrepreneurial universities. However, added to those, specific success factors are extracted from the case.

The main four pillars of such model are (Figure 3):

- Effective management structure and operations;
- A distributed education provision model;
- Entrepreneurial and Innovative spirit;
- Internationalisation as a core strategic theme.

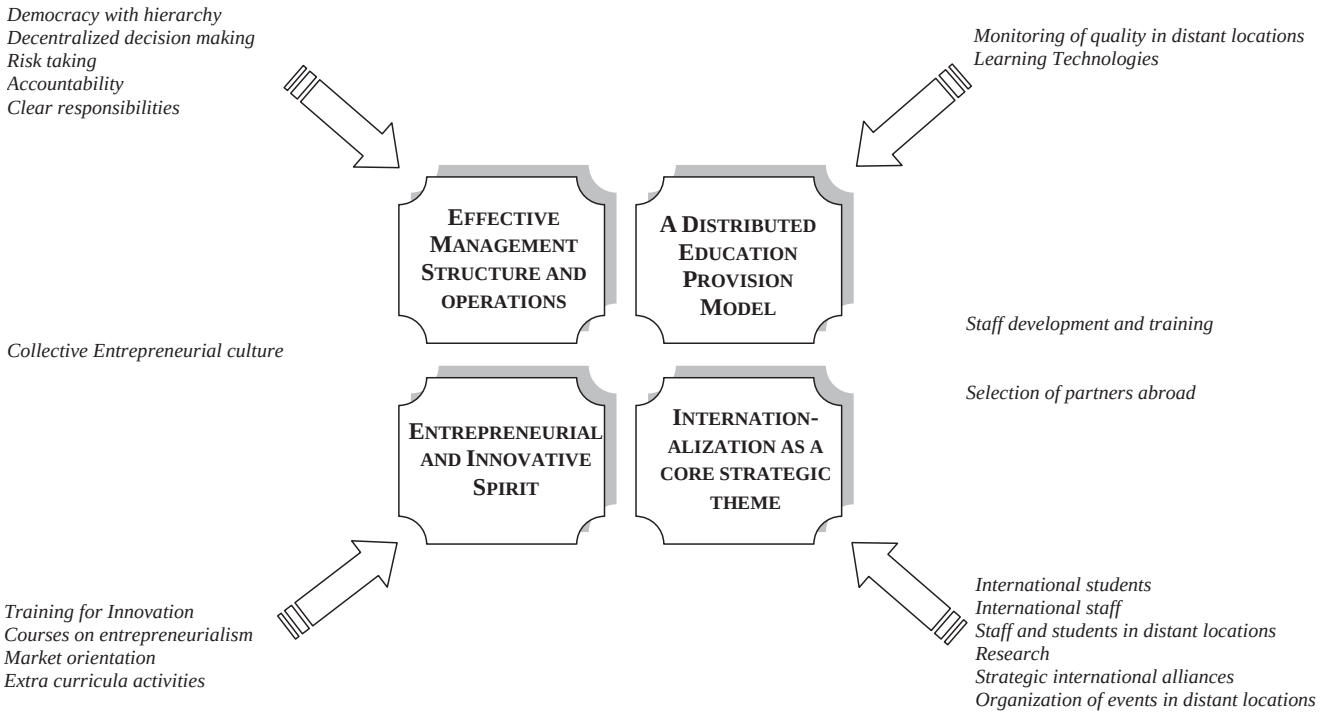

Figure 3: An Entrepreneurial Model for Internationalisation of Higher Education

Management should be characterised by flexible and fast moving distributed decision making, accountability, combination of democracy with hierarchy and in general an entrepreneurial culture among all members of staff.

The "flying faculty" distributed provision model guarantees quality monitoring and high standards in all locations. It can be supported by learning technologies and innovative teaching and learning methods. It will be facilitated by a number of partners who are carefully selected to facilitate the entrepreneurial path defined in the institution's strategic goals.

The collective culture for entrepreneurialism and innovative thinking as well as risk taking, should be the main characteristic of the faculty. Additionally, students, irrespectively of core discipline, should be cultivated with a strong entrepreneurial spirit inside and outside market-oriented curricula.

Internationalisation should form the core strategic theme of the establishment. Students, staff, research activities in the wider region, delivery of programmes abroad, strategic partnerships for collaboration, etc. are core elements which further sustain the entrepreneurial model for internationalisation of higher education.

VIII. CONCLUSIONS

We have presented the case of CITY College in Greece, which is an International Faculty of the University of Sheffield, U.K. The International Faculty is a full academic part of the university but has a discrete identity and an appropriate degree of autonomy for decision making on issues such as strategic development and resourcing with respect to educational provision and management of educational resources.

The International Faculty concept which is the case with CITY College, is unique so far and it is not mentioned / discussed in the related literature. The College proved to be a very successful education business model for internationalisation of HE. The case illustrates the attempt by a local small education provider, to transform within two decades into an International Faculty of a top 1% ranked University in the world. We showed how the strategic vision and the entrepreneurial culture of the management, academic and administration staff contributed more effectively to enabled the dynamic shift of a local institution to a South East Europe knowledge-based hub. This is demonstrated by the results in student body and diversification as well as by the quality of education provision of an expanded programme portfolio, events and research collaborations developed in the region.

- http://www.topuniversities.com/
- http://www.arwu.org/
- http://www.city.academic.gr/
- http://www.shef.ac.uk/
- http://www.qaa.ac.uk
- http://www.bcs.org/
- http://www.mbaworld.com

- http://www.the-bac.org/
- http://www.managers.org.uk/

IX. REFERENCES

Altbach, P. G. and Knight, J. 2007. The Internationalisation of Higher Education: Motivations and Realities. Journal of Studies in International Education; 11(3-4). 290-305.

Ayoubi, R. M. and Massoud, H. K. 2007. The strategy of internationalisation in universities: A quantitative evaluation of the intent and implementation in UK universities. International Journal of Educational Management; 21(4). 329-349.

Barnett, R. 2005. Convergence in Higher Education: The Strange Case of "Entrepreneurialism". Higher Education Management and Policy; 17(3). 51-64.

Barnett, R. and Phipps, A. 2005. Academic Travel: Modes and Directions. The Review of Education, Pedagogy, and Cultural Studies; 27. 3–16.

Bernardo, A. B. 2001. International Higher Education: Models, Conditions and Issues. Philippine Institute for Development Studies - PASCN Discussion Paper; 12.

Bernasconi, A. 2005. University Entrepreneurship in a Developing Country: the Case of P. Universidad Catolica de Chile, 1985-2000. Higher Education; 50. 247-274.

Bleiklie, I. and Kogan, M. 2007. Organisation and Governance of Universities. Higher Education Policy; 20. 447-493.

Bramwell, A. and Wolfe, D-A. 2008. Universities and Regional Economic Development: the Entrepreneurial University of Waterloo. Research Policy; 37, 1175-1187.

Bryant Lewis, V. F. 2007. Integrated Internationalism in UK higher education: interpretations, manifestations and recommendations. University of Bath, UK.

Burnett, S-A and Huisman, J. 2010. Universities' responses to globalization: the Influence of Organisational Culture. Journal of Studies in International Education; 14(2). 117-142.

Chan, D. and Lo, W. 2007. Running Universities as Enterprises: University Governance Changes in Hong Kong. Asia Pacific Journal of Education; 27(3). 305-322.

Clark, B. R. 1998. Creating Entrepreneurial Universities: Organisational Pathways of Transformation. IAU Press. Elsevier Science, UK.

Clark, B. R. 2004. Sustaining Change in Universities. Maidenhead, Open University Press.

Collins, S. and Wakoh, H. 2000. Universities and Technology Transfer in Japan: Recent Reforms in Historical Perspective. Journal of Technology Transfer; 25(2). 213-222.

Crowther, P., Joris, M., Otten, M., Nilsson, M., Teekens, T. and Wächter, B. 2000. Internationalisation at Home A Position Paper. Published by the European Association for International Education (EAIE).

Etzkowitz, H. 1998. The norms of the entrepreneurial science: cognitive effects of the new university – industry linkages. Research Policy; 27(8). 823-833.

Etzkowitz, H. 2003. Research Groups as Quasi-firms: the Invention of the Entrepreneurial University. Research Policy; 32. 109-121.

Etzkowitz, H., Webster, A., Gebhart, C. and Terra, B-R. 2000. The Future of the University and the University of the Future: Evolution of Ivory Tower to Entrepreneurial Paradigm. Research Policy; 29(2). 313-330.

Harman, G. 2004. New Directions in Internationalizing Higher Education: Australia's Development as an Exporter of Higher Education Services. Higher Education Policy; 17. 101-120.

Kefalas, P. 2012. Reaching the parts other delivery cannot: alternatives to campus-based face-to-face education; The Flying Faculty Model. 6th Annual Learning & Teaching Conference, http://www.shef.ac.uk/lets/conf/conf12-opening.

Kefalas, P. 2011. From resistance to leadership: Helping students move on to e-professional futures. 5th Annual Learning & Teaching Conference, http://www.shef.ac.uk/lets/conference11/session28.

Knight, J. 2003. GATS Trade and Higher Education: Perspectives 2003 – Where are we ?. The Observatory on Borderless Higher Education, UK.

Kwiek, M. 2008. Accesibility and Equity, Market Forces and Entrepreneurship: Developments in Higher Education in Central and Eastern Europe. Higher Education Management and Policy; 20(1). 1-22.

Marginson, S. and Considine, M. 2000. The Enterprise University: power, governance and reinvention in Australia. Cambridge University Press.

Martinez, R. and Kitaev, I. 2009. Entrepreneurialism and the internationalisation of higher education in a knowledge society., in M. Shattock (ed.). Entrepreneurialism in Universities and the Knowledge Economy. Open University Press.

McDougall, P. P. and Oviatt, B. M. 2000. International Entrepreneurship: the Intersection of Two Research Paths. Academy of Management Journal; 43(5). 902-906.

Middlehurst, R. 2004. Changing Internal Governance: a Discussion of Leadership Roles and Management Structures in UK Universities. Higher Education Quarterly; 58(4). 258-279.

Mora, J. G. and Vieira, M. J. 2009. Governance, organisational change and entrepreneurialism: is there a connection?. In Shattock (ed.), M. Entrepreneurialism in universities and the knowledge economy: diversification and organisational change in European higher education. 74-99. Open University Press, Berkshire, UK.

Olsen, J. 2000. Is Virtual Education for Real ? Issues of Quality and Accreditation. TechKnwologia, 1.

Poole, D. 2001. Moving towards professionalism: the strategic management of international education

activities at Australian universities and their faculties of business. Higher Education. 42. 395-435.

Porsteinsson, B. 2010. Internationalisation in Higher Education. Annual Nova Seminar, Agricultural Institute of Iceland.

QAA 2010. Code of practice for the assurance of academic quality and standards in higher education, UK Quality Assurance Agency

Rinne, R. and Koivula, J. 2005. The Changing Place of the University and a Clash of Values: The Entrepreneurial University in the European Knowledge Society A Review of the Literature. Higher Education Management and Policy; 17(3). 91-123.

Rothaermel, F. T., Agung, S. D. and Jiang, L. 2007. University Entrepreneurship: a Taxonomy of the Literature. Industrial and Corporate Change. 16(4). 691-791.

Sadlak, J. 1998. Globalization and concurrent challenges for higher education. In Scott, P. (ed.), The Globalization of Higher Education. Buckingham, UK. SRHE and Open University Press. 100-107.

Salmi, J. 2000. Higher Education: Facing the Challenges of the 21 century. TechKnowlogia,1.

Shattock, M. 2003. Managing Successful Universities. Open University Press.

Shattock, M. 2005. European Universities for Entrepreneurship: Their Role in the Europe of Knowledge The Theoretical Context. Higher Education Management and Policy; 17(3). 13-25.

Shattock, M. 2009. Entrepreneurialism and organisational change in higher education. In Shattock, M. (ed.), Entrepreneurialism in universities and the knowledge economy: diversification and organisational change in European higher education (Eds.). 1-9. Open University Press, Berkshire, UK.

Taylor, J. 2004. Toward a strategy for internationalisation: lessons and practice from our universities. Journal of Studies in International Education; 8(2). 149-210.

UNESCO. 2005. Policy Paper for Change and Development in Higher Education. Paris.

Vorley, T. and Nelles, J. 2009. Building Entrepreneurial Architectures: a conceptual interpretation of the Third Mission. Policy Future in Education; 7(3). 284-296.

Williams, G. 2009. Finance and entrepreneurial activity in higher education in a knowledge society. In Shattock, M. (ed.), Entrepreneurialism in universities and the knowledge economy: diversification and organisational change in European higher education. 10-32. Open University Press, Berkshire, UK.

Wong, P. K., Ho, Y. P. and Singh, A. 2007. Towards an “Entrepreneurial University” Model to Support Knowledge – Based Economic Development: the Case of the National University of Singapore. World Development; 35(6). 941-95.

DIFFERENT APPROACHES TO OPPORTUNITY PROCESS AND THEIR CONCEQUENCES FOR TEACHING PRACTICE

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This study identifies three different opportunity processes: search, discovery and action. We argue that the differences in understanding what opportunities are have effect on how to learn and teach opportunity competences. First, we identify different theoretical approaches to the opportunity process from the learning perspective. Then, we investigate (basing on 16 writings), how students understand what opportunities are in the venture creation process with respect to these different approaches and, finally, we elaborate what this means for learning and teaching practices. We conclude that courses aimed at opportunity enhancement should be designed in a way that students increase their awareness of the different nature of an opportunity and its process, as well as the varying nature of human involvement in opportunity processes. Entrepreneurship education should not be to look for uniform methods and teaching tools, but to try to combine them in order to enable all students to learn and increase their competences.

Keywords: opportunity process, teaching

I. INTRODUCTION

Even opportunities are regarded as a core element, process or competence in entrepreneurship, only recently has the question of how to teach or learn these opportunity-related competences started to attract scholars (Carrier 2007, Corbett 2005, Kirby 2007, Lumpkin and Lichtenstein 2005, Saks and Gaglio 2002). This field of research still leaves marginal interplay between opportunity definitions and process as well as the interplay between these and the learning process. Accordingly the aim of our research is to better understand different approaches to the opportunity process and their impact on learning opportunity competences.

II. THREE APPROACHES TO OPPORTUNITY PROCESS

As Corner and Ho (2010) argue opportunity process depends on the general approach to entrepreneurship. Following this suggestion leads to three different opportunity approaches: (1) search (Cantillon 1931, Kaplan 2000), (2) discovery (Kirzner 1979, Shane 2000, 2003; Shane and Venkataraman 2000) and (3) action (Mises 1949; Venkataraman 2003) approach (See Table 1).

The search approach has its roots in the ideas of Cantillon (1931). For Cantillon (1755) the entrepreneur is responding to "need and necessity" in the market to achieve equilibrium, matches producers with consumers, making rational judgments in an uncertain environment. In this approach, entrepreneurial opportunities are formed when individuals through purposeful, deliberate and conscious search (Drucker, 1998; Zietsma, 1999), identify and filter entrepreneurial opportunity for venture creation (Choi & Shepherd 2004). The underlying assumption is that opportunities exist, but are dependent on entrepreneurial action (Singh, Hills, & Lumpkin, 1999). Thus searching is the human action of evaluating alternatives and making choices.

The discovery approach is rooted in Kirzner`s views. Opportunities are responses of the individual to changes in environment and exist independently of entrepreneurial action and need to be discovered as objective phenomena. Iindividuals should become "alert and sensitive to their environments" (Kirzner, 1997; Shane, 2003) as a result of serendipity effects (Alsos and Kaikkonen, 2004; Ardichvili et al., 2003). Individuals rely on their cognitive abilities to identify opportunities as they arise. In this approach, discovery is a use of individual cognitive abilities to connect different ideas which might contain sources for an opportunity.

The action approach proposes that individuals do not recognize opportunities first and act next (Ardichvili et al., 2003; Choi, 1993; Huber, 2001). Rather, they act, wait for a response to their actions and then they readjust and act again. In this sense, opportunities do not exist until individuals act to create them (Aldrich and Zimmer, 2006; Gartner, 1985; Sarasvathy, 2001; Weick, 1979). Individuals rarely see the end from the beginning (Alvarez & Barney, 2007). Thus opportunities are the result of what individuals do as Gartner, Carter & Hills (2003) suggest. Action approach means interpreting the results of experience oriented actions. This approach

corresponds to the idea of effectuation of Sarasvathy (2001).

The process moderators in these three approaches are different. In search approach they are based on past knowledge and experiences and in discovery approach past cognitive patterns (Baron 2006). In action process past behaviour patterns perhaps best describe moderators for the process. The nature of the process is also different in each approach. In the search approach it is characterized by a linear process from idea to opportunity and further to its exploitation. In discovery approach the process is non-linear, where the opportunity recognition and its evaluation are intertwined. Finally in action approach different phases of opportunity process are cyclical and intertwined.

View	Search approach	Discovery approach	Action approach
Roots	Cantillon 'judgment maker'	Kirzner 'arbitrageur'	Mises 'speculator'
Opportunity	Opportunity is a solution to the problem or need of an individual Opportunities exist, dependent of entrepreneurial actions	Opportunity is a response of individual to changes in the environment Opportunities exist, independent of entrepreneurial actions	Opportunity is a result of iterative actions of an individual behaviour Opportunities do not exist until entrepreneurs engage in opportunity process
Opportunity process	Opportunity process is rational, purposeful and systematic , aimed at achieving given ends Nature of process: linear Process moderators: past knowledge and experience	Opportunity identification takes place through cognitive patterns, Nature of process: non-linear Process moderators: past cognitive patterns	Opportunity identification and exploitation are intertwined Nature of process: cyclical, serendipitous or opportunistic, bricolage Process moderators: past behavior patterns
Nature of human involvement	human action of evaluating alternatives and making choices	use of individual cognitive abilities and be alert to the changes in environment	interpreting the consequences as a result of action based experience

Table 1. Three approaches to opportunity identification

The competences needed for proceeding along each of these approaches are different. Rational thinking based on identified need or problem assumes competences needed for identifying or formulating the problem and those for developing options and making choices between them. In the discovery approach to enhance alertness to changes in environment might be best learned by training to reflect one's own cognitive patterns and thus learning to change them and in action approach experiential learning process that offers an arena to develop own ideas together with diverse stakeholders needed in the process might best support competences to identify and exploit opportunities in real life contexts with opportunities. Thus how to learn opportunity process assumes that we know more about how students understand and experience this process. For that purpose we have chosen case study approach which gives us an opportunity at the same to study how valid these three approaches might be and to investigate what student's expectations for learning opportunity competences are.

III. METHODOLOGY

A case study approach with multiple informants (Eisenhardt 1989, Yin 1984) provides the diversity and specifics needed to identify differences and similarities in students understanding of opportunities and their expectations for learning opportunity competences. Here we especially expect to find ideas for teaching and learning opportunity competences drawn from different approaches to opportunities. We build our methodology upon three pillars – theoretical sampling, analytical pattern-matching logic and analytical generalisation. Pattern matching logic is adopted as a general analytic strategy, where events are explained when they are related to a set of other elements (Pauwels and Matthyssens' 2004, 128), In this study, patterns that emerge from individual student writings (within-case analysis) are related to other students (theoretical replication).

Theoretical sampling and data gathering

To create theory-driven variation and divergence in the data as Pauwels and Matthyssens (2003) suggest, information-oriented selection of the case

was executed. Diversity of informants (16 students) includes different bachelor's degree backgrounds (business management, economics, management, engineering, informatics, politics and international studies); different working and life experience (international exposure); different nationality (Austrian, Finnish, Russian, Ecuadorian, Czech, Nepalese, German); and different entrepreneurial experiences (non-entrepreneurs, entrepreneurs, serial entrepreneurs). In the assignment students were asked to submit a written assignment on how they want to develop themselves as venture creators at the beginning of a course which was their first course on the entrepreneurship master's programme.

Adopted pattern matching analytical logic enables us to check whether our observational realm might support our theoretical construct. In the first phase the matching criteria are the same as used in Table 1 that is: understanding of opportunity, opportunity process, and nature of human involvement. Here the students' writings were analyzed deductively according to the three criteria and then matched to the patterns of the three approaches. Thus we can conclude on how well the three approaches fit reality. In the second phase we identified what students' expectations for learning opportunity competences are drawn inductively from the data. This evidence was then pattern matched with the outcome of the analysis of the first phase. Finally, we summarize our analytical generalization based on the interplay between our theoretical frame and empirical findings.

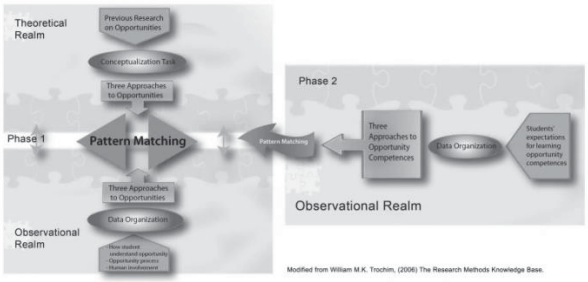

Figure 1. Methodological framework.

IV. RESULTS

A. *Phase one*

Three out of 16 students (8, 12, 14) fell into the search approach (see Table 2). Their willingness to create ventures follows their understanding of opportunity as a planned and systematic manner. They see venture creation as a necessity for a particular need and/or improvements in existing businesses. In the course of the process, students believe in evaluating rationally the opportunities to determine whether they meet their venture-related needs and goals. Considering human involvement and process moderators they believe that finding more information and providing rational plans will help them to evaluate and make choices between different ideas and make decision of exploiting opportunity.

Criteria	Student 8	Student 12	Student 14
Opportunity *a solution to the problem or need *exist dependent of entrepreneurial actions	Opportunity is "desired improvement" which may be achieved I need to complete the following steps	Often connected to some operation ventures or new product ventures, which means proper technical\IT\or engineer knowledge..	"ventures can be created for some particular need or existing businesses can be done better"
Opportunity process rational, purposeful and systematic, aimed at achieving given ends based on knowledge and experience	Is a multi-stage and repetitive process of "detecting weakness and where the improvement is most needed" Draw a development plan for team and individuals with set goals	identifying the real risks are very crucial stages in development	Is having habit to think how you can do things better or faster", for example by networking or gaining knowledge
Nature of human involvement evaluating alternatives and making choices	I need to complete the following steps: …" achieved by "creating a development plan to show progress"	"it is very essential to know all the information, have an appropriate knowledge about the opportunity and circumstances"	Individual should "broaden thinking about business opportunities" to "become more active with finding information"

Table 2. Search approach

Four students (1, 3, 10, 16) following the discovery approach, believe that opportunities emerge independent of their action and by responding these changes they can create their

ventures. For them it is a result of observing changes in their environment. They describe the opportunity process as getting holistic picture that is a consequence of their ability to combine different ideas and simultaneously evaluate their feasibility with respect to markets, thus it is based as process moderator rather on previous cognitive patterns than previous knowledge and experiences per se. Being alert to these changes students think they can find their ventures. As described by students this requires alertness or mindset to those opportunities available for them.

Criteria	Student no. 1	Student no. 3	Student no. 10	Student no. 16
Background				
Opportunity a response of an individual to changes in the environment exists independent of entrepreneurial actions	evaluate the ideas that came through the identifying opportunities, understand the market potential of the idea	"I am eagerly looking for excellent business ideas	Is a process of "accepting changes as an opportunity	one must be inspired, open to new and creative thinking. Second, one must be motivated.
Opportunity process identification takes place through cognitive patterns	Is a process composed of various stages that due to possessed skills and knowledge enables to "understand the bigger picture":	I should always find out new ideas for ventures and also bounder their feasibility and potential in the specific market and segment"	to see things from beginner's perspective"	"by giving order to processes that can otherwise seem like a complex puzzle with no clear starting point"
Nature of human involvement use of individual cognitive abilities and be alert to the changes in environment	"alertness or swift in identifying opportunities" and capability to understand the market potential	mindset which makes it easier to operate your own business	Individual has to accept "the way things are" and "surround with success models"	"Dynamics between traditional knowledge, interactive and critical brainstorming"

Table 3. Discovery approach

Eight out of sixteen students fell into the action approach. All of them underlined the need for doing and practical experience where opportunities are created by constant engagement in the iterative process of developing and implementing opportunities from ideas. The drivers are creativity, passion and willingness to learn from mistakes and failures. These descriptions demonstrate the behavioural nature of entrepreneurs to the effect that individuals respond to the consequences of their actions and readjust to act again. Students believe in practicality and experiencing a real action as a means of identification of an opportunity and creation a venture. The primary reason for the students to become venture creators is their passion for creating innovations i.e. being able to execute things in a way that was not done in the past. Students believe that they cannot identify opportunities without the series of their actions. The past behaviour patterns also become evident process moderators for these students.

Criteria	Student no. 4	Student no. 5	Student no.6	Student no. 7	Student no. 9	Student no. 11	Student no 13	Student no. 15
Opportunity * is a result of iterative actions of an individual behaviour * do not exist until entrepreneurs engage in opportunity process	can be roughly divided into four categories: learning by doing,...	*passion for creating something very new with a risk of failure, ... *trying to achieve always better than on previous try *not to be afraid of mistakes and always learn from them,	*Opportunities are born when "an innovative entrepreneur has met his passion" *to go around the obstacles and continue in my chosen path. *for me to get involved in activities	As a venture creator it is of utmost importance to become a "doer", someone who simply tries to realize the ideas because if you do not try you already lost.	the best way to know ... is by putting my ideas into practice and by making things work "Putting my ideas into practice",	*you need the diligence and organizational strictness to carry out the plan whilst you need the adaptation to adjust your plans and deal with changing circumstances. *"Hypothesizing ideas are opposed to taking (considered) action"	the true learning of entrepreneurship in practice is only achieved through trial and error. For the past few months I have been pushing forward my venture in social entertainment.	I believe that one of the most difficult parts of a venture creation process is how to handle failures. All of this must be done in practice to develop me as a venture creator.
Opportunity process * Identification and exploitation are intertwined * Cyclical, serendipitous or opportunistic, bricolage	"Search of information should be embedded to venture creator's daily routines"	"implementing innovative mindset and thinking out of box, "There is nothing as a final state of venture creation"	*Is a process of "letting innovative ideas grows and develop"	Is a process of becoming "a doer who simply tries to realize the ideas" For me the invention of the post-its is one of the best ventures ever created. They had glue and saw the need to leave messages at peoples desks that will catch their interest when they would come back, so they developed glue that would stick but that was not too sticky. Nowadays, this simple though genius idea is sold a million times a year.	"making things work"…"to keep pushing forward"	"I need to get back into taking action", "Over thinking won't get you moving"	"the venture is constantly developing" "Keeping an open mind at all times and not being afraid of making mistakes"	"Capabilities to solve various issues that are met as a new venture is created." Also, I think that sometimes venture creator needs to have the courage to trust on luck rather than his/her own capabilities.
Nature of human involvement Interpreting the consequences as a result of action based experience	when you become an active member of the start-up community you start getting more and more good ideas, create a network and also learn from other's mistakes.	It is absolutely impossible to identify what kind of characteristics comes from natural predispositions and what is developed during the time, and it is even harder to say what is developed intentionally and what comes without awareness, for example from experience.	"have rich imagination that helps creating ideas and solving "I should let my innovative ideas grow and develop into their potential"	the heuristics that guide our behaviour is hard to decouple the perception from a new business this distinction is important, because it opens up a new perspective, a new angle on the status-quo.	I should be alert to my actions, evaluating them while I go deeper in the subject and the creation process	You can talk yourself out of any business idea Making mistakes is usually the most effective way to learn.	Some choices may be less right than others, but it is never too late to fix something, so in the end, all one has to do is constantly just keep solving different problems that arise. The venture then keeps moving forward and growing by itself in a sense.	All of this must be done in practice "to make difference between relevant and irrelevant questions

Table 4. Action approach

Results indicate that it is possible to identify three different approaches thus validating their basic differences; that is understanding of opportunities, their processes and the nature of human involvement.

*B. **Phase two***

In this second phase we inductively identified what students' expectations of learning opportunity competences are. Regardless of the approach, students declare that the learning process is an essential part of their development as venture creators. Learning shapes and stimulates their transformation from them-today (being identity) to them-in-future (becoming identity). At present students identify themselves as those who have already some entrepreneurial experience and knowledge, and now try to enhance their competences in order to become a successful venture creator in future by embracing knowledge absorption, various skills, formal education, interaction with colleagues and networking. However, the way of development and the expectations from learning process to become venture creator vary in each approach.

For students under the search approach, the learning process is based on knowledge, information or data availability which are further exploited according to development plans and/or goals. They want mostly to improve their skills and personal attributes in learning rationally to find knowledge in order to make better choices for developing and exploiting opportunities.

Student no. 8	Student no. 12	Student no. 14
• *Identify the important skills and personal attributes needed for the particular venture* • *Evaluate me and my team in terms of those needed skills* • *Draw a development plan for team and individuals with set goals* • *Follow up the execution of the plan to ensure that desired improvement is achieved* * *Repeat the process*	Taking the risk and identifying the real risks are very crucial stages in development as a venture creator for me to know all the information, have an appropriate knowledge about the opportunity and circumstances	Becoming more active with finding information, to acquire better negotiation skills and get to know the field that I am really interested in. I also should broaden my thinking about business opportunities.

Table 5. Perception of learning opportunity competences for students from search approach

Students representing the discovery approach expect to be aware of environment they live in and changes that happen in that environment. It allows them to adapt changes into their ideas. They want to have broader perspectives and a bigger picture of the world, all indicating their

expectations to develop their cognitive patterns. They believe that alertness and developing mind-set would improve their venture creation competences.

Student no. 1	Student no. 3	Student no. 10	Student no. 16
better alertness or swift in identifying opportunities capability to understand the market potential of the idea. understanding of the patenting process…how to license the patents to whom and when. how to monitor the ventures that I have already created to understand the bigger picture as a venture creator.	an entrepreneurial and global aspect and mind-set	changing as a person, changing my beliefs about the world and my self-image, and integrating a new system of values which consistently drive me and my actions to develop in myself… accepting changes as an opportunity to see things from bigger perspective the learning process is continuous	be inspired, open to new and creative thinking. Second, one must be motivated. The implementation phase, especially, requires grit and determination.

Table 6. Perception of learning opportunity competences for students from discovery approach

Action type of students demand creative and imaginative thinking, letting their ideas appears, grow and change. They describe the opportunity process as a continuous process of learning and development. They connect venture creation with uncertainty or risk and assume that the possibility of learning from failures and experiences enhance their venture creation competences. They are not afraid of making mistakes; they are interested in others' mistakes and even see it as a way of learning. By trying out many options they call for more courage. Students representing the action approach are also more oriented to other people and networking than students identifying with other approaches.

Student no. 4	Student no. 5	Student no.6	Student no. 7	Student no. 9	Student no. 11	Student nor 13	Student no. 15
** learning by doing, active and continuous search of information, and school* **Most of the successful entrepreneurs have learned their lessons through trial and error.. but also when you create network and also learn from others' mistake* **innovativeness is something venture creator cannot live without.* **get to know a lot of people and get a chance to them work.*	**is combination of adapting unique way of thinking and of course never stopping with self-awareness and personal development.* **The mission must be coded in the mindset, motivation must be cumulated, abilities must be improved, personality must be ready and there cannot be a thought that this is a final state of the mind.* **developing the state of the mind together with acquiring knowledge and personal abilities. Being a venture creator does not have anything common with comfort.* **not to be afraid of mistakes and always learn from them*	**to get involved in activities where I get to know even more people and expand my social network.* **mapping the things that I am interested in and study more around these topics* **feed my imagination through reading about inspiring examples of creative entrepreneurs and success stories and perhaps also about unsuccessful ventures and learn from their failures*	**to be able to connect the right people, acknowledging each individuals potential contribution and motivating them for your own ideas* **persistence and belief in superiority of idea* **every task that I accept and do not decline will help me developing as a venture creator*	*I believe that what I need to develop myself as a Venture Creator is, in great part, about my own motivation and self confidence not necessarily books will give me the right answer, real life experiences will and I should listen to them*	**the creativity to come up with the correct venture whilst you need the analytical ability to evaluate its feasibility.* **the balance of taking action versus planning and hypothesizing (not taking action) .* **the adaptation to adjust your plans and deal with changing circumstances to be well rounded in the functions of business* **to carry out the needs that a new venture will need as it evolves from its initial idea*	**by keeping an open mind at all times and not being afraid of making mistakes studying the theory behind different subject areas can help to develop one's own ideas.* **learning of entrepreneurship in practice is only achieved through trial and error*	**to know when and how to engage other people in the venture creation* **to have the courage to trust on luck capabilities solving various issues that are met as a new venture is created*

Table 7. Perception of learning opportunity competences for students from action approach

These results indicate that students' expectations for learning opportunity competences consistently follow three different approaches. Thus expectations for learning competences in each category acquire their own unique profile or learning pattern which effect on learning and teaching practices. These differences are elaborated next.

V. DIFFERENCES IN LEARNING AND TEACHING PRACTICES IN DIFFERENT OPPORTUNITY IDENTIFICATION APPROACHES

The two-phase pattern matching indicates the differences in learning and teaching practices in three different approaches. To enhance the search approach competences students need to be exposed to processes where problem solving and rational thinking are encouraged. Work done in the field of problem based learning in other contexts, for example in medicine and education, might be a suitable approach for teaching in the search approach added with rational problem solving methods as is for example expected in compiling the business plans.

In the discovery approach being aware of one's own cognitive patterns, its possibilities and limitations might help students to increase their awareness and thus provide opportunities to

consciously train alertness. The newest developments in the global concept mapping community in education and learning might provide some tools for this. Baron frames of cognitive pattern recognition might serve as a good starting point for this approach. On the other hand to creatively provide ideas needs more creative approaches and for example classical mind map techniques and other idea generating techniques could be combined to learning interventions in discovery approach.

Action approach has much in common with Sarasvathy's effectual process. However, rather than models the main idea for this approach is that students are exposed to real life venture creation processes where they actually create and exploit their own ideas and opportunities. Teaching means creating arenas and environment for these interventions and supporting students' own processes. These ideas are summarized in Table 8.

	TEACHING METHODS		
	Focus on	**Enhanced competences**	**Tools**
Students with search approach	Problem formulation and rational problem solving methods	Enhancing problem identification and formulation competences and competences to provide alternative solutions for problem solving and decision making	Problem based learning and for example Business plan training
Students with discovery approach	Cognition process	Enhancing alertness to outside world and influencing on cognitive patterns	Concept mapping Mind mapping and other idea generation techniques
Students with action approach	Effectuation	Enhancing entrepreneurial venture creation process	Putting students into the process in which they create and try to exploit opportunities in order to experience venture creation processes

Table 8. Different methods of opportunity process teaching.

These findings carry an important message of diversity and give some ideas to break the barriers between teachers' hesitation on how to teach different approaches.

VI. CONCLUSIONS AND IMPLICATIONS FOR THEORY AND PRACTICE

The results indicate that our basic claim about the diversity instead of uniformity of opportunity identification processes thus seems to be quite valid. This implies also practicing diversity in teaching opportunity process. However, even more valid is our claim that more research is needed in the nexus of education and opportunity identification, since our research is only a small explorative pilot study to identify differences and their consequences than a profound and comprehensive study of three approaches. Thus theoretical generalization in this study can be seen as only providing ideas for that but not as yet leading to generalization. Even so it seems to us that we need to consider differences in our teaching practices with respect to different approaches.

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VII. REFERENCES:

Aldrich, H., Zimmer, C. 2006. Entrepreneurship through social networks. In D. Sexton, and R. Smilor (Eds.), The art and Science of Entrepreneurship (3-23). Cambridge, M.A: Ballinger.

Alsos, G. A.& Kaikkonen, V. 2004. Opportunity recognition and prior knowledge: a study of experienced entrepreneurs. NCSB 2004 Conference, 13th Nordic Conference on Small Business Research.

Alvarez, S.A. & Barney, J.B. 2007. Discovery and creation: alternative theories of entrepreneurial action. Strategic Entrepreneurship Journal 1: 11–26 (2007), pp.11-26.

Ardichvili, A., Cardozo, R., & Ray, S. 2003. A theory of entrepreneurial opportunity identification and development. Journal of Business Venturing, 18(1), 105–123.

Baron, R. 2006. Opportunity Recognition as Pattern Recognition: How Entrepreneurs "Connect the Dots" to Identify New Business Opportunities. Academy of Management Perspectives, 20, 104-119.

Cantillon, R. 1931. Entrepreneur & Economist, MacMillan, London.

Carrier, C. 2007. Strategies for teaching entrepreneurship: what else beyond lectures, case studies and business plans? In A. Fayolle (Ed.), Handbook of research in entrepreneurship education (Vol. 1, pp. 143–172). Cheltenham: Edward Elgar.

Choi, Y. R. & Shepherd, D. A. 2004. Entrepreneurs' decisions to exploit opportunities. Journal of Management, 30(3), 377–395. doi:10.1016/j.jm.2003.04.002.

Choi, Y.B 1993. Paradigms and Conventions: Uncertainty, decision making and entrepreneurship. Ann Arbor: University of Michigan Press.

Corbett, A. 2005. Experiential learning within the process of opportunity identification and exploitation. Entrepreneurship Theory and Practice, 29(4), 473-491.

Corner P.D., Ho M. 2010. How Opportunities Develop in Social Entrepreneurship?, Entrepreneurship Theory and Practice, July 2010, 635-659.

Drucker, P. F.1998. The discipline of innovation. Harvard Business Review 80 (8), 95–102.

Gartner, W. 1985. A conceptual framework for describing the phenomenon of new venture creation. Academy of Management Review, 10(4): 696-706.

Gartner, W., Carter, N. & Hills, G. 2003. The language of opportunity. in Steyaert, C., Hjorth, D. (Eds), New Movements in Entrepreneurship, Edward Elgar, Cheltenham, pp.103-24.

Kaplan, T. 2000. University-sponsored family business programs: Program characteristics, perceived quality and member satisfaction. Entrepreneurship Theory and Practice, spring 24(3): 5-23.

Kirby, D. 2007. Changing the entrepreneurship education paradigm. In A. Fayolle (Ed.), Handbook of research in entrepreneurship education (Vol. 1, pp. 21–45). Cheltenham: Edward Elgar.

Kirzner, I. 1979. Perception, Opportunity and Profit. Chicago, IL: University of Chicago Press.

Kirzner, I. 1997. Entrepreneurial discovery and the competitive market process: An Austrian approach. Journal of Economic Literature. 35, 60–85.

Lumpkin, G.T & Lichtenstein B.B. 2005. The role of Organizational Learning in the Opportunity-Recognition Process. Entrepreneurship Theory and Practice, July 2005.

Mises, Ludwig von 1949. Human Action: A Treatise on Economics (4th ed.), San Francisco: Fox & Wilkes.

Pauwels, P. & Matthyssens P. 2003. The dynamics of international market withdrawal. in State of Art of Research in International Marketing, (ed.), S. Jain, Cheltenham, UK and Northampton, MA, USA: Edward Elgar, forthcoming.

Pauwels, P. & Matthyssens P. 2004. The Architecture of Multiple Case Study Research in International Business. In Handbook of Qualitative Research Methods for International Business (ed.) R. Marschan-Piekkari and C. Welch. Edward Elgar.

Saks, N.T., Gaglio C.M. 2002. Can Opportunity Identification be Taught? Journal of Enterprising Culture, 10, pp.313-347.

Sarasvathy, S. 2001. Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. Academy of Management Review 26(2), 243–263.

Shane, S. 2003. A General Theory of Entrepreneurship. The Individual–Opportunity Nexus. Cheltenham: Edward Elgar, 2003.

Shane, S. A. 2000. Prior knowledge and the discovery of entrepreneurial opportunities. Organization Science, 11, 448-469.

Shane, S. & Venkataraman, S. 2000. The Promise of Entrepreneurship as a Field of Research.The Academy of Management Review, 25(1), 217-226.

Singh, R. P., G. E. Hills, & G. T. Lumpkin, 1999. New Venture Ideas and Entrepreneurial Opportunities: Understanding the Process of Opportunity Recognition, Proceedings of the 1999 U.S. Association for Small Business and Entrepreneurship, 657-671.

Troch im, W.M.K. 2006. The Research Methods Knowledge Base, http://www.socialresearchmethods.net/kb/pmconval.php

Venkataraman, S. 2003. 'Foreword'. In Shane, S., A General Theory of Entrepreneurship. The Individual-Opportunity Nexus, Northampton, MA: Edward Elgar.

Weick, K. 1979. The social psychology of organizing. Addison-Wesley Publishing Company.

Yin, R. K. 1984. Case study research: Design and methods. Newbury Park, CA: Sage.

Zietsma, C. 1999. Opportunity knocks—or does it hide? An examination of the role of opportunity

DETERMINANTS OF GROWTH PROCESSES OF ACADEMIC SPIN-OFF COMPANIES: A RESOURCE-BASED PERSPECTIVE

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The characteristics and performance of university spin-off activities is a significant issue in economic and management studies literature. These studies merit research because it is suggested that university innovations stimulate economies by spurring product development, by creating new industries, and by contributing to employment and wealth creation. For this reason, universities have come to be highly valued in terms of the economic potential of their research efforts. The aim of this paper is to contribute to the ongoing debate on the growth (or non-growth) of academic spin-off companies and the potential causes of the observed diversity, by focusing on the Italian context. This study adopts a resource-based perspective to identify the critical variables determining early growth processes of academic spin-off in the Italian context, in terms of employees, revenues and total assets. Using a database of over 800 Italian spin-off companies, our multivariate analysis indicates that the formal involvement of an industrial partner among the company's shareholders during the first year of firm's operation is lying at the heart of the firm's growth prospects. On the contrary, the size of the IPRs' portfolio at founding; the experience previously ripened by the promoting partners in R&D and production functions do impact negatively and significantly on the growth processes (most in terms of total assets). Finally, the stage of new product development at founding; the initial amount of the starting capital; the formal involvement of a VC among the company's shareholders during the first year of firm's operation do not affect growth processes. The paper discusses the implications of these results for university and public policy.

Keywords: academic entrepreneurship; academic spin-off companies; technology transfer; Italian start-ups; Resource-based view.

I. INTRODUCTION

The progressive development of the knowledge-based economy is forcing regions to reconsider and often revise their approach to economic development, creating new innovative, technology-based start-ups. As a result, there is a growing need for universities to develop more rapid linkages between science, technology and utilization (Allen & Cohen 1969; Allen, Tushman & Lee 1979) and serve a 'third-mission' of contributing to local economic development (Etzkowitz 2002).

One of the key technology transfer mechanisms that have attracted attention in recent years is the emergence of university spin-offs. University spin-offs are a highly successful sub-set of all start-up firms because they generate jobs for highly skilled graduates and demonstrate strong economic effects for regional communities (Shane 2004a). However, at present there is little evidence about the determinants of growth processes of academic spin-offs. This gap in the literature can be ascribed to the fact that only recently have scholars become aware about the heterogeneity in spin-offs' growth processes. Since then, several attempts (Autio & Yli-Renko 1998; Mustar 1997; Delapierre, Madeuf & Savoy 1998; Mustar 1995; Heirman & Clarysse 2004b) have been made in order to explain how spin-offs differ in their early growth, with a specific focus on the determinants of firms' success.

While these studies have advanced our understanding of spin-off behaviour, a number of scholars have pointed out deficiencies in the literature. First, most studies have explored the effects of individual, institutional or environmental factors on university spin-off behaviour (Nicolaou & Birley 2003). As a result, a distinct void exists with respect to the organizational factors accounting for variability in university spin-off activity. Second, the literature has been primarily atheoretical and non-cumulative in that most writers have developed conceptual models that are not empirically tested or make conclusions based on case studies (Djokovic & Souitaris 2004). Third, while a number of studies have investigated knowledge flow effects from universities to industry (Siegel, Waldman, Atwater & Link 2003a; Siegel, Waldman & Link 2003b) and university technology transfer performance (Siegel et al. 2003a,b), few studies have systematically attempted to explain the critical variables determining the diversity in growth processes of spin-off firms, and the Italian context is not an exception.

By building on previous research, which argues that founding conditions can have a long-term effect on firm growth and performance (Boeker 1989), this paper aims at closing this gap and investigates the starting resources, seeking to explain spin-off activity in terms of university resources. With regard to growth measures, the annual average growth in employment, revenues and total assets of Italian academic spin-off companies are considered.

The remainder of the paper is organized as follows. After setting the theoretical framework and introducing the research question, we formulate specific research hypotheses, introducing the control variables included in the model and then describing the research method. Finally we discuss the results of our multivariate analysis, by highlighting the limitations of this paper and the directions for future research.

II. THE THEORETICAL FRAMEWORK

The important role that academic spin-offs have in supporting economic and technological growth and as a channel for TT has been widely recognized in the literature. Since they are technology-based, these firms have been often perceived in the literature as critical drivers of technological development, social progress and economic growth (Utterback, Meyer, Roberts & Reitberger 1988).

The relevance of academic spin-offs has initially contributed to very optimistic perceptions about their growth potentials (Heirman & Clarysse 2004a), on the basis – among others – of the highly visible success stories (the so-called 'gazelles') in the early- and mid-Nineties and the success of HT clusters such as Silicon Valley and Route 128 in the US and Cambridge in the UK. However, several researchers have later expressed doubts about the real extent of rapid growth potentials of all academic spin-offs: the indiscriminate attribution of this characteristic was not corroborated by sufficiently robust evidence (Oakey 1995; Storey & Tether 1998). These remarks have been indeed confirmed by several empirical studies (Autio & Yli-Renko 1998; Mustar 1997; Chiesa & Piccaluga 2000), showing that the vast majority of spin-off companies remain very small.

Several scholars also indicate that the overall impact of academic spin-offs for employment generation might be lower than the popular perception (Delapierre et al. 1998; Mustar 1995). Consequently, at present, relatively little is known about the determinants of growth processes of academic spin-offs and, more particularly, about the distinguishing factors between fast growing and not (or slowly) growing firms. The identification of potential causes of spin-offs' growth processes is one of the least understood aspects in entrepreneurial research (Cooper, Gimeno-Gascon & Woo 1994; Kazanijan & Drazin 1990). Since growth is argued to be a complex and multidimensional phenomenon (Westhead & Birley, 1994), there is no single theory that can fully explain spin-offs growth processes. However, as observed by several scholars, the growth patterns of academic spin-offs are not completely random and unpredictable; rather, they are systematically related to the characteristics of the firms and to their environment (Smallbone, Leig & North 1993; Delmar, Davidsson & Gartner, 2003). In particular, previous research argues that founding conditions may have a long-term effect on firm growth and performances (Boeker 1989).

According to the Resource-based view (RBV), spin-off performance depends on the characteristics of the firm's resources bundle (Barney 1991; Chandler & Hanks, 1994), all instrumental in the development of an initial resource base, and which therefore play a key role for their survival and success (Carter, Stearns, Reynolds & Miller 1994; Roberts 1991). In this perspective, the entrepreneurial challenge consists in the identification and assembly of the starting resources (Penrose 1959), including: a) *human resources* (Roberts 1991; Shane & Stuart, 2002); b) *technology* (Utterback et al. 1988); c) *finance* (Roberts 1991; Manigart, Bayens & Van Hyfte 2002).

Once the awareness among scholars about the heterogeneity in growth processes experienced by academic spin-off firms has been achieved, there have been several attempts to explain why spin-offs differ in their early growth stage, with a specific focus on the identification of the determinants of firms' success (Heirman & Clarysse 2004b). However, entrepreneurship literature has exclusively analysed the independent effects of single resources on the survival rate and growth processes of the firms, neglecting inter-resources relationships (Carter et al. 1994; Lee, Lee & Pennings 2001). In particular, empirical studies have so far mainly focused: i) on the characteristics of both the entrepreneurs and the organisations for which they have been working (Roberts 1991; Rogers 1986); ii) on a complex of external influences, including VC availability, supporting services, economic climate, market and technology opportunities, industrial relationships and

complementary assets (Chiesa & Piccaluga 2000; Segal 1986; Niosi 2006). However this focus on the direct effects of single resources provides a limited understanding of growth phenomena, because it does not take into consideration inter-resource configurations (Lee et al. 2001). Moreover, it is also in contrast with the RBV of the firm, according to which spin-offs' long-term competitive advantage lies in resource configuration that managers build using dynamic capabilities.

III. RESEARCH QUESTION

The present paper aims at identifying the critical variables determining early growth processes of academic spin-offs in the Italian context:

A. RBV: technology

With regard to growth determinants in a RBV perspective, this study uses different measures of the spin-off's technological base, by including in the model both i) the New Product Development (NPD) stage at founding and ii) the firm's patents and licenses portfolio.

With regard to the *NPD stage at founding*, previous empirical evidence on academic spin-offs (Roberts 1991; Delapierre at al. 1998) shows that firms which start by offering their own product(s) and/or technology(-ies) significantly outperform those which begin as consultants or Research and Development (R&D) contractors. Moreover, Leifer, McDermott, O'Connor, Peters, Rice & Veryzer (2002) found that successful NTBFs are earlier in identifying their market applications and in defining an appropriate business model. Finally, focusing on the Flanders region (Belgium), Heirman & Clarysse (2004a) found that the NPD stage at founding is not significantly related with growth in employees or revenues, whereas it is positively associated with growth in total assets. By building upon this contrasting evidence, it is possible to advance the following research hypothesis about Italian spin-off companies.

Hypothesis 1: Italian academic spin-offs which are further in the NPD cycle at founding will grow more in terms of employees, revenues and total assets than Italian spin-off firms which are earlier in the product development cycle at founding.

With regard to the *IPRs granted to the new ventures*, Grandi & Grimaldi (2003) adopt the number of patents as well as the licences assigned to the academic entrepreneurs as indicators of the 'technological excellence' of the new venture, as related to the quality of applied research activities carried out by the promoting partners during the period spent in doing research at the university of origin. Moreover, IPRs are considered to be fundamental building blocks of an academic spin-off aspiring to become a successful company (British Venture Capital Association – BVCA, 2005). In line with this perspective, empirical evidence about success factors in Canadian spin-off ventures (Niosi 2006) found that spin-offs' growth seems to be related to patent portfolios of the new ventures. In fact, spin-offs with more patents tend to be larger as well as more successful. Hence, the following research hypothesis can be formulated for the Italian context:

Hypothesis 2: Italian academic spin-offs which have been granted IPRs (patents and/or licences and/or trademarks) will grow more in terms of employees, revenues and total assets than Italian spin-off companies showing neither patents or licences or trademarks in their portfolio.

B. RBV: finance

With regard to financing this project investigates the effects of both: i) the amount of the starting capital and ii) the involvement of VC investors in Italian academic spin-offs. In fact, insufficient *financial resources* are often cited as a primary reason for the failure of new ventures. Consequently, the amount of the starting capital at founding is argued to be a source of competitive advantage for spin-off companies (Heirman & Clarysse 2004b). In fact, spin-offs with higher levels of investments at the beginning of their activity will tend to collect a greater amount of strategic assets than their low-investing counterparts (Lee et al. 2001). Moreover, well-funded spin-offs can devote higher amounts of money to product/service development and have stronger resistance in case of liquidity constraints (Heirman & Clarysse 2004b). As previous research suggests that the amount of initial capital invested is positively related to the spin-off firm survival and success (Cooper et al. 1994), the following research hypothesis about Italian academic spin-offs can be presented.

Hypothesis 3: Italian academic spin-offs which have higher starting capital at founding will grow more in terms of employees, revenues and total assets compared to Italian spin-off companies which start with more modest financial resources.

Moreover, Venture capitalists play an important role in the innovation process by providing risk capital and operating assistance to new high technology firms (Florida & Kenney 1988). In fact, venture capital plays a particularly important

role in financing university start-ups because it is a major source of funds for new firms in fields in which universities are a major source of new technology, like biotechnology (Zucker, Darby & Brewer 1998).

Because formal venture capital is a major source of equity financing for new technology companies, its availability is important to overcoming capital market barriers to the financing of new technology firms. In addition, venture capitalists serve as 'market makers' in a 'spot market' for business development resources by connecting new technology companies with potential suppliers, customers, lawyers, manufacturers, and employees (Florida & Kenney 1988).

Davila, Foster & Gupta (2003) found a positive association between the presence of VC and high growth, attributable to VCs' ability to select firms with high growth potential or to post-investments benefits that accrue to VC-backed spin-offs. In particular, Heirman & Clarysse (2004a) found a positive and significant relationship between large amounts of VC at founding (1 to 6 million Euros raised in the first year) and growth in spin-offs' employees and revenues, whereas a significant and negative association can be observed between small amounts of VC and with spin-off growth. In a study on Canadian spin-off firms, Niosi (2006) registers the existence of a positive relationship between spin-offs' growth and the availability of public incentives, whereas no significant effect on spin-offs' growth depending on the availability of VC can be identified. By building upon this diversified evidence, it is worth to test at least the impact of the formal involvement of VC among the company shareholders during the first year of operation, by advancing the following research hypothesis about Italian academic spin-offs.

Hypothesis 4: Italian academic spin-offs which raised VC during their first year of operation will grow more in terms of employees, revenues and total assets compared to Italian spin-off companies which start without the formal involvement of VC.

C. RBV: management and entrepreneurship

Research has shown that a critical human capital resource for the development of cutting-edge technologies is access to persons with expert knowledge and talent (Powers & McDougall 2005). Zucker et al. (1998) argue that 'star' scientists from higher quality academic institutions create spin-off firms to capture the rents generated by their intellectual capital. Such capital is tacit and, therefore, it is difficult for lower quality institutions to imitate. With regard to human resources, this study will analyse the management and entrepreneurship dimension, that is both: i) the experience of the promoting partners in different business functions and ii) the involvement of an industrial shareholder in the firm since the first year of company operation.

Firm-specific human capital in newly established spin-off firms is contained within the management know-how and experience of the founders. The *quality (experience) of the founding team* represents also an important criterion for ventures funding, which suggests that human capital is an relevant predictor for spin-off success. In line with this, several researchers report that the academic entrepreneurs' skills and experiences are positively related to spin-offs performances (Roberts 1991; Cooper et al. 1994). Heirman & Clarysse (2004a) found that the entrepreneurial culture of the promoting partners is positively related to growth processes: more experienced founding teams grow faster. In particular, commercial experience leads to high growth, but it is often lacking in the mostly technical founding teams of academic spin-off companies. Therefore, the fifth research hypothesis will be as follows:

Hypothesis 5: Italian academic spin-offs started by founding teams with previous experience in different functional domains (R&D, commercial, other) will grow more in terms of employees, revenues and total assets compared to Italian spin-off companies started by less experienced teams.

On the basis of the above depicted considerations, the formal involvement of an industrial shareholder among the promoting partners of the spin-off company or at least its entry in the spin-off's equity during the first year of company operation, would provide the firm with a significant inward flow of knowledge and professional skills in different functional domains and it is therefore likely to impact positively on the early growth paths. In this respect, Roberts (1991) argues that promoting partners with previous entrepreneurial experience (namely *industrial partners*) have a better understanding of both the market and the financial community. In line with this, Roure & Keeley (1999) argue that in order to grow, a firm should accept and manage growth processes, including the willingness to add new shareholders. Moreover, Aggarwal, Echambadi, Franco & Sarkar (2004) observe that interaction with industry through the promoting partners is more effective than knowledge acquisition through hiring experienced

employees. In consideration of this, the sixth research hypothesis may be advanced:

Hypothesis 6: Italian academic spin-offs in which one or more industrial partners took an equity stake during their first year of operation will grow more in terms of employees, revenues and total assets if compared with Italian spin-off companies without such shareholders.

IV. CONTROL VARIABLES

We control for several variables, which are suitable to affect the early growth of academic spin-offs but which however fall outside our conceptual model.

A. Industry

The identification of the industrial sector in which each spin-off will operate represents a key decision for the success of the newly established venture (Compagno & Pittino 2006). In the literature, there is some evidence about dissimilarity of spin-offs' growth paths depending on the sectors in which they are involved (Delmar et al. 2003). In fact, previous research (Niosi 2006) observes that the growth of Canadian spin-off companies seems to be related - among other factors - to their field of activity. With regard to the Italian context, previous research (Balderi, Conti, Granieri & Piccaluga 2010) observes that the preferred areas of TT processes from academia to industry through spinning-off of new ventures have progressively changed, by switching the focus from the involvement in the fields of mechanics, electronics, industrial automation, energy and environment in the early Seventies to the growing interest nowadays shown for biotechnologies, pharmaceutical, biomedical, nanotechnologies, ICT.

B. Competitive forces

The Industrial Organization (IO) literature argues that a firm's performance is not only dependent on the industry in which the firm is active but also on how the firm positions itself in this industry. In this perspective, the firm is a bundle of strategic activities aimed at positioning the venture on the market (Porter 1980). Sandberg & Hofer (1987) found that venture strategy as well as competitive forces in the industry have an impact on the success of new ventures. Therefore, we control for four competitive forces, namely: (i) threat of new entrants, (ii) threat of substitutes and bargaining power of both (iii) buyers and (iv) suppliers. Controlling for direct competitors can be difficult and even misleading in the context of academic spin-offs because of the extreme novelty of their products and services for which industry boundaries are very vague.

C. Local context

The support provided by the local context to spinning-off activities from academia to industry may have a significant impact on their creation and growth processes. In fact, at regional/local level initiatives aimed at fostering the development of academic spin-off companies (i.e. introduction of public subsidies, and so on) may be carried out. In a recent study on Canadian spin-off firms, Niosi (2006) registers the existence of a positive relationship between spin-offs' growth and the local availability of public incentives. More specifically it emerged from the study that academic spin-off companies not supported by public subsidies are more likely to be stagnant. By building upon this evidence, we included in the model a control variable measuring the supportive level of the local context to academic entrepreneurship.

D. Firm size

Firm's age and size are likely to impact on firm's growth pattern (Penrose 1959). The best known relationship between an organization's size and its growth rate is Gibrat's (1931) law or the Law of Proportionate Effect, holding that proportional growth rates are independent of size. However, this view has been challenged by several scholars (Evans 1987a,b; Dunne, Roberts & Samuelson 1989; Barron, West & Hannan 1994), arguing that – among firms of the same age – the higher the size, the lower the growth rates. Therefore, we control for firm size in this study. Following previous work on firm growth, we use the firm's employment size at founding as our control measure (Lee et al. 2001; Heirman & Clarysse 2004a).

E. Firm age

Empirical evidence in the literature shows that – among firms of the same size – the older the firms, the lower their growth rates, regardless of the number of industries included in the sample (single industry versus multiple industries; Sutton, 1997). The available literature indicates that the younger the firms, the higher their growth rates, especially in terms of employment. However, in considering the effect of age on growth of academic spin-offs, it must be emphasized that all firms in this study are quite young (the average age being 4.6 years) and that the age variation is low. We therefore include firm age at time of survey as a control variable in our analysis.

V. RESEARCH METHOD

A. *Identification of academic spin-off companies in Italy, sampling and data collection*

The identification of the universe of Italian spin-off companies was achieved by collecting information from a very diversified range of sources: i) phone contacts with all Italian universities and other PROs; ii) phone contacts with all Italian business incubators, business accelerators and other STPs; iii) constant monitoring activity of all the BP competitions; iv) emerographic analysis; v) web search; vi) informal sources. As a result of this empirical process of identification and validation of the information, a database of over 800 spin-off companies has been built.

The primary data source was a structured questionnaire specifically designed by the authors in order to enable the reconstruction of the firm's history and particularly focusing on the firm's resources, products, market characteristics, employees and link with the parent PRO. For each item, data were collected on both the initial conditions (during their first year of operations) and on the current situation (time of interview). The questionnaire was completed during Computer Assisted Telephone Interviews (CATI method) with either the founders or the Chief Executive Officers (CEOs). A total of 291 interviews (with an incidence of 36.1% on the total population of academic spin-off companies identified in Italy) were carried out in November and December 2009.

B. *Measures for outcome variables*

The clear specification of the growth criteria adopted is critical for the interpretation of the results and the comparison with other studies. In this respect, the occurrence of different results depending on the growth measures adopted emphasizes the relevance of using multiple criteria, especially for newly established ventures (McDougall, Shane & Oviatt 1994; Delmar et al. 2003). For this reason, in this paper, employment, revenue and total assets growth have been adopted as outcome variables. In particular, employment growth is important for policy makers, in a job creation perspective; revenue growth is the most diffused measure of small and new ventures (McDougall et al. 1994; Delmar et al. 2003); total assets growth plays a key role for newly established companies, where especially at the beginning total assets can grow without registering any revenue (Achtenhagen, Helin, Melin & Naldi 2004).

Another key issue is about the use of measures of absolute or relative growth (Achtenhagen et al. 2004). As small firms are more likely to exhibit astonishing percent growth rates (Delmar et al. 2003), in this paper absolute growth has been adopted. In particular, we use: 'Annual Absolute Employment Growth [AAEG]', 'Annual Absolute Revenue Growth [AARG]', and 'Annual Absolute Total Asset Growth [AATAG]' as objective measures of the annual absolute employee, revenue and total asset change (Hanks, Watson, Jansen & Chandler 1993; Westhead & Birley, 1994; Delmar et al. 2003; Heirman & Clarysse, 2004). A description about how each one of the outcome variables is calculated is reported in table 1.

Variable Label	Variable Description
AAEG	Annual Absolute Employee Growth = (Employees $_{2008}$ – Employees $_{\text{year of founding}}$) / Firm's Age
AARG	Annual Absolute Revenue Growth = (Revenues $_{2008}$ – Revenues $_{\text{year of founding}}$) / Firm's Age
AATAG	Annual Absolute Total Assets Growth = (Total assets $_{2008}$ – Total assets $_{\text{year of founding}}$) / Firm's Age

Table 1 – Outcome variables: labels and description

C. *Measures for predictor variables*

We already discussed the predictor variables in this study in the formulation of the hypotheses. In particular, basing on the empirical findings available in the literature, we consider three dimensions which have been found suitable to influence early growth processes experienced by spin-off companies, namely (i) technology, (ii) finance, (iii) management and entrepreneurship (within the RBV theoretical framework). For each one of these dimensions, several predictor variables measuring different elements which are suitable to be proxies of different aspects of the considered dimensions have been introduced in the model. A schematic representation of the predictor variables included in the model is reported in table 2.

Theoretical approaches	Res. Hp.	Variable Label	Variable Type	Variable Description
RBV: Technology	1	NPD	Ranking	Ranking variable about the stage of NPD at founding, ranging from : (0) = no-prototype; (1) = prototype; (2) = standardised, market-ready product; (3) = product immediately commercialized
	2	IPR	Quant.	Total number of active patents (both applications and grants) owned by the company at founding + active patents licensed to the company at founding (active licensing in) + trademarks owned at founding (proxy for the number of products)
RBV: Finance	3	EQUITY	Quant.	Financial amount of capital raised in the first year (in Euros)
	4	VC	Ranking	Dummy indication whether VC funds were raised during the first year
RBV: Manage-ment & Entrepre-neurship	5	RD_EXPE	Ranking	Dummy indication about the eventual experience ripened by all the promoting partners in R&D function
		PROD_EXPE	Ranking	Dummy indication about the eventual experience ripened by all the promoting partners in the production function
		COMM_EXPE	Ranking	Dummy indication about the eventual experience ripened all the promoting partners in commercial function
		MGMT_EXPE	Ranking	Dummy indication about the eventual experience ripened by all the promoting partners in a management function
	6	INDU	Ranking	Dummy indication about the presence of an industrial partner as a shareholder during the first year

Table 2 – Predictor variables: link with both theoretical approaches and research hypotheses, variable label, type and description

D. ***Measures for control variables***

Basing on the empirical findings available in the literature, we consider five dimensions which have been found suitable to be controlled for, and namely: (i) industry, (ii) competitive forces, (iii) local context; (iv) firm size; (v) firm age. For each one of these dimensions, control variables measuring different elements which are suitable to be proxies of different aspects of the considered dimensions have been controlled for in the model. A schematic representation of the control variables included in the model is reported in table 3.

	Variable Label	Variable Type	Variable description
Industry	NANO	Ranking	Dummy variable indicating whether the firm is active in the nanotechnology and advanced materials sector
	CHEM	Ranking	Dummy variable indicating whether the firm is active in the chemical sector
	LIFE	Ranking	Dummy variable indicating whether the firm is active in the life sciences sector
	MECH	Ranking	Dummy variable indicating whether the firm is active in the advanced mechanics sector
	ELECT	Ranking	Dummy variable indicating whether the firm is active in the electronics sector
	ICT	Ranking	Dummy variable indicating whether the firm is active in the ICT sector
	INNOV	Ranking	Dummy variable indicating whether the firm is active in the innovation services sector
	EN_ENVI	Ranking	Dummy variable indicating whether the firm is active in the energy and environmental sector
Compe-titive forces	ENTRY	Ranking	Barriers to entry the industry at founding, ranging from: (0) = very low (very easy to enter) to (7) = very high (very difficult to enter)
	SUBS	Ranking	Threat of substitutes, ranging from: (0) = not at all (no threats) to (7) = very high (very high threats)
	BUY	Ranking	Power of the customers of the firm, ranging from: (0) = very weak (high bargaining power of the firm) to (7) = very strong (low bargaining power of the firm)
	SELL	Ranking	Power of the suppliers of the firm, ranging from: (0) = very weak (high bargaining power of the firm) to (7) = very strong (low bargaining power of the firm)
Local context	CONT	Ranking	Supportive level of the local context to academic entrepreneurship, ranging from: (0) = not at all (low support) to (7) = very high (strong support)
Firm size	SIZE	Quant.	Number of FTEs during first year of operation of the company
Firm age	AGE	Quant.	Numbers of years since founding (N) = [2009 – (year of foundation of the company)]

Table 3 – Control variables: link with both theoretical approaches and research hypotheses, variable label, type and description

E. ***Sample characteristics***

The spin-offs in the sample are between zero and thirty years old with an average age of 4.6 years and a median age of 3 years. At start-up (during their first year of operation), these firms employed 1,817 FTEs (Full Time Equivalent units) in total. In 2008, these firms employed 2,896 FTEs in total, meaning that they have grown their employment base by almost 60%. The mean employment size in 2008 is 10 FTEs (it was 6.2 FTEs during the first year of company's operation), with the majority of the firms employing no more than 6 FTEs. However, the growth is not uniform across the sample. As expected, the 30 fastest growing spin-offs (about 10% of our sample; n=291) account for 53.8% of net additional jobs. Overall, the spin-offs included in the sample appear to be a group of firms of particular interest to policy-makers. In fact, in a relatively short time, they have created apparently viable growing businesses in a wide range of technologies, including ICT (25.2%), energy and environmental sector (20%), life sciences (17.9%), advanced mechanics (9.7%), electronics (9.3%), nanotechnologies and advanced materials (8.3%), innovation services (6.9%) and chemical sector (2.8%). Table 4 gives an overview of the descriptive statistics about all the variables included in the model.

Variable name	Mean	Median	Min.	Max.	S.D.	n
AAEG	0.9	0.0	-6.7	25.0	2.4	291
Log_AAEG	0.2	0.0	-2.8	3.2	1.1	140
AARG	232,877.8	26,666.7	-19,000,000.0	30,000,000.0	3,185,348.0	133
Log_AARG	10.7	10.6	5.9	17.2	1.7	107
AATAG	40,875.0	3,666.7	-737,500.0	1,335,000.0	204,905.1	78
Log_AATAG	9.9	10.0	7.4	14.1	1.7	50
NPD	1.0	1.0	0.0	3.0	0.9	290
IPR	0.6	0.0	0.0	16.0	1.9	290
EQUITY	546,709.3	12,000.0	500.0	10,400,000.0	2.034,941.2	204
VC	0.1	0.0	0.0	1.0	0.2	291
RD_EXPE	0.9	1.0	0.0	1.0	0.3	291
PROD_EXPE	0.3	0.0	0.0	1.0	0.5	291
COMM_EXPE	0.2	0.0	0.0	1.0	0.4	291
MGMT_EXPE	0.2	0.0	0.0	1.0	0.4	291
INDU	0.2	0.0	0.0	1.0	0.4	291
MKT	1.6	1.0	1.0	3.0	0.7	291
INT_OR	1.6	1.0	1.0	4.0	0.8	290
INFORM_SUP	3.4	3.0	0.0	9.0	2.0	290
FORM_SUP	1.2	1.0	0.0	4.0	1.0	290
NANO	0.1	0.0	0.0	1.0	0.3	290
CHEM	0.0	0.0	0.0	1.0	0.2	290
LIFE	0.2	0.0	0.0	1.0	0.4	290
MECH	0.1	0.0	0.0	1.0	0.3	290
ELECT	0.1	0.0	0.0	1.0	0.3	290
ICT	0.3	0.0	0.0	1.0	0.4	290
INNOV	0.1	0.0	0.0	1.0	0.3	290
EN_ENVI	0.2	0.0	0.0	1.0	0.4	290
ENTRY	4.8	5.0	0.0	7.0	1.9	291
SUBS	3.5	4.0	0.0	7.0	2.0	291
BUY	3.9	4.0	0.0	7.0	1.7	291
SELL	2.9	3.0	0.0	7.0	1.8	291
CONT	3.0	3.0	0.0	7.0	1.9	291
SIZE	6.2	5.0	1.0	150.0	10.5	291
AGE	4.6	3.0	0.0	30.0	4.2	290

Table 4 – Descriptive statistics - all variables

VI. RESULTS AND DISCUSSION

A. ***Reliability statistics***

Table 5 presents the Pearson Product-Moment correlation coefficients for the three outcome variables, namely the absolute annual growth in employment [AAEG], revenues [AARG] and total assets [AATAG]. The correlation coefficients range between 0.54 and 0.63. The Cronbach's Alpha for these three growth measures is 0.74 on non-standardized items and 0.80 on standardized items. Hence, the data indicate that the three growth measures are strongly correlated.

		1	2	3
1	Log_AAEG	--		
2	Log_AARG	.622***	--	
3	Log_AATAG	.537***	.553***	--

Table 5 – Pearson's Product-Moment Correlation Coefficients between outcome variables

Note: (***) Correlation is significant at the 0.01 level (2-tailed).

B. Multivariate regression analysis

In order to assess the combination of factors at founding that best explains early growth processes of academic spin-off companies, General Least Squares (GLS) regression analysis has been carried out. In fact, this statistical technique allows association of each predictor variable with the outcome variable while controlling for the effects of other predictor variables. As the outcome variables (i.e. our growth measures: [AAEG], [AARG], [AATAG]) are not normally distributed (table 6), statistical tests on the absolute growth measures could be invalid (Hair, Anderson, Tatham & Black 1984). The logarithms of the growth measures ([Log_AAEG], [Log_AARG], [Log_AATAG]), which are normally distributed, are therefore considered in the analysis.

Variable name	Variable type	Variable role	Kolmogorov-Smirnov (**)			Shapiro-Wilk		
			Statistic	df	Sig.	Statistic	df	Sig.
AAEG	Quant.	Outcome	0.23	28	0.00	0.76	28	0.00
Log_AAEG	Quant.	Outcome	0.10	28	0.20(*)	0.98	28	0.81
AARG	Quant.	Outcome	0.29	28	0.00	0.51	28	0.00
Log_AARG	Quant.	Outcome	0.08	28	0.20(*)	0.97	28	0.49
AATAG	Quant.	Outcome	0.38	28	0.00	0.44	28	0.00
Log_AATAG	Quant.	Outcome	0.08	28	0.20(*)	0.97	28	0.45
NPD	Ranking	Predictor	0.27	28	0.00	0.81	28	0.00
IPR	Quant.	Predictor	0.46	28	0.00	0.29	28	0.00
EQUITY	Quant.	Predictor	0.34	28	0.00	0.58	28	0.00
VC	Ranking	Predictor	0.54	28	0.00	0.29	28	0.00
RD_EXPE	Ranking	Predictor	0.54	28	0.00	0.29	28	0.00
PROD_EXPE	Ranking	Predictor	0.48	28	0.00	0.51	28	0.00
COMM_EXPE	Ranking	Predictor	0.47	28	0.00	0.54	28	0.00
MGMT_EXPE	Ranking	Predictor	0.51	28	0.00	0.42	28	0.00
INDU	Ranking	Predictor	0.45	28	0.00	0.57	28	0.00
MKT	Ranking	Predictor	0.30	28	0.00	0.75	28	0.00
INT_OR	Ranking	Predictor	0.27	28	0.00	0.79	28	0.00
INFORM_SUP	Ranking	Predictor	0.17	28	0.04	0.90	28	0.01
FORM_SUP	Ranking	Predictor	0.21	28	0.00	0.88	28	0.00
NANO	Ranking	Control	0.53	28	0.00	0.36	28	0.00
CHEM	Ranking	Control	0.54	28	0.00	0.29	28	0.00
LIFE	Ranking	Control	0.50	28	0.00	0.47	28	0.00
MECH	Ranking	Control	0.53	28	0.00	0.36	28	0.00
ELECT	Ranking	Control	0.54	28	0.00	0.29	28	0.00
ICT	Ranking	Control	0.48	28	0.00	0.51	28	0.00
INNOV	Ranking	Control	0.51	28	0.00	0.42	28	0.00
EN_ENVI	Ranking	Control	0.53	28	0.00	0.36	28	0.00
ENTRY	Ranking	Control	0.16	28	0.06	0.92	28	0.03
SUBS	Ranking	Control	0.17	28	0.03	0.91	28	0.02
BUY	Ranking	Control	0.21	28	0.00	0.94	28	0.10
SELL	Ranking	Control	0.17	28	0.05	0.90	28	0.01
CONT	Ranking	Control	0.14	28	0.20	0.95	28	0.20
SIZE	Quant.	Control	0.22	28	0.00	0.86	28	0.00
AGE	Quant.	Control	0.29	28	0.00	0.58	28	0.00

Table 6 – Results of the normality tests (all variables – listwise method)(***)

Notes: (*) This is a lower bound of the true significance; (**) Lilliefors Significance Correction; (***) By basing on this method, cases have been excluded listwise, which means that if a subject has a missing value for any variable, then they are excluded from the whole analysis (Field 2000).

Table 7 shows the results of three GLS regression models, one for outcome variable in this study (i.e. log employment growth [Log_AAEG], log revenue growth [Log_AARG] and log growth in total assets [Log_AATAG]). Each GLS model includes both the predictor and the control variables.

The results from the different growth measures adopted reveal a reassuring consistency. Predictor variables explain 32.8% of the variance in employment growth (R Square for [Log_AAEG] model), 40.1% of revenue growth (R Square for [Log_AARG] model) and 72.6% of growth in total assets (R Square for [Log_AATAG] model).

The Durbin-Watson statistics is equal to 2.0 for the model about the log employment growth [Log_AAEG]; to 2.1 for the model about the log revenue growth [Log_AARG]; to 1.9 for the model about the log growth in total assets [Log_AATAG]. The F-ratio is equal to 1.5 ($p<0.10$) for the model about the log employment growth [Log_AAEG]; to 1.4 ($p<0.10$) for the model about the log revenue growth [Log_AARG]; to 1.7 ($p<0.10$) for the model about the log growth in total assets [Log_AATAG].

	Critical dimensions	**Res. Hp.**	**Variables**	**Log_AAEG**	**Log_AARG**	**Log_AATAG**
			Intercept	.917 (.661)	9.489*** (1.180)	11.128*** (1.461)
Predictor variables	RBV: Technology	1	NPD	-.111 (.123)	.035 (.179)	-.296 (.265)
		2	IPR	-.056 (.067)	-.119 (.094)	-.257* (.132)
	RBV: Finance	3	EQUITY	.000 (.000)	.000 (.000)	.000 (.000)
		4	VC	.099 (.345)	.349 (.742)	.548 (.979)
	RBV: Management & Entrepreneurship	5	RD_EXPE	-.123 (.334)	.206 (.596)	-1.434* (.767)
			PROD_EXPE	.020 (.240)	-.095 (.488)	-1.283** (.497)
			COMM_EXPE	-.128 (.262)	.720 (.463)	.365 (.562)
			MGMT_EXPE	-.143 (.313)	-.413 (.521)	.426 (.644)
		6	INDU	.402* (.230)	.390 (.375)	.108 (.512)

Table 7 – Multiple regression models - listwise method(****)

The results of the multivariate analysis show that firms' conditions at founding impact significantly on their growth path, even if not always in the expected direction. In particular, in the previous section, relying on sound evidence provided by previous empirical studies available in the literature about the factors suitable to influence spin-offs' early growth processes, we advanced six research hypotheses. In this respect, by basing on the research hypotheses previously advanced, table 8 reports the expected results of the GLS regression models, whereas table 9 shows the estimated results through the carrying out of multivariate regression analysis.

We found a significant correlation between growth in employees, revenues and total assets are (see again table 5). In particular, some predictor variables - such as the support mechanisms, both formal [FORM_SUP] and informal [INFORM_SUP], provided by the parent PROs to the academic spin-off companies - explain for more than one form of growth (being significant for both revenue [Log_AARG] and total asset [Log_AATAG] growth), while other predictors - such as the experience ripened by all the promoting partners in both R&D function [RD_EXPE] and production function [PROD_EXPE] - explain just for one form of growth (being significant only for total asset [Log:AATAG] growth).

	Critical dimensions	Res. Hp.	Variables	Log_AAEG	Log_AARG	Log_AATAG
Predictor variables	RBV: Technology	1	NPD	+	+	+
		2	IPR	+	+	+
	RBV: Finance	3	EQUITY	+	+	+
		4	VC	+	+	+
	RBV: Management & Entrepreneurship	5	RD_EXPE	+	+	+
			PROD_EXPE	+	+	+
			COMM_EXPE	+	+	+
			MGMT_EXPE	+	+	+
		6	INDU	+	+	+
Control variables	Industry		NANO			
			CHEM			
			LIFE			
			MECH			
			ELECT			
			ICT			
			INNOV			
			EN_ENVI			
	Competitive forces		ENTRY			
			SUBS			
			BUY			
			SELL			
	Local context		CONT			
	Firm's size		SIZE			
	Firm's age		AGE			

Note: (*) [+] = positive and significant regression coefficient (b); [-] negative and significant regression coefficient (b).

Table 8 – Research hypotheses: expected results(*) – multivariate regression analysis (all variables, listwise method)

	Critical dimensions	Res. Hp.	Variables	Log_AAEG	Log_AARG	Log_AATAG
Predictor variables	RBV: Technology	1	NPD			
		2	IPR			-
	RBV: Finance	3	EQUITY			
		4	VC			
	RBV: Management & Entrepreneurship	5	RD_EXPE			-
			PROD_EXPE			-
			COMM_EXPE			
			MGMT_EXPE			
		6	INDU	+		
Control variables	Industry		NANO			
			CHEM	-		-
			LIFE			
			MECH			
			ELECT			
			ICT			
			INNOV			
			EN_ENVI			
	Critical dimensions		Variables	Log_AAEG	Log_AARG	Log_AATAG
	Competitive forces		ENTRY	-		
			SUBS			
			BUY			
			SELL			
	Local context		CONT			-
	Firm's size		SIZE	+	+	
	Firm's age		AGE	-		-

Note: (*) [+] = positive and significant regression coefficient (b); [-] negative and significant regression coefficient (b).

Table 9– Research hypotheses: estimated results(*); multivariate regression analysis (all variables, listwise method)

1) RBV: technology

Hypothesis 1 is rejected for the Italian case, the regression coefficients being not significant. Indeed, the empirical evidence available in the literature about this issue is contrasting. The Italian evidence provided by this paper shows that being further in NPD does not significantly influence employment, revenues and total asset growth of spin-off companies.

Hypothesis 2 is also rejected, as the multivariate analysis indicates that firms with less IPRs grow significantly more in total assets [Log_AATAG] during the first years than firms exhibiting a greater volume in the IPR's portfolio at founding (the regression coefficient is negative and significant). Moreover, the Italian evidence provided by this paper shows that the number of IPRs granted to the spin-off at founding does not significantly affect employment [Log_AAEG] and revenues [Log_AARG] growth processes (the regression coefficients being not significant). These findings about the Italian case are in contrast with previous evidence available in the literature (Niosi 2006). The negative, significant relationship between the total number of IPRs [IPR] and the total asset growth [Log_AATAG] experienced by Italian spin-off companies can be attributed to the fact that spin-off companies with a high number of IPRs at founding already possess the knowledge and the technology in order to develop their own products/services without further investing big amount of money in R&D activities. On the other side, spin-off companies starting their activities without being granted any IPR do need to invest massively in R&D activities. In these cases, the growth in total assets is not due to increased sales activities (the revenue growth being not significant) but to increasing investments in R&D. As a consequence, firms that are heavily investing in R&D grow in total assets even if their 'market' activities are not increasing (Heirman & Clarysse 2004a). The accounting practice of activating R&D costs therefore explains the significant negative coefficient of the IPRs on total asset growth.

2) RBV: finance

Hypothesis 3 is rejected for the Italian case, the regression coefficients being null and not significant. This finding - which is contrasting with the empirical evidence provided by the available literature (Cooper et al. 1994; Heirman & Clarysse, 2004b) - must be interpreted by analyzing more in depth the characteristics of the responding companies in respect of the amount of their starting capital [EQUITY] at founding (n=204). The minimum value is 500 Euros while the maximum value is over 10 million Euros, the average value being about 550 thousand Euros. However the distribution is highly left-skewed, the median value being 12 thousand Euros (meaning that for 50% of the responding companies the amount of starting capital at founding was less than 12 thousand Euros), the 75th percentile's value being 50 thousand Euros and the 90th percentile's value being about 290 thousand Euros. We further investigated the characteristics of the upper 10% of the distribution by basing on the amount of starting capital at founding and we found that it includes very young firms (1 to 2 years old), which physiologically did not experience dramatic growth trends yet. Therefore, the absence of any significant relationship between the amount of the starting capital at founding and annual absolute growth is mainly attributable to this situation, in which most Italian spin-offs (both the growing and the non-growing ones) were founded with a very small amount of starting capital. It is just in the last two years that cases of highly capitalized companies at founding can be spotted, but it is still too early to find association with growth trends.

Hypothesis 4 is rejected, the regression coefficients being positive but not significant. This finding - while being in contrast with the empirical evidence provided by some scholars (Davila et al. 2003) - is in line with the evidence reported by Niosi (2006) for Canadian spin-off companies, registering no significant effect on spin-offs' growth depending on the availability of VC. Similarly to our Italian case, Niosi (2006) found that Canadian VC-backed spin-offs are not significantly different from their non VC-backed counterparts in terms of growth performances. In order to better understand the dynamics leading to such a result for the Italian case, we analyzed more in depth the characteristics of the responding companies in respect of the formal involvement of a VC among the company's shareholders [VC] in the first year of operations (n=291). In particular, just a small minority (n=16) of the sample (the incidence being 5.4%) registered the entry of a VC in the companies equity in the first year of activity. Just in one case the starting capital was equal to 10 million Euros, while for the other 15 companies it was not greater than 100 thousand Euros. By looking at the age of the VC-backed spin-off companies in our sample, we found that the average age is 3.6 years, while the median age is 2 years (meaning that 50% of the VC-backed responding companies

have been founded 2 years ago). This result confirms that in the Italian context, VC taking an equity state in academic spin-off companies is a recent phenomenon (Balderi et al. 2010). Indeed, the evidence shows that the subset of VC-backed spin-off in our sample includes very young firms, which physiologically did not experience yet dramatic growth trends. Therefore, similarly to what observed regarding the amount to the starting capital [EQUITY], the absence of any significant relationship between the formal involvement of VC among spin-offs' shareholders and annual absolute growth is mainly attributable to this situation, in which most Italian spin-offs (both the growing and the no-growing ones) were no VC-backed in their first year of operations. It is just in recent years that VC started investing more frequently in academic spin-off companies, but it is still too early to find association with growth trends.

3) RBV: management and entrepreneurship

Hypothesis 5 is rejected, as the multivariate analysis indicates that Italian spin-offs whose promoting partners exhibited at founding previous experience in R&D [RD_EXPE] and production [PROD_EXPE] functions firms grow significantly less in total assets [Log_AATAG] during the first years than firms started by non-experienced promoting partners, the regression coefficient being negative and significant. Moreover, the Italian evidence provided by this paper shows that previous experience ripened by the promoting partners in both commercial [COMM_EXPE] and managerial [MGMT_EXPE] functions does not significantly affect employment [Log_AAEG], revenue [Log_AARG] and total asset [Log_AATAG] growth processes, the regression coefficients being not significant. This result is contrasting with most of the evidence provided in the available literature (Roberts 1991; Cooper et al. 1994; Heirman & Clarysse, 2004a). Similarly to the above-expressed considerations pointed out while commenting the testing of hypothesis 2, the negative, significant relationship between the previous experience ripened by promoting partners in R&D [RD_EXPE] and production [PROD_EXPE] function and the total asset growth [Log_AATAG] experienced by Italian spin-off companies can be attributed to the fact that spin-off companies started by experienced promoting partners are more likely to already possess the knowledge and the technology which are necessary to develop their own products/services without further investing big amount of money in R&D activities. On the other side, spin-off companies started by non-experienced promoting partners do need to invest massively in R&D activities. In these cases, the growth in total assets is not due to increased sales activities (the revenue growth [Log_AARG] is not significant) but to increasing investments in R&D. The accounting practice of activating R&D costs therefore explains the significant negative coefficient of the previous experience ripened by promoting partners in R&D [RD_EXPE] and production [PROD_EXPE] functions on total asset growth [Log_AATAG]. Firms which do not possess yet the knowledge and/or the technology in order to develop their products/services need to invest more in R&D and, since these costs are activated, they grow more in total assets.

Hypothesis 6 is accepted just with regard to total employment growth [Log_AAEG] (the coefficient being positive and significant) while the Italian evidence provided by this paper shows that the formal involvement of an industrial partner [INDU] does not significantly affect revenue [Log_AARG] and total asset [Log_AATAG] growth processes (the regression coefficients are in fact positive yet not significant). Therefore, the involvement of an industrial partner among spin-offs' shareholders [INDU] turns out to be a main determinant of early employment growth [Log_AAEG], our results showing that founding teams including an industrial partner grow significantly more in terms of employment. These findings are in line with the empirical evidence available in the literature (Roberts 1991; Aggarwal et al. 2004) arguing that the greater is the prior entrepreneurial experience of the promoting partners, the higher is the firm's growth rate.

C. Control variables

Regarding the *industry*, we found that spin-offs operating in the chemical sector [CHEM] grow significantly less in terms of both employment [Log_AAEG] and total assets [Log_AATAG] during their early growth path than spin-offs companies involved in other technologies.

Concerning *competitive forces*, a negative significant effect of entry barriers [ENTRY] on the early growth of academic spin-offs in terms of employment [Log_AAEG] can be observed. In other words, those firms which encountered at founding higher level of entry barriers tend to grow less in terms of number of employees than the academic spin-off companies which did not find so difficult to enter the market. This inverse relationship is physiological if we consider that in cases of high levels of entry barriers at founding,

firms have to sustain very significant costs to enter the market and therefore in the first years of operations they are likely not to be able to increase their size (in terms of human resources employed).

With regard to the *local context*, the support provided by the local environment in which the academic spin-off companies are embedded [CONT] has a negative and significant effect on growth in terms of total assets [Log_AATAG]. Such a negative relationship can be interpreted by adopting an 'open innovation' perspective (Chesbrough 2003). In fact, those spin-off companies which embedded in local contexts being more conducive to entrepreneurial activities and more vibrant in terms of ideas generation, knowledge exchange, public subsidies offers and so on, are more likely to benefit from such supportive environment rather than investing directly further money in order to develop internally what is needed, with physiological negative effects on total assets growth.

Concerning *firm's size*, we found a significant positive effect of size (in terms of FTEs) at founding [SIZE] on growth in employment [Log_AAEG] and revenues [Log_AARG], indicating that larger firms at founding grow more in terms of both employees and revenues than their smaller counterparts. Such results seem to confirm for the sample of Italian spin-offs the validity of the Gibrat's (1931) Law of Proportionate Effect, holding that (absolute) growth is proportional to size and that the proportionality factor is random. In other words, according to this law, proportional growth rates are size-independent.

Regarding *firm's age*, we found a significant negative effect of age in year 2009 [AGE] on growth in employment [Log_AAEG] and total assets [Log_AATAG], indicating that older firms grow less in both employment and total assets than their younger counterparts. This finding is strongly supported by previous empirical evidence available in the literature (Barron et al. 1994; Evans 1987b; Storey & Tether 1998; Delmar et al. 2003), suggesting that younger firms are likely to have higher annual growth rates than older firms.

VII. CONCLUSIONS AND RECOMMENDATIONS

In recent years, academic spin-offs received a lot of attention from both academia and policy makers, primarily due to their perceived potential for job creation, economic growth and wealth creation. Empirical evidence has shown, however, that just a small percentage of them exhibit actual growth paths, whereas most of them tend to be stagnant (Storey & Tether 1998). This paper aimed at identifying the critical variables determining early growth processes of academic spin-off in the Italian context, in terms of employees, revenues and total assets. Our results indicate that the formal involvement of an industrial partner among the company's shareholders during the first year of firm's operation is lying at the heart of the firm's growth prospects. On the contrary, the size of the IPRs' portfolio at founding; the experience previously ripened by the promoting partners in R&D and production functions do impact negatively and significantly on the growth processes (most in terms of total assets). Finally, the stage of new product development at founding; the initial amount of the starting capital; the formal involvement of a VC among the company's shareholders during the first year of firm's operation do not affect growth processes. We found that production and R&D experience previously ripened by the promoting partners has a strong negative impact on the early growth of academic spin-offs in terms of total assets while the majority of spin-off companies are started by purely technical founding teams, often lacking in market orientation. The importance of having an industrial partner taking an equity stake in the spin-offs is still often undervalued by technical entrepreneurs, TTOs and policy makers. This study clearly shows that also for spin-offs, the impact of entrepreneurial experience on growth is stronger than the impact produced by R&D experience. Prospective entrepreneurs should first assess their own readiness for starting a new business, by checking their market competencies and – if lacking – by (eventually) waiting for an industrial partner or build a proper set of own skills before creating the new venture. Regarding limitations of the present paper and directions for further research, our study only contains data on Italian academic spin-off companies. A positive consequence of analyzing a national geographic coverage is that it reduces the influence of non-measured variance. The trade-off, however, is that one might question the external validity of this national context and our findings.

Secondly, we focus on the effects of firms' conditions at founding on the early growth path of academic spin-off companies. Of course, both the outcome variables and the predictor variables are not static. A more dynamic definition of the predictor variables would therefore be more realistic (Davidson & Wiklund 2001).

Thirdly, in the future, research could deepen the analysis of the growth issue, by investigating its links with the literature about spin-off survival, failure and long-term competitive advantage. Our results indicate that an interesting research question would be to study more in-depth spin-offs' business models, by investigating the characteristics of their revenue streams, of their human resources and employment structure, of their business functions.

Finally, a stimulating research topic for future would be the formation of the entrepreneurial teams. In fact, our data clearly show that adding an industrial partner to the promoting partners of the spin-offs facilitate their early employment growth. However, functional heterogeneity brings with it various challenges, increasing both cognitive conflict and affective conflict within the decision-making team. At present, there is little evidence in the literature about this issue and what can be done to facilitate these interactions.

VIII. REFERENCES

Allen, T.J. & Cohen, S. 1969. Information flow in research and development laboratories. Administrative Science Quarterly 1969; 14. 12–20.

Allen, T.J., Tushman, M.L. & Lee, D.M. 1979. Technology transfer as a function of position in the spectrum from research through development to technical services. Academy of Management Journal 1979; 22(4). 694–708.

Achtenhagen, L., Helin, J., Melin, L. & Naldi, L. 2004. Towards a re-conceptualization of firm growth. In: Proceedings of the Annual Entrepreneurship Research Conference. Strathclyde: Annual Entrepreneurship Research Conference 2004.

Aggarwal, R., Echambadi, R., Franco, A.M. & Sarkar, M.B. 2004. Knowledge Transfer Through Inheritance: Spin-out Generation, development and survival. Academy of Management Journal 2004; 47(4). 501-522.

Alistair, B., Gibson, D.V. & Smilor, R.W. 1993. University Spin-Off Companies: Economic Development, Faculty Entrepreneurs, and Technology Transfer. Southern Economic Journal 1993; 60(2). 505-506.

Autio, E. & Yli-Renko, H. 1998. New Technology Based Firms in Small Open Economies - An Analysis Based on the Finnish Experience. Research Policy 1998; 26(9). 973-987.

Balderi, C., Conti, G., Granieri, M., Patrono, A. & Piccaluga A. 2010. La Valorizzazione dei Risultati della Ricerca Pubblica Cresce. La Sfida Continua. Settimo rapporto Netval sulla valorizzazione della Ricerca nelle Università italiane. Lucca: Maria Pacini Fazzi Editore.

Barney, J.B. 1991. Firm Resources and Sustained Competitive Advantage. Journal of Management 1991; 17(1). 99-120.

Barron, D.N., West, E. & Hannan, M.T. 1994. A Time to Grow a Time to Die: Growth and Mortality of Credit Unions in New York City, 1914 – 1990. American Journal of Sociology 1994; 100(2). 381-421.

Boeker, W. 1989. The Development and Institutionalization of Subunit Power in Organizations. Administrative Science Quarterly, 1989; 34(3). 388-410.

BVCA. 2005. Creating Success from University Spin-Outs. Available at: http://www.bvca.co.uk [19 December 2009].

Carter, N.M, Stearns, T.M., Reynolds, P.D. & Miller, B.A. 1994. New Venture Strategies: Theory Development with an Empirical Base. Strategic Management Journal 1994; 15(1). 21-41.

Cesaroni, F., Moscara, P. & Piccaluga, A. 2005. Le Imprese Spin-Off della Ricerca in Italia: Modelli di Sviluppo e Percorsi di Crescita. Urbino: Piccola Impresa - Small Business 276(I).

Chandler, G., Hanks & S.H. 1994. Market Attractiveness, Resource-Based Capabilities, Venture Strategies and Venture Performance. Journal of Business Venturing 1994; 9(4). 331-349.

Chesbrough, H. 2003. Open Innovation: The New Imperative for Creating and Profiting from Technology. Boston: Harvard Business School Press.

Chiesa, V. & Piccaluga, A. 2000. Exploitation and Diffusion of Public Research: The General Framework and the Case of Academic Spin-Off Companies. R&D Management 2000; 30(4). 329-340

Clarysse, B. & Moray, N. 2004. A Process Study of Entrepreneurial Team Formation: The Case of a Research Based Spin-Off. Journal of Business Venturing 2004; 19(1). 55-79.

Clarysse, B., Wright, M., Lockett, A., Van de Velde, E. & Vohora, A. 2005. Spinning-out New Ventures: A Typology of Incubation Strategies from European Research Institutions. Journal of Business Venturing 2005; 20(2). 183-216.

Compagno, C. & Pittino, D. 2006. Ricerca Scientifica e Nuove Imprese. Spin-off Accademici e Valore della Conoscenza. Novara: Isedi - DeAgostini Scuola SpA.

Cooper, A.C., Gimeno-Gascon, F.J. & Woo, C.Y. 1994. Initial Human and Financial Capital as Predictors of New Venture Performance. Journal of Business Venturing 1994; 9(5). 371-395.

Davidson, P. & Wiklund, J. 2001.Levels of Analysis in Entrepreneurship Research: Current Research Practice and Suggestions for the Future. Entrepreneurship Theory and Practice 2001; 25(4). 81-99. Summer.

Davila, A., Foster, G. & Gupta, M. 2003.Venture Capital Financing and the Growth of Startup Firms. Journal of Business Venturing 2003; 18(6). 689-708.

Degroof, J.J. & Roberts, E.B. 2004. Overcoming Weak Entrepreneurial Infrastructures for Academic Spin-

Off Ventures. Massachusetts Institute of Technology, Industrial Performance Center Working Paper Series 2004; MIT-IPC-04-05. April.

Delapierre, M., Madeuf, B. & Savoy, A. 1998. NTBFs - The French Case. Research Policy 1998; 26(9). 989-204.

Delmar, F., Davidsson, P. & Gartner, W.B. 2003. Arriving at the High-Growth Firm. Journal of Business Venturing 2003; 18(2). 189-216.

Di Gregorio, D. & Shane S. 2003. Why do some universities generate more start-ups than others?. Research Policy 2003; 32(2). 209-227.

Djokovic, D. & Souitaris, V. 2004. Spinouts from Academic Institutions: A Literature Review with Suggestions for Further Research. Cass Business School City of London Working Paper Series 2004; June.

Dunne, T., Roberts, M. & Samuelson, L. 1989.The Growth and Failure of U.S. Manufacturing Plants. Quarterly Journal of Economy 1989; 104(4). 671-698.

Etzkowitz, H. 2002. MIT and the Rise of Entrepreneurial Science. London: Routledge.

Evans, D.S. 1987a. The Relationship between Firm Growth, Size and Age: Estimates for 100 Manufacturing Industries. Journal of Industrial Economy 1987; 35(4). 567-581.

Evans, D.S. 1987b. Tests of alternative Theories of Firm Growth. Journal of Political Economy 1987; 95(4). 657-674.

Florida, R. & Kenney, M. 1988. Venture capital financed innovation and technological change the United States. Research Policy 1988; 17. 119–137.

Gibrat, R. 1931. Les Inégalités Economiques. Paris: Sirey.

Grandi, A. & Grimaldi, R. 2003. Exploring the Networking Characteristics of New Venture Founding Team. Small Business Economics 2003; 21(4). 329-341.

Hair Jr., J.F., Anderson, R.E., Tatham, R.L. & Black WC. 1984. Multivariate Data Analysis with Readings (4th edition 1995). Englewood Cliffs: Prentice-Hall.

Hanks, S.H., Watson, C.J., Jansen, E. & Chandler, G.N. 1993. Tightening the Life-Cycle Construct: A Taxonomic Study of Growth Stage Configurations in High-Technology Organizations. Entrepreneurship Theory & Practice 1993; 18(2). 5-29. Winter.

Heirman, A., Clarysse, B. 2004a. The Initial Resources And Market Strategy To Create High Growth Firms. Working Paper Steunpunt OOI 2004; October.

Heirman, A. & Clarysse, B. 2004b. How and Why Do Research-Based Start-Ups Differ at Founding? A Resource-Based Configurational Perspective. Journal of Technology Transfer 2004; 29(3-4). 247-268.

Jones-Evans, D., Klofsten, M., Andersson, E. & Pandaya, D. 1999. Creating a bridge between university and industry in small european countries—the role of the industrial liason office. R&D Management 1999; 29. 7–56.

Lee, C., Lee, K. & Pennings, J.M. 2001. Internal Capabilities, External Networks, and Performance: A Study of Technology-Based Ventures. Strategic Management Journal 2001; 22(6-7). 615-640.

Leifer, R., McDermott, C.M., O'Connor, G.C., Peters, L.S., Rice, M. & Veryzer, R.V. Jr. 2002. Radical Innovation: How Mature Companies Can Outsmart Upstarts. Boston: Harvard Business School Press.

Manigart, S., Bayens, K., Van Hyfte, W. 2002. The Survival of Venture Capital Backed Companies. Venture Capital 2002; 4(2). 103-124.

McDougall, P.P., Shane, S., Oviatt, B.M. 1994. Explaining the formation of international new ventures: The limits of theories from international business research. Journal of Business Venturing 1994; 9(6). 469-487.

Mustar, P. 1995. The Creation of Entreprises by Researchers: Conditions for Growth and the Role of Public Authorities. In proceedings of the High Level Workshop on SMEs: Employment, Innovation and Growth. Washington: OECD 1995; 16-17 June.

Mustar, P. 1997. Spin-off Enterprises. How French Academics Create Hi-Tech Companies: The Conditions for Success and Failure. Science & Public Policy 1997; 24(1). 37-43.

Nicolaou, N. & Birley, S. 2003. Academic networks in a trichotomous categorisation of university spinouts. Journal of Business Venturing 2003; 18 (3). 333–359.

Niosi, J. 2006. Success Factors in Canadian Academic Spin-Offs. Journal of Technology Transfer 2006; 31(4):451-457.

Oakey, R. 1995. High Technology New Firms: Variable Barriers to Growth. London: Paul Chapman Publishing Ltd.

Penrose, ET. 1959. The Theory of the Growth of the Firm. New York: Wiley.

Powers, J. & McDougall, P. 2005. University start-up formation and technology licensing with firms that go public: a resource based view of academic entrepreneurship. Journal of Business Venturing 2005; 20(3). 291–311.

Roberts, E. 1991. Entrepreneurs in High Technology. Lessons from MIT and Beyond. New York: Oxford University Press.

Roberts, E. & Malone, D.E. 1996. Policies and structures for spinning off new companies from research and development organizations. R&D Management 1996. 26. 17–48.

Rogers, E.M. 1986. The Role of the Research University in the Spin-Off of High Technology Companies. Technovation 1986; 4(3). 169-181.

Rogers, E.M., Takegami, S. & Yin, J. 2001. Lessons learned about technology transfer. Technovation 2001; 21(4). 253–261.

Roure, J.B. & Keeley, R.H. 1999. Predictors of success in new technology based ventures. Journal of Business Venturing 1999; 5(4). 201-220.

Sandberg, W.R. & Hofer, C.W. 1987. Improving new venture performance: the role of strategy, industry structure, and the entrepreneur. Journal of Business Venturing 1987. 2(1). 5-28.

Shane, S., Stuart, T. 2002. Organizational Endowments and the Performances of University Start-Ups. Management Science 2002; 48(1). 154-170.

Siegel, D.S., Waldman, D., Atwater, L. & Link, A.N. 2003a. Commercial knowledge transfers from universities to firms: improving the effectiveness of university–industry collaboration. Journal of High Technology Management Research 2003; 14. 111–133.

Siegel, D., Waldman, D. & Link, A. 2003b. Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study. Research Policy 2003; 32 (1). 27–48.

Smallbone, D., Leig, R. & North, D. 1993. The Characteristics and Strategies of High Growth SMEs. International Journal of Entrepreneurial Behaviour & Research 1993; 1(3). 44-56.

Storey, D.J. & Tether, B.S. 1998. New Technology-Based Firms in the European Union: An Introduction. Research Policy 1998; 26(9). 933-945.

Utterback, J.M., Meyer, M., Roberts, E. & Reitberger G. 1988. Technology and Industrial Innovation in Sweden: A Study of Technology-Based Firms, formed between 1965 and 1980. Research Policy 1988. 17(1). 15-26.

Westhead, P., & Birley, S. 1994. Employment Growth in New Independent Owner-managed Firms in Great Britain. International Small Business Journals 1994; 13(3). 11-33.

Wright, M., Vohora, A. & Lockett A. 2003. Annual UNICO-NUBS Survey on University Commercialisation. Nottingham: Nottingham University Business School.

Zucker, L., Darby, M. & Brewer, M. 1998. Intellectual human capital and the birth of US biotechnology enterprises. American Economic Review 1998; 88 (1). 290–305.

BUSINESS PLAN COMPETITIONS - STAKEHOLDER IDENTIFICATION AND KEY PERFORMANCE AREAS

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Business Plan Competitions (BPCs) are often used as instruments to facilitate business creation in University clusters. Successful BPCs engage different actors in venture creation and connect them to an entrepreneurial ecosystem. BPCs also provide an interesting tool for wealth creation by exposing the potential business ventures to young student entrepreneurs, academic innovators and entrepreneurs, private and public support companies and institutions, start-up financiers such as business angels and venture capitalists, and many other potential stakeholders in the academic innovation and entrepreneurship eco-system. BPCs may therefore serve as a venture creation cluster platform to benchmark business ideas and share best practices. Different actors have different stakes in such activities, which makes it important for BPCs to address the right interests for the right stakeholders.

In our case-study we identified the major stakeholders in the BPC "Venture Cup", which has been developed and implemented in the Nordic countries since 1998. Venture Cup has a main focus to provide support to entrepreneurs with potential business ideas, and it is focusing on start up activities with the addition of coaching and mentoring support in the setting of a business plan competition. We identified the stakeholders in terms of name, position and organization, policy, alliances, resources, power, and leadership. We also characterized the stakeholders based on type; (primary and secondary), interest (high and low), relationship attributes (power, legitimacy and urgency) as well as other perspectives. The survey was performed using a web-based questionnaire that was sent to the identified stakeholders. We also made structured interviews with some of the major stakeholders identified.

The concept of business plan competitions to promote entrepreneurship and venture creation originates from the early 1980's.The Venture Cup BPC has been very successful in supporting new company formation. We have analysed the perspectives of different stakeholders in order to gain a more holistic view of the whole stakeholder community and their interests. Based on our analysis we will discuss ways to improve risk identification and response planning when creating and running a BPC in an academic setting.

Keywords: Business plan competitions, stakeholder analysis, innovation creation and development, entrepreneurship education and ecosystem, university – business cooperation

I. INTRODUCTION

As the interest in entrepreneurship and new business development grows worldwide, the number of academic courses and training curricula to stimulate the entrepreneurial orientation of individuals expands (Klofsten 2008). Activities that stimulate and facilitate training of academic entrepreneurs are increasingly implemented to create an entrepreneurial culture throughout University in research, in curricula and in interactive activities with society and business communities (Garavan & O'Cinneide 1994; Klofsten 2008).

A number of studies have found a resistance to entrepreneurial education at universities. Universities, by tradition, lack sufficient theoretical and practical expertise to design and implement effective venture creation programs (Curran & Stanworth, 1989; Klofsten & Mikaelsson, 1998). There is, evidently, much more to do if entrepreneurship is to become a core component of the university curriculum. Integration of entrepreneurship training firmly into the academic structure has the purpose of creating an entrepreneurial university setting (Etzkowitz & Klofsten, 2005; Klofsten & Spaeth, 2004). The BPC training concept meets some of these educational challenges by combining theoretical business education with tacit and narrative business training. Students develop investment ready business plans in competitive real world setting during a structured and formal guiding, coaching and mentoring in the presence of experienced entrepreneurs and business professionals.

It is important to create a scientific platform to better understand the nature of new business development and especially the early business development processes can be effectively

organized and managed (Klofsten & Spaeth, 2004). Investment in entrepreneurship educational programs and business plan competitions; show that the increase in employment through new business development can be expressed as an exponential function (Wallmark & Sjösten, 1994; Roberts & Eesley, 2009; Hedner et al., 2011).

Venture Cup is a good example of a BPC that has been run for a decade and today involves a range of Nordic universities and colleges. From its start, the role and importance of the Venture Cup BPC increased, and it is now the major North European BPC concept (Maack et al. 2011). The BPC Venture Cup will serve as a case study in the present paper regarding a benchmark for BPC stakeholder identification and key performance area identification.

II. THEORETICAL BACKGROUND

A. *Business Plan Competitions*

Finding entrepreneurial champions within the university community and combining them with additional talent such as donors and sponsors from the business community and government agencies may implement vibrant BPCs implemented in the academic ecosystem. In many cases, such as in MIT (Massachusetts Institute of Technology), Moot Corp and Venture Cup competitions students and alumni have been instrumental in creating the BPC concept (Maack et al 2011).

After the initiation of the local or regional BPC concept, internal and external actors need to work in concert to encourage expansion, and to actively suppress bureaucratic resistance to further developing the BPC concept and other entrepreneurial academic venture creation activities. Experience demonstrates, that when the implementation of an academic BPC is successful, it often develops into a robust curricular expansion and co-curricular programs for the development of innovation and entrepreneurship teaching and research incentives (Hedner et al 2010, Hedner 2011).

The on-going institutionalization of many entrepreneurship programs and venture creation activities at the university level has generated new implications both for research and practice. Entrepreneurship is increasingly becoming a trans disciplinary subject extending to man disciplines: micro- and macro- economics, innovation management, project management, the natural sciences, and psychology and sociology. In particular, it is important to create a scientific platform to better understand the nature of new business development and especially the early business development processes can be effectively organized and managed (Klofsten & Spaeth, 2004).

B. *Stakeholder identification & key performance areas*

In this study we identify the stakeholders related to BPCs by first identifying attributes of key performance areas (KPA) and then connect individuals and organisations to these KPA. We define a stakeholder to be an individual or an organization that are actively involved in BPCs, or whose interests may be affected as a result of activities executed from BPCs. It is also all those who need to be considered in achieving the goals of venture cup and whose participation and support are crucial to its success. Stakeholders can be individuals within BPCs, individuals or departments within the organization around BPCs or individuals and groups outside the BPC organization (can be influencers).

- A stakeholder analysis can help a project to identify: The interest of all stakeholders, who may affect or be affected by BPCs
- Potential issues that could disrupt BPCs
- Key people for information distribution during execution
- Groups that should be encouraged to participate in different stages of BPCs
- Communication planning and stakeholder management strategy during planning
- Ways to reduce potential negative impacts and manage negative stakeholders

The aim of the stakeholder analysis process is to develop a strategic view of the human and institutional landscape, and the relationships between different stakeholders and the issues they care about most.

III. METHOD

A. *Case identification – Venture Cup*

Further we have performed a case study on Venture Cup, which is one of the largest BPCs in the world. It is important for venture cup to manage the stakeholders' expectations and ensuring their active involvement, such as:

- It is indispensable for continuation of the project and its successful completion
- It gives opportunity to individuals or groups to express their ideas/issues/concerns over BPCs
- It gives a sense of accountability and enhances responsibility

- It enables effective risk identification and response planning
- It opens up excellent learning opportunity for both the project team and stakeholders

B. Data collection

In this article we have utilized steps in the process of stakeholder management as a method for collecting information to our stakeholder analysis. Stakeholder management is a process that contains six main activities connected in a cyclic manner, se figure 1. To find out how BPCs relate to different stakeholders needs we have focused on step 1 and 3 in this article, which is to identify the stakeholders and start to analyse their respective influence and interests.

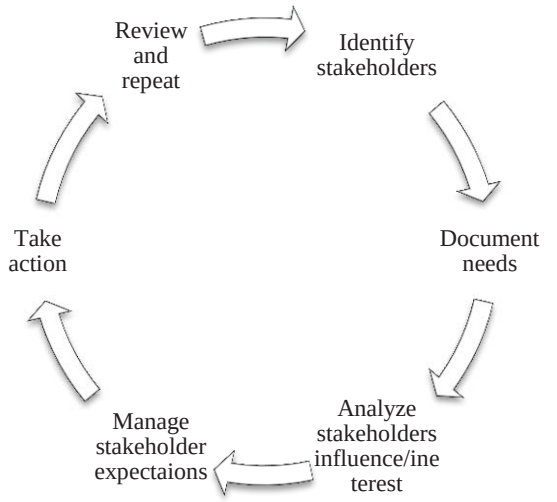

Figure 1. A model over how the six main components of stakeholder management relate to each other.

We identified the stakeholders in terms of name, position and organization, policy, alliances, resources, power, and leadership.

We also characterized the stakeholders based on type; (primary and secondary), interest (high and low), relationship attributes (power, legitimacy and urgency) as well as other perspectives.

The survey was performed using a web-based questionnaire that was sent to the identified stakeholders. We also made structured interviews with some of the major stakeholders identified.

IV. RESULTS

A. Case Study - Venture Cup

Since its start in Gothenburg in Western Sweden, a total of over 10000 unique business idea competition entries have been submitted to the Venture Cup BPC in Sweden, with an additional large number of BPC entries and investment ready start-up companies have been created in Norway, Denmark and Finland.

The competition was established in 1998 by an initiative from McKinsey & Company that contacted the University of Gothenburg and Chalmers University of Technology with the idea of a Business Plan competition that mimicked the MIT $100K Entrepreneurship Competition. The setup was that the universities should support students to run the competition and establish a core of coaches, mentors and teachers from the academia as well as the industrial and societal network that existed. The Venture Cup established itself in the growing innovation system in Gothenburg in close collaboration with the entrepreneurship schools at the universities. From this collaboration the idea of a academic course that followed the competition structure but at the same time gave higher education credits or the participants evolved and soon became a very popular course for the students at the university. Since Venture Cup has always have had a low barrier for entry to the competition, this course was not mandatory for the competitors, but provided a good possibility for students to obtain academic merits at the same time as they gain experience from building their business ideas into ventures.

In the process of identifying the stakeholders connected to the BPC we have concentrated our study on nine key performance areas (KPA), listed in table 1.

KPA #	KPA	Definition
KPA 1	Internal Management	All aspects of infrastructure, operational management and organizational performance
KPA 2	External Management	All aspects of governance and compliance
KPA 3	People Management	Management and development of Venture Cup staff
KPA 4	Academic Management	Management of academic verification and validation
KPA 5	Idea Provider Management	Management of idea providers
KPA 6	Public Confidence	Building and maintaining public awareness and confidence in Venture Cup
KPA 7	Number of Participants	Participants/learners, Projects Evaluated, Projects incorporated
KPA 8	Ethics Management	Management of the ethical validation of activities

KPA #	KPA	Definition
KPA 9	Working with Stakeholders	Working with and maintaing stakeholder relationship

Table 1. Definitions of the key performance areas for developing and maintaining a BPC.

In connecting the potential stakeholders to a KPA we first need to define and clarify the attributes that each KPA is dependent on. Here we have identified several attributes for each KA and listed them in Table 2.

KPA#	Attributes	Definition of the attribute and its limits
KPA1	Information technology	IT infrastructure-efficient, timely, comprehensive, supporting business needs and customer requirements, integrated with work processes
	Equipment	Modern, safe, well-maintained, well managed, planned replacement program, back-up capacity, cost effective
	Facilities	Facilities of appropriate standard, location and capacity
	Planning and project management	Effective and operational planning
	Quality management	Quality system, continuous improvement, error handling, auditing, standards, document control, record keeping, archiving, validations, change management, training, quality assurance
KPA2	Liability management	Litigation management, liability reduction, insurance management
	Disaster recovery	Development of plans, management scenario testing and communication strategies
	Risk management	Identification and awareness, management plans for general and operational risks
	Accountability and financial	Accountability to founders, Responsibility in creating, managing and reporting of budgets vs expenditure
	Code of good service practice	Complying with praxis and codes of business, legal, financial, ethical, privacy, agreements
	Academic validity requirements	Legal requirements from the academic validation process and accreditation.
KPA3	Recruit and train staff	Effective recruitment processes, positive organizational culture, appropriate induction of staff, support of new employees, individual fit into organisation, staff turnover levels
	Learning and development	Opportunities provided to staff to develop further capabilities - formally and informally
	Performance development, recognition and reward	Good staff management, staff satisfaction, accountability, conditions of employment, performance based management/aligning individual staff goals with that of the organization
	Improving leadership skills	Staff leadership development program, mentoring, promotional opportunities
	Interpersonal/customer relationship skills	Developing improvement in staff customer and interpersonal skills
KPA4	Idea provider recruitment	Eligible new Idea provider enrolled (attracting the right new type of donor)
	Idea provider retention	The notion of repeat custom by Idea providers, donation rate per annum increased
	Idea provider/market research	Target research on BPC Idea providers (e.g. Motivation, rewards, donation attributes) to maximize collections and market research
	Convenience of the Idea provider centre	Hours of operation, location, access, transportation logistics
	Experience of donating	Through-put, waiting time, environment, staff attitude, courtesy and competency, experience with venepuncture, comfort and perception of safety, privacy/confidentiality
KPA5	Issue management	Reducing the impact of potentially damaging issues taken up by media
	Proactive media management	Establishing good relationship with media, public profile management, good stories into the press
	Idea providers	Idea provider process, Idea provider collaboration issues,
KPA6	Individual learners	Number of individual participants taking on activities in the BPC and therefore undergo a learning process
	Projects evaluated	Number of projects evaluated strengthens and supports opportunity recognition

KPA#	Attributes	Definition of the attribute and its limits
	Projects incorporated	
KPA7	Synergy with ..	
	Uniform processes, practices, services and information	Consistency and integration across regions
	Attentiveness to stakeholders views in decision making	Investing, evaluating listening and responding prior to decision making
	Quality of communication	Written, oral communication - including relevance, quantity, clarity and quality
	Stakeholder satisfaction	Regular survey and measurement of improvement
	Consecutiveness to surrounding sector	Identification of and improved interaction and connection with surrounding sector stakeholders

Table 2. Definitions of the attributes and limits of the KPA.

B. Venture Cup - Stakeholders

In our study we found the following stakeholders, presented in table 3, where we also indicate if the stakeholder is within venture cup or in the surrounding organisation or an external stakeholder. We also state if the individual/organisation has a direct influence on venture cup and /or if venture cup has a direct influence on the individual/organisation.

The different attributes of each KPA help us understand which individuals or organisations that might have stakes in the BPC. Building further on this we have identified several stakeholders that could influence or be influenced by the BPCs KPAs (see table 3).

Code	Individual/organisation/ Position	Group
S1	Regional manager	Internal organization
S2	Marketing manager	Internal organization
S3	Event manager	Internal organization
S4	Education manager	Internal organization
S5	IT manager	Internal organization
S6	Partner manager	Internal organization
S7	Competition manager	Internal organization
S8	Board	Internal organization
S9	Coaches	External organization
S10	Inspirational lecturers	External organization
S11	e-on	Partners
S12	Erik Johan Ljungbergs Utbildningsfond	Partners
S13	Tillväxtverket	Partners
S14	Näringsdepartementet	Partners
S15	SEB	Partners
S16	McKinsey&Company	Partners
S17	Local politician	Government
S18	Regional politician	Government
S19	National policymaker	Government
S20	Foreign affairs	Government
S21	Higher education institution	Academia
S22	Teacher/trainer	Academia
S23	Course administrator/examiner	Academia
S24	Banks	Financier/sponsor
S25	Law firms	Financier/sponsor
S26	Regional support	Financier/sponsor
S27	National support	Financier/sponsor
S28	Incubator	Financier/sponsor
S29	Past participants	Alumni
S30	Past staff	Alumni
S31	Past idea providers	Alumni
S32	Participant/student	Participant/student

Table 3. Identified stakeholders of BPCs, through the case study on Venture Cup.

From these identified stakeholders we want to build a hypothesis on their influence on the BPC, as well as their respective attitude towards the competition activities. We have illustrated our hypothesis in the figure 2 and aim at verifying this in a future study.

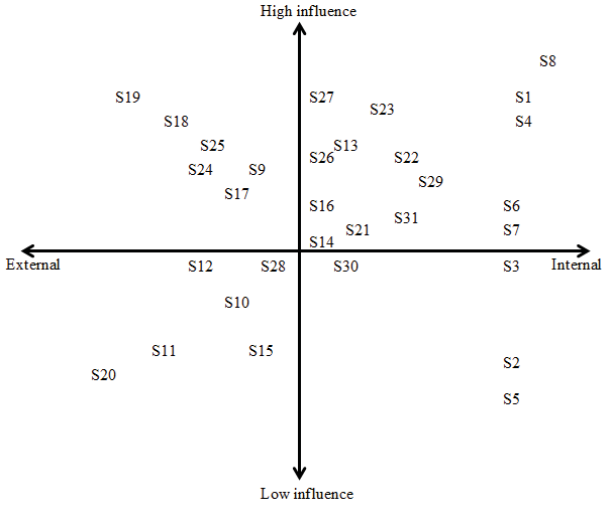

Figure 2. This chart visualises the mapping of stakeholders in regard to their interest/attitude and influence/power towards Venture Cup.

V. DISCUSSION

Since the origin of business plan competitions (BPCs) in USA in the 1980ies, regional Universities have implemented this element in their innovation and entrepreneurship ecosystems in order to foster real business start-up tacit/narrative learning, networking, mentoring, coaching, and partner collaboration (Russel et al 2008). Many academic entrepreneurship programs also use BPCs as a showcase to the business ideas of their students (Russel et al 2008) in order to attract talented students and staff. The BPCs also provide an interesting tool for wealth creation by exposing the potential business ventures to start-up financiers such as business angels and venture capitalists (Russel et al 2008), since they also serve as a venture creation cluster platform to benchmark business ideas and share best practices. With the current global proliferation of BPCs in academic settings, there will be a demand for greater accountability and return of investment from a variety of stakeholders.

Aspects of learning (theory vs tacit/vocational); A number of academic curricula in innovation, entrepreneurship and venture creation developed at Swedish Universities emphasize a blend of theoretical and tacit/vocational business training. Traditionally and early on, entrepreneurship teaching relied heavily on a learning by reading approach by using a traditional theoretical knowledge base. At the University of Gothenburg and Chalmers University of Technology, and in respect to the VC BPC, we have developed and implemented a learning by doing approach emphasizing the tacit/vocational aspects of business training. The VC business competition and academic course can thus focus on actual creation of new firms via business plan competitions and venture creation curricula. This comes out of the needs to create novel forms of educational strategies combining theoretical teaching (traditional classroom business management) with tacit and narrative learning (real life entrepreneurship case training and venture creation) in order to prepare students for entrepreneurial careers in the local and global knowledge societies.

Aspects of drive and motivation (the competitive element); The idea of BPCs builds on the concept that the competitive element itself has a positive effect on idea generation and development of start-up companies. For innovation and entrepreneurship to succeed in an academic environment, there are more requirements than the presence of motivated entrepreneurs. More complete ecosystems are needed to ensure the survival and growth of new firms with a goal to spread job creation and wealth to the regional social and economic environment in order to foster regional economic growth and development. If the new businesses created by the BPC ecosystem are based on high-value products and services that require knowledge and venture talent, the BPC concept is more likely to be accepted as an important and natural ingredient of the University ecosystem. However, as more academic entrepreneurship programs integrate competitions into curricular and extra-curricular settings, there is a need to critically assess the goals, the set-up and operations, the outcomes for the students, the teachers as well as the society, from the BPC concept. Since a large number of regional competitions are in their "introductory" or "growth" stage, they may benefit from the development of assessment methods and quality measures.

Aspects of Venturing Risk (a low risk platform to test idea feasibility); In essence, business plan competition programs represent an integrated part of the academic venture creation ecosystem, and also an experiment in learning entrepreneurship by involvement, in an entrepreneurial high-tech or service start-up enterprise. In the BPC setting students are exposed to the real life tacit aspects of entrepreneurial practice and real business environments. The BPC programs have generally been developed as a long-term investment in cultivating an entrepreneurial mindset of future entrepreneurs and business leaders. In the BPC programs, some students start their own ventures during their academic studies, but a much larger group is given an entrepreneurial mindset that would orient their career towards venture creation

embedded in the high-tech academic environment. Most BPCs and associated academic courses also provide students with valuable lifelong social networks within the regional venture creation communities. This means that they are be better equipped for starting and expanding high-tech companies with global aspirations.

Aspects of collaboration and openness (input of all types – academia, business etc); The large number of BPCs that are operating today follow different models ranging from; campus-only access to regional university and to open global scope; specialized tracks for entries, such as the arts, life sciences or social entries; as well as varying involvement from the business society and sponsors. The diversity of goals and contexts, stages of development and success are important reasons for developing best practice benchmarks for academically linked BPCs. Like academic programs, BPCs serve diverse stakeholder interests and objectives. Several major competitions, such as Venture Labs BPC, MIT$100K and Venture Cup, are today well established BPCs. In order to develop the BPC concept, there is a need to move beyond a focus on short-term success factors to encompass more extrinsic and long-range results for the major stakeholders. We also need to understand how academic start-ups may best be integrated over time into the wider regional business creation ecosystem. An increasing number academic innovation and entrepreneurship programs have over the years recognized the importance of increasing the efforts to consolidate the entrepreneurial ecosystem and to actively participate in the regional business life.

Aspects of Coaching and Mentoring; An active participation from the business community is needed through business angels and venture capitalists as well as the active participation of municipal, state and federal government institutions to create the necessary societal framework needed to assign adequate resources and networking possibilities. Aspiring entrepreneurs need be given access to resources in the entrepreneurial ecosystem including a variety of resources in the dominating academic centres. Provision of such resources, have helped leading US and European academic venture creation clusters to develop a range of functions and capabilities needed to promote and foster an entrepreneurial orientation on their campuses

Today, an increasing number of Universities around the world are shifting their traditional focus from being primary an educational provider and scientific knowledge creator to a more dynamic and complex innovative and entrepreneurial university model that also includes the commercialization of academic knowledge and research in order to actively contribute to the creation of start-up ventures in the local and regional economy (Etzkowitz et al. 2000; Etzkowitz 2003). The business plan completion concept can be seen as an effective means to implement this additional mission. Due to the on-going focus shift, universities are becoming an increasingly important force in the national innovation system as they recognize the need to operate within a triple-helix nexus that involves closer interactions with government and private industry. What distinguishes successful university ecosystems from unsuccessful ones is that their non-classroom educational activities explicitly attempt to reach beyond the campus. By doing so, entrepreneurial universities promote and catalyse the development of the regional external venture ecosystem, and turns the university into an attractor for entrepreneurial networking activities linking the academic community with the external venture ecosystem. Venture Cup. We found a large number of internal and external stakeholders and the complexity was larger than we initially expected.

The present stakeholder analysis identified the broad range of stakeholders needed to implement the Venture Cup BPC in the regional business setting. Internal – external organisation – regional and central government – academia with different academic specialities – regional business partners – financiers – teachers – alumni and of course the students themselves. We found the stakeholder analysis of importance to improve spread of this format of venture creation training as well as for further development and management of the VC BPC. The stakeholder analysis made for the Venture Cup BPC is valid for a format where the business competitive format is integrated in the academic and entrepreneurial ecosystem with a focus on value creation in the form of new start-ups. Importantly, the VC BPC is an academic course of 7,5 HEC in start-up business planning, which is integrated in the competition format. An additional important format of VC is that the course is shared equally between the faculty of engineering, medicine and business allowing for considerable integration between students, academic teachers and the local and regional business communities. Therefore, it is important to integrate all internal and external stakeholders toward one shared goal – job creation and for society new business start-ups.

Venture cup has over the years become one of the worlds largest PCs and is a contributor to society through the creation of new jobs.

VI. Conclusion

A rather complex network of relationships with both combined and individual stakes of different kind surrounds the BPCs. These actors are both external and internal and what we have seen is that their positioning in or outside the organisation does not necessarily go in parallel with the power of influence on the competition itself.

As a case we have seen that Venture Cup is and should remain an unpretentious test bed for new ideas, and by being just that, Venture Cup has demonstrated its potential as a value creating network for innovators, entrepreneurs, academia, as well as regional government and the business community.

An important conclusion from a sustainable development perspective is that the acceptance of academic BPC initiatives must be actively facilitated in terms of support from the university administration and support from the large number of external interest groups for which programs are designed.

VII. References

Curran, J. and Stanworth, J. 1989 'Education and training for enterprise: Some problems of classification, evaluation, policy and research', International Small Business Journal, 7(2), 45–58.

Etzkowitz H., and Leydesdorff, L., 2000; 'The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university–industry–government relations' Research Policy, 29(2), 109-123.

Etzkowitz 2003 'Innovation in innovation: the triple helix of university-industry-government relations' Social Science Information, 42(3), 293.

Etzkowitz, H. E., and Klofsten, M. 2005 'The innovative region: Toward a theory of knowledge-based regional development. R&D Management, 35(3), 243–255.

Garavan, T. N., and O'Cinneide, B. 1994 'Entrepreneurship education and training programmes: A review and evaluation — Part 1', Journal of European Industrial Training, 18(8), 3–12.

Hedner, T. 2011 'How to implement an innovation and entrepreneurship curriculum',Global Focus EFMD, June 2011.

Hedner, T., Edgar, B., Maack, K. and Abouzeedan, A. 2010 'Innovation and Entrepreneurship curricula at Swedish Universities - theoretical, tacit and narrative learning aspects', Working paper presented at FINPIN, Innovation and Entrepreneurship in Universities conference, 25-27 April, Joensuu, Finland.

Klofsten, M. and Spaeth, M. 2004 'Entrepreneurship training for regional growth and innovation: A Swedish case study and ten year retrospective',Paper presented at the ICSB 49th world conference, Johannesburg, South Africa, June 20–23.

Klofsten, M. and Mikaelsson, A.S. 1998 'Support of technology-based SMEs: An analysis of the owner managers attitude',During, W and Oakey, R.P (red.), New technology small firms in the 1990s, Vol. 4, sid., 71-80, Paul Chapman Publishing, London.

Klofsten, M. 2008. 'Supporting academic enterprise: A case study of an entrepreneurship programme',In; New Technology Based Firms in the New Millennium, Volume VI, Eds A. Groen, R. Oakey, P. van der Sijde and G. Cook. Emerald Group Publishing Ltd.

Maack, K., Klofsten M., and Hedner, T. 'Venture Cup – The Nordic Business Plan Competition', World Sustainable Development Outlook 2011, pp 221–241, World Assosiation for sustainable development, ISBN: 978-1-907106-12-5.

Roberts, E. B. and Eesley, C. E. 2009 'Entrepreneurial Impact: The Role of MIT' (February 1, 2009). Available at Social Science Research network: http://ssrn.com/abstract=1352633

Russell, R., Atchison, M. and Brooks, R. 2008'Business plan competitions in tertiary institutions: encouraging entrepreneurship education',Journal of Higher Education Policy and Management 30 (2): 123 – 138.

Wallmark, T., & Sjosten, J. (1994). Stability and turbulence among spin-off companies from Chalmers University. Paper presented at the 8th Nordic Congress of Small Business Research, Halmstad, Sweden...

INNOVATION BROKERAGE AND INNOVATION CAPABILITY IN SME'S AND HIGHER EDUCATIONAL INSTITUTIONS

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Information is the fuel for innovations, but the actors in the regional innovation system who control the flow of information possess the actual spark. At the moment, the needs of SME's and higher educational institutions (HEI's) do not meet in a comprehensive way. Particular brokerage capabilities must be generated and nurtured. This paper represents Innobrokers-project that strives to achieve a change in the mind-set among the actors of regional innovation system by training experts of innovation brokerage, i.e. innobrokers, and developing an innovation brokerage network.

The essential building blocks in the process are a broker training for teachers, students and business representatives, and business pilots that are run in intensive cooperation with the training. As an outcome, innovation capabilities in a form of innovation brokerage are improved and a network of innobrokers will be established. Innobrokers are contributors, executors and brokers of innovation activities, who know the needs of SME sector as well as the possibilities of the HEI's. They have a central role as creative actors and sculptors of organizations as well as transcenders of borders.

By combining the resources of SME's, teachers and students for the sake of the developing the innovation capability, an actual environment reflecting reality is attained and innovation development platforms are formulated. All three of them will have a comprehensive and holistic understanding of the innovation system as a whole and particularly the importance of networking and taking part into brokerage actions within the network. The seamless connection to entrepreneurship also supports the student entrepreneurship. The main goal is a continuous cooperation in systemic and sustainable network of skilled innobrokers contributing the regional innovation system.

Keywords: Innovation, Brokerage, Regional Innovation System, SME's and HEI's Collaboration

I. INTRODUCTION

The fact that great majority of new innovations spring from hands-on approach must be taken into serious consideration. The competitiveness of small and medium-sized enterprises (SME's) is based on the speed of their innovation processes and their ability to respond to user needs in constantly changing operational environment. In order to participate and support the regional innovation system and provide proper education for future professionals and experts, the higher educational institutions (HEI's) must develop their own innovation capabilities from congruent point views (cf. e.g. Cooke, 1992; Doloreux, 2002; Melkas & Harmaakorpi, 2008). Currently, the mutual needs and supplies of both sectors do not meet in a systemic and continuous way. This presumes further networking between the actors in the innovation processes and the developing organizations of the innovations systems by inventing an ecosystem for the cooperation. New forms of collaboration, which are neither self-evident nor prevailing in any organizational culture, are required.

Though open and practice-based innovation has been the topic in both academics' and practitioners' discussions for a while, its implementation into the practices of innovation systems is not that obvious. This paper represents a description of ESF- funded project Innobrokers that promotes a new way of thinking - a change in the mindset - and strives to plant and foster this new mindset among the regional innovation actors. The means to achieve the aim are training, open lectures, seminars and meet ups for representatives of local SME's, educational personnel and students of HEI's. The premise of the project is built on open and practice- based innovation thinking.

Collaborative training of business representatives, teachers and students creates an actual environment reflecting real work life and actual innovation development platforms. A genuine win-win-win -situation will be achieved by providing an opportunity for all three stakeholder groups to participate into the development process of innovation system. All three of them will have a comprehensive and holistic understanding of the innovation system as a whole and particularly the importance of networking and the cooperation within the network. They all will also acquire vis-à-vis benefits. The SME's will have a chance to get an outsider's view on their own processes; teachers can update their practical know-how in substantial field; and the students will have a valuable experience of team work and work life in general.

II. LITERATURE REVIEW

Lall (1992) defined innovation capability as the skills and knowledge needed to effectively absorb, master, and improve existing technologies, and to create new ones. When this definition is adapted for the purposes of Innobrokers-project, the word "technology" is complemented with words like "products", "services", "processes" and "organizations", even "organizational culture". This way a lot broader picture can be drawn. As the innovation capabilities are essentially determined by organizational learning processes (Weerawardena, 2003), the aspect of organizational learning becomes crucial. Actually, the learning approach to innovation suggests that the degree of innovation mirrors the amount of new knowledge embedded in an innovation (Dewar and Dutton, 1986; Ettlie, 1983).

Currently, HEI's have to struggle their way according the same conditions as businesses in general, and thus, learning from markets is a key source of innovation. By nurturing distinctive market-focused learning capabilities, HEI's are able to outperform their competitors by creating superior value to their customers (e.g. students, local business life and other stakeholders). (cf. Weerawardena, 2003) The organizational learning as conceptualized in the literature (Huber, 1991; Sinkula, 1994; Slater and Narver, 1995; Schein, 1990) comprises four learning activities constituting the overall organizational learning process of the organization. These activities are knowledge acquisition (the development or creation of skills, insights, relationships), knowledge sharing (the dissemination to others of what has been acquired), knowledge utilization (integration of the learning so that it is assimilated, broadly available, and can also be generalized to new situations) and unlearning (the review and renewal of existing knowledge and communication of changes within the firm). Unlearning must be considered as a vital aspect in the organizational learning process (Slater and Narver, 1995; Schein, 1990).

According to Melkas and Harmaakorpi (2008), learning and knowledge creation are important questions that must be managed. It has been shown that actors from different parts of innovation system might be unable to start mutual innovation process, due to the absence of shared rules of communication (cf. Uotila et al., 2006). Even in the same field, for example the lack of shared language hinders the beginning of an innovation process in the first place, although the innovation potential in the structural hole could be apparent. There emerges the chance for a broker. Burt (1997) has noted that such a structural hole is a place where a broker is needed to broker the flow of information between people bringing them together despite the distance between them.

Melkas and Harmaakorpi (2008) have also delineated the practical tasks for a broker: understanding the needs of the innovation network regarding to different forms of data, information and knowledge (i.e. tacit, self-transcending, explicit); identifying the necessary flows of these different forms, as well as potential bottlenecks in these flows; recognizing the roles of actors in the innovation network as well as their specific needs regarding data, information and knowledge; and identifying of the necessary data, information and knowledge quality for different purposes. In accordance with this background innobroker's qualifications (needed skills) are defined in this project as follows: Innobroker makes actors aware of interests of other groups of actors within the innovation system and brings them together; transfers the best practices; sees correspondences between groups of actors apparently irrelevant to one another; and combines by synthesizing these knowledge interests (cf. Burt, 2004; Melkas & Harmaakorpi, 2008). In other words, innobroker's job is to create environments and possibilities for fertile collisions in order to produce innovative thinking, i.e. make the sparks fly in a good way.

III. PURPOSE OF THE RESEARCH

Innovations are crucial in building and sustaining the competitive advantage for SME's and the same is valid with the HEI's as well. Indeed, the survival in the harsh competitive environment depends mostly on organizations ability to develop and renew their operations, to be innovative in other words. Innovativeness has become increasingly complex, costly and risky because of changing preferences, extensive pressure, rapid and radical changes in operational environment (e.g. Cavusgil, Calantone & Zhao, 2003). Here, the innovation capabilities become crucial. The purpose of Innobrokers-project is to enhance local innovation capabilities, particularly brokering skills related to brokerage functions, and to strengthen regional innovation system by building and developing a brokerage network. Disseminating the knowledge and know-how of innovation brokering and spreading the brokering mindset are the broad resources to respond to the challenge. The practical tools to achieve these aims are presented in the following chapter. Accordingly, the research question is formulated

as follows: How a new way of thinking, i.e. innovation brokerage mind-set, can be planted and fostered among the regional innovation actors?

IV. METHODOLOGY

The phenomenon under study is a change in a social system, i.e. regional innovation system, where the aims of planned actions is strived to accomplish in order to develop the innovation capabilities, i.e. brokering functions. The planned actions, as the project as such, are manifold. Thus, the available data will be mostly in qualitative format and in several various formats: group and personal interviews, diaries, blogs, web discussions and web rehearsals, etc. Also questionnaires and feedback inquiries will be used in order to produce quantitative data.

Considering the purpose of the study, the Action Research tradition and more specifically Participatory Action Research (PAR) is deployed as a methodological approach. This decision is based mainly on Ozeanne and Saatcioglu's (2008) article on PAR, where they present the history and evolution of the methodology. There Reason and Bradbury (2001) define participatory action research (PAR) as "a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes." Simply stated, this is a systematic approach that seeks knowledge for social action (Fals-Borda and Rahman1991).

Accordingly, Reason and Bradbury (2007) continue by defining Action research as "an interactive inquiry process that balances problem solving actions implemented in a collaborative context with data-driven collaborative analysis or research to understand underlying causes enabling future predictions about personal and organizational change". It is reasonable to argue that somewhere there are the premises of this research.

V. APPLICATION TO PRACTICE

The essential building blocks in the process of improving the individuals' innovation capabilities, enhancing the innovation brokerage functions and building the innobroker network consist of three main activities: innobroker training, business pilots and open cafés for wider audience. The innobroker training is directed to business representatives, lecturers and educational personnel as well as students. By combining these three groups, an eclectic interaction and cooperation with multiple voices and various views to innovating and supporting activities (e.g. innovation brokerage) is strived to achieve. The training is executed from very practical premises where actual doing is emphasized in comparison to traditional lecturing and listening. It consists of three two-day periods during altogether three months and all of them have a specific main theme: the first two days concentrates on individual's innovation capabilities from personal baseline; the second theme is innovation process and its dynamics, while the third period focuses on leadership/management of innovation process and organizational culture. All these three themes are approached with an "innobroker sight" meaning that the themes are considered from broker's point of view, i.e. what kind skills are especially important for brokerage functions. As the significance of communication is evident in brokering functions, innovation communication is embedded in the training along the main themes as well.

To support the practical emphasis in the training, business pilots are run in intensive cooperation with the training. Business pilots are actual development

projects in SME's that aim to improve products or services produced by the firm, or then to develop the organizational culture or organization as such to more innovation friendly direction. They provide inputs to the content of training days, which then again, give guidance and advises proceeding with the pilots between the training days. The training and the pilot projects are implemented in the spirit of practice-based innovation thinking, which means that the purpose for pilot projects and the training emerges from a specific practical need, and then at the end of training, some concrete benefit will be realized, and along, more abstract intangible benefit, innovation capability in a form of innovation brokerage skills, is also achieved.

In order to spread the word of open and practice-based innovations as well as the importance of innovation brokerage, series of open cafés are carried out. The themes follow the training so that the best practices learned during the training are disseminated to the wider audience. Especially, interest groups and colleagues of the trainees are encouraged to participate to the open cafés. By sharing the kindred information with the trainees, they can then support the trainees in their actions as change agents in the various organizations. Two persons are a stronger change muscle than one person alone, they can start the change. These three building blocks, i.e. training, business pilots and open lectures, will be endorsed with seminars. The seminars have an important task in

creating the sense of community among the trainees, which will endorse commitment within the network. Because the training sets will be carried out altogether four times, one per each four following semesters, the seminars are rendezvous or meet ups for the trainees. In the seminars, the trainees of past training season meet the trainees of coming season and the experiences and expectations can be shared. These seminars are significant regarding the necessary publicity, too. As an outcome from the training, business pilots and the open lectures and the seminars, a network of innovation experts, i.e. innobrokers, is established. Innobrokers are contributors, executors and brokers of innovation activities, who know the needs of SME sector as well as

the possibilities of the HEI's. They have a central role as creative actors and sculptors of organizations as well as transcenders of borders.

VI. DISCUSSION AND CONCLUSIONS

Unfortunately, at this point only assumptions of the project and its results can be made. Social change is slow and it takes its time. It can be presumed that by combining the resources of SME's, educational personnel and students for the sake of the developing the innovation capability, an actual environment reflecting reality is attained and innovation development platforms can be formulated. A genuine win-win-win -situation will be achieved by providing an opportunity for all interest groups to participate into the development process of innovation system. All participants and their interest groups will get and share a comprehensive and holistic understanding of the innovation system as a whole and particularly the importance of networking and the cooperation within the network. They all will also acquire vis-à-vis benefits. The SME's will have a chance to get an outsider's view on their own processes; lectures and educational personnel can update their practical know-how in substantial field; and the students will have a valuable work life experience. The seamless connection to entrepreneurship also supports the student entrepreneurship. The main goal of the project is to enhance the innovation capabilities, especially brokerage functions, and build a systemic and sustainable network of skilled innobrokers contributing continuously and through cooperation to the regional innovation system where all would be winners.

Due to the preliminary phase of the project, it is too early to either make any stronger statements or to comment its results or achievements more thoroughly. However, it can be said that the earlier the project planning process is opened to wider discussion and exposed to different views and opinions, the better. According to the principles of open and practice-based innovation thinking, the multiple voices in every phase of the development or planning process can provide guidance and lead to an improved outcome.

Overall, the theme of practice-based innovation is so extensive and abstract that it can be implemented in spite of the industry, sector (public/private), type of organization or field of substance area. This argument will be tested as the project proceeds. The training groups come from various backgrounds with diverse premises challenging the capabilities and expertise of the trainers as well as the participants. The multidisciplinarity will provide the most fertile base for innovative collisions and also intensify the dissemination of the outcomes. The pre-default and main argument is that the procedure for disseminating the new way of thinking (i.e. open practice-based innovation thinking) developed and tested in Innobrokers- project will be widely adaptable to various contexts.

Further, all procedures carried out during the project will be documented and reported in suitable formats in order to ensure the transparency, repeatability and adaptability of actions and activities. This means descriptions of the business pilots, contents of the training periods and open cafés as well as capturing and transmitting the seminars and meet ups for wider audiences. Such documentation facilitates easier access to the knowledge created in the project and furthers the duplication of the good practices developed on the way. Also, a proper evaluation system has been running along the project as it proceeds. This will support the flexibility to react to the coming feedback and take revising action when needed.

VII. REFERENCES

Burt, R.S. (1997). The contingent value of social capital. Administrative Science Quarterly, 42, 339-404.

Burt, R.S. (2004). Structural holes and good ideas. American Journal of Sociology, 110(2), 349-448.

Cooke, P. (1992). Regional innovation systems: Competitive regulation in the New Europe. Geoforum, 23, 365-382.

Cavusgil, S. T., Calantone, R.J., Zhao, Y. (2003). Tacit knowledge transfer and firm innovation capability. Journal of Business & Industrial Marketing, 18(1), 6-21.

Dewar, R.D., Dutton, J.E. (1986), The adoption of radical and incremental innovations: an empirical analysis, Management Science, 32, 1422-33.

Doloreux, D. (2002). What should we know about regional systems of innovation? Technology in Society, 24, 243-63.

Ettlie, J.E. (1983), Organisational policy and innovation among suppliers to the food processing sector, Academy of Management Journal, 26, 27-44.

Huber, G. (1991), Organizational learning: the contributing processes and literature, Organization Science, 2, 88-115.

Lall (1992).Technological capabilities and industrialisation. World Development, 20(2), 165-186.

Melkas, H., Harmaakorpi, V. (2008). Data, information and knowledge in regional innovation networks: Quality considerations and brokerage, European Journal of Innovation Management, 11(1), 103-124.

Ozanne, J.L., Saatcioglu, B. (2008). Participatory action research. Journal of Consumer Research, 35 (3), 423-439.

Reason, P., Bradbury, H. (2001). Introduction: Inquiry and Participation in Search of a World Worthy of Human Aspiration," in Handbook of Action Research, ed. Peter Rea-son and Hilary Bradbury, Thousand Oaks, CA: Sage, 1-14. in Ozanne, J.L. Saatcioglu, B. (2008) Participatory action research. Journal of Consumer Research, 35 (3), 423-439.

Reason, P., Bradbury, H. (2007). Handbook of Action Research, 2nd Edition. London: Sage.

Schein, E.H. (1990), Organisational culture. American Psychologist, 45 (February), 109-128.

Sinkula, J.M. (1994), Market information processing and organizational learning, Journal of Marketing, 58, 35-45.

Slater, S.F., Narver, J.C. (1995), Market orientation and the learning organization, Journal of Marketing, 59, 63-74.

Uotila, T., Harmaakorpi, V. and Melkas, H. (2006), Futures research and absorptive capacity in regional innovation systems, paper presented at the Conference Changing Foresight Practices in Regional Development - Global Pressures and Regional Possibilities, Turku, Finland, 15-17 June 2006

Weerawardena, J. (2003). Exploring the role of market learning capability in competitive strategy. European Journal of Marketing, 37(3/4), 407-429

PROMOTING AN ENTREPRENEURIAL DISPOSITION THROUGH STRATEGIC PLANNING AND QUALITY OF WORK CLIMATE

INSIGHTS FROM THE UNIVERSITY OF LIMERICK IN IRELAND

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In meeting the requirements of the knowledge economy, Florida (2005) argues for the need to develop talent. Nurturing talent and collaboration in higher education institutions (HEIs) is important for entrepreneurial organisations and requires the creation of an empowered and positive work climate. This is a complex endeavour. This paper outlines the results of a strategic initiative designed to promote entrepreneurship while fostering talent and innovation amongst employees in one HEI in the mid-west of Ireland. The focus of this plan was to enhance the University of Limerick as an entrepreneurial university. The plan was developed in consultation with all stakeholders, and empirical research in the form of a questionnaire was conducted in order to examine perceptions of organisational climate, quality of work life and quality of work relationships/collaboration. This was distributed to all 1,150 employees, and a 60% response rate was achieved.

The University of Limerick's strategic plan has resulted in some real innovation in terms of dynamic task forces comprising employees who are committed to developing UL as an entrepreneurial university. The impact on climate is significant with 93% indicating the university was 'a good place to work'; 'high motivation' (88%); 'proud to work for the university' (91%); 'feeling safe and secure' (94%); and 'it's not just a job to me' (95%). The quality of job satisfaction was above the national HEI norms. Clearly, attention to organisation climate pays dividends; however, strategic thinking in the public sector, such as in HEIs, is necessary to effectively retain talented and innovative employees.

Keywords: quality of work life; entrepreneurialism; strategic planning

I. INTRODUCTION

By and large, Irish universities have performed remarkably well in providing excellent undergraduate and graduate learning for Irish students despite many decades of severe under-funding (Prospectus 2007:2). Previous strategic funding initiatives (Programme for Research in Third-Level Institutions [PRTLI] and Strategic Innovation Fund [SIF] in particular) have strengthened Irish universities in terms of their internationalisation and cutting-edge research. This injection of capital was more than timely, and while it has without doubt fortified the contribution of Irish universities on the international stage in terms of teaching innovation and research leadership, it has also challenged Irish universities to become more responsive in terms of finding "new ways of planning, organising and managing higher education" (Prospectus 2007: 2) and of adopting more entrepreneurial strategies.

The Prospectus national survey of higher education – the first of its kind in Ireland – examined the views/perspectives of the third- and fourth-level sectors. It examined a comprehensive range of themes, including policy, governance, teaching and learning, management capacity and organisational development (ibid). It is heartening that they write:

We found a sector which is thoroughly engaged with the challenges it faces, working hard to negotiate significant change, while recognising that there is substantial work to be done before Ireland achieves its ambition to be at the fore of global knowledge (Prospectus 2007:6).

Recent years have, however, brought considerable economic strain to bear on the higher education sector in Ireland. The economic pressures with which Irish universities now find themselves contending are significant. Notwithstanding such pressures, it is laudable that Irish universities continue to prioritise their deep commitment to innovation and to entrepreneurship.

Entrepreneurialism is generally characterised by the introduction of management systems that emphasise budgets, return on investment, performance evaluation and strategic planning.

The focus is also more generally on innovative management practices. Therefore, entrepreneurialism implies the adoption of a more strategic approach to the management of the university sector. The authors advocate a broader characterisation of entrepreneurialism for their university. While including the characteristics identified above they also advocate that universities which seek to foster entrepreneurialism in their organisations need be concerned with an entrepreneurial climate because it is significantly influenced by organisational climate and job satisfaction.

The authors draw on Clark's (2001) conceptualisation of the entrepreneurial university as emphasising a "looking forward orientation" and a willingness to seek out new frontiers of knowledge. It stresses that the university is engaged in the pursuit of new opportunities, and that collegiality need not be limited to defence of the status quo, but that collegial as well as personal forms of authority and leadership can be sources of change (Clarke 2001:28). In order for these dispositions to be effective a positive organisational climate is essential. Organisational climate has been defined as "members' collective perceptions of their organisation with respect to such dimensions as autonomy, trust, cohesiveness, support, recognition, innovation and fairness (Moran & Volkwein 1992:20). It has also been articulated as the way in which organizational members perceive their environment in an attitudinal and value-based manner (Denison, 1996). The link between positive organisational climate and successful performance is well documented in the literature (Patterson, Warr, & West 2004; Ekvall 1996; Thompson 1996; Denison 1990).

The seminal definition of job satisfaction as professed by Locke (1976 p.1304) conceptualises it as the "pleasurable or positive emotional state resulting from the appraisal of one's job or job experience." In effect job satisfaction is the result of employees' perceptions of how well their job provides those things that employees view as important (Tella, Ayeni and Popoola 2007). The factors that significantly and positively impact job satisfaction have been found to be teamwork, recognition, advancement, feelings of independence, and social and professional relationships with colleagues and supervisors (Volkwein and Parmley 2000, Volkwein and Zhou 2003). The literature identifies the centrality of job satisfaction evidencing that lack of job satisfaction often leads to lethargy and reduced organizational engagement and commitment (Moser, 1997). Indeed lack of job satisfaction is a predictor of job quitting (Tella, Ayeni and Popoola 2007; Alexander, Litchtenstein and Hellmann, 1997; Jamal, 1997). Morale is also inextricably linked with job satisfaction. Work morale has been defined as the "state of mind regarding one's job, including satisfaction, commitment, loyalty, and sense of common purpose with respect to one's work" (Johnsrud and Rosser 1999:124). Organisational climate factors that influence this have been identified as trust, communication, guidance, feedback and recognition of competence (Johnsrud, Heck and Rosser 2000). Therefore, attention to organisational climate that facilitates empowerment and positive conceptualisations are important to effectiveness. The authors advocate that in higher education these also have a positive impact on entrepreneurialism particularly in terms of facilitating criteria such as autonomy, trust, empowerment, recognition innovation and fairness – the factors Moran and Volkwein (1992) have cited as definitive for positive organisational climate. Palfreyman (1989) identified that for universities to adopt such an entrepreneurial culture it requires not only consideration of issues of efficiency and effectiveness, but also sensitivity to the people orientated issues of skills, style, shared values and collegiate engagement. It also requires the development of empowered skills such as increased internal problem solving, flexibility and networking (Thomas 1998).

Systemically, the motivation behind entrepreneurialism reform processes in higher education seeks to place the university sector on a commercial course within a competitive environment in order to emulate the perceived superior entrepreneurial management and leadership practices of the private sector. However, a move towards the incorporation of private sector practices requires managerial reforms to transform the university sector into one that is flexible and responsive and exhibits characteristics such as customer service, output orientation, less vertical/hierarchical management structures, devolution of management functions, accountability, focus on performance, key performance indicators and entrepreneurial spirit.

Such a reform agenda has significant impact for how universities currently engage with their work practices. Distinctive features of university sector entrepreneurial reform include, for example, changes to the working environment and to managerial systems. As the university sector embarked upon implementing new managerial and entrepreneurial processes, efforts

were made to devolve responsibility for management of staff to heads of department, managers and supervisors (line management) in order to drive innovation. It is argued that this effort to devolve management helps senior management to focus more on strategic activities, such as achieving an entrepreneurial university, than on day-to-day, people-management activities. Devolution of management responsibility to head of departments is best done in an holistic manner (Thomas 1998). Empowering staff and encouraging managers to build the capacity of staff to become more flexible, innovative and independent is central to the achievement of this aim.

In response to the changing nature of Irish society and, in particular, the changing needs of its stakeholders, the University of Limerick (UL) in the mid-west region of Ireland has adopted a strategic initiative to protect and enhance what it views as its greatest asset – its people. In nurturing the talent of its people (as Florida 2005 advocates), the University of Limerick believes it will enhance its entrepreneurship and innovation, and the evidence certainly suggests that this is the case.

Some impacts of the entrepreneurialism agenda adopted here that are discussed, focus on the move away from traditional management practices to new managerial systems and processes, the devolution of decision-making and accountability to line management, engagement with management systems, the implementation of business practices with new management functions and strategic approaches to fostering entrepreneurialism.

II. STEP 2: LISTENING TO STAFF

The University of Limerick has a real commitment to improving the quality of the working life of all employees and aims to promote an organisational culture that values, motivates and supports staff.

In order to examine the impact of the strategic approach to entrepreneurialism and of the reforms on staff, all members of staff were invited to participate in an anonymous survey.

Capita, an independent consulting service, was employed to design and to implement the survey. Capita's services were also used to conduct the initial data analysis to safeguard objectivity. A pilot questionnaire was distributed to gain feedback on its design and content, and the full survey was then distributed. From an overall distributed sample of 1,150, a total of 689 staff completed the survey, yielding a response rate of 60%. In terms of reliability, the 60% response rate is above the minimum threshold needed to overcome non-response bias.

Forty-four percent of respondents were male and 56% were female. Contractual status varied: 67% of respondents were full-time permanent employees, 4% were part-time, 23% were full-time temporary and 6% were part-time temporary. Academic staff comprised 41% of respondents, support staff 42%, research staff 11% and 'other' 6%. For additional demographical information on age and years of service, please see Table 1.

	25 or under	**26-35**	**36-45**	**46-55**	**56+**
Age	1%	29%	32%	25%	13%
	0-2	3-5	6-10	11-20	20+
No. of Years in UL	13%	23%	26%	21%	17%

Table 1: Respondent Demographics:

Respondents were generally very positive about their experiences of working in the University of Limerick and about their quality of work life (see Table 2). In particular, 93% of staff agreed that the university is a good place to work; this is 3% higher than the national HEI norm. When asked to agree or disagree that "My motivation at work is generally high", 88% agreed, which was 8% higher than the national HEI norm. Respondents were generally in agreement that their work in UL gives them a sense of personal achievement (88%), that they are personally involved in activities that make a difference to others (85%) and that they have freedom to use their autonomy and initiative in their work (94%).

However, they were also clear that there is still some work to be done. In terms of confidence that the university is recruiting the right people for its future, the results were less impressive: only 57% of staff agreed or tended to agree. Furthermore, only 40% agreed or tended to agree that the university was doing a good job of retaining its most talented people (see Table 2).

The University is a good place to work	Agree	93% (n=638)
I enjoy my work	Agree	95% (n=649)
My work gives me a sense of personal achievement	Agree	88% (n=608)
My motivation is generally high	Agree	88% (n=608)
I feel inspired to work to the best of my ability every day	Agree	80% (n=540)

I have been personally involved in activities that make a positive difference to people at the University	Agree	85% (n=571)
My work offers me opportunity to use my initiative	Agree	90% (n=614)
I can decide on my own how to go about doing my work	Agree	94% (n=648)
I have enough freedom to do what is necessary to put service users first	Agree	77% (n=524)
I am not interested in the University; to me it is just a job	Agree	5% (n=35)
I feel the University is doing a good job of recruiting the right people for its future	Agree	57% (n=372)
I feel the University of doing a good job of retaining its most talented people	Agree	40% (n=267)

Table 2: Respondents Perspectives on Quality of Work Life

III. STEP 3: STRATEGIC PLANNING

The drive for entrepreneurialism has taken the form of the introduction of new management systems for activities such as income generation (Clark 2001), and includes enhancing links to industry, spin-out companies, creating enterprise centres, focusing on patents, performance management, workload allocation models, full economic costing, decentralised budgets, wage systems connected to results, review of academic contracts, role profiles, competency frameworks, quality improvement and key performance indicators. According to Gibb, Haskins and Robertson (2009 p.7) entrepreneurship in the university setting "places emphasis in a 'teaching' context upon the pedagogical and organisational processes necessary to support entrepreneurial competency and attributes across a range of different disciplinary and multi-disciplinary contexts." Drawing on the work of Roman, Cuestas and Fennollar (2008) they further identify that "entrepreneurship therefore becomes almost an intra-disciplinary concept intrinsic to the development of all students and teaching staff" and that this has implications for the organisational structures that will support the embedding of such an entrepreneurial concept within the organisation". It was with this in mind that the University of Limerick decided to embed its reform in an overall strategic plan.

Dooris, Kelly and Trainer (2004) identify that higher education strategic planning is now increasingly about learning and creativity and that university leaders need to challenge assumptions and consider radically changing existing structures and processes. To create a dynamic and innovative University of Limerick strategic plan, it was decided to take a twleve-month period to engage in significant consultation across the campus community. A consulting company was employed to support the process. The aim was to generate a strategic plan that was to be a 'living document' that generated real and committed action by university leadership and employees in partnership.

In 2011, the strategic plan *Pioneering and Connected 2011-2015* was born. Entrepreneurship is at the heart of the plan, and the mission of the university clearly espouses this: *"The mission of the University of Limerick is to be a distinctive, pioneering and connected university that shapes the future through educating and empowering people to meet the real challenges of tomorrow."* This forward looking agenda is reflective of Clark's (1998) indication of the vision needed for entrepreneurialism. Clearly empowerment is at the heart of the process. Because 'people' are a central theme of the strategic plan, the explicit values cited in the plan reflect the university's commitment to its people as well as to innovation. We seek to educate our students to have social justice high on their list of priorities and to have entrepreneurial staff with a strong quality of work life. In particular, the plan's underpinning values include:

Student-centred education that empowers, inspires, develops and sustains productive and enquiring citizens who place a premium on social justice.

High-quality research that maximises relevance, *commercialisation and innovation.*

The *uniquely strong esprit de corps* among our staff, which is characterised by a distinctively *bold, entrepreneurial* and *innovative spirit* combined with a clear and unique sense of identity.

Because the goal was to ensure that all employees and students would know that the plan was relevant to them and that they had a role to play, it was decided during strategic planning to have a 'people' underpinning theme. This perspective is made explicit in the plan, which states that people are central to making the plan a reality and that all staff share in the achievements made.

The implementation of the People enabling theme will ensure effective recruitment policies, planning and practices that strengthen our staff profile; foster a culture of lifelong learning among our staff and nurture that culture by investing in

knowledge and professional skills development; promote an organisational culture in which people are valued and motivated; and recognise the diversity of our staff, promote equality of opportunity and identify relevant targets (University of Limerick 2011:48).

IV. Step 4: The Plan Comes to Life

Overall responsibility for the implementation of the strategic plan lies with the university's Executive Committee. This committee comprises the President (Chair), the Vice President Academic & Registrar, the Vice President Research, Faculty Deans, the Director of Finance and the Director of Human Resources.

It was essential that this plan was not simply an 'academic exercise' but would serve as a springboard to meeting our aim of promoting entrepreneurial engagement and an excellent quality of work life balance for empowered and talented employees. The leadership in the university was charged with the task of creating a dynamic implementation strategy. The Executive Committee began this process by initiating the development of strategic task forces. Each task force included of members of staff who had some expertise, knowledge or interest in the theme of that task force.

The task forces were charged with devising implementation plans to achieve the actions and targets specified by the strategic plan. Their brief was to ensure that the implementation plans were focused, action-orientated and integrated across the goals and enabling themes of the strategic plan. The task forces were asked to facilitate the development of a strong commitment to support the key directions and quality improvements demanded by the implementation plans and to be creative in developing the individual and collective capacity to manage implementation.

Eight task forces were established with respect to the following areas:

- Staff Morale and Motivation
- Communications
- Continuing Professional Development
- E-learning
- Income Generation
- International Students
- Quality
- Research Outputs

The task forces informed themselves of current practice and staff needs and conducted research on models of practice in other national and international institutions, where necessary.

For the purpose of this paper, four of these task forces are relevant and will be discussed. These are: Staff Morale and Motivation; Communications; Continuing Professional Development; and E-learning.

A. Staff Morale and Motivation Task Force

This task force had the specific remit of engaging with staff morale and motivation. Increasing morale and motivation involves creating a workplace that facilitates a sense of belonging and empowerment in which employees are enabled to do their job to an excellent standard and to progress in their careers in a way that meets the goals of the university. With that in mind, this task force made recommendations under four main headings: a) people can progress; b) work is varied and viable; c) people are valued; and d) people are connected. For example, in response to the need for staff to feel confident that they can progress their careers within the structures of UL, the task force recommended that promotions for academic staff be restored, with a specific emphasis on progression across the bar. Due to the current economic recession, promotions at UL had been in abeyance but have now been reintroduced.

This task force also addressed the need for individual employees to feel valued and recommended that an award for excellence in a support staff role be created. This is to match the existing awards for academic staff for excellence in teaching and research.

B. Communications Task Force

The Communications task force based its work on the premise that open and transparent communication flows are the hallmark of an organisation that is dynamic, responsive and creative. The task force reviewed existing practices concerning internal communications at the university (including all in-house publications, online fora and so forth), consulted with a variety of interested parties within UL and examined examples of best communications practice in other third-level settings. While the task force made many specific recommendations, including the need for more communication from the president and senior management to staff and more effective use of modern information communications technology, its overarching recommendation was that an efficient, clear and mutually respectful internal communications culture be established, one that sees communication as a central part of our activities rather than an afterthought or add-on.

C. *Continuing Professional Development Task Force*

The specific focus of this task force was to advise on the development of a coherent university approach to continuing professional development (CPD) activities. This advice was to form the basis of the development of a coherent strategy for CPD. The task force proposed the initial roadmap in the form of five key recommendations and actions required to achieve these recommendations. In considering its recommendations, the task force decided to broaden the definition of CPD to include personal development, i.e. continuing *professional and personal development* (CPPD), which moves beyond the traditional view that further education is limited to the professional development arena.

The task force carried out market research to examine current impressions of the university's CPPD and to identify opportunities for how UL should position itself in the future to optimise market position. The responses from the surveys, focus group and individual interviews relating to the current impression of the university's CPPD showed strong agreement that UL has a weak market presence for CPPD. The lack of a coherent strategy and offering for CPPD is considered to be a major disadvantage.

The next stage of this process is the drafting of a strategy for CPPD at the institutional level. Following this, it is intended to have mirror strategies at faculty level that are aligned with the institutional plan. It is intended that CPPD at the University of Limerick will be learner-centric: the learning offerings will be proactive and responsive to learner needs. It is intended to prioritise flexibility in access, transfer, progression and modes of delivery. The university believes that it is important for staff to see CPPD as a core function of their work and to value it. To support this, CPPD will be linked to incentivisation mechanisms.

D. *E-learning Task Force*

This task force looked at ways of optimising the use of e-learning. The task force was quick to recognise that the university already had e-learning expertise and has benefited from inputs and on-going research at the Centre for Teaching and Learning, Library and Information Services, Information Technology Division, National Digital Learning Repository and within other units within the faculties. However, the task force found that UL does not have a university-wide strategy that supports and motivates academics to fully engage with e-learning. The task force recommended more coherent institutional support and resourcing as well as the need to foster and support e-learning champions on the ground. It also noted that e-learning should neither replace nor undermine the role of teachers nor be used to offer poor-quality alternatives to 'conventional teaching'. Instead, the purpose of optimising e-learning opportunities is to enhance and enable the university's commitment to supporting connected, motivated, creative teaching and learning dynamics.

E. *Retention of Talented Employees*

The survey of staff was challenging in terms of their perception of the engagement of the university with a) recruiting the right people for its future and b) retaining its most talented people. Only 57% of respondents believed that the university was recruiting the right people for its future. Even fewer (40%) were convinced that the university was doing a good job of retaining its most talented people. Such a 'brain drain', if it does exist, is clearly problematic, particularly because of the central role the university's commitment to people plays in its strategic plan. Therefore the university was quick to respond to this issue by instigating a retention policy in 2011. In effect, the policy caters for staff members who have been offered an external appointment above the grade of their existing UL grade and who wish to continue to make a strong contribution to UL. Whether or not they are eligible to apply for promotion under the relevant UL academic promotions policy, such members of staff may make an application under the retention scheme for promotion to the equivalent grade at which they have been offered an external appointment.

V. IMPLICATIONS

Citing Liebmann (1986:14), Lau (2010) declares that higher education is an "enterprise of human beings." Quality faculty members is a must for any higher education institution aspiring to achieve high standards (Santhosh 2011). In adopting an entrepreneurial agenda, the quality, flexibility and initiative of staff is central. To achieve an entrepreneurial ethos, the HEI must endeavour to prioritise and value its employees and seek to create a facilitative organisational climate. Lau further argues that an innovative organisational climate is important to higher education because it "maximizes the potential of its members", thereby creating an enhanced work environment where employees feel empowered to use their initiative and to experiment with new ideas. This is essential for successful entrepreneurship in the university sector.

Globally, higher education is experiencing significant challenges, particularly in terms of economic pressures, social changes and increased competition, and, as a result, needs to be open to change (Mathisen & Einarsen, 2004). To create a climate of innovation where staff are appreciated and their talent is nurtured, it is important to listen to their experiences of the organisation and to respond effectively when concerns are raised. The University of Limerick values its people and believes that facilitating the empowerment of staff is central to the process of meeting its strategic goals. Adopting devolved management and strategic task forces comprised of staff and senior management in partnership has proved to be an effective approach.

Empowered staff use their initiative more and have the freedom to make decisions about how they do their work and how they respond more effectively to service users. In addition, when staff have more freedom and discretion, they benefit in terms of increased self-efficacy because they are free to decide the best way to perform their role (Gist & Mitchell, 1992). When staff feel empowered to use their initiative and to work in a manner that is most effective for them, this makes for a more flexible and responsive organisational climate (Bowen & Lawler 1992). These are important entrepreneurial characteristics.

There has been increasing attention on employee empowerment and change management in recent years (Pitts, 2005; Spreitzer & Doneson, 2008). The University of Limerick believes that achieving cutting-edge entrepreneurial status is linked to the need to facilitate the greater empowerment of staff. Achieving this will also engender higher job satisfaction, higher levels of initiative and more innovation and scholarship (Spreitzer, 1995).

VI. Conclusions and Recommendations

While adopting an entrepreneurial agenda that will assist the University of Limerick to compete in an economically challenging and increasingly competitive environment, it is still too early to predict its impact. The question remains as to whether or not the introduction of entrepreneurialism and new and devolved management systems will deliver efficiency, performance, new companies and new research processes that will facilitate job creation and excellent value for money. Measuring the impact of entrepreneurialism is quite a challenge. This needs to be done over time so that changes that directly and indirectly link to the entrepreneurialism strategy and its methods, including the devolved management systems, can be identified. To name but a few, intended improvements are in the realm of more spin-out companies; more patents; more funding for research; more publications; more revenue from industry; more graduates, including postgraduates; higher world ranking and greater internationalisation.

Another issue to consider is the role of government in creating an environment for entrepreneurialism in higher education. For Irish universities to strengthen their entrepreneurialism functions, a significant shift from direct governmental control (via national regulations) to greater autonomy for the universities is required. While change in higher education is complex and demanding, it can improve the quality of work life and can provide greater initiative and flexibility for staff while at the same time developing the capacity of the organisation to compete more effectively on the international stage. Without a doubt, this makes it all worthwhile.

VII. References

Alexander, J., Liechtenstein, R. & Hellmann, E. 1998. A causal model of voluntary turnover among nursing personnel in long term psychiatric setting. Research in Nursing and Health, 1998; 21 5. 415-427

Bowen, D. & Lawler, E. 1992. The empowerment of service workers: What, why, how, and when. Sloan Management Review, 1992; 33, 3. 31-39.

Clark, B. (2001) The Entrepreneurial University: New Foundations for Collegiality, Autonomy and Achievement Higher Education Management 2001; 13, 2. 9-24

Denison, D. 1996. What is the difference between organizational culture and organizational climate? A native's point of view on a decade of paradigm wars. Academy of Management Review, 21, 619-654.

Denison, D. (1990). Corporate Culture & Organizational Effectiveness. New York: Wiley Press

Dooris, M., Kelley, J. & Trainer, J. 2004. Strategic Planning in Higher Education. New Directions for Institutional Research, 2004; 123. 5-11.

Ekvall, G. 1996. Organizational climate for creativity and innovation. European Journal of Work and Organizational Psychology, 1996; 5, 1. 105-123.

Florida, R. 2005. The flight of the creative class: The new global competition for talent. New York: Harper Business.

Gibb, A. Haskins, G. and Robertson, I. 2009. Leading the Entrepreneurial University: Meeting the entrepreneurial development needs of higher education, University of Oxford: National Council for Graduate Entrepreneurship

Gist, M. & Mitchell, T. 1992. Self-efficacy: A theoretical analysis of its determinants and malleability. Academy of Management Review, 1992; 17, 2. 183-211.

Jamal, M. 1997. Job stress, satisfaction and mental health: An empirical examination of self

employed and non-self employed Canadians. Journal of Small Business Management, 1997; 35, 4. 48-57

Johnsrud, L. and Rosser, V. 1999. College and university mid-level administrators: Explaining and improving their morale. Review of Higher Education, 1999; 22, 121-141.

Johnsrud, L., Heck, R., and Rosser, V. 2000. Morale matters: Midlevel administrators and their intent to leave. Journal of Higher Education, 2000; 71, 34-59.

Lau, W. K. J. 2010. Empowerment of non-academic personnel in higher education: exploring associations with perceived organizational support for innovation and organizational trust. Dissertation, University of Iowa, Available: http://ir.uiowa.edu/etd/843.

Locke, E. 1976. The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), Handbook

of industrial and organizational psychology (pp. 1297–1349). Chicago: Rand McNally

Mathisen, G. E., & Einarsen, S. 2004. A review of instruments assessing creative and innovative environments within organizations. Creativity Research Journal, 2004; 16, 1. 119-140.

Moran, E. T. and Volkwein, J. F. 1992. The cultural approach to the formation of organizational climate. Human Relations, 1992; 45, 19-47.

Moser, K. 1997. Commitment in organizations. Psychologies 1997; 41, 4. 160-170

Patterson, M., Warr, P., & West, M. 2004. Organizational climate and company productivity: The role of the employee affect and employee level. Journal of Occupational and Organizational Psychology, 2004; 77, 2. 193-216

Palfreyman, D. 1989. The Warwick Way: A case study of entrepreneurship within a university context, Entrepreneurship and Regional Development, 1989; 1, 2. 207-219.

Pitts, D. W. 2005. Leadership, empowerment, and public organizations. Review of

Public Personnel Administration, 2005; 25, 1. 5-28.

Prospectus 2007. Lead or Follow? The global challenge for Irish Universities Available: http://www.prospectus.ie/documents/6622041Lead%20or%20Follow%20summary%20report.pdf

Roman, S., Cuestas, P. and Fenollar, P. 2008. An examination of the interrelationships between self-esteem, others' expectations, family support, learning approaches and academic achievement. Studies in Higher Education, 2008; 33, 2. 127 - 138

Santhosh, A. 2011 Organisational Stress among Faculty Members of Higher Education Sector Available

http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_&ERICExtSearch_SearchValue_0=ED522272&ERICExtSearch_SearchType_0=no&accno=ED522272

Spreitzer, G. M., & Doneson, D. 2008. Musings on the past and future of employee empowerment. In T. Cummings (Ed.) Handbook of organizational development (pp. 311-324). Thousand Oaks, CA: Sage Publications.

Spreitzer, G. M. 1995. An empirical test of a comprehensive model of intrapersonal empowerment in the workplace. American Journal of Community Psychology,1995; 23, 5. 601-629.

Tella, A., Ayeni, C. and Popoola, S. 2007. Work Motivation, Job Satisfaction, and Organisational Commitment of Library Personnel in Academic and Research Library Philosophy and Practice 2007. ISSN 1522-0222

Thomas, H. 1998. Reform and Change in financial Management: the need for an holistic approach, Higher Education Management, 1998; 10, 2. 95-106

Thompson, M. 1996. in Ashkanasy, N., Wilderom, C., & Peterson, M. 2000 Handbook of Organizational Culture & Climate. London: Sage.

University of Limerick 2011. Pioneering and Connected: Strategic Plan 2011-2015. Available: http://www2.ul.ie/pdf/521283169.pdf

Volkwein, J. and Parmley, K. 2000. Comparing administrative satisfaction in public and private universities. Research in Higher Education, 2000; 41, 95-116.

Volkwein, J. and Zhou, Y. 2003. Testing a model of administrative job satisfaction. Research in Higher Education, 2003 44, 149-171.

FOSTERING ENTREPRENEURIAL UNIVERSITIES' SUPPORT ACTIVITIES

Students as key players in a UBC context at Mondragon University

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The evolution of the university towards an Entrepreneurial University started with the second academic revolution, when the university adopted the third mission and turn into a teaching, research and economic and social development enterprise (Etzkowitz 2003). For achieving this new status, an Entrepreneurial University requires to undertake "soft" and/or "hard" entrepreneurial activities, depending on the maturity of each university in entrepreneurial issues (Philpott, Dooley, O'Reilly & Lupton 2011). The purpose of this paper is to develop the understanding of how the Polytechnic School of Engineering from Mondragon University (EPS - MU onwards) is working on these entrepreneurial activities to turn into an Entrepreneurial University, focusing on a new experience it has carried out within its students. Getting more in detail, we planned and developed an Entrepreneurial Action Plan (EAP onwards), following a bottom-up initiative, during the academic course 2010/2011 to establish suitable mechanisms for increasing the percentage of ideas (generated by our students) developed as potential business projects. For analyzing this path, we have employed an action research approach to provide insights into this concrete entrepreneurial activity that EPS-MU is carrying on; evaluating its success, reflecting on its possible improvements and planning next activities. Furthermore, this paper shows how engineering students and some specific universities characteristics could be key factors for the path to an Entrepreneurial University. On EPS - MU's case, we have identified the interrelation of our collaborative research model, the high university business collaboration (UBC onwards) and the role of our students (PhD students included) as key factors that foster entrepreneurial universities support activities.

Keywords: Entrepreneurial University, Academic Entrepreneurship, Entrepreneurial activities, University-Business Collaboration, Collaborative Research, Action Research.

I. INTRODUCTION

It is now generally accepted that innovation is the most important engine of long-term competitiveness, growth and employment (EC 2001). For improving this system of innovation is critical the collaboration between the three institutional spheres: industry, academia and government (Etzkowitz, Webster, Gebhardt & Cantisano 2000). This model is known as the Triple Helix model, which states that the university can play an enhanced role in innovation in increasingly knowledge-based societies (Etzkowitz & Leydesdorff 2000). Furthermore, universities are catalysts for the enhancement of employment opportunities for local industry, especially with regional and national governments viewing the high technology and knowledge-based sectors as a crucial source of direct and indirect employment opportunities in the future (Klofsten & Jones-Evans 2000).

Getting more in depth, Universities contribute to the R&D capability of an economy in different ways, including: the creation of new knowledge from basic research, the production of specialized human capital, the technology transfer from academia to industry and the territorial development, through the promotion and management of projects of territorial innovation (Lazzeroni & Piccaluga 2003).

For achieving this new role, university has been adapting its mission to the needs of the economic and social situation of each moment. At its beginnings, universities only mission was the preservation and dissemination of knowledge. However, the first academic revolution, taking off in the late 19th century, did research a university function in addition to the traditional task of teaching (Etzkowitz 2003). After that, due to the emphasis on technology-transfer from universities to industry and the need to develop more "rapid" links between science, technology and utilization, a second academic revolution had been given (O'Shea, Allen, O'Gorman, Roche 2004). As a result of this fact, universities mission was transformed into a teaching, research and economic development enterprise, playing a

major role in regional innovation and economic growth (Etzkowitz 2003). In this new division of labour, academe is increasingly seen as a key provider of new technologies and business ventures.

Any university that embraces its role within the triple helix model and adopts the third mission is referred to as an 'Entrepreneurial University' (Philpott et all. 2011). This term was coined by Etzkowitz (1998) to describe any university that undertakes "entrepreneurial activities" with the objective of improving regional or national economic performance as well as a financial advantage for the university (Etzkowitz et al. 2000). Furthermore, despite this narrow definition, there are some other key characteristics that differentiate an Entrepreneurial University from a non-entrepreneurial one, such as: the mission, governance and strategy, the stakeholders' engagement, the entrepreneurship education, the internationalisation and the knowledge transfer, exchange and support (Gibb, 2012).

Analysing more in detail the entrepreneurial activities that a university engages to achieve its missions, they can be classified across a spectrum of 'soft' and 'hard' initiatives (Philpott et al. 2011). This classification has been done depending on the potential of each activity to contribute to the economic development. On the one hand, there are hard activities (such as, patenting, licensing, spin-off formation and Technology Park creation) which are more tangible outputs; and on the other, there are soft activities (such as, producing highly qualified graduates, academic publishing, grantsmanship, consulting, industry training courses and contract research) which are generally perceived with the traditional academic culture. However, not every university is prepared for achieving all these entrepreneurial activities. Depending on the characteristics (previously mentioned) and the maturity of the university, it is positioned in a specific point inside the entrepreneurial activities spectrum and then, little by little, it will be facing harder activities.

In the present paper it is described one concrete activity, focus on students, that the Polytechnic School of Engineering from Mondragon University (EPS-MU onwards) is carrying on to make the path towards an Entrepreneurial University. For achieving this objective we defined an Entrepreneurial Action Plan (EAP onwards) which, at the same time, has the aim to promote the entrepreneurial spirit (among our engineering and PhD students) and to increase the number of business projects transferred to a Business Innovation Center (BIC onwards). To that end, the paper employs an action research approach for providing insights into the EAP that EPS-MU is carrying on; evaluating their success, reflecting on their possible improvements and planning next activities.

II. ENTREPRENEURIAL ACTIVITIES AT EPS-MU

EPS-MU can be described as a Knowledge Transfer University which has promoted, with the collaboration of a close BIC called Saiolan, the creation of new business initiatives and the spread of new innovative services, products and projects for the growth and stability of the existing organizations. For achieving these objectives, EPS-MU has been working hard on developing entrepreneurial activities inside the university. These activities can be classified following the "soft" and "hard" initiatives spectrum defined by Philpott et al. (2011), depending on their potential to contribute (directly or indirectly) to economic development, as well as the financial wellbeing of the university. In Table1 ("Table 1 EPS-MU's Entrepreneurial Spectrum") it is shown which EPS-MU's entrepreneurial current situation is, from the entrepreneurial activities classification perspective.

		EPS-MU 2009/2010 (MU 2010)
Entrepreneurial **"hard"** activities	Creation of a Technology Park	GARAIA Innovation Centre
	Spin-Off Firm Formation	10 Spin-Off generated
	Patenting and Licensing	5 Patents or Licenses
Entrepreneurial **"soft"** activities	Contract Research	150 Companies contracting R&D
	Industry Training Courses	40 Industry Training Courses
	Consulting	152 Consulting works
	Grantsmanship	More than the 50% of the R&D budget, has been financed by Industry
	Publishing Academic Results	35 Indexed publications
	Producing Highly Qualified Graduates	452 Graduates

Table 3 EPS-MU's Entrepreneurial Spectrum (adapted from (Philpott, Dooley et al. 2011))

These figures show that EPS-MU had a good starting point for the path towards an Entrepreneurial University. Furthermore, the results from the Entrepreneurial "soft" activities show that, in this case, a close University Business relationship and a Collaborative Research model are key factors for an Entrepreneurial University. However EPS-MU, at that initial situation, had had still some lack of "hard" entrepreneurial activities, since it had only generated 10 Spin-off firms during the academic course 2009/2010. Due to this fact, EPS-MU developed an "Entrepreneurial Action Plan" (EAP onwards) which promoted the entrepreneurial spirit and tried to increase the number of students' business projects transferred to the BIC.

III. EPS-MU'S ENTREPRENEURIAL ACTION PLAN

Dealing with this new approach towards an Entrepreneurial University, EPS-MU developed an EAP for the course 2010/2011. The aim of this bottom-up plan was to establish suitable mechanisms for increasing the percentage of students' ideas developed as business projects. The role of students as key players into the academic entrepreneurial process has been oft-quoted through Stanfords and MITs descriptions. These two Entrepreneurial Universities are clear examples of lots of innovations and enterprise generations developed by their students, which significantly impact on industry and the economy (Teh and Yong, 2008). Furthermore, university students stand at one of life's inflection points, one at which they have to think about their careers (Mark et al., 2009), thus they should have all the information about the entrepreneurial path.

The EAP was divided in three consecutive parts, which were the three milestones that any entrepreneur should face during the early phases of the entrepreneurial process. The objective of the first one was the promotion of the entrepreneurial culture and the idea generation. Then, during the second stage, students learnt how to turn those business ideas into potential business projects. And finally, at the last part, they developed their own Business Plan. In Figure1 ("Figure 1 Entrepreneurial Action Plan") there are shown the three consecutive parts of the EAP.

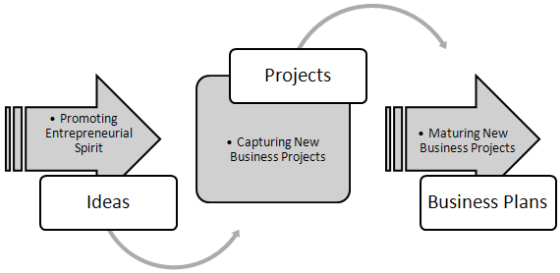

Figure 1 Entrepreneurial Action Plan (EAP)

The "Promoting Entrepreneurial Spirit" part was focused on the promotion of the entrepreneurial spirit and it was developed during the entire academic course. We developed punctual "entrepreneurial pills" for instilling the entrepreneurial culture among our students.

In the second part, actions were more oriented to identify and develop possible business ideas. There were some mechanisms and actuations established for capturing ideas which could turn into entrepreneurial projects. Moreover, this part was also oriented to develop the first draft of the ideas' Business Model, supported by some mentors. This assistance helped the entrepreneurs developing their value propositions, customers segment, cost structure, etc. and at the sane time, turning their initial business ideas into a potential business project (we used the Business Model Canvas from Osterwalder & Pigneur (2010) for that task). Then, there was a filter where a committee decided which ideas were suitable to transfer to the third part or not.

The "Maturing New Business Projects" part started with a potential entrepreneurial project and its aim was to develop its Business Plan. At this point, a second evaluation committee evaluated these Business Plans and if they were suitable, the business idea would be transferred to the BIC-Saiolan, for continuing the analysis and becoming an established company.

A. EAP in detail

Each stage of the EAP had a specific target inside all the entrepreneurial process. The activities oriented to the first two parts of the EAP were opened for all EPS-MU students. However, once the business projects were becoming more solid, during the third stage, only the idea providers were invited to the activities. In Figure2 ("Figure 2 Entrepreneurial Activities") it is shown how these activities fit in the EAP.

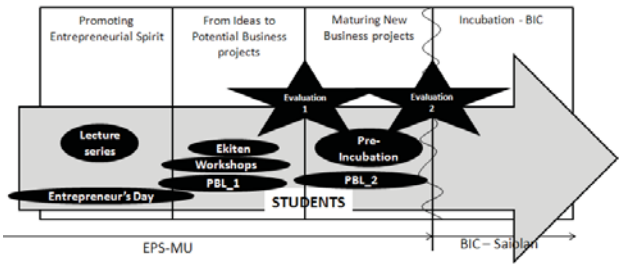

Figure 2 Entrepreneurial Activities

All the activities had a particular role inside the entrepreneurial process, providing EPS-MUs students' with entrepreneurial unique knowledge and skills according to the maturity of the business ideas. These key skills, behaviour and attributes are summarised in Table 2 ("Table 2 Entrepreneurial skills, behaviour and attributes").

Motivation	Entrepreneurial Skills	New Venture Creation
Self-motivation	Opportunity spotting Team building	Sufficient contacts – networks
Clear values	Speed General knowledge of business skills	Taking risks
Risk-taking	The ability of fail	Responding quickly
Need for achievement	Positive thinking Vision	Managing conflicts
Internal locus of control	Creativity Creativity problem-solving	Innovation
High tolerance of ambiguity and novelty	Intuitive decision-making Managing interdependency on "know-who" basis Negotiation skills Strategic thinking Time management Persuasion	General management skills Presentation skills Interpersonal skills Business Planning skills

Table 4 Entrepreneurial skills, behaviour and attributes (Collins, Smith et al. 2006)

Any entrepreneur learn in the real world through "adaptive" learning (Gibb 1995), they are action oriented and much of their learning is experientially based (Rae & Carswell 2000). Furthermore, entrepreneurs also "learn by doing" which encompasses activities such as "trial and error", problem solving… (Deakins & Freel 1998). Following this vein, EAP adopted a "learning by doing" approach, using the "Project Based Learning" (PBL onwards) methodology, where every participant lived a real entrepreneurial situation. Table3 ("Table 3 Entrepreneurial Activities Description") shows a brief description of the skills, knowledge and behaviours that were target in each EAPs' activities.

Stage	Activity	Description	Skills, knowledge and behaviours targeted (Collins, Smith et al. 2006)
Part 1 Promoting Entrepreneurial Spirit	Entrepreneur's Day	A whole day dedicated to entrepreneurial activities. -Dynamics for developing Creativity skills. -Presentations with entrepreneurs, for sharing their experience with students. -A small workshop for working entrepreneurial skills.	-Academic Entrepreneurial awareness -Motivation -Need for achievement -Creativity skills -Entrepreneurial skills
	Lecture Series	Three lectures during school hours to present successful entrepreneurial cases, in order to motivate and encourage our students for undertaking this life style.	-Academic Entrepreneurial awareness -Motivation -Risk taking -Need for achievement
Part 2	PBL milestone	Through a PBL project, students detect, identify and develop new business ideas and their	-Vision -Interpersonal skills

From Ideas to Potential Business Projects	1	respective Business Models	-Team building -Creativity skills -Creative problem solving -Business Ideas Generation skills -Business Model Development skills
	Creativity & Entrepreneurship Workshops	A workshop for showing some creativity plus entrepreneurial tools and methodologies to our students, based on a real problematic from an important Basque company.	-Creativity skills -Learning creativity and entrepreneurship tools -Business Ideas Generation -Business Model Development
	Business Plan Competition	Students sent their Business Plans and the winner has the opportunity to develop more in deep their business idea in the BIC-Saiolan	-Business Planning skills -Strategic thinking
	Evaluation committee 1	An evaluation committee valued all the developed Business Model and decided which transfer to the next step.	
Part 3 Maturing New Business Projects	PBL milestone 2	Through a PBL project, students develop Business Plans from their own business ideas.	-Interpersonal skills -Team building -Creative problem solving -Business Planning skills -General management skills -Presentation skills
	Pre-incubation	Entrepreneurs developed their Business Plans more in detail. To achieve this goal, they have infrastructural (computers, meeting rooms…) and human (mentors…) resources from EPS-MU.	-Vision -Interpersonal skills -Team building -Creative problem solving -Business Planning skills -General management skills -Presentation skills -Taking risks
	Evaluation committee 2	An evaluation committee valued all the developed Business Plans and decided which transfer to a BIC.	

Table 3 Entrepreneurial Activities Description

B. ***Description of stage 1:promoting entrepreneurial spirit***

The first stage was focused on promoting entrepreneurial culture among EPS-MUs students and was lend by two main activities. The first one was the Entrepreneur's Day, which had two main objectives. On the one hand, it was focused on the awareness and motivation of entrepreneurship among students; and on the other hand, it showed (through dynamics) some basic creativity and entrepreneurial tools. During the day, we developed an initiative creativity workshop where students learned some creativity techniques for ideas generation. Then, there was a presentation where two entrepreneurs shared their experiences with students. Finally, to end the day, we organized a small workshop for working entrepreneurial skills. The second activity was a lecture series, which were throughout the academic course. We arranged three lectures during school hours to present successful entrepreneurial cases, in order to motivate and encourage our students for undertaking this life style.

C. ***Description of stage 2: from ideas to potential business projects***

The second stage, turning business ideas into potential business projects, was more focused on team working. Three of the activities had the objective of developing a business model from students' potential business ideas; but, each of them was focused on different target groups (a specific engineering degrees or any engineering degree).

During the last course of three specific engineering degrees (management, informatics and telecommunications), students (in small teams) developed a PBL project where they had to identify one potential business idea and developed its business model (using the "Business Model Canvas" (Osterwalder & Pigneur 2010)). At the beginning of the project, there were a few master classes for sharing some

helpful tips and tools and then, students had free time to develop the project.

Furthermore, there was a similar activity which had the same objectives as the PBL project but was opened to any student from EPS-MU. It was the Creativity and Entrepreneurship Workshop, where students from different degrees spend a whole week simulating the first steps of the entrepreneurial process; starting with the idea generation and ending with the business model development. Furthermore, this activity had the support from an important Basque organization, which shared with our students one of their current challenges and they tried to solve it using the learned tools and methodologies.

At this point, we set up the first evaluation committee with the aim of evaluating all the potential Business Models developed in the previous two activities and decided if any of them had the potential to be transferred to the next stage.

Finally, once students had some basic knowledge around idea generation and business model generation, we launched a Business Plan Competition called EKITEN. Any student from MU was free to send their Mini-Business Plans to the evaluation committee, and then, the winners had the opportunity to develop more in deep their business idea in the BIC-Saiolan.

D. Description of stage 3: maturing new business projects

This last stage of the EAP was focused on the Business Model development. Students had two different options for achieving this objective. On the one hand, students from three concrete degrees (management, informatics and telecommunications) had a second PBL project where they had to develop their own Business Plan, taking the Business Model as a starting point. On the other hand, we also developed another key activity opened to all the students who wanted to develop their own potential idea (previously validated by the Evaluation Committee 1) more in deep. This activity is the Pre-Incubation and there the entrepreneurs had available an equipped room with computers where they could work, hold meetings, make prototypes… Moreover, they had assigned a tutor for guiding them through all the entrepreneurial process.

Finally, another Evaluation committee was set up for valuating all the developed Business Plans and decide if any of them was suitable to be transferred to the BIC.

IV. EAPS ACTION RESEARCH APPROACH

Action research is a process which is usually described as cyclic, with action and critical reflection taking place in turn, and where this critical reflection is used to review previous actions and plan the next one (Collins, Smith & Hannon 2006). Furthermore, it is appropriate to use when knowledge required is specific to a particular problem in a specific situation (Cohen & Manion 2000) and is extensively used in the context of curriculum development in education.

Action research also contributes to practice as well as informing theory building and is characterised by the innovation-taking place during its implementation (Collins et al. 2006). In this context, our engineering students try out their ideas and thus learn more about the consequences of their own actions and decisions. Moreover, the EAP's activities were designed in a participatory way that could create opportunities for learning entrepreneurial capacities.

Any action research approach has different phases that progress and continue in a cyclical pattern (see "Figure 3 Phases of an Action Research"). The first phase involves planning, which in this case implied the design of the EAP for a whole year. The second phase requires acting on the plan. The third phase deals with observing while the plan is being acted upon. It entails self-observation as well as the presence of one or more project mates who watch as the activity is carrying on. The fourth phase includes the teacher and observer(s) in a reflecting session based on the experiences of the lesson. The fifth phase, re-planning, completes the cycle and is a result of the work that has transpired over the first four phases. In most cases, this re-planning phase will create a revised or new plan based on new concerns (Hoppe 1996, as cited in (D'Oria 2004).

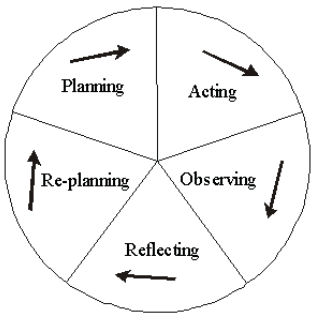

Figure 3 Phases of an Action Research (D'Oria 2004 adapted from Hoppe, 1996)

The most important phases of Hoppes cycle are the observing, reflecting and re-planning phases, because during them we detect, think on and re-plan the new improved activities. Due to this fact,

we have focused the present research paper on explaining more in deep these three phases.

A. Observing Phase

During the observing phase of the action research, we had adopted the most appropriate action research techniques, for the EAP, from McNiff (1988). In Table 4 ("Table 4 Action research techniques") there are shown the action research techniques suggested by (McNiff 1988).

Technique	Advantage(s)	Disadvantage(s)	Use(s)
Field Notes	Simple; on going; personal; aide memoire	Subjective; needs practice	- Specific issue - Case study - General impression
Audio Tape Recording	Versatile; accurate; provides ample data	Transcription difficult; time consuming; often inhibiting	- Detailed evidence - Diagnostic
Pupil Diaries	Provides pupils perspective	Subjective	- Diagnostics - Triangulation
Interviews and Discussions	Can be teacher-pupil; observer-pupil; pupil-pupil	Time consuming	- Specific in depth information
Video Tape Recorder	Visual and comprehensive	Awkward and expensive; can be distracting	- Visual material - Diagnostics
Questionnaires	Highly specific; easy to administer; comparative	Time consuming to analyse; problem of "right" answer	- Specific information & feedback
Sociometry	Easy to administer; provides guide to action	Can threaten isolated pupils	- Analysis social relationships
Documentary evidence	Illuminative	Difficult to obtain; time consuming	- Provides context & information
Slide/Tape Photography	Illuminative; promotes discussion	Difficult to obtain, superficial	- Illustrates critical incidents
Case Study	Accurate; Representative; Uses range of techniques	Time consuming	- Comprehensive overview of an issue - Publishable format

Table 4 Action research techniques (McNiff 1988)

Each technique had advantages and disadvantages; however, some of them fixed properly with our research approach. We have used different techniques depending on each activity; due to the divergence between the developed activities not every technique was appropriate for all of them.

Table 5 ("Table 5 Action research techniques applied in EAP") shows a summary of the action research techniques we applied in the EAP. During the entire Entrepreneur's Day, an observer had been recording all the activities and presentations where the students participated. This method was very useful due to its simplicity and the high amount of information we gathered from it. There was also an observer in each of the three lectures taking notes about the discussion between the students and the entrepreneurs. During the PBL projects (both milestones), the mentors recorded all the sessions in field of notes. Moreover, the final presentations of the students were video recorded and then, they were asked for filling a satisfaction questionnaire. The Creativity & Entrepreneurship workshop and its discussion between the participants were also notes and video recorded. For the Business Plan Competition, we gathered information about the participants (such as their profile, CV…) when the competition started. Moreover, we maintained multiple interviews and discussion between tutors from the Pre-incubator and the nascent entrepreneurs. Students also fill a satisfaction questionnaire at the end of their stay. Finally, both evaluation committees meetings were recorded in field of notes by an observer.

Activity	Source of data	Where used
Entrepreneur's Day	Field Notes Video Tape Recorder	The whole day was recorded in field of notes and video by an observer.
Lecture Series	Field Notes Interviews and Discussions	The whole lecture was recorded in field of notes and there was a discussion between the participants and the lecturer at the end of each lecture.
PBL milestone 1	Interviews and Discussions Questionnaire Video tape recorder	At the end of the project we recorded the presentations made by the students. We also shared out a satisfaction questionnaire.
Creativity &	Field Notes	The whole workshop was recorded in field of notes and

Entrepreneurship Workshop	Interviews and Discussions Video tape recorder	video by an observer. Moreover, during the entire session the students had the opportunity to discuss about any issue.
Business Plan Competition	Documentary evidence	Evidences from participants were gathered when the Competition began.
Evaluation Committee 1	Field Notes	The whole meeting was recorded in field of notes by an observer.
PBL milestone 2	Interviews and Discussions Questionnaire Video tape recorder	At the end of the project we recorded the presentations of the Business Plans made by the students. We also shared out a satisfaction questionnaire.
Pre-Incubation	Interviews and Discussion Questionnaire	We maintain a weekly interview with the students from the pre-incubator. We also shared out a satisfaction questionnaire.
Evaluation Committee 2	Field Notes	The whole meeting was recorded in field of notes by an observer.

Table 5 Action research techniques applied in EAP

B. Reflecting Phase

In this exploration, the action research approach provided us the opportunity to analyse if our EAP was achieving its objective: the promotion and development of entrepreneurial activity towards EPS-MUs students. Reflecting on all the collected evidences, through the previously mentioned techniques, we can state that the EAP is in the correct way. Students had evaluated positively all the developed activities and more concretely, they had highlighted the PBL activities and the workshop. The recollected evidences show clearly that students had a better disposition towards more active exercises than to lectures; they prefer the learning by doing methodology. Furthermore, it has been highly valuated the implication of industry during the Creativity & Entrepreneurship Workshop. Students show higher proactiveness towards real problems than fictitious ones.

The Entrepreneur's Day and the Business Plan Competition also had good reception, a high number of students enrolled through these two activities. More concretely, on the one hand, we had 140 students taking part in the whole Entrepreneur's Day; and on the other hand, we received 25 Business Plan proposals from 97 students. The students aptitude showed during the Entrepreneur's Day was very good. As it is reflected in the recorded video, the participants took part in every organized dynamics and activities without any complain. However, although the participation in the Business Plan Competition was high, we have received some complains about the form they had to fill in.

Finally, from the interview we have maintained with the students from the Pre-incubator, we have received a very good feedback. They valuate positively both, the physical infrastructure and also the support they received from their tutors. However, they felt that there is lack a of grants for academic entrepreneurs who still haven't constituted the company.

C. Re-Planning Phase

At the fourth phase of the action research cycle, we re-planned some of the previously developed activities in order to satisfy our students' proposals. We have decided not to change all of them at the same time and for the following academic course, we have re-planned to modify the PBL project and the Business Plan Competition form.

In the case of the PBL project, we have planned to focus its topic on a real industrial problematic. We are trying to involve some Basque companies through PBL projects, to explain their challenges to our students and evaluate their work. In this manner, our students will feel that their academic task would turn into a real solution, providing them an incentive.

For the next Business Plan Competition, it has been planned to change the form which the students have to fill in. Moreover, there will be a new requirement for their participation in the competition. Our students, as well as the written memory, should make a presentation of their business ideas in front of an evaluation committee. Thus, students would practice presentation skills which are really important in any entrepreneur.

V. CONCLUSIONS AND RECOMMENDATIONS

Nowadays Universities are contributing more and more to the R&D capability of an economy in different ways and for achieving this new role, they have been adapting their mission to the needs of this new economic and social situation. Due to this fact, universities have turned into a teaching, research and economic and social development organization. To achieve this new status, the Polytechnic School of Engineering from

Mondragon University, during the academic course 2010/2011, developed an Academic Entrepreneurial Plan focused on their students. For analysing this new mechanism, we have employed an action research approach to provide insights into the entrepreneurial activities that EPS - MU is carrying on; evaluating their success and reflecting on their improvements.

Through our action research approach, we have proved that students inside a UBC context are a core step in the path towards an Entrepreneurial University. All the activities that composed the EAP have had the participation of industry in several ways; from funds for the Entrepreneurial Business Plan Competition, to lectures about diverse enterprise and entrepreneurship subjects. Moreover, thanks to the EAP, our students also had the opportunity to test and contrast their ideas within industry's reality.

Thanks to workshops and the PBL projects, our students can deal with companies' real problems and necessities, in an academic way; and beside they develop their final year projects within a company (national or international), improving enterprising and entrepreneurial skills in a more practical way. Furthermore, through some of our EAPs activities we have used the "learning by doing" methodology, specifically, the PBL. This learning way allowed our students to face up real problems in a real way, turning a simple class task into their own project. At the same time, the PBL project is also other important channel for students to acquire transversal skills for their future careers.

All this approach has been possible due to a bottom-up initiative, promoted by some academics from EPS-MU, and fostered by the institution itself according to its strategy towards an "entrepreneurial university".

The necessity of working on entrepreneurship promotion and education with our students and within an UBC context, has been detected by our academics, based on the previous trajectory of our university in entrepreneurial activities as has been explained through this paper.

Finally, it should be highlighted that the fruit of all this labour has been an environment where students, academics, researcher, executive team and industry are working together for contributing into the social and economic development.

VI. REFERENCES

Cohen, L. M. & Manion, L. 2000. Research Methods in Education. Routledge Falmer, London: ISBN: 0 415(19541): 1.

Collins, L. A., Smith, A. J. & Hannon, P.D. 2006. Discovering entrepreneurship: an exploration of a tripartite approach to developing entrepreneurial capacities. Journal of European Industrial Training 30(3): 188-205.

D'Oria, T. 2004. How can I improve my teaching practice in grade 9 boys? Physical education to increase student's participation and enjoyment.

Deakins, D. & Freel, M. 1998. Entrepreneurial learning and the growth process in SMEs.The Learning Organization, 5(3): 144-155.

EC. 2001. Building an Innovative Economy in Europe. E. Commission. Luxembourg.

Etzkowitz, H. 1998. The norms of entrepreneurial science: cognitive effects of the new university-industry linkages. Research Policy 27(8): 823-833.

Etzkowitz, H. 2003. Research groups as "quasi-firms": the invention of the entrepreneurial university. Research Policy 32(1): 109-121.

Etzkowitz, H. & Leydesdorff, L. 2000. The dynamics of innovation: From National Systems and "mode 2" to a Triple Helix of university-industry-government relations. Research Policy 29(2): 109-123.

Etzkowitz, H., Webster, A., Gebhardt, C. & Cantisano, B. R. 2000. The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm. Research Policy 29(2): 313-330.

Gibb, A. A. 1995. Learning skills for all the key to success in small business development? International Council for Small Business - 40th World Conference. Sidney.

Gibb, A. 2012. Exploring the synergistic potential in entrepreneurial university development: towards the building of a strategic framework. Annals of Innovation & Entrepreneurship, 3.

Klofsten, M. & Jones-Evans, D. 2000. Comparing Academic Entrepreneurship in Europe – The Case of Sweden and Ireland. Small Business Economics 14(4): 299-309.

Lazzeroni, M. & Piccaluga, A. 2003. Towards the Entrepreneurial University. Local Economy 18(1): 38-48.

Mark, P., Rachel, S., Bryan, T., Francisco, L. & Jerry, F. 2009. Explaining entrepreneurial intentions of university students: a cross-cultural study. International Journal of Entrepreneurial Behaviour & Research, 15, 571-594.

McNiff, J. 1988. Action Research: Principles and Practice. Basingstoke, Macmillan.

MU. 2010. Mondragon Unibertsitatea, The University of Knowledge Transfer Mondragon University.

O'Shea, R., Allen, T. J., O'Gorman, C. & Roche, F. 2004. Universities and Technology Transfer: A Review of Academic Entrepreneurship Literature. Irish Journal of Management 25(2): 11.

Osterwalder, A. & Pigneur, Y. 2010. Business model generation: A handbook for visionaries, game changers, and challengers, Wiley.

Philpott, K., Dooley, L., O'Reilly, C. & Lupton, G. 2011. The entrepreneurial university: Examining the underlying academic tensions. Technovation 31(4): 161-170.

Rae, D. & Carswell, M. 2000. Using a life-story approach in researching entrepreneurial learning: the development of a conceptual model and its implications in the design of learning experiences. Education+ Training 42(4/5): 220-228.

Teh, P.-L. & Yong, C.-C. 2008. Multimedia University's experience in fostering and supporting undergraduate student technopreneurship programs in a triple helix model. Journal of Technology Management in China, 3, 94-108.

ENHANCING TEACHERS' ENTREPRENEURIAL COMPETENCIES: THE INFLUENCE OF COLLABORATIVE LEARNING EXPERIENCES

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Today entrepreneurship education is understood as an effective way to promote entrepreneurship and entrepreneurial behaviour in a society both in Finland and globally. Consequently, educational institutions and teachers are challenged to be more entrepreneurial in their ethos and practices. The previous studies of entrepreneurial competence (EC) development have focused primarily on potential or nascent entrepreneurs in SME context, whereas studies in teaching context are scarce. This article aims at narrowing this gap by exploring the influence of shared learning experiences in developing teachers' entrepreneurial competences. This qualitative study draws from interpretative competence framework and adopts a narrative and phenomenological approach. The data consists of teachers' written learning reflections gathered during a teacher training intervention.

The preliminary results of a phenomenological analysis indicate that collaborative learning experiences have effect on teachers' perceptions of entrepreneurship and their role as entrepreneurship educators. This study contributes theoretically by expanding the concept of entrepreneurial competence and by providing a more nuanced understanding about teachers' EC development. It also offers practical contribution by outlining the advantages of teachers' collegial learning in creating enterprising learning environments.

Keywords: Entrepreneurial competencies, collaborative learning experiences

I. INTRODUCTION

Educational institutions and teachers are acknowledged to have an important role in promoting entrepreneurship (Hannon 2007; Hytti & O'Gorman 2004; Matlay & Carey 2007). However, the studies focusing on development of teachers' entrepreneurial competencies are still rare.

While the entrepreneurship scholars have made important contributions to open up entrepreneurial competence and its development in general, they have tended to focus on entrepreneurial competence among potential or nascent entrepreneurs in SME context. Yet, considerably less attention is given to opening up entrepreneurial competence in other contexts. This study seeks to provide a more nuanced understanding about teachers' entrepreneurial competence development and especially the role of shared learning experiences in this process. The object of the study is to give a "voice" to the teachers and explore what kind of influence collaborative learning experiences have on teachers' perceptions of entrepreneurship and their role as entrepreneurship educators.

II. ENTREPRENEURIAL COMPETENCE IN TEACHING CONTEXT

A. *What do we know about teachers' entrepreneurial competence?*

Entrepreneurial competence (EC) as a concept stems from both the literature of entrepreneurship and competence literature (Mitchelmore & Rowley 2010). Drawing upon organization and work studies Chandler and Jansen (1992) as well as Chandler and Hanks (1994) were the first to present a concept of entrepreneurial competence to entrepreneurship research in the beginning of 1990s. Entrepreneurial competence as a term usually refers to entrepreneur's underlying characteristics and skills needed in effective action (Mitchelmore & Rowley 2010). Entrepreneurial competence is thus usually defined as the set of knowledge, skills and abilities that enable an entrepreneur to successfully perform the job role (Baum, Locke and Smith 2001; Chandler & Hanks 1994; Man, Lau & Chan 2002).

However, recently the idea of EC has been broadened outside business context. The study of Taatila (2010) is worth mentioning because he enlarges the traditional view of entrepreneurial competence by arguing that "entrepreneurial competencies are more holistic and psychologically oriented than traditional subject-matter skills". He also stresses that entrepreneurial competencies are not "skills specific to a business or academic branch".

Béchard and Grégoire (2005), as well as Heinonen and Poikkijoki (2006) suggest that

entrepreneurial competencies in teaching context can be seen as abilities to adopt such teaching methods, which encourage and enhance the entrepreneurial expertise of students, i.e. learning to understand entrepreneurship, learning to become entrepreneurial and learning to become an entrepreneur. On the other hand, Westerholm (2007) uses a term of readiness, which incorporates both competence and attitudes and presents that personal competence is a result from an ability to act and make relevant decisions in a given situation. Kyrö, Mylläri and Seikkula-Leino (2008) also use this concept by arguing that it is more flexible and more extended concept than competence as it considers also the role of context. On the other hand, Leffler (2002), Backström-Widjeskog (2008), Johansen and Schanke (2008) as well as Svedberg (2010) and Ødegård (2003) have adopted a term of pedagogical entrepreneurship to describe realization of entrepreneurship education from teachers' point of view. Hence, an educator can be seen as an entrepreneur who through his/her educational activities enhances entrepreneurship. Thus, both entrepreneurship and education are linked and connected in teachers' pedagogical actions. This perspective on teachers' entrepreneurial competence is adopted in this study and thus pedagogical entrepreneurship can be seen to incorporate willingness to act in entrepreneurial way by reflecting and renewing one's pedagogical thinking and actions and readiness to initiate, guide and maintain students' entrepreneurial learning processes considering the role of social context.

B. Theoretical perspectives on competence development

Competence as a term is an ambiguous concept and attached to various theoretical approaches. Despite several endeavours to classify and formulate the concept of competence, two main stream of thought can be identified, namely a rationalistic approach and an interpretative approach to competence.

A rationalistic approach draws upon a rationalistic, positivistic perspective, where competency is defined in terms of attributes of efficient employees (Garavan & McGuire 2001; Sandberg 2000). Within a rationalistic approach two separate perspectives to competence can be found in the literature, such as a work and a worker approaches (Garavan & McGuire 2001; Sandberg 2000). Though emphasizing slightly different angles of competence, both of these approaches share the idea of competence as an attribute-based phenomenon, which means that in order to perform a particular work or task more competently than others, a person should possess a superior set of attributes. (Sandber, 2000). The implication of the rationalistic approach to competence is that workers' competences can be enhanced by teaching them new skills and knowledge (Sandberg 2000).

This study adopts a recently emerged postmodern, phenomenological approach of competency, also called as interpretative approach, which offers an alternative to the dominant rationalistic approach (Garavan & McGuire 2001). By drawing upon phenomenological sociology the interpretative perspective combines the two previous approaches and offers a more holistic typology of competence (Lans, Hulsink, Baert and Mulder 2008). An interpretative approach highlights the significance of a given context, situation or role in competence development. (Garavan & McGuire 2001; Sandberg 2000.) As Sandberg (2000) argues, it is significant to focus on the way an individual experiences her/his work, as the conceptions of work defines what competencies she or he develops and uses in performing that work. Accordingly, competences are developed and reconstructed through the experiences lived by the works and by meanings they give to these experiences (Sandberg 2000). This means that when wanting to enhance teachers' entrepreneurial competences, more attention should be paid on how to change their present conceptions of entrepreneurship and their role as entrepreneurship educators.

C. The role of learning in acquiring entrepreneurial competencies

A competence approach has gained interest also in entrepreneurship education research although studies on this area are still scarce (Fastré & Van Gils 2007). For a long time entrepreneurship research on entrepreneurial behaviour was dominated by psychological stream of thought and its trait-based approach with an assumption that entrepreneurs are born, not made (Van Dam, Schipper & Runhaar 2010). In contrast to that approach, entrepreneurship education builds on presupposition that entrepreneurial competencies can be developed through learning (e.g. Cope & Watts 2000; Rae & Carswell 2001). According to Lans et al. (2008) the first conceptual model of entrepreneurial competence viewing competence from a learning perspective was set by Bird (1995). In this model entrepreneurial competence was seen as learned through education, training or experience. As a result the term learned entrepreneurial competence is used to refer to the competence that is acquired through education,

training or experience (Lans & al. 2008). This perspective is also adopted in this study.

III. METHODOLOGY

This article is based on an interpretative phenomenological research of six teachers' written reflections gathered during a teachers' continuing education program called Entrepreneurial pedagogy studies (5 ECTS) between October 2010 and February 2011. The studies were part of the Entrepreneurial University project administered by The Small Business Center at Aalto University School of Economics and aimed at enhancing teachers' entrepreneurial capabilities. These written reflections are used to explore the entrepreneurial learning process of teachers and particularly to interpret the meanings given to collaborative learning experiences.

The study applies Interpretative phenomenological analysis (IPA), developed by Smith (1996) as a research and data analysing method. As a qualitative research approach concerned with individuals' lived experiences focusing on how individuals make sense of the experiences in regards to a particular phenomenon or event this approach seemed suitable for the purposes of this study. IPA is originated in psychology and is widely used in the human, social and health sciences (Smith & al. 2009), but is a new approach in entrepreneurship education research (see e.g. Cope 2011). IPA is applicable in especially in case studies with a sample size, usually small, from three to six people which are purposively selected (Smith & al. 2009).

The data analysis process is conducted according to the description of IPA provided by Smith et al. (2009) starting from thematic coding on a single case level ending up to construction of the final table of identified themes in a group level and interpretation of the meanings of participants' experiences.

IV. SUMMARY OF THE KEY FINDINGS

The analysis of the participants' sense making of the learning process reveals that the collaborative learning intervention has provided meaningful learning experiences for the informants in many respects. Analysis of the informants narratives emerged four main themes, which are which are labelled as "networking", "change in conceptual thinking", "change in role perceptions" and "change in action level". The emerged themes represent participants' experiences of the impact of collaborative learning interventions in respect of their perceptions of entrepreneurship and their role as entrepreneurship educators. These main themes are identified as recurrent in all the analysed narratives and thus they are chosen for closer scrutiny. Each of these master themes has several sub-themes which represent different aspects of the main theme.

Space not allowing the detailed analysis and constructed narrative accounts are not presented here entirely, but instead the group level key findings based on the informants narratives are briefly introduced below.

Networking:

- Belonging in the group is valued because it enables meeting and getting to know colleagues who have faced similar challenges and obstacles.
- Being together with the like-minded people is appreciated, because the group is seen as a safe learning environment. The informants feel safe and become heard and understood in the group.
- Conversations with the colleagues are seen extremely rewarding and useful, because they enable learning from others and their previous experiences (what works and what is not worth of trying), provide a forum for detailed questions and sharing of problems and worries.
- Apart from taking advantage of others' experiences it is equally important to be able to give ideas for others and help them as well.

Change in conceptual thinking:

- Collaborative learning interventions and shared learning exercises provide opportunities for reflecting own experiences and presuppositions of entrepreneurship.
- The personal history and interest towards entrepreneurship education can be seen as "driving forces" behind attending the training program. However, the influence of those experiences on their attitudes and perceptions of entrepreneurship is not clear-cut.
- Apart from broadening conceptual understanding of entrepreneurship, the informants highlight that the studies help them to become aware of own prevalent perceptions.
- The meaning and content of entrepreneurial pedagogy and other theoretical aspects of entrepreneurial learning and teaching has been vague before the studies and thus opening the theoretical perspectives is highly valued.

Change in role perceptions:

- Shared learning experiences helped the informants to reflect their prevalent teaching practices as well as their role as entrepreneurship educators. This process includes questioning the traditional role of teacher and resistance of change.
- The informants highlight the importance of their own attitude in teaching entrepreneurship.
- Along with criticism raises awareness that teachers do have a meaningful role in enhancing students' entrepreneurial mindset and behavior.
- The informants learned to become aware of their role as organizational and societal change agents.

Change in action level:

- Collaborative learning experiences and opportunities to share the feelings of confusion and lack of self-efficacy helped the informants to carry on their projects despite facing obstacles in their working contexts.
- Collaboration with the "significant others" may help to overcome the "knowing-doing gap" (i.e. knowing what should be done, but not doing it), and turn knowledge into action.
- Collaboration with "the meaningful others" and participation in project works forced" the participants to start acting and doing things

Taken together, teachers' entrepreneurial competence development can be seen as a gradually-evolving process, where a person seeks to develop his/her competencies. Through networking and collaborative learning experiences an individual becomes more aware of the prevalent perceptions and thus collaborative learning experiences are the "triggers" for conceptual change which occurs through interaction and reflection leading to reconstruction of the work role perceptions which in turn stimulate renewal in action level leading to increased sense of competence.

V. CONCLUSIONS AND RECOMMENDATIONS

As the key findings of this study indicate the participants highly appreciate the studies and particularly collaborative learning experiences. Collaboration is valued by the participants because it offers possibilities to learn from others and reflect own thinking against the ideas of others. However, as the analysis of the data revealed, apart from appreciating collective benefits gained during the studies, the participants highlight the impact of collaborative learning experiences on individual level thinking.

The research findings indicate that the development of entrepreneurial competencies is closely linked with the perceptions of teaching and teachership. This means that when wanting to enhance teachers' entrepreneurial competencies we should first create forums that enable teachers to share and reflect their perceptions of entrepreneurship, the aims of entrepreneurship education and their role as entrepreneurship educators and societal change agents. A conceptual change takes place through shared experiences, collaborative interaction and reflection leading to reconstruction of own role perceptions. Hence, based on the findings of this study collaborative learning experiences can be seen as "triggers" for renewed thinking and acting.

A practical implication on this is that more consideration should be put on increasing dialogue and teamwork in the work places. Apart from creating opportunities for shared informal discussions it should also put more emphasis on creating opportunities for collaborative on-the-job-learning (e.g. team-teaching). The research findings also indicate that perhaps already during teacher training more emphasis should be put on reflection of conceptions of work and teachers' role as societal change agents.

VI. REFERENCES

Backström-Widjeskog, B. 2008. Du kan om du vill: lärares tankar om fostran till företagsamhet. Academic Dissertation, Åbo Akademi

Baum, J.R., Locke, E.A. & Smith, K.G. 2001. A Multidimensional Model of Venture Growth. The Academy of Management Journal 2001; 44. 292-303.

Béchard, J-P. & Grégoire, D. 2005. Understanding teaching models in entrepreneurship for higher education. In Kyrö, P. & Carrier, C. (Eds.) The Dynamics of Learning Entrepreneurship in a Cross-Cultural University Context. Hämeenlinna: University of Tampere, Faculty of Education, Research Center for Vocational and Professional Education.

Berglund, H. 2007. Researching entrepreneurship as lived experience. In Neergaard, H. & Ulhøi, J.P. (Eds.) Handbook of Qualitative Research Methods in Entrepreneurship. Edward Elgar Publishing Limited.

Bird, B. 1995. Toward a theory of entrepreneurial competency. Advances in Entrepreneurship Firm Emergence and Growth, 1995; 52-72.

Blair, C.2002. School Readiness Integrating Cognition and Emotion in a Neurobiological

Conceptualization of Children's Functioning at School Entry. American Psychologist 2002; 57, 111–127.

Chandler, G. & Jansen, E.1992. The founder's self-assessed competence and venture performance. Journal of Business Venturing, 1992; 7, 223-236.

Chandler, G. N. & Hanks, S.H.1994. Founder Competence, the Environment, and Venture Performance. Entrepreneurship: Theory and Practice 1994; 18. 77-89.

Cope, J. 2011. Entrepreneurial learning from failure: An interpretative

phenomenological analysis. Journal of Business Venturing 2011; 26. 604–623.

Cope, J. & Watts, G. 2000. An Exploration of Experience, Critical Incidents and Reflection in Entrepreneurial Learning', International Journal of Entrepreneurial Behaviour and Research 2000; 6. 104-124.

Fastré, G. & Van Gils, A. 2007. Competence development in Entrepreneurship. The Role of University Education. In M.K. McCuddy et al. (eds.) The challenges of educating people to lead in a challenging world. Dordrecht : Springer. 385-398.

Garavan, T. M. & McGuire, D. 2001. Competencies and workplace learning: Some reflections on the rhetoric and the reality. Journal of Workplace learning 2001; 13. 144-163.

Hannon, P. 2007. Enterprise for all? The fragility of enterprise provision across England's HEIs. Journal of Small Business and Enterprise Development 2007; 14. 183-210.

Emerald Group Publishing Limited

Heinonen, J. & Poikkijoki, S-A. 2006. An entrepreneurial-directed approach to entrepreneurship education: mission impossible? Journal of Management Development 2006; 25. 80-94.

Hytti, U. & O´Gorman, C. 2004. What is "enterprise education"? Education + Training 2004; 46. 11-23.

Hänninen, V. 1999. Sisäinen tarina, elämä ja muutos. Acta Universitatis Tamperensis 696. Tampere: Tampereen yliopistopaino:

Johansen, V. & Schanke, T., 2008, Evaluation of Pedagogical Entrepreneurship. Evaluation of the Preparatory Work on Introducing Entrepreneurship in Namibian Junior Secondary Schools. ENRI-report no. 11/2008, Eastern Norway Research Institute.

Kyrö, P., Mylläri, J. & Seikkula-Leino, J. 2008. Meta processes of entrepreneurial and enterprising learning – the dialogue between cognitive, conative and affective constructs. Paper presented in the 15th Nordic conference on Small Business Research 2008 Tallinn Estonia. Available online: http://cmapspublic3.ihmc.us/rid=1223538622171_1866467376_1871/Kyro-meta%20process.pdf

Lans, T., Hulsink, W., Baert, H. & Mulder, M. 2008. Entrepreneurship Education and Training in a Small Business Context: Insights from the Competence-based Approach. ERIM Report Series Research in Management. ERS-2008-028-ORG. Available at SSRN: http://ssrn.com/abstract=1144291

Leffler, E. 2002."Entreprenörskap och Företagsamhet i skolan – en del i Pedagogiskt arbete. Journal of Research in Teacher Education 2002:1-2. 87-100.

Man, T.W.Y., Lau, T. & Chan, K.F. 2002. The competitiveness of small and medium enterprises. A conceptualization with focus on entrepreneurial competencies. Journal of Business Venturing 2002; 17. 123–142.

Matlay, H. & Carey, C. 2007. Entrepreneurship education in the UK: a longitudinal perspective. Journal of Small Business and Enterprise Development, Vol. 14 No. 2, pp. 252-263. Emerald Group Publishing Limited.

Mitchelmore, S. & Rowley, J. 2010. Entrepreneurial competencies: A literature review and

development agenda. International Journal of Entrepreneurial Behaviour & Research 2010; 16. 92-111.

Ødegård, I.K.R.,2003.Læreprosesser i pedagogisk entreprenørskap. Å lære i dilemma og kaos. HøyskoleForlaget. Norwegian Academic Press.

Rae, D. & Carswell, M. 2001. Towards a conceptual understanding of entrepreneurial learning. Journal of Small Business and Enterprise Development 2001. 8. 150 – 158.

Sandberg, J. 2000. Understanding human competence at work: An Interpretative approach. Academy of Management Journal 2000; 43. 9-25.

Smith, J,A. 1996. Beyond the divide between cognition and discourse: Using interpretative phenomenological analysis in health psychology. Psychology & Health 1996; 11. 261-271.

Smith, J.A., Flowers, P. & Larkin, M. 2009. Interpretative Phenomenological Analysis. Theory, Method and Research. London: Sage Publications Inc.

Squire, C. 2008. Experience-centered and culturally-oriented approaches to narrative. In Andrews, M., Squire, C. & Tamboukou, M. (Eds.) Doing Narrative Research. London: Sage Publications Inc.

Svedberg, G. 2010. Pedagogical entrepreneurship in the formulation and realisation arena". In: J Sjøvoll, and K Skogen (eds.) Creativity and Innovation: preconditions for entrepreneurial education Trondheim: Tapir Academic Press, pp. 121-129.

Taatila, V.P. 2010. Learning entrepreneurship in higher education. Education + Training 2010; 52. 48-61.

Van Dam, K., Schipper, M. & Runhaar, P. 2010. Developing a competency-based framework for teachers' entrepreneurial behaviour. Teaching and Teacher Education 2010; 26. 965-971.

Westerholm, H. 2007. A Journey into the core of the occupational competence and attitudes of small business entrepreneurs. A study based on a review of literature and a DACUM analysis. Academic dissertation. Jyväskylä: University of Jyväskylä.

TYPOLOGY OF SYNERGY IN SPATIAL CLUSTERS

A strategic tool for policy makers

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As policy makers are interested in stimulating entrepreneurship through the initiation of spatial clusters, synergy between the participating entrepreneurs is regarded to have a positive impact on individual performance of the entrepreneurs in the cluster (Gordon and McCann, 2000; Welbourne & Pardo del Val, 2009).

Various benefits of the synergy between entrepreneurs are mentioned in various forms such as cost saving, improved decision making, cross innovations, enhanced capacity for action, brand building and new markets (Hansen and Nohria, 2004; Miles, Miles & Snow, 2006; Ribeiro-Soriano & Urbano, 2009; Drake, 2003; Gasmann, Enkel & Chesbrough, 2010). These benefits don't occur by accident, management and participants involved in spatial clusters are interested in coordinated processes or planned activities that have a positive impact on synergy within the cluster (Montgomery, 2007). Numerous examples of spatial clusters are found in practice in a wide variety of forms.

This paper presents a model to categorize the different types of synergy in spatial clusters found in Dutch incubators. The model is based on both a field study as well as literature on Collaborative Entrepreneurship and Communities of Practice.

It was found that the two most relevant determinants of success in a spatial cluster are an active management team and the primary goal of the cluster as perceived by the participants. These two determinants resulted in four types of clusters: facilitator, incubator, collective and accumulator each with their specific pro's and con's. Each type of cluster brings its own benefits and expectations to both the initiator and the participants and predicts how the cluster performs on several attributes. Hence it can be used as a strategic tool for policymakers. The tool developed from this typology was successfully used in one specific case: Hangar 36 in The Hague.

Keywords: Spatial Clusters, Business Accelerators, Innovation Partnerships, Communities of Practice, Policy.

I. INTRODUCTION

At the initiation of a spatial cluster, various benefits are expected concerning regional and economic development (Drake, 2003; Florida, 2000) and stimulation of entrepreneurship in the form of synergy between participating entrepreneurs (Gordon and McCann, 2000; Hansen and Nohria, 2004; Miles, Miles & Snow, 2006; Drake, 2003).

At the same time, the availability of space at low costs is the primary reason for creative entrepreneurs to settle in a certain area (Heebels and van Aalst, 2010). Resources spent by participating entrepreneurs on collaborative actions are limited and might not always yield the expected outcome in terms of synergy within the cluster.

Therefore, management and participants involved in spatial clusters are interested in coordinated processes or planned activities that have a positive impact on synergy within the cluster (Montgomery 2007). It can be argued that successful policy towards synergy in spatial clusters is based on reciprocity between management and participants. At the same time, the relation between management and participants varies in each cluster.

II. THEORETICAL FRAMEWORK

A. Synergy in spatial clusters

Synergy in spatial clusters is either based on physical distance and transport-cost reduction or based on social interactions (Gordon and McCann, 2000). This paper is interested in a form of synergy that is based on interaction between the participating entrepreneurs. Gordon and McCann (2000) describe this form of synergy as a social network model which is based on collective action and trust between the participating businesses about the intensity of action and the willingness to take risks.

Benefits of synergy between entrepreneurs are mentioned in various forms such as cost saving, improved decision making, cross innovations, enhanced capacity for action, brand building and new markets (Hansen and Nohria, 2004; Miles, Miles & Snow, 2006; Ribeiro-Soriano & Urbano, 2009; Drake, 2003; Gasmann, Enkel & Chesbrough, 2010).

These benefits usually don't occur by accident, management and participants involved in spatial clusters are interested in coordinated processes or planned activities that have a positive impact on synergy within the cluster (Montgomery 2007). Best practices on managing and setting up spatial clusters include the employment of experts that provide training and coaching. Furthermore it is advised to select participants that serve a single target group and to organize graduate network events (Costa-David, Malan, & Lalkaka, 2002; Schopman, 2009).

However, not every cluster is pursuing the same goals or has the same budget. Some authors argue that best practices don't exist. Montgomery (2007) for example, states that successful projects develop according to the vision of individuals or an organization, local need, local renewal strategies and available funding.

B. Organized versus unorganized synergy

Planning and coordinating synergy creates a paradox as the forming of social relationships and trust between entrepreneurs highly depends on the personal characteristics and preferences of the participants (Akkermans, 2008; Wenger, 1998). This paper investigates the process of forming collaborative relationships between entrepreneurs and the organizational structure behind the collaboration.

C. Communities of practice

Communities of practice are defined as a group of entrepreneurs who are informally bound by a shared set of problems. Over time their mutual interactions build up a shared body of knowledge and a sense of identity (Wenger, 1998). Akkerman et al. (2008) define a process of three sequential steps that occur in effectively collaborative groups.

First: Activities become meaningful when they are connected with the specific needs of the participants. Second: Activities become shared when there is a sense of belonging to the group. Third: Activities become coordinative, when activity becomes structured and organized in such a way that it moves into specific and desired directions. According to Akkerman (2008), the challenge in generating meaningful activity is identifying the specific needs of the participants in the COP. It is an easy mistake to pick topics that are relevant to the broad sector. Instead, focus on the needs and objectives of the participants in the COP.

Furthermore, Distance between the collaborative firms in an alliance is found to be an important factor for successful synergy, perceived differences such as culture or maturity, have significant impact (Chesbrough & Schwartz, 2007; Munyon, Perryman , Morgante & Ferris, 2011).

D. Organization of collaborative entrepreneurship: strategy, structure and philosophy

Authors on collaborative entrepreneurship provide a blueprint of optimal organizational conditions for effective collaboration between entrepreneurs. Efficient collaboration between entrepreneurs consists of strategy, structure and management philosophy (Chesbrough 2003; Hardy, Lawrence & Grant, 2005; Ribeiro Soriano & Urbano, 2009).

Strategy is described as a shared and clearly documented organizational vision and objectives (Chesbrough 2003; Hardy et al. 2005; Ribeiro Soriano & Urbano, 2009). Structure is described as a model where members operate independently in their own markets, but share ideas and search for innovation opportunities (Chesbrough 2003; Miles & Snow, 2006; Robeiro Soriano & Urbano, 2008; Hansen & Nohria, 2004; Welbourne & Pardo del Val, 2008). Management philosophy is described as an atmosphere of trust in which participants treat ideas as a common resource and collaboratively exploit capabilities (Chesbrough, 2003; Ribeiro Soriano & Urbano, 2009).

III. METHOD

The research method is to conduct a series of interviews amongst those who are concerned (policy makers and participants) with synergy in spatial clusters with a qualitative and open ended approach. Interviewees are asked about their personal experience in the past and expectations for the future on the topics discussed in theory. These topics are: 1. Relevance 2. Taking initiative 3. Identity 4. Structure: risks and rewards.

A series of interviews has been held with 7 policy makers in Dutch clusters in The Hague (Hangar 36), Rotterdam (Ro-Co, Creative Factory), Amsterdam (Xpositron, Veeel) and Eibergen (Rotor innovation lab, AAA concept cars). And 11 participants in spatial clusters in the Hague (9 in Hangar 36), Amsterdam (Xpositron) and Utrecht (FabLab) The interviews lasted between 45 and 90 minutes and have been recorded and transcribed. The interviews have been translated into English afterwards. The information from the interviews with policy makers is used to create a typology of spatial clusters while the interviews with participants provide the input for a case study on the application of the typology.

IV. INTERVIEWS WITH POLICY MAKERS

The information in the interviews has been categorized into four different topics. The information shows that spatial clusters originate from different views and believes that highly influence the type of synergy within a cluster.

1) Relevance

Initiating collaborative action is perceived as beneficial for a multitude of reasons: Working more efficient, expand networks, generating new and creative impulses and make money from rent.

"The problem is that everybody is very busy doing his own business. Most of the members here do very well. Including me, if I'm busy the first thing I do is not finding new projects for the collective. "_Policymaker at RoCo

"If you want to make any profit from a business building you just have to rent the space, everything else will cost you money."_ Policymaker at the Creative Factory

"If you work for client A with a team of 10 designers with 3 specialists in a certain area; and client B comes along and wants the same thing you cannot use your 3 specialists and you can help client B three months later. In our vision you reach a better solution faster by using the capacity of more designers at the same time efficiently."_ Policymaker at Veeel

"The focus of our innovation lab is mainly on internal processes. Successful examples that originate from the innovation lab are the implementation of a new and efficient billing system, the implementation of a new energy efficient testing method for electronic motors and several lean manufacturing principles that have been applied." policy maker at Rotor

"The innovation center has a perishable nature. That's where its power is. You need a continuous flow of new impulses, new managers, and new interns to keep the innovation process going. And even that process can be perishable. If you are not careful you will start creating profiles and boundaries where new managers and interns are fitted in. As soon as you do that you are killing the innovation process. You need managers with different styles and different backgrounds, students as well."_ Policymaker at AAA concept cars

2) Taking initiative

Different policy makers have different methods to stimulate initiative. Some policy makers take all the initative, others try to kickstart new initiatives from the participants by organising events and some policy makers rely on the group to organise something.

"Organizing events and taking initiative is something we expect from the group. Some people here work in the event business, for them its familiar territory. Tom and I don't have the time to do acquisition, or to actively look for projects. We want to spend time on making things easier for everyone in the collective, like ordering paper. But we feel that initiative to projects should come from the group." _Policymaker at RoCo

"We organize drinks and events for entrepreneurs to get them to know each other. We are also experimenting with a new concept called creative business scan. We approach companies (large companies like Unilever) who we think must have some sort of creative problem they want a solution for. They can buy that solution at the Creative Factory. We select a group of entrepreneurs to work on that problem. It is a good way to force them to work together and get to know each other."_ Policymaker at Creative Factory

"When we compose teams we gather them at a location and execute a session. We make sure everybody knows who brings what skills to the project and what we can expect from each other. Eventually you'll get people to participate if you are a motivating and inspiring facilitator."[..]" Students graduate at a company, hand in a report with a thousand great ideas, and nobody is responsible for executing them; the report with a thousand great ideas ends up gathering dust. Taking initiative, doing something that's not in your job description is something most people don't do, in a company or in a collective of entrepreneurs. "_ Policymaker at Veeel

"*Students that are hired have to write their own assignment. The advantages to this principle are that a student will not write an assignment that is too easy or too hard. Furthermore they will focus on the aspects they are most interested in and have a higher motivation to pursue these aspects."_ Policy maker at Rotor*

"You have to find co-operation yourself, I collaborate with 2 design agencies in Amsterdam. In fact, Amsterdam is one big incubator"_ Policymaker Xpositron

3) Identity.

Spatial clusters create an image to attract a different range of clients and participants.

"We don't have a specific theme or guideline our projects should meet. The group I free to organize whatever they like. We do have five members

working on a plan to present ourselves right now because what we do is hard to explain. It looks a bit like this:

A client has a problem, perhaps he needs a team of three members, the client contacts Ro-Co and he can pick three of our members to generate a solution. Perhaps we pick the members, we don't know yet. But this is a difficult story to tell because clients are not used to work like that." _Policymaker at Roco

" The creative factory has to be known as the inspiring community. Come to this place for inspiration, come to this place with your creative problems, we have a bunch of entrepreneurs who solve them for you"_ Policymaker at the Creative Factory

" Our process is what makes us unique and what we are known for by our clients."_ policy maker at Veeel

4) Structure: risk and rewards

Different goals of the initiator lead to a different structure of risks and rewards. Implementation of new innovations can be a satisfying result for some, while others aim at finding new assignments to participate in with their own company. Another example is when initiators expand their network and let their participants benefit.

"The idea is that once we have a project we form a team internally, who is suited for the job? and who is motivated to participate? In practice this turns out to be a lot harder than in theory." _Policymaker at RoCo

" Leo maintains all the contact we have with partners; it really is a skill that he possesses. He meets someone from KPMG at a network event and three weeks later we have a partnership. His networking skills are a crucial element."_ Policymaker at Creative Factory

"We have contact with a client; we deliver the strategy and determine how we are executing the project and what the best way to involve our designers is. We start with a big group and make smaller teams when the tasks get more specific during the project. Designers apply for a project; we generate the teams and decide what is necessary. If we need a space we rent a suitable space, if we need a prototype we arrange a partner to produce it."_ Policymaker at Veeel

"The final two months of the internships are dedicated to implementation. This process motivates the students to come up with something practical and also forces them to seek contact with employees within the company. Furthermore, Rotor benefits most from an implemented proposal and the ability of the proposal to generate internal support also acts as an indication of its quality. "[...]" Organizing the work is something you have to do yourself. The detailing can be done by whoever you hire for it. I don't need to know how much it benefits my company in terms of profit or ROI. If I see proposals by students getting implemented I know I benefit"_ Policymaker at Rotor

V. TYPES OF SPATIAL CLUSTERS

Differences and similarities have been found between the clusters. In order to create a better understanding of these differences, a model is proposed that captivates the type of synergy in specific situations. Through a combination of theory and information from the interviews it is argued that successful synergy in spatial clusters is based on reciprocity between management and participants. Information about the participants is discussed in a separate case study after this chapter.

Specific goals from the initiator attract participants that have certain expectations. The model divides two kinds of clusters: those that are initiated with a primary goal towards collaboration between participants and those that are not.

Furthermore, a division can be made between organized and unorganized synergy. Some clusters have a budget or funding to employ a management team that actively engages in enhancing the performance of individual entrepreneurs within a cluster through the organization of teambuilding or network events. Other clusters are expected to organize themselves.

Based on these two variables 4 different forms of collaboration in a creative cluster can be distinguished that are represented in the following model:

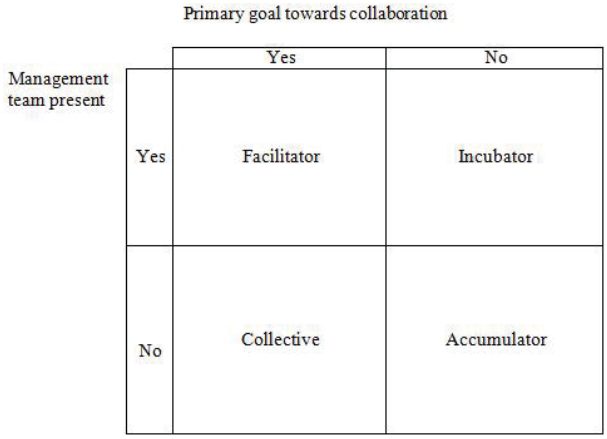

Figure 1: Different types of synergy in spatial clusters

A. *Facilitator*

Facilitators are interested in combining the work of multiple participants that are often entrepreneurs, freelancers or students to a final and better result. Examples include several crowd sourcing initiatives, internship pools or innovation labs. Management is responsible for taking initiatives and approaching clients while involving participants through teambuilding and coaching activities. Participants benefit from a strong identity of the initiator.

1) Benefits for the initiator: Access to many competences and ideas

The initiator has access to a very large pool of knowledge, capabilities, competences and ideas. This makes it easy to generate a high number of solutions to a problem, to deliver quality on many different disciplines, to serve a very wide variety of clients and to be original. Working with new people every time ensures a fresh and unbiased approach towards problems every time. The facilitator takes the risk and also the reward, participants are paid a fixed reward.

2) Benefits for participant: Access to clients and compensation

Participants have a chance to work for a client that would otherwise be inaccessible. They also have a chance to work on a project where the end result is of a higher quality than what could be achieved alone. They don't need to engage in activities that are not their strengths; for example, acquisition and they don't have to carry any risks. A participant can earn compensation in the form of money, study points, or a chance at winning a competition.

B. *Incubator*

Incubators have a primary goal towards individual growth of the participants and synergy is regarded as a method to achieve that. Typical participants in an incubator are starting entrepreneurs, that don't have a very strong company culture developed and don't have a large network yet. At the same time, they are very busy and focused on the growth of their own company. Participants carry their own risk and make their own decisions. This means involvement depends on very personal preferences of the entrepreneur. Management is monitoring and steering performance of the participants and is also responsible for initiating network events.

1) Benefits for the initiator: Entrepreneurial image

The initiator has a chance to stimulate entrepreneurship. Therefore the initiator is very often a person or organization that benefits from this stimulation directly (city governments), or indirectly in the form of networking, promotion, sponsorships and subsidies (e.g. universities, housing corporations or individuals with affinity towards entrepreneurship).

2) Benefits for participants: Reduced risk and Access to expertise and networks

Participants benefit from an organization that has an interest in stimulating their growth and reducing their risks. Benefits could include: renting a relatively cheap space and facilities, coaching and training below market price, introduction to potential clients through events, introduction to potential partners through events, branding, and working in a stimulating environment.

C. *Collective*

A collective is a collection of individuals, entrepreneurs or students that have decided to work together on certain projects. A collective has a shared vision and a common goal and has decided to team up in order to pursue that goal. A collective has a shared identity that participants feel connected to. Initiatives to execute mutual projects have to come from within the group, and the division of risks and benefits depends on agreements within the collective. Participants are expected to take initiative towards collective action, generate new projects and ideas, perform acquisition, and motivate others to participate. Furthermore, members are expected to participate in initiatives from others.

1) Benefits: Execute bigger projects, share expenses and promotion

Benefits include executing projects that are too big for an individual entrepreneur to work on. Share expenses and facilities such as work space, a kitchen, a copy machine and ink-cartridges and to work in an inspiring environment. Sharing the

risks is both an advantage as a disadvantage as it makes participants more dependent on each other.

*D. **Accumulator***

An accumulator is the accumulation of a number of companies in a building, often initiated to stimulate entrepreneurship by offering office space at low costs. Management is responsible for maintaining the building. Therefore, initiative towards collaborative projects has to come from within the group, which has a low level of involvement regarding collaboration. At the same time, entrepreneurs highly value their companies' identity and are less interested in collaborative projects. Taking initiative is taking a risk at the same time, because it takes time and resources to develop an idea before potential partners get interested.

1) Benefits for the initiator: Rent Space and entrepreneurial image

The initiator has a chance to stimulate entrepreneurship. Therefore the initiator is very often a person or organization that benefits from this stimulation directly (city governments), or indirectly in the form of networking, promotion, sponsorships and subsidies (e.g. universities, housing corporations or individuals with affinity towards entrepreneurship).

2) Benefits for participants: Low cost office space

Participants have the option to rent office space at a relatively low price and share facilities. Furthermore, they have the chance to work in an inspiring environment and to meet other entrepreneurs and exchange ideas and knowledge.

	Facilitator	**Incubator**	**Collective**	**Accumulator**
Involvement	Management is responsible for teambuilding activities. And is interested in doing so.	Management is responsible for teambuilding activities. But has other priorities.	High level of involvement because every member shares the same goal.	Low level of involvement because collaboration is not relevant
Initiative	Management is responsible for initiating projects.	Management is responsible for initiating projects. But participants have the option to do so.	Participants are responsible for initiating collaborative projects.	Participants are responsible for initiating collaborative projects.
Identity	Participants benefit from a strong identity from the cluster.	Participants benefit from a strong identity from the cluster. But are developing their own identity at the same time.	Participants feel very connected to a shared identity.	Participants value their own companies' identity.
Risk and rewards	The initiator carries all the risk. And is entitled to all the rewards.	Risks are divided between initiator and participant.	Risks are divided between the participants.	Risks are carried by the entrepreneur.

Table 1: Performance of each cluster on the four bottlenecks

VI. CASE STUDY: HANGAR 36

Hangar 36 is a Dutch cluster located in The Hague. The entrepreneurs in Hangar 36 are active in the creative industries, for example: architecture, interior architecture / styling, product development, photography, graphic design, smart-phone apps and fashion. In the current situation, the entrepreneurs benefit from each others' proximity by sharing facilities, accidental exchange of ideas and informal exchange of help and advice.

Some entrepreneurs see the potential of a group of multi-disciplined, talented and creative entrepreneurs in one location and are interested in a structural benefit from this potential. Every company in Hangar 36 is successful in its own market, but initiating and participating in collaborative projects requires an investment and taking risks. The main goal of the case was to find answer to the question:

How can the entrepreneurs in Hangar 36 structurally benefit from their presence in a spatial cluster which is shared by a group of multi-disciplinary, talented and creative entrepreneurs?

This study investigates the Dutch cluster Hangar 36 in practice using the proposed typology as a tool to assess its performance in terms of synergy.

VII. Interviews in Hangar 36

Entrepreneurs started their business because they want to be independent and do things according to their own vision. Working for inspiring clients, being a bit more special every year and execute noticeable projects and earning a profit are examples of indicators for entrepreneurs to measure their success.

"I got shingles when I worked for a boss, you are a successful entrepreneur if you keep can keep pushing yourself to renewal and broadening your horizon." _Entrepreneur in Hangar 36

"I started as an entrepreneur because I am perky and I think I do everything better if I do it myself. With my latest job I got stuck because there is always someone above you with a different view." _Entrepreneur in Hangar 36

When it comes to the wants and needs in a possible collaboration, entrepreneurs don't exactly know what to expect or what to wish for. Most participants praise the high level of expertise from their group members in their own specialism.

"Our biggest strength is the combination of different disciplines. I wouldn't find it interesting to be located here with 20 of the same companies." _Entrepreneur in Hangar 36

But at the same time they indicate that for advice on their own problems they would rather talk to someone who works in the same industry. It is also believed that the chances for a client that actually needs all their different specialties at the same time are very slim.

While their wishes are a bit ambiguous, the entrepreneurs know exactly what they don't want. Anything that interferes too much with their business is undesired. Time spent on collaborating is less time spent on doing business. Money invested in collaborative projects is less money invested in personal projects.

"Creating and developing is our passion, entrepreneurship is a necessary detail." _Entrepreneur in Hangar 36

A. *Performance on each topic*

Information from the interviews has been used to determine the performance on each topic.

1) *Relevance*

While most entrepreneurs say they would participate in a project they believe in, the truth is that there is little relevance in earlier executed projects to a number of entrepreneurs. If an entrepreneur is prepared to take initiative it is hard to find other participants in the project. A shared vision and objectives (Chesbrough 2003; Hardy et al. 2005; Ribeiro Soriano & Urbano, 2009), or shared domain (Wenger, 1998) are absent.

"Eventually the decisiveness is very low; you have your own company to worry about. If there is no output, commercially, you have to consider how and where you want to spend your time. That's the reason we have become reticent. However, I do believe we can help each other a lot, every discipline related to product design is represented in the Hangar. It's good to be in each other's presence and understand each other and sometimes need each other. That's why I once joined the Hangar." _Entrepreneur in Hangar 36

2) *Taking initiative*

Before an idea is worth participating in; a certain amount of time and recourses have to be invested in that idea by the initiator. A busy schedule and limited recourses prevent most entrepreneurs from taking initiatives. Taking initiative is not perceived as meaningful or relevant (Akkermans, 2008).

"If I think an idea is interesting I am willing to invest more time. That's the bottleneck; you don't get to something you truly believe in without making an initial investment." _Entrepreneur in Hangar 36

3) *Identity*

The entrepreneurs in Hangar 36 highly value the personal identity of their company. Mutual interactions build up a shared body of knowledge and a sense of identity (Wenger, 1998). However, participating in projects that are presented under a shared name or identity conflicts with the reason they became entrepreneurs in the first place. Distance between the entrepreneurs in terms of company identity is high (Munyon et al., 2011).

"We will never want to give up our identity. If Hangar would be worth mentioning I would link my name to it. But when you are an entrepreneur for so long your company is sort of like your baby. You don't want to sacrifice your baby, especially if your baby exists longer then the cluster. " _Entrepreneur in Hangar 36

"If you have no idea about what exactly you are profiling there is no use. What about the underlying message you try to communicate when organizing events? "Come to hangar.. we have nice people here" that's not a message. Who should come to such events? You can bring your own network here, but that's your own network. Do they have any advantage from the collaboration of a collective? You don't want to spend your energy trying to communicate a message without substance which is exactly what happened in the past." _Entrepreneur in Hangar 36

4) Structure: risk and rewards

An atmosphere of trust in which participants treat ideas as a common resource and collaboratively exploit capabilities (Chesbrough 2003; Ribeiro Soriano & Urbano, 2009) is present when it comes to hiring each other's' expertise for existing clients.

However, a shared project for Hangar 36 as a client brings risks in terms of investing time and recourses and additional dependence on other firms. There is no vision on how investments, risks and the eventual reward between the entrepreneurs in the cluster should be structured (Chesbrough 2003; Miles & Snow, 2006; Robeiro Soriano & Urbano, 2008; Hansen & Nohria, 2004; Welbourne & Pardo del Val, 2008).

"I started in Hangar because of the dynamic situation. Things originate with or without rules. People that really want something find each other. Other people don't do that much, they don't have the need or they don't show initiative. Because there are people that don't do as much, other people are not willing to do that much either, you don't want people hitchhiking on your work. Hangar 36 is not what it could be. I'd rather work in a small group with all motivated people than a group in which I have to motivate people because they aren't motivated by themselves. I also believe if you didn't participate you also shouldn't be able to benefit, people don't like hitchhikers." _Entrepreneur in Hangar 36

VIII. CONCLUSIONS

A. *Impact on Hangar 36*

The model is used to determine what type of synergy is present in Hangar 36. With no management team and no initial goal to produce synergy Hangar 36 is ranked as an accumulator. Any form of collaborative action has to be initiated from an entrepreneur within the cluster. There will be a very high threshold to do so because involvement in collaborative projects is low. According to Akkermans et al. (2008) mutual activities become meaningful or relevant if they connect to the specific needs of the participating entrepreneurs. In the case of Hangar 36, the participants don't need anything that interferes with their daily routines.

For Hangar 36 the interviews and plenary sessions helped to determine what actually is relevant to the entrepreneurs. Promotion of the cluster and expanding each others' network are two areas of interest that are perceived as relevant by the participants.

Since there is nobody officially responsible for managing mutual projects, accumulators always will be dependent on the levels of energy from individual entrepreneurs. By dedicating the plenary meetings towards relevance and action, the possibilities of participants finding that energy will increase.

B. *Impact on spatial clusters in general*

The model acts as a tool for policy makers that are initiating a new cluster or trying to implement new policy into an existing cluster. It shows the different motivations from both initiator and participants to be part of the cluster, which are predictors for their needs and wants of what is relevant to them. The model can be used to say something about the expectations of successful synergy inside a spatial cluster.

Organizing synergy is difficult because success depends on different actors that are driven by different interests. If the initiator benefits from the synergy such as a facilitator there is more reason to invest time and money in a shared domain (Wenger, 1998), organization (Robeiro Soriano & Urbano, 2008) and cover expenses such as prototyping. This leaves the participants with plenty of time to focus on actual projects producing the best results without making risky investments.

The opposite is true for an accumulator; participants have to spend time, energy and money on shared practice, organization and cover project expenses. While being responsible for the contents of the project at the same time.

Furthermore, performance of a cluster depends on how well the initial tasks are executed. A collective without a strong identity and a shared vision and goals faces the same problems as an accumulator. The same rule applies to a poorly managed cluster or facilitator.

IX. RECOMMENDATIONS

The model has only been applied on a case that is an accumulator. Further research is necessary to determine if the model is accurate on other types of clusters. The four topics that have been found play a different role in each cluster that has to be further investigated.

The two variables in the model suggest that creating a shared domain and organization are two separate activities that distract participants from the content of collaborative projects. The relation between shared domain, organization and involvement in collaborative projects in different types of spatial clusters can be further investigated.

To combine this model with research on entrepreneurial personalities might produce valuable insights. The interviews with entrepreneurs in Hangar 36 showed that reasons for entrepreneurs to start a company include independence and own responsibility. These reasons are sometimes in conflict with the collaborative nature of synergy.

X. REFERENCES

Akkerman, S. Petter, C. Laat de, M., (2008). Organizing communities-of-practice: facilitating emergence. Journal of workplace Learning 20 (6) 383-399.

Chesbrough, H. Schwartz, K., (2007). Innovating business models with co-development partnerships. Research technology management 1 55-59.

Costa-David, J. Malan, J. Lalkaka, R., (2002). Improving business incubator performance through benchmarking and evaluation: Lessons learned from Europe. 16th international conference on business incubation. National business incubation association, April 28 – May 1, 2002, Toronto, Canada.

Drake, G., (2003). This place gives me space: place and creativity in the creative industries. Geoforum 34 511-524.

Florida, R., (2002). The rise of the creative class. New York: Basic Books.

Gasmann, O., Enkel, E., Chesbrough, H., (2010). The future of open innovation. R&D management 40 (3) 213-221.

Gordon, I.R., McCann, P., (2000). Industrial clusters: complexes, agglomeration and/or social networks? Urban studies 37 (3) 513-532.

Hansen, M.T., Nohria, N., (2004). How to build collaborative advantage. MIT Sloan management review 46 (1) 22-30.

Hardy, C., Lawrence, T.B., Grant, D., (2005). Discourse and collaboration: the role of conversations and collective identity. Academy of management review 30 (1) 58-77.

Heebels, B., Aalst van, I., (2010). Creative clusters in Berlin: entrepreneurship and the quality of place in prenzlauer berg and kreuzberg. Geografiska Annaler: Series B, Human Geography 92 (4) 347-363.

Miles, R.E., Miles, .G, Snow, C.C., (2006). Collaborative entrepreneurship: a business model for continuous innovation. Organizational dynamics 35 (1) 1-11.

Montgomery, J., (2007). Creative industry business incubators and managed workspaces: a review of best practice. Planning, practice and research 22 (4) 601-617.

Munyon, T.P. Perryman, A. A., Morgante, J.P., Ferris, G.R., (2011). Firm relationships: the dynamics of effective organization alliances. Organizational dynamics 40 96-103.

Ribeiro-Soriano, D., Urbano, D., (2009). Overview of Collaborative Entrepreneurship: An Integrated Approach Between Business Decisions and Negotiations. Group decision negotiation 18 419-430.

Schopman, E,. (2009). Eindverslag launch 2007-2009. Saxion Hogeschool Enschede.

Welbourne, T.M., Pardo-del-Val, M., (2009). Relational capital: strategic advantage for small and medium size enterprises (SMEs) through negotiation and collaboration. Group decision negotiation 18 483-497.

Wenger, E. , (1998). Communities of Practice: Learning, Meaning and Identity. Cambridge University Press, Cambridge.

EXPLORING THE ENTREPRENEURIAL POTENTIAL OF LMSS AND WEB 2 TECHNOLOGIES: A LITERATURE REVIEW

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While both the educational use of information technologies and entrepreneurship education are on the rise in higher education institutes, an important question is left: Can e-learning promote entrepreneurial competencies in students? Thus, there is a need to understand the capacity of new technologies to cultivate entrepreneurial competencies. In this paper we review published research studies on the use of commercial and open source Learning Management Systems (LMSs) and Web 2 Technologies. The purpose of this review is to identify a set of entrepreneurial benchmarks required to evaluate LMSs and Web 2, to present a synthesis of the accumulated state of knowledge concerning these technologies, and to define future research and evaluation perspectives concerning the entrepreneurial usage of the new technologies. Following the review guidelines organised by Creswell (1994) and using Constant Comparative Method (Lincoln and Guba, 1985), prior studies (mostly empirical) were summarized and grouped concerning entrepreneurial aspects into 4 categories including: "integration with entrepreneurial competencies", "entrepreneurial tools", "meeting the training needs of firms" and "entrepreneurial approaches". Providing a comprehensive list of 46 entrepreneurial benchmarks (in the 4 categories above) for evaluating e-learning platforms, this review identified that entrepreneurial viewpoints were more significantly explored in Web 2 tools than LMSs and in the "integration with entrepreneurial competencies" category rather than other categories. The conclusions overall suggest that entrepreneurial aspects have to yet be explored in e-learning platforms especially in LMSs.

Keywords: Entrepreneurship, LMS, Open source, Commercial, Web 2, Technology, Criteria

I. INTRODUCTION

The entrepreneur is the central actor in generating entrepreneurial activity (Tajeddini and Mueller, 2009) so they are widely seen as a vital component for economic competitiveness (Roffe, 2007). Global Entrepreneurship Monitor (GEM) describes entrepreneurship as a "worldwide phenomenon that is on the increase" and the twenty-first century's generation has been branded as generation E, the most entrepreneurial since the Industrial Revolution (Garavan et al., 2010). Furthermore, the use of technology in educational systems is on the rise in recent decades, since "the current belief is that ICT is not only the backbone of the Information Society, but also an important catalyst and tool for inducing educational reforms that change our students into productive knowledge workers" (Pelgrum, 2001, p.163). Thus, it is important to understand the capability of e-learning platforms to cultivate entrepreneurial competencies in students. This paper attempts to identify the aspects of e-learning systems that have been under evaluated in terms of supporting the development of entrepreneurial competencies in order to direct future research.

"E-learning platforms" is a generic term covering a variety of different products, which support learning by using electronic media and information technologies. These products can be used to provide different ways of virtual education with different contexts, ranging from conventional, classroom delivery to off-line, distance learning and on-line learning (Buendía and Hervás, 2006) as well as blended learning (Alonso et al., 2005).

E-learning evaluation, namely the process by which people make value judgements, (Dyson and Barreto Campello, 2003) is very important, and must be carried out at each stage of the learning programme (e.g. such as the analysis stage, design, development and implementation). E-learning evaluation is also crucial in order to determine whether the learning and training programme is effective and is able to positively enhance knowledge, skills, productivity, performance, quality, learning outcomes, etc; able

to achieve the desired learning objective; able to give impact and added value to the organisation or able to meet customer needs (Yunus & Salim, 2008). To do so, multiple benchmarks and methods are required. This situation requires the elaboration of frameworks to drive such systematized evaluation (Buendía García and Hervás Jorge, 2006). On the other hand, there have been some barriers in the evaluation of e-learning platforms (See table 1).

Barrier	Researcher
Variety of platforms and contexts	Buendía García and Hervás Jorge, 2006
Lack of benchmarks	
Unconsolidated evaluation methodology	Costabile et al, 2005
High dependence upon the skills and experiences of the evaluators	Ardito et al, 2004
Disagreement about standard framework for e-learning evaluation	Chua & Dyson, 2004

Table 1. Some of the barriers of e-learning platforms' evaluating

With regard to the importance of having a standard framework for e-learning evaluation, there are some frameworks such as: "Framework for evaluation of Virtual Learning Environments (VLEs)"; "Framework for Pedagogical Evaluation of Virtual Learning Environments"; "Framework for evaluation of Virtual Learning Environments based on Benchmarks"; "Framework for evaluation of Virtual Learning Environments based on OSS" (Kljun et al., 2007); "Framework for evaluation e-learning platforms based on their conformance with some standards, such as: SCORM (ADL, 2004) and IMS LD (IMS, 2003)" (Hervás Jorge, 2006). While each of these frameworks tries to show a special perspective for e-learning platforms' evaluations, there has been a lack of a specific framework and benchmark to evaluate the capacity of these virtual environments to enhance entrepreneurial capabilities, since none of the above cited frameworks have addressed the entrepreneurial capabilities of e-learning platforms.

Furthermore, modern e-learning systems are mostly implemented by computer science specialists, who often lack awareness of the other aspects of e-learning processes (Tankelevičienė and Damaševičius, 2009). Many previous evaluations of e-learning platforms were conducted by technological experts, while entrepreneurial specialists were not involved in these evaluations. Additionally, there has not been a significant investigation of the formation of entrepreneurial competencies by e-learning systems in universities, while the entrepreneurship education area has been investigated by many researchers.

there is clear evidence that entrepreneurship can be taught – at least to some extent (Lendner and Huebscher, 2009). entrepreneurship is a legitimate area of scholarly inquiry and a curricular component for the entire university, not only departments, schools and colleges of business (Hines, 2009). As a result, "new entrepreneurship courses, minors and less structured certificates have woven entrepreneurial principles and philosophies into the disciplinary fabric of higher education" (Mars and Hoskinson, 2009, p. 191). Consequently, it can be expected that the rise of cross-campus programs in entrepreneurship now offers a golden opportunity to explore the integration of e-learning systems to support the greater cognitive diversity of students who come from different majors, different academic levels and even different physical locations (Krueger, 2009). This cross-campus and interdisciplinary essence of entrepreneurship education increases the importance of entrepreneurial capabilities of e-learning platforms.

With regard to the importance of paying attention to cultivating entrepreneurial competencies in students, the next question is: Which barriers most often confront the cultivation of entrepreneurial competencies in students? Prior studies have identified various contributions in this area and highlighted diverse barriers. Some of those findings have been summarised in Table 2 briefly.

Reason	Researcher
Disciplinary based nature of fields in universities	West et al., 2009
Scepticism viewing of faculties to business schools	
Bad and deficient understanding of entrepreneurship	
Lack of theoretical foundation for the relationship between the entrepreneurship and all of university's fields	
Lack of research activity in this area	Wong et al., 2005
traditional "behaviourist" approach in education	Krueger, 2009
the improper assessment methods	
Insufficient knowledge about entrepreneurs' learning style	

Table 2. Some of the prior studies' findings difficulties encountered cultivating entrepreneurial competencies in university students

having discovered the range of evaluation studies of current virtual learning platforms reported in recent relevant journals and publications, this paper outlines a comprehensive framework for evaluating e-learning platforms in terms of their entrepreneurial capabilities.

II. METHODOLOGY

Precise definitions of some methodological terms which are frequently used in this paper are provided here. "Benchmark" in this paper is defined as the principles or standards by which e-learning platforms may be compared, judged or decided to be selected or not (in this case: in terms of their entrepreneurial competencies). Some of these benchmarks are presented in Appendix 1.

The focus of this literature review is limited to the entrepreneurial aspects of LMSs (Open source and commercial) and Web 2 technologies, studies which deal with other e-learning platforms as well as other dimensions such as pedagogical, technical or institutional aspects of these platforms are excluded.

The search for relevant studies was conducted in two stages. Firstly, using some keywords including "entrepreneurial", "evaluation", "e-learning platforms", "LMS", "Web 2", "benchmark", "criteria" and some other their subtitles and secondly, further searches on the some papers cited in the prior found articles were carried out. Altogether and discarding unrelated articles, 76 papers were analysed using the variables described below.

This study follows the review guidelines organised by Creswell (1994), which described that the aim of a review is to evaluate the accumulated knowledge in terms of issues that research has yet to resolve. Accordingly, using the research questions and hypothesis of the selected papers as a guide, each individual paper was reviewed and marked. The benchmarks proposed in this article were not pre-determined prior to the review of gathered articles but emerged in the process of reviewing prior studies inductively.

Using the constant comparative method (Lincoln and Guba, 1985), the first paper was reviewed and the entrepreneurial concepts within it were identified to form a tentative benchmark. As second and subsequent articles were reviewed new variables were added where required, while existing identified variables were noted, thus indicating the frequency of appearance of technological variables explored in the reviewed papers.

This process was repeated until all 76 articles were reviewed, examined and categorised. According to the number of questions and hypothesis in a given study, it is possible that one paper may produce more than one benchmark.

III. FINDINGS

The results of this review are presented in two sections: "Categorisation of identified entrepreneurial benchmarks", and "Distribution of identified entrepreneurial benchmarks amongst the different e-learning platforms".

A. Categorisation of identified entrepreneurial benchmarks:

Based on the above process, 46 entrepreneurial benchmarks for comparing/assessing e-learning platforms were identified and classified, as summarised in Table 3.

Category	Number of benchmarks
Integration with entrepreneurial characteristics	20
Entrepreneurial tools	8
Meeting the Training Needs of Firms	12
Entrepreneurial approaches	6

Table 3. Categorisation of identified entrepreneurial benchmarks for evaluating e-learning platforms

As it can be seen in the table 3, there are four categories of entrepreneurial benchmarks which are required for evaluation of e-learning platforms. The first and most examined category is "Integration with entrepreneurial characteristics". In this category some benchmarks for evaluating the amount of integration of some entrepreneurial competencies e.g. autonomy, creativity, proactivity, visionary etc. with e-learning platforms are addressed. In the second category, includes; Exclusive e-incubation, Entrepreneurship-based games, e-mentoring, Carriers database, etc. the third category includes 12 exclusive training needs of firms such as: Marketing, Consistent delivery, Value Creation, Modularity, etc. Finally, the fourth category contains 6 learning methods as entrepreneurial approaches including: Experiential learning (Learning by doing), Team working (Group Project), constructivism, etc.

As it has been mentioned, 46 benchmarks in the above 4 categories have been extracted from different relevant studies for evaluating e-learning platforms in terms of their entrepreneurial

capabilities. While most of these benchmarks are dedicated to the first category, only 6 benchmarks are related to the fourth category. A completed list of these benchmarks is available in the Appendix 1.

B. Distribution of evaluation of e-learning platforms based on the identified entrepreneurial benchmarks:

Some identified entrepreneurial benchmarks mentioned in the prior section have been used to evaluate e-learning platforms in prior studies. In this section we focus on the distribution of evaluation of e-learning platforms based on the identified entrepreneurial benchmarks.

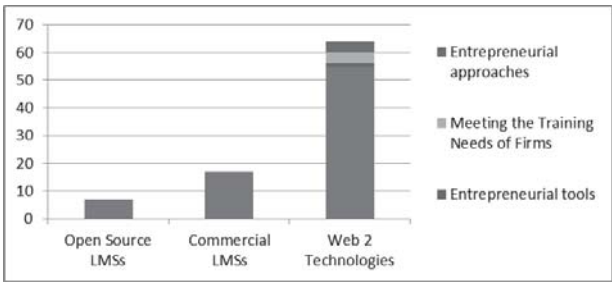

Figure 1. Distribution of evaluation of e-learning platforms based on the identified entrepreneurial benchmarks

Figure 1 describes the distribution of these examined benchmarks amongst the different e-learning platforms. As it can be seen here, unlike the LMSs, more Web 2 technologies have been evaluated in terms of their entrepreneurial training support capabilities. Furthermore, it shows that the LMSs have only been examined based on their integration with entrepreneurial characteristics and other entrepreneurial benchmarks have not been addressed in those studies.

IV. DISCUSSION AND CONCLUSION

This paper systematically reviews the literature on the use of Web 2 as well as LMSs as e-learning platforms in the context of entrepreneurial education. the current situation of entrepreneurial benchmarks for evaluation of e-learning platforms is classified and opportunities for future research are recognised. Providing a comprehensive list of 46 entrepreneurial benchmarks (in 4 categories) for evaluating e-learning platforms, this review identified that entrepreneurial viewpoints were more significantly explored in Web 2 tools than LMSs and in the "Integration with entrepreneurial competencies" category rather than other categories. as the first contribution of this study, it can be concluded that in future studies entrepreneurial aspects should be explored further in e-learning platforms especially in LMSs. Also prior evaluations of e-learning platforms largely ignored "Entrepreneurial approaches", "Entrepreneurial tools" and "Meeting the training needs of firms".

Some of the entrepreneurial benchmarks identified in this study, have been focused on by other researches. For instance, regarding the first category of our identified benchmarks, Lans and Gulikers (2010) pointed out that there is an increase of empirical evidence which suggests that entrepreneurial processes or events are enabled by entrepreneurial competencies. Interestingly, many of these studies emphasize that these constructs are in fact subject to learning and development. This finding shows a support for our widest and most evaluated entrepreneurial benchmark category which addresses the platforms' integration with the entrepreneurial competencies. In fact, in this category, the capability of each e-learning platform for cultivating entrepreneurial competencies will be evaluated. For instance, it is possible that some of these platforms have more potency for enhancing entrepreneurial competencies of students through their studies over other platforms.

In another case, it was suggested that the most common causes for small business failure lie in the business incubators' assistance programs (Wong et al, 2005). So, as has been identified in this study, it can be predicted that some modified and IT based incubators which are embeddable in e-learning platforms can assist students to create low-failure businesses.

"Experiential learning" or Work Integrated Learning (WIL), one entrepreneurial benchmark identified in this study and a well-known phenomenon in the entrepreneurship education, is defined as the process of knowledge creation through the transformation of experience (Kolb, 1984). Accordingly, many researchers such as Politis (2005) pointed out that entrepreneurial learning is an experiential process in which knowledge grows through experiencing, reflecting, thinking and acting. This evidence supports the finding of the current study in this area.

In the context of experiential learning, "mentorship" as another entrepreneurial benchmark is a "protected relationship in which learning and experimentation can occur, potential skills developed and results measured in terms of competencies gained rather than curricular territory covered" (Sullivan, 2000, p. 169) and has been stressed by some scholars.

The third category of identified entrepreneurial benchmarks for evaluating e-learning platforms is

dedicated to the exclusive training needs of firms. It is generally accepted by prior studies that businesses have some special training requirements. For instance, "modularity" as one of our benchmarks, is related to an educational course being designed as a series of independent units of study that can be combined in a number of ways. Fleming and Yang (2010) described this feature as one of the important capabilities of some of the Stanford University's courses. Also, Cooke and Dinkelmann (2001) pointed out that entrepreneurship education which includes more than one study field or qualification would be more effective with modularisation.

Lo¨bler (as cited in BINKS et al., 2006) has suggested that a constructivist approach, which stipulates that reality is a construct of the human mind borne of the subjective interaction between information and experience, can serve as a new paradigm for entrepreneurship education, arguing that constructivism satisfies the demands of entrepreneurship education that emerge from the entrepreneurship research literature. This supports for our "constructivism" benchmark in the "entrepreneurial approaches" category. Constructivism, while more difficult to assess, can provide a framework for understanding how individuals organise experience, as well as their perception of reality (Ibid).

In summary this study provides a framework for evaluation of e-learning platforms in terms of their entrepreneurial competencies. This framework consists of 46 entrepreneurial benchmarks categorised into 4 groups. We find that these benchmarks have been assessed more often in Web 2 technologies than in LMSs. Future work in this area should therefore concentrate on applying these benchmarks to LMSs.

V. REFERENCES

Alonso, Fernando. López, Genoveva. Manrique, Daniel. Viñes, José M. (2005). An instructional model for web-based e-learning education with a blended learning process approach. British Journal of Educational Technology, 36(2), 217–235.

Ardito, C. Costabile, M. De Marsico, M. Lanzilotti, R. Levialdi, S. Plantamura P. Roselli, T. Rossano, V. Tersigni, M. (2004). Towards guidelines for Usability of E-Learning applications. In: C. Stary and C. Stephanidis (Eds). User centered interaction paradigms for universal access in the information society. (vol. LNCS 3196, pp.185-202). Heidelberg: Springer-Verlag (Germany).

Beckman, Gary D. Cherwitz, Richard A. (2009). Advancing the authentic: intellectual entrepreneurship and the role of the business school in the fine arts entrepreneurship curriculum design. In G. Page West, Elizabeth J. Gatewood, and Kelly G. Shaver (Eds.), Handbook of university-wide entrepreneurship education (pp. 21-34), Massachusetts: Edward Elgar Publishing Limited.

BINKS, MARTIN. STARKEY, KEN. MAHON, CHRISTOPHER L. (2006). Entrepreneurship Education and the Business School. Technology Analysis & Strategic Management, 18(1), 1–18.

Buendía García, Félix. Hervás Jorge, Antonio. (2006). EVALUATING E-LEARNING PLATFORMS THROUGH SCORM SPECIFICATIONS. IADIS Virtual Multi Conference on Computer Science and Information Systems, pp.53-58.

Buendía García, Félix. Hervás Jorge, Antonio. (2006). EVALUATING E-LEARNING PLATFORMS THROUGH SCORM SPECIFICATIONS. IADIS Virtual Multi Conference on Computer Science and Information Systems, pp.53-58.

Buendía, Félix. Hervás, Antonio. (2006). An evaluation framework for e-learning platforms based on educational standard specifications. Proceedings of the Sixth International Conference on Advanced Learning Technologies (ICALT'06)

Chua, B.B. & Dyson, L.E. (2004). Applying the ISO9126 model to the evaluation of an e-learning system. In R. Atkinson, C. McBeath, D. Jonas-Dwyer & R. Phillips (Eds), Beyond the comfort zone: Proceedings of the 21st ASCILITE Conference (pp. 184-190). Perth, 5-8 December.

Colace, F. De Santo, M. Vento, M. (2003). Evaluating On-line Learning Platforms: a Case Study. Proceedings of the 36th Hawaii International Conference on System Sciences, Italy: Università degli Studi di Salerno.

Cooke, Lesley. Dinkelmann, Eric. (2001). MODULAR EDUCATION: A TECHNIKON PERSPECTIVE. CTM QUALITY PROMOTION SERIES; Curriculum Development series; Modularisation: No 1.

Costabile, M. F. De Marsico, M. Lanzilotti, R. Plantamura, V. L. Roselli, T. (2005). On the Usability Evaluation of E-Learning Applications. Proceedings of the 38th Hawaii International Conference on System Sciences, pp.1-10.

Costabile, M. F. De Marsico, M. Lanzilotti, R. Plantamura, V. L. Roselli, T. (2005). On the Usability Evaluation of E-Learning Applications. Proceedings of the 38th Hawaii International Conference on System Sciences, pp.1-10.

Dyson, Mary C. Barreto Campello, Silvio. (2003). Evaluating Virtual Learning Environments: what are we measuring? Electronic Journal of e-Learning, 1:1, pp.11-20

Fleming, Lee. Yang, Woodward. (2010). Increasing science-based and high-technology entrepreneurship through educational innovation. (Unpublished paper).

Garavan, Thomas. Birdthistle, Naomi. O'Cinneide, Barra. Collet, Chris. (2010). Entrepreneurship education in the Republic of Ireland: context, opportunities and challenges. In Alian Fayolle

(Ed), Handbook of research in entrepreneurship education, volume 3 (pp. 225-247), Cheltenham: Edward Elgar Publishing Limited.

Kljun, Matjaz. Vicic, Jernej. Kavsek, Branko. (2007). Evaluating Comparisons and Evaluations of Learning Management Systems. Proceedings of the ITI 2007 29th Int. Conf. on Information Technology Interfaces, June 25-28, 2007, Cavtat, Croatia, pp.363-368.

Kolb, D.A. (1984), Experiential Learning, Prentice-Hall, Englewood Cliffs, NJ, .

Krueger, Norris F. (2009). The micro-foundations of entrepreneurial learning and … education: the experiential essence of entrepreneurial cognitaion. In G. Page West, Elizabeth J. Gatewood, and Kelly G. Shaver (Eds.), Handbook of university-wide entrepreneurship education (pp. 35-59), Massachusetts: Edward Elgar Publishing Limited.

Kumara, S A Vasantha. Sahasranam, C. (2009). Entrepreneurial Characteristics Among Business Management Students: An Empirical Study. The Icfaian Journal of Management Research, 8, 7-29.

Lans, Thomas. Gulikers, Judith. (2010). Assessing entrepreneurial competence in entrepreneurship education and training. In Alian Fayolle (Ed), Handbook of research in entrepreneurship education, volume 3 (pp. 54-67), Cheltenham: Edward Elgar Publishing Limited.

Lendner, Christian. Huebscher, Jutta. (2009). Entrepreneurship simulation game seminars: perceived learning effects on natural science, liberal arts and business school students. In G. Page West, Elizabeth J. Gatewood, and Kelly G. Shaver (Eds.), Handbook of university-wide entrepreneurship education (pp. 176-190), Massachusetts: Edward Elgar Publishing Limited.

Mars, Matthew M. Hoskinson, Sherry. (2009). Interesting entrepreneurship and law: an experiential learning exchange. In G. Page West, Elizabeth J. Gatewood, and Kelly G. Shaver (Eds.), Handbook of university-wide entrepreneurship education (pp. 191-202), Massachusetts: Edward Elgar Publishing Limited.

Mendes, Anthony. Kehoe, Cynthia. (2009). Academic entrepreneurship: possibilities and pitfalls. In G. Page West, Elizabeth J. Gatewood, and Kelly G. Shaver (Eds.), Handbook of university-wide entrepreneurship education (pp. 73-94), Massachusetts: Edward Elgar Publishing Limited.

Pelgrum, W.J. (2001). Obstacles to the integration of ICT in education: results from a worldwide educational assessment. Computers & Education, 37, 163–178.

Politis, D. (2005), "The process of entrepreneurial learning. A conceptual framework", Entrepreneurship Theory and Practice, Vol. 29 No.3, pp.399-424.

Roffe, Ian. (2007). Competitive strategy and influences on e-learning in entrepreneur-led SMEs. Journal of European Industrial Training, 31(6), 416-434.

Roy, A. and Raymond, L. (2008). Meeting the Training Needs of SMEs: is e-Learning a Solution? The Electronic Journal of e- Learning, 6: 2, pp.89-98.

Sullivan, R. (2000), "Entrepreneurial learning and mentoring", International Journal of Entrepreneurial Behaviour & Research, Vol. 6 No.3, pp.160-75.

Tajeddini, Kayhan. Mueller, Stephen L. (2009). Entrepreneurial characteristics in Switzerland and the UK: A comparative study of techno-entrepreneurs. Journal of International Entrepreneurship, 7, 1–25.

Tang Lin, Hsien. Ming Yuan, Shyan. (2006). Taking Blog as a Platform of Learning Reflective Journal. In Liu, Wenyin. Li, Qing. Lau, RynsonW.H. (Eds.), Advances in Web Based Learning – ICWL 2006, (pp.38-47). Verlag Berlin Heidelberg: Springer.

Weaver, K. Mark. D'Intino, Robert. Miller, DeMond. Schoen, Edward J. (2009). Building an entrepreneurial university: a case study using a new venture development approach. In G. Page West, Elizabeth J. Gatewood, and Kelly G. Shaver (Eds.), Handbook of university-wide entrepreneurship education (pp. 107-121), Massachusetts: Edward Elgar Publishing Limited.

West, G. Page. Gatewood, Elizabeth J. Shaver, Kelly G. (2009). Legitimacy across the university: yet another entrepreneurial challenge. In G. Page West, Elizabeth J. Gatewood, and Kelly G. Shaver (Eds.), Handbook of university-wide entrepreneurship education (pp. 1-11), Massachusetts: Edward Elgar Publishing Limited.

Wong, Wing-Ki. Cheung, Hong-Man. Venuvinod, Patrik. (2005). INDIVIDUAL ENTREPRENEURIAL CHARACTERISTICS AND ENTREPRENEURIAL SUCCESS POTENTIAL. International Journal of Innovation and Technology Management, 2, 277–292.

Yunus, Yusminar. Salim, Juhana. (2008). Framework for the Evaluation of E-learning in Malaysian Public Sector from the pedagogical perspective. International Symposium on Information Technology, ITSim 2008. pp.1-8.

VI. APPENDIX A. THE LIST OF ENTREPRENEURIAL BENCHMARKS FOR EVALUATING E-LEARNING PLATFORMS (THE REFERENCES ARE SORTED IN EACH SUBCATEGORY BASED ON THE DATE OF THEIR PUBLICATION)

Benchmark		Some Author(s)
Category	**Title**	
Integration with entrepreneurial characteristics	Autonomy	Hirst and White, 2001; Kurilovas, 2005; Khan and Ahmad, 2008, Cockbain et al, 2009
	Creativity and innovation	Hirst and White, 2001; Bennett and Bennett, 2003; Armstrong et al, 2009; Hung et al, 2010; Lai and Chen, 2011
	negotiation	Kurilovas, 2005
	Proactivity	Di Iorio et al, 2010
	communication	Nardi et al, 2000; Nicholson, 2002; Ras et al, 2007; Armstrong et al, 2009; Günther et al, 2009; SANSERM, 2010; Hamuy and Galaz, 2010; Halic et al, 2010; Hung et al, 2010; Smith, 2010; Chen, 2011; Waters and Jamal, 2011; Muralidharan et al, 2011; Schultz et al, 2011; Briones et al, 2011
	adaptability	Khan and Ahmad, 2008
	flexibility	Di Iorio et al, 2010
	self-confidence	Armstrong et al, 2009; Kabilan et al, 2010; Su and Beaumont, 2010; Ertmer et al, 2011
	Estimation	Nikiforidou and Pange, 2010
	Decision Making	Stanley and Latimer, 2011; Pasin and Giroux, 2011
	Desire to have high earning	Enders et al, 2008
	Initiator	Raban et al, 2011
	Critical thinking	Hirst and White, 2001; Altinay and Paraskevas, 2007; McLeod and Vasinda, 2008; Armstrong et al, 2009; Schellens et al, 2009; Mendenhall and Johnson, 2010; Baylen, 2010; Schillinger, 2011; Stanley and Latimer, 2011
	Risk Taking and Uncertainty	Boone and Witteloostuijn, 1999; Lewis and George, 2008; Pi et al, 2010
	Time planning	[Romiszowski (2004)]; Kurilovas, 2005; Huang and Nakazawa, 2010
	Visionary	O'Droma et al, 2003
	Problem Solving	Manning, 2004; Huang and Chuang, 2008; Lazakidou and Retalis, 2010; Buckley and Williams, 2010; Baylen, 2010
	Persistence	Hershkovitz and Nachmias, 2011
	Entrepreneurial Perception	Arnold and Paulus, 2010; Ertmer et al, 2011
	networking and team-working	Francoli and Ward, 2008; Armstrong et al, 2009; Stanley and Latimer, 2011
Entrepreneurial tools	Exclusive e-incubation	Hackett and Dilts, 2004
	e-mentoring	Wheeler and Lambert-Heggs, 2009
	Careers database	McCullough, 2000; Basye, 2000; DUGAN et al., 2009
	networking	Chatti et al., 2007; Mason and Rennie, 2008
	Entrepreneurial think tank	Walsh, 2009
	Entrepreneurship-based games	LAI and SIAU, 2003; Steinkuehler, 2007
	BP improver	Reich and Benbasat, 1996
	Industrial-educational forums	Ziegler, 1983
Meeting the Training Needs of Firms	Distribution of literature	Roy and Raymond, 2008
	Modularity	Roy and Raymond, 2008
	Personalization (Speed, Learning Style etc.)	Roy and Raymond, 2008
	Privacy	Roy and Raymond, 2008
	Flexibility and	Roy and Raymond, 2008

	accessibility (availability)	
	Interactive Feedback	Roy and Raymond, 2008; Huang and Nakazawa, 2010; Mompean, 2010
	Cost	Roy and Raymond, 2008
	Partnership with other organisations	Pacheco et al, 2006
	Value Creation	Enders et al, 2008
	Evaluation	[Barnes, 2005]
	Marketing	Barnes, 2005
	Consistent delivery	Roy and Raymond, 2008
Entrepreneurial approaches	Compatibility with Theories	Tao et al, 2009
	Action learning	Jarvis and Dickie, 2010
	Team working (Group Project)	May and Carter, 2001; Johnson et al., 2002
	constructivism	Swan et al., 2009; Payne, 2009
	Experiential learning (Learning by doing)	[Dieleman and Huisingh, 2006]; Jarvis and Dickie, 2010; Arnold and Paulus, 2010
	Students presentation	Mazur and Kozarian, 2010

VII. APPENDIX B. LIST OF STUDIES REVIEWED

Altinay, Levent. Paraskevas, Alexandros. (2007). A computer-supported collaborative learning (CSCL) approach in teaching research methods. Hospitality Management, 26, 623–644.

Armstrong, Gary R.; Tucker, Joanne M.; Massad, Victor J. (2009). Interviewing the Experts: Student Produced Podcast. Journal of Information Technology Education, 8, IIP-79-IIP-90.

Arnold, Nike. Paulus, Trena. (2010). Using a social networking site for experiential learning: Appropriating, lurking, modeling and community building. Internet and Higher Education, 13, 188–196.

Barnes, Tom. (2005). RSS: Marketing's Newest Communication Channel. Journal of Website Promotion, 1: 4, 15-30.

Basye, Anne. (2000). Opportunities in Direct Marketing Careers. VGM career Horizons, Chicago, USA.

Baylen, Danilo M. (2010). Adult Learners Learning Online: A Case Study of a Blogging Experience. In Kidd, Terry T. Keengwe, Jared. (Eds), Adult Learning in the Digital Age: Perspectives on Online Technologies and Outcomes (pp.163-177), Hershey: Information Science Reference (an imprint of IGI Global).

Baylen, Danilo M. (2010). Adult Learners Learning Online: A Case Study of a Blogging Experience. In Kidd, Terry T. Keengwe, Jared. (Eds), Adult Learning in the Digital Age: Perspectives on Online Technologies and Outcomes (pp.163-177), Hershey: Information Science Reference (an imprint of IGI Global).

Bennett, John. Bennett, Linda. (2003). A review of factors that influence the diffusion of innovation when structuring a faculty training program. Internet and Higher Education, 6, 53–63.

Boone, Christophe. Witteloostuijn, Arjen van. (1999). Competitive and opportunistic behavior in a prisoner's dilemma game: experimental evidence on the impact of culture and education. Scandinavian Journal of Management, 15, 333-350.

Briones, Rowena L. Kuch, Beth. Fisher, Brooke. Jin, Liu Yan. (2011). Keeping up with the digital age: How the American Red Cross uses social media to build relationships. Public Relations Review, 37, 37–43.

Buckley, Clive N. William, Angela M. (2010). Web 2.0 Technology for Problem-Based and Collaborative Learning: A Case Study. In Kidd, Terry T. Keengwe, Jared. (Eds), Adult Learning in the Digital Age: Perspectives on Online Technologies and Outcomes (pp.118-125), Hershey: Information Science Reference (an imprint of IGI Global).

Chatti, Mohamed Amine. Jarke, Matthias. Frosch-Wilke, Dirk. (2007). The future of e-learning: a shift to knowledge networking and social software. Int. J. Knowledge and Learning, 3(4/5), pp. 404-420.

Chen, Gina Masullo. (2011). Tweet this: A uses and gratifications perspective on how active Twitter use gratifies a need to connect with others. Computers in Human Behaviour, 27, 755–762.

Cockbain, M.M. Blyth, C.M. Bovill, C. Morss, K. (2009). Adopting a blended approach to learning: Experiences from Radiography at Queen Margaret University, Edinburgh. Radiography, 15, 242-246.

DI IORIO, ANGELO. MUSETTI, ALBERTO. PERONI, SILVIO. VITALI, FABIO. (2010). Ontology-driven generation of wiki content and interfaces. New Review of Hypermedia and Multimedia, 16: 1_2, 9_31.

Dieleman, Hans. Huisingh, Don. (2006). Games by which to learn and teach about sustainable development: exploring the relevance of games and experiential learning for sustainability. Journal of Cleaner Production, 14, 837-847.

DUGAN, MARY. BERGSTROM, GEORGE. DOAN, TOMALEE. (2009). Campus Career Collaboration: "Do the Research. Land the Job." College & Undergraduate Libraries, 16:122–137.

Enders, Albrecht. Hungenberg, Harald. Denker, Hans-Peter. Mauch, Sebastian. (2008). The long tail of social networking. Revenue models of social networking sites. European Management Journal, 26, 199– 211.

Enders, Albrecht. Hungenberg, Harald. Denker, Hans-Peter. Mauch, Sebastian. (2008). The long tail of social networking. Revenue models of social networking sites. European Management Journal, 26, 199– 211.

Ertmer, Peggy A. Newby, Timothy J. Liu, Wei. Tomory, Annette. Yu, Ji Hyun. Lee, Young Mi. (2011). Students' confidence and perceived value for participating in cross-cultural wiki-based collaborations. Educational Technology Research Development, 59, 213-228.

Ertmer, Peggy A. Newby, Timothy J. Liu, Wei. Tomory, Annette. Yu, Ji Hyun. Lee, Young Mi. (2011). Students' confidence and perceived value for participating in cross-cultural wiki-based collaborations. Educational Technology Research Development, 59, 213-228.

Francoli, Mary; Ward, Stephen. (2008). 21st century soapboxes? MPs and their blogs. Information Polity: The International Journal of Government & Democracy in the Information Age, 13: 1/2, 21-39.

Günther, Oliver. Krasnova, Hanna. Riehle, Dirk. Schöndienst, Valentin. (2009). Modeling Microblogging Adoption in the Enterprise. Proceedings of the Fifteenth Americas Conference on Information Systems, San Francisco, California August 6th-9th 2009.

Hackett, Sean M. Dilts, David M. (2004). A Systematic Review of Business Incubation Research. Journal of Technology Transfer, 29, 55–82.

Halic, Olivia. Lee, Debra. Paulus, Trena. Spence, Marsha. (2010). To blog or not to blog: Student

perceptions of blog effectiveness for learning in a college-level course. Internet & Higher Education, 13: 4, 206-213.

Hamuy, Eduardo. Galaz, Mirtha. (2010). Information versus Communication in Course Management System participation. Computers & Education, 54, 169–177.

Hershkovitz, Arnon. Nachmias, Rafi. (2011). Online persistence in higher education web-supported courses. Internet and Higher Education, 14, 98–106.

Hirst, Paul H. White, Patricia. (2001). PHILOSOPHY OF EDUCATION, London & New York: Routledge

Huang, Chenn-Jung. Chuang, Yi-Ta. (2008). Supporting the development of collaborative problem-based learning environments with an intelligent diagnosis tool. Expert Systems with Applications, 35, 622–631.

Huang, Wen-Hao David. Nakazawa, Kazuaki. (2010). An empirical analysis on how learners interact in wiki in a graduate level online course. Interactive Learning Environments; 18: 3, 233-244.

Hung, Chia-Liang. Chou, Jerome Chih-Lung. Dong, Tse-Ping. (2010). Innovations and communication through innovative users: An exploratory mechanism of social networking website. International Journal of Information Management. doi:10.1016/j.ijinfomgt.2010.12.003.

Jarvis, Claire; Dickie, Jennifer. (2010). Podcasts in Support of Experiential Field Learning. Journal of Geography in Higher Education, 34: 2, 173-186.

Johnson, Scott D. Suriya, Chanidprapa. Yoon, Seung Won. Berrett, Jared V. Fleur, Jason La. (2002). Team development and group processes of virtual learning teams. Computers & Education, 39, 379–393.

Kabilan, Muhammad Kamarul. Ahmad, Norlida. Abidin, Mohamad Jafre Zainol. (2010). Facebook: An online environment for learning of English in institutions of higher education? Internet and Higher Education, 13, 179–187.

Khan, Muzafar. Ahmad, Aleem. (2008). Usability Evaluation of a Student Wiki System in Higher Education, PROCEEDINGS OF WORLD ACADEMY OF SCIENCE, ENGINEERING AND TECHNOLOGY, VOLUME 32, AUGUST 2008, pp. 680-689.

KURILOVAS, Eugenijus. (2005). Several Aspects of Technical and Pedagogical Evaluation of Virtual Learning Environments. Informatics in Education, 4, 215-252.

Lai, Hui-Min. Chen, Chin-Pin. (2011). Factors influencing secondary school teachers' adoption of teaching blogs. Computers & Education, 56: 4, 948-960.

LAI, Yuen Poh. SIAU, Tan Long. (2003). EBIZ GAME: A SCALABLE ONLINE BUSINESS SIMULATION GAME FOR ENTREPRENEURSHIP TRAINING. Developments in Business Simulation and Experiential Learning, 30, 270-278.

Lazakidou, Georgia. Retalis, Symeon. (2010). Using computer supported collaborative learning strategies for helping students acquire self-regulated problem-solving skills in mathematics. Computers & Education, 54, 3–13.

Lewis, Carmen C. George, Joey F. (2008). Cross-cultural deception in social networking sites and face-to-face communication. Computers in Human behaviour, 24, 2945–2964.

Manning, C.K. (2004). WEBCT DISCUSSIONS IN PROBLEM BASED LEARNING (PBL): ANALYSIS OF USE BY REPRESENTATIVE GROUPS IN AN INTRODUCTORY FOOD SCIENCE COURSE. Journal of the American Dietetic Association, 104, 40.

Mason, Robin. Rennie, Frank. (2008). E-learning and social networking handbook. Routledge, New York, USA.

May, Andrew. Carter, Chris. (2001). A case study of virtual team working in the European automotive industry. International Journal of Industrial Ergonomics, 27(3), 171–186.

Mazur, Elizabeth; Kozarian, Lauri. (2010). Self-Presentation and Interaction in Blogs of Adolescents and Young Emerging Adults. Journal of Adolescent Research, 25: 1, 124-144.

McCullough, Hope. (2000). THE DESIGN AND DEVELOPMENT OF AN ONLINE DATABASE FOR THE CAREER SERVICES DEPARTMENT OF THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL. Master dissertation, University of North Carolina.

McLeod, Julie. Vasinda, Sheri. (2008). Critical Literacy and Web 2.0: Exercising and Negotiating Power. Computers in the Schools, 25: 3/4, 259-274.

Mendenhall, Anne. Johnson, Tristan E. (2010). 'Fostering the development of critical thinking skills, and reading comprehension of undergraduates using a Web 2.0 tool coupled with a learning system', Interactive Learning Environments, 18: 3, 263 — 276.

Mompean, Annick Rivens. ReCALL, (2010). The development of meaningful interactions on a blog used for the learning of English as a Foreign Language. ReCALL, 22: 3, 376-395.

Muralidharan, Sidharth. Rasmussen, Leslie. Patterson, Daniel. Shin, Jae-Hwa. (2011). Hope for Haiti: An analysis of Facebook and Twitter usage during the earthquake relief efforts. Public Relations Review, 37, 175–177.

Nardi, B., Whittaker, S., & Bradner, E. (2000). Interaction and outeraction: instant messaging in action. CSCW '00: Proceedings of the Conference on Computer-Supported Cooperative Work (pp.79–88). New York: Association for Computing Machinery.

Nicholson, Scott. (2002). Socialization in the ''virtual hallway'': Instant messaging in the asynchronous Web-based distance education classroom. Internet and Higher Education, 5, 363–372.

Nikiforidou, Zoi. Pange, Jenny. (2010). “Shoes and Squares”: A computer-based probabilistic game for pre-schoolers. Procedia Social and Behavioural Sciences, 2, 3150–3154.

O’Droma, Mairtin S. Ganchev, Ivan. McDonnell, Fergal. (2003). Architectural and functional design and evaluation of e-learning VUIS based on the proposed IEEE LTSA reference model. Internet and Higher Education, 6, 263–276.

Pacheco, Pedro. Motloch, John. Vann, John. (2006). Second Chance Game: local (university-community) partnerships for global awareness and responsibility. Journal of Cleaner Production, 14, 848-854.

Pasin, Federico. Giroux, Hélène. (2011). The impact of a simulation game on operations management education. Computers & Education, 57, 1240–1254.

Payne, Carla R. (2009). Information Technology and Constructivism in Higher Education: Progressive Learning Frameworks. Union Institute and University of Vermont College, USA.

Pi, Shih-Ming. Liao, Hsiu-Li. Liu, Su-Houn. Hsieh, Chia-Yu. (2010). The effects of USER PERCEPTION OF value on USE OF blog services. SOCIAL BEHAVIOR AND PERSONALITY, 38: 8, 1029-1040.

Raban, Daphne Ruth; Ronen, Inbal; Guy, Ido. (2011). Acting or reacting? Preferential attachment in a people-tagging system. Journal of the American Society for Information Science & Technology, 62, 4, 738-747.

Ras, Eric. Carbon, Ralf. Decker, Björn. Rech, Jorg. (2007). Experience Management Wikis for Reflective Practice in Software Capstone Projects. IEEE Transactions on Education, 50: 4, 312-320.

Reich, Blaize Horner. Benbasat, Izak. (1996). Measuring the Linkage between Business and Information Technology Objectives. MIS Quarterly, 20(1), 55-81.

Romiszowski, Alexander J. (2004). How’s the E-learning Baby? Factors Leading to Success or Failure of an Educational Technology Innovation. Educational Technology, 44, pp.5-27.

Roy, A. Raymond, L. (2008). Meeting the Training Needs of SMEs: is e-Learning a Solution? The Electronic Journal of e- Learning, 6: 2, pp.89-98.

SANSERM, SINEENUCH KHRUTMUANG. (2010). STUDENT AND INSTRUCTOR PERCEPTIONS OF USING ATUTOR AS THE LEARNING CONTENT MANAGEMENT SYSTEM FOR LEARNING AT A DISTANCE IN THAILAND. Doctoral dissertation, Oklahoma State University, USA.

Schellens, T.; Van Keer, H.; De Wever, B.; Valcke, M. (2009). Tagging thinking types in asynchronous discussion groups: effects on critical thinking. Interactive Learning Environments, 17: 1, 77-94.

Schillinger, Trace. (2011). Blurring Boundaries: Two Groups of Girls Collaborate on a Wiki. Journal of Adolescent & Adult Literacy, 54:6, 403–413.

Schultz, Friederike. Utz, Sonja. Göritz, Anja. (2011). Is the medium the message? Perceptions of and reactions to crisis communication via twitter, blogs and traditional media. Public Relations Review, 37, 20–27.

Smith, Brian G. (2010). Socially distributing public relations: Twitter, Haiti, and interactivity in social media. Public Relations Review, 36, 329–335.

Stanley, David. Latimer, Karen. (2011). ‘The Ward’: A simulation game for nursing students. Nurse Education in Practice, 11, 20-25.

Steinkuehler, Constance. (2007). Massively multiplayer online games & education: an outline of research. Proceeding CSCL'07 Proceedings of the 8th international conference on Computer supported collaborative learning, 675-685.

Su, Feng. Beaumont, Chris. (2010) 'Evaluating the use of a wiki for collaborative learning', Innovations in Education and Teaching International, 47: 4, 417—431.

Swan, Karen. Garrison, D.R. Richardson, Jennifer C. (2009). A Constructivist Approach to Online Learning: The Community of Inquiry Framework. Information Technology and Constructivism in Higher Education: Progressive Learning Frameworks.

Tao, Yu-Hui. Cheng, Chieh-Jen. Sun, Szu-Yuan. (2009). What influences college students to continue using business simulation games? The Taiwan experience. Computers & Education, 53, 929–939.

Walsh, Bob. (2009). The Web Startup Success Guide, Apress L. P., Berkeley, CA.

Waters, Richard D. Jamal, Jia Y. (2011). Tweet, tweet, tweet: A content analysis of non-profit organizations’ Twitter updates. Public Relations Review, doi:10.1016/j.pubrev.2011.03.002.

Wheeler, Steve; Lambert-Heggs, Wendy. (2009). CONNECTING DISTANCE LEARNERS AND THEIR MENTORS USING BLOGS The MentorBlog Project. Quarterly Review of Distance Education, 10: 4, 323-331.

Ziegler, William L. (1983). Computer science education and industry: Preventing educational misalignment. The Proceedings of the Twentieth Annual Computer Personnel on Research Conference, New York, NY, USA, 108-112.

LEARNING BY DOING

A possibility for development of entrepreneurship

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Both in Europe, and in one of its member states, Hungary, higher education requires new types of innovation to be introduced to improve competitive edge, and more efficient use of the workforce. These types of innovation point toward better, more effective employability. The purpose of this paper is to demonstrate what responses higher education can give to the challenges of the labour market.

The research investigated the changes of the EU's employment needs in the period up to 2020 as well as the achievements of the learning by doing movement in the EU, and the outcome of research aimed at activating students' entrepreneurial talents. Finally we provide a general description of the Finnish Partus Rocket Model and of the way in which it may be successfully applied in a traditional learning environment. The main outcomes (values) of this paper may be summed up as follows:

The appearance of the post-industrial knowledge-based society gradually changes the traditional situation/environment of higher education, first of all employment needs, required skills and competencies. The fast-changing situation changes also the formerly generally accepted approach to employability. The article analyses the changed tasks of those contributing to the process (labour market, higher education, students), and presents some possible answers (Partus Rocket Model).

An important outcome of the article is what advantages and difficulties arise from the introduction of an LBD system in a traditional learning environment.

Keywords: Learning by doing, entrepreneurship, competences, employability, Team Academy, Partus Rocket Model, Work based learning

I. INTRODUCTION

It seems increasingly that in Europe – and in Hungary in particular – new types of innovation must be introduced to ensure competitive advantage and better use of the workforce. These innovations – supported by various EU documents – point in the same direction, i.e. *better employability*.

The importance of serving labour market needs has long been present in the thinking of the functions, and tasks of the education and training system. However, advocates of the academic Humbolt type higher education have long held the view that higher education is not responsible for satisfying labour market needs, and it is enough if it just educates 'smart' students who will then find jobs they find attractive, and can manage their own integration in the labour market.

However, the appearance of post-industrial knowledge-based society has changed the previous well established situation almost overnight. That is because knowledge based society has created complex and dynamically changing management and production processes that requires higher standards of knowledge, skills, competences, and activity in masses previously unheard of. The recent re-surfacing of the concept of employability is not only important because of the practical requirements of the labour market environment, but also because *knowledge* and the *transmission of knowledge* have meanwhile undergone major transformation.

Various documents, strategies, action plans, etc. describing the routes of social and economic development including the flexible labour market, entrepreneurial culture, improving skills in countries of Europe, but mostly of EU member countries all suggest that their authors see the prerequisites of creating a competitive Europe in educational services offering qualifications mutually understandable and acceptable by individual member countries.

The old interpretation of employability whereby jobs requiring more knowledge also require longer studies, but pay higher wages has long been forgotten.

In our fast changing world the situation must be seen as system where the actors (labour force, institutions, labour market actors) all contribute their characteristic share, and their cohesion unity brings about the desirable (practical) employment situation.

The characteristic features of employability from the *young expert's (student's)* point of view are a cohesive set of the following: (1) finding a job after obtaining a qualification, (2) performing appropriately in that position, and (3) developing

knowledge, skills, and competences required to take on a higher position at the next career move.

For the *training institution* the same concept consist of set of innovative and sustainable activities required for the successful structural, and qualitative adaptation to the labour market.

As for the *labour market*, the required features include access to the knowledge, skills, and competences sufficient to and required for the given job, position, and experience.

So, over the last few years we have seen a clear tendency turning higher education more practice oriented by default to ensure that their graduates in the labour market can better complete ever changing tasks, and both Europe and the US make major efforts to that end. One of the most important documents of recent years is a publication by the European Commission titled *New Skills for New Jobs* in which, trying to better satisfy future manpower needs, emphasis is placed on further, even more profound establishment of relationships, and even closer partnership, and two-way communication. Same as labour market requirements, employees' needs are also well articulated and multi-layered (different things are expected of a young expert at a multinational firm than at SME), while various types of higher education institutions can also greatly differ from each other. It is sufficient at this point to refer to the different functions and educational objectives of research universities on the one hand and applied universities (colleges) on the other.

Our investigation focuses on colleges which, even today, may be qualified as *practice oriented* meaning that they place their students in the labour market, wherefore they have a vested interest in keeping that task constantly on their agenda, in monitoring changing needs on a daily basis, renewing, and further developing results already achieved.

II. FUTURE LABOUR MARKET NEEDS IN THE EU

The uncertainty concerning the future in the wake of the crisis has forced even Europe to re-think its tendencies forming its possible future, and to elaborate a strategy up to 2020 to implement it. Figure 1: 'Future labour market needs in the EU' provides a graphic representation of the most important challenges, and changes.

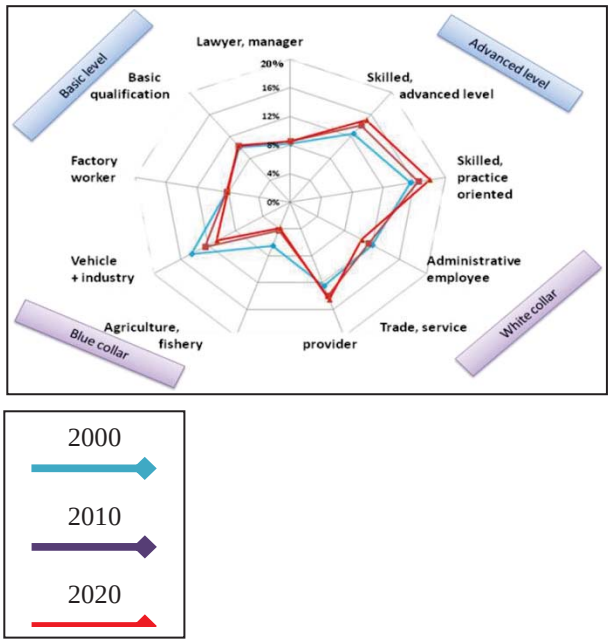

Figure 1: Future labour market needs in the EU

The figure suggests that the majority of newly created jobs (approximately 8.5 million) will be knowledge and competence-intensive jobs different from traditional ones such as top manager and technician. However, it is important to point out in conjunction with the forecast that even traditional jobs will transform significantly. Only applicants familiar with the new technology can have those jobs.

The forecasts have major implications on the world of training and education. On the one hand, the – so far widening – gap between labour market needs and course content and quality needs to be brought back closer to each other so that they should, as much as possible, take into account the fact that the labour market needs practical oriented courses which are essentially

- short-cycle
- practice oriented
- aimed at skills development

(for more details see the document *New Skills for New Jobs* NSNJ 2010 by the European Commission – http://ec.europa.eu/social/main)

But it is equally nice to know that the labour market is neatly structured, and there are a variety of endeavours active in the world of labour such as:

- traditional employment (graduation for tertiary education followed by on-the-job training and employment)
- competence based employment (it is not the educational institution that counts but the competences needed in a given job)

- assistant type employment (e.g. US, Japan): multinationals recruit staff for separate phases of the working process, and teach the employee skills required for each)

(for more details see the document 'Managing tomorrow's people - The future of work to 2020' – Price Waterhouse Coopers, 2012)

III. THE *LEARNING BY DOING* MOVEMENT IN EUROPE

The 1960s saw intensifying demand for more practice oriented training in the EU, primarily in specialties training directly for the labour market. The essential objective in adopting the Bologna system was also to ensure that the majority of graduates from the first BA/BSc (Bachelor) should enter the labour market, and should be allowed to move on to the next phase (MSc) only after a year spent there.

In a BSc setting, higher education institutions provide courses that are in instant demand in the labour market, thus they guarantee a high degree of placement ratio to students;

This feature, i.e. the close cooperation between the education system and employers enables higher education institutions to adjust their courses to changing market need. (see Bologna Declaration)

Practice in the individual countries applying the Bologna concept, however, does not reflect the above objectives. There is strong criticism by representatives of both the schools, and the labour market claiming that the BA/BSc courses deteriorates rather than improves the employability of school leavers by ensuring too little time and practical orientation for students' skills development in practical session inside and outside the higher education institutions.

To counterbalance the above, the labour market tried to help itself, and created so-called work-based learning courses in which skills development at the workplace could become daily practice by ensuring that students can spend perhaps as much as several days besides their academic duties in a real workplace environment solving real problems. That recognition then led to the well known vocational education systems in the different countries, such as

- the IUT in France,
- the Foundation Degree in the UK,
- the Berufsacademia in Germany,
- the Team Academy in Finland.

Over the past period vocational training provided as part of higher education has been rapidly gaining ground. They are the so-called Short Cycle Higher Education (SCHE) type practice oriented courses having one common feature namely that they both enable credit transfer to the BA/BSc courses of higher education.

More focus on better employability in various European countries is primarily due to the fact that in post-industrial society fundamental expectations have necessarily changed concerning both the workplace and the employee.

Employability has, by now, become a combined concept including the ability of the person with a given qualification to (1) find a job, (2) hold his ground once employed, and (3) develop the various types of knowledge, skills, and competences necessary for subsequent changes of jobs.

The skills and competences expected by the labour market are manifold and the work based courses seeking success must comply with these. They are:

- the personality, and relation to work of the school leaver
- experience concerning the world of labour
- self-knowledge, consciousness, and a sense of responsibility
- conscious building of one's career
- realistic expectations
- team work, communication skills
- conflict resolution skills

The knowledge-based society in which we all live has set further requirements as presented in Figure 2: 'Requirements set by the labour market standards'.

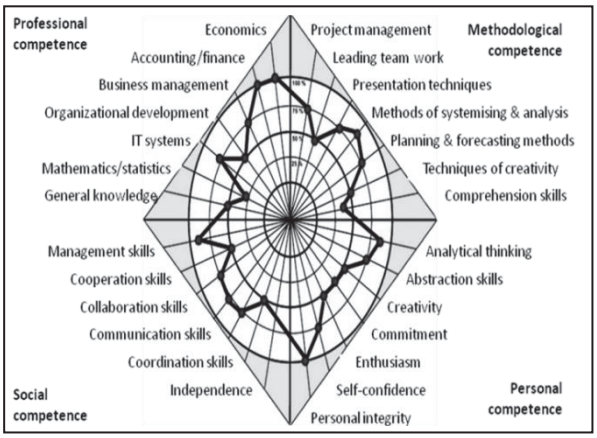

Figure 2: Requirements set by the labour market standards

Source: Model creation for the development of the labour market network of the Budapest Business School, designing

the organisational and operational system of the Enterprise Relations Bureau p.29 (For more details see the recommendations of the European Commission - http://ec.europa/enterprise/entrepreuership/support)

IV. ENTREPRENEURIAL ACTIVITY IN HIGHER EDUCATION

The above clearly suggest the degree of entrepreneurial activity that youth, and more specifically students studying at, and later graduating from higher education will have.

There have been several attempts over recent years to measure the entrepreneurial activity of students in higher education. Hungary joined the international research project GUESS in both 2006 and 2008 aimed at evaluating university and college students' activity. Most recently two researchers reported about their new research project (OTKA NK 69283) that further developed the previously applied methodology (Farkas, Kovács (2010) Entrepreneurial activity of university and college students - 2010)

From the results obtained, the one relevant for this paper is the international comparison of students' entrepreneurial index (Table 1: 'International comparison of students' entrepreneurship index in 2005 and 2008').

Country	2006	2008
Switzerland	3,45	2,80
Germany	3,39	2,90
Luxemburg	n/a	3,00
Belgium	3,60	3,00
Greece	n/a	3,20
Finland	3,71	3,20
France	n/a	3,30
Austria	3,53	3,30
Hungary	3,52	3,50
Singapore	3,95	3,70
Ireland	4,09	3,80
Liechtenstein	3,75	3,80
New Zealand	3,66	3,90
South Africa	n/a	4,50
Estonia	n/a	4,70
Mexico	n/a	4,70
Indonesia	n/a	5,20
Norway	3,49	n/a
International average	3,55	3,30

Table 1: Students' entrepreneurial index in 2006 and 2008

The table suggests that Hungary comes in the middle range of the countries represented, however, looking at the individual institutions, one realises that the majority of higher education institutions do not create an effective entrepreneurial environment for students as there are too few services provided to support business start-ups by graduating students.

Authoritative opinions both abroad and domestically claim that supporting students' enterprises will become increasingly important in the form of specific entrepreneurial programs, and services. More and more factors seem to encourage higher education institutions to adopt business solutions for knowledge and technology transfer (spin offs, operating enterprises, non-profit centres, clusters, etc.), and ensure that students participate.

V. THE APPEARANCE OF INTERACTIVE ENTREPRENEURIAL LEARNING IN A TRADITIONAL TRAINING ENVIRONMENT THE PARTUS ROCKET MODEL

The European strategy aimed at growth, employment, and skills development must encourage the launching of innovative businesses, and must support the creation of culture supporting the entrepreneurial spirit, and the growth of small and medium sized enterprises. At the level of tertiary education, entrepreneurial training plays a major role primarily in business training courses, in launching a business, in innovative enterprises, and job creation. However, familiarising, and identifying with the entrepreneurial spirit is essential for everybody regardless of the trade one is in, and it is an important skill by means of which one can make his plans come true, and a key competence helping youth find their way in the trade they are pursuing to ensure they are more creative and more confident. The Partus Rocket Model is an innovative, modern learning opportunity for higher education students taking a business course. Its basic principle is that all knowledge and competence required in business life can be most effectively and most successfully acquired through practice. The concept of the Partus Rocket Modell comes from JAMK University of Applied Sciences in Finland. That idea called the school of entrepreneurs is associated to Jonannes Partanen. The system now operating as a Europe-wide network started in 1993. The novelty of the education is that – unlike in learning centred education – students do not attend lectures/presentations, and do not take examinations. However, they test their talent and upgrade their knowledge, and prove their competence in a real business environment. The most successful keep building their business started as students, and try their luck as entrepreneurs.

The Partus Rocket Model may be characterised by the following:

- Student-centred courses,
- Practical approach,
- Fresh, novel ideas that stimulate thinking,
- Opportunity for 'free thinking',
- Developing communication among students,
- Trainers regard students as potent, innovative adults

The theoretical basis of the model is the study Knowledge Creation Theory by Nonaka and Takeuchi (Figure 4: 'General model - application of Nonaka's & Takeuchi's Knowledge Creation Theory')

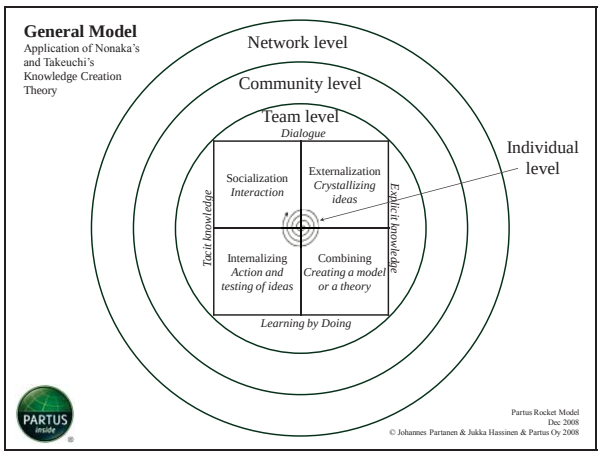

Figure 4: General model - application of Nonaka's & Takeuchi's Knowledge Creation Theory

VI. THE PROCESS OF ENTREPRENEURIAL LEARNING

The Partus Rocket Model – as illustrated by the figure below – describes the development process of entrepreneurs. The Rocket model is in fact a framework system applied to the learning process

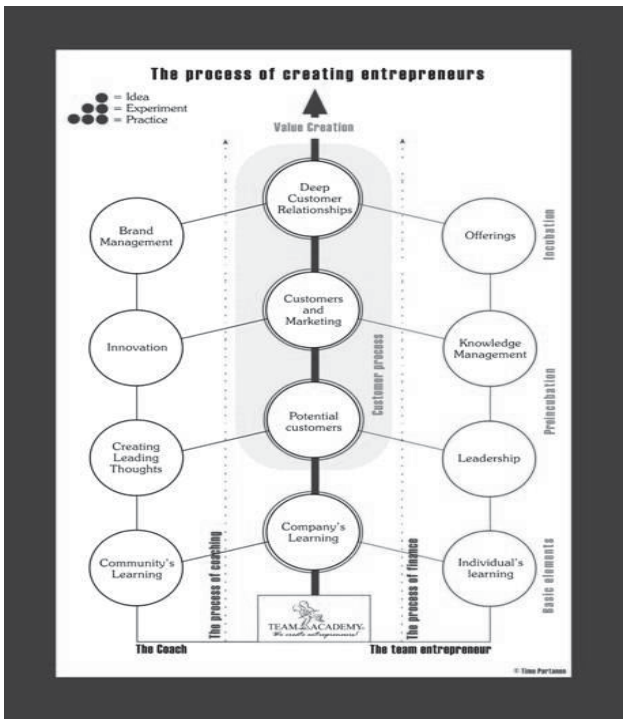

Figure 5: The process of creating entrepreneurs

The figure clearly demonstrates that the model consists of 12 subject areas. The learning path begins at the bottom of the model. During the first academic year students learn how to learn, and the fundamentals of how to operate an enterprise. The next step is practising management skills, and creating client relationships. In the third year they learn the specifics of how to operate services and to write a quote to a hopeful client. The section on the left is the core activity of the coach. On the right hand side the 'entrepreneur students' subject areas are listed. In the centre of the system are the clients. They are indispensable in the development of entrepreneurs.

Figure 6: Partus Rocket Model

VII. CONCLUSIONS AND RECOMMENDATIONS

As a result of the process we must answer the question why we have selected the Partus Model for implementation in Hungary. Implementing the Learning by Doing training concept counts as a serious achievement in a purely teaching/research oriented institution. This is not simply a story of changing into a group based teaching format in one speciality (TA) where it is no longer the performance during classes or score achieved at a test that matter most, but instead, students are organised in practical exercises, smaller projects where they can experience themselves the result – or indeed the failure – of their work. Introducing this may be a huge step forward in teaching entrepreneurial skills, in synthesizing, and applying in practice the material learned. This is real experience, this is how students can become acquainted with direct business experiences through either success or failure, let alone the fact that they can also learn how to recognise, handle, and avoid or prevent risk. What the training offers is in fact élite training in a mass-training environment, clearly promising an overall result that generously justifies the surplus costs required by any elite training including TA also.

*A. **Realising student-focus***

The other important result factor of introducing TA training is the realisation of student focussed training in a traditional learning environment.

Numerous sections of technical literature have, over the past period, shown the advantages of student focussed training over traditional training. The young generation today is much more responsive to this model, they will give their attention much more easily if they are doing something that they like, and feel motivated. (Let us just think of the amount of time our children spend watching TV or playing computer games).

The whole point of student focussed training is that the student chooses themselves the subjects, and sessions in which they would be interested to participate, and if the structure of the program is one where they can e.g. change entrepreneurial roles, or try in a real-world setting what they are being taught in a classroom, students' preference will be very strong for the latter.

*B. **Mixed training in a traditional setting***

There is one more favourable effect of the training, which derives from its mixed character. On introducing the TA we bore in mind the principle of gradience, thus we will do the four semesters of the grounding phase in a traditional setting so that the basics can be taught as safely as possible. In semester 4, in line the guidelines of the TA system we will have students complete a personality test (BELBIN test) to be able to select students with some entrepreneurial mentality, and qualities. Thereafter, in the remaining three semesters they will do their work in a student-focussed environment, working on specific projects, and complete tasks most suitable to their individual interest, essentially in a group work format.

Finally, we have included the following in the list of *other effects of TA training on student achievement.*

Domestic higher education institutions have had to perform their missions in a very competitive environment over the past years. Each is essentially interested in broadening their profiles, and offering a more colourful set of training scenarios.

That is what we also expect at the BBS. We look forward to a broadening of profiles that will further improve the overall assessment of our college, and we also expect the market to give positive feedback not just for the TA, but the entire organisation of the BBS.

Further important elements to improve our results could be those that we hope to achieve through training provided jointly with Debrecen University. It is widely known that this type of cooperation between two institutions to launch a brand new training, and training method happens quite rarely in Hungary. In fact, the two institutions work together in the best kind of cooperation despite the fact that the training will be introduced in the college one year after its launch in the university. However, first steps, if successful, will be followed by another launch. In addition, the two institutions have successfully applied for EU funding (TÁMOP), and are now designing a TA master course to be co-managed by the two institutions having equal status.

Finally, we regard it a potential improvement of the situation that students' interest is likely to increase, and, as a result, that current government endeavours foreshadow an increasing ratio of fee-paying students

VIII. REFERENCES

Cedefop (European centre for the development of VET) http://www.cedefop.europa.hu

Farkas, Kovács (2010) Entrepreneurial activity of university and college students, Felsőoktatási Műhely

Managing tomorrow's people. The future of work to 2020 (2012) Price Waterhouse Coopers

New Skills for New Jobs. NSNJ 2010 (http://ec.europa.eu/social/main)
N. Leinonen - J. Partanen - P. Palviainen (2001) The Team Academy. A True Story of a Community that Learns by Doing
Training of entrepreneurial knowledge in higher education
https://ec.europa/enterprise/entrepreuership/support

ENTREPRENEURIAL UNIVERSITIES IN POLAND

Searching for best practices

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The purpose of the paper is to identify effective paths of university entrepreneurship development (among students and academics). Methods will be identified that are addressing new trends in university management (incl. growing popularity of Third Generation University concept and implementation of the European Qualifications Framework).

To achieve this objective, a typology of methods for university entrepreneurship development will be proposed and these are examined in the Polish HEI sector.

Findings suggest that methods for increasing student entrepreneurship in Poland are quite diversified and located on different levels of learning by doing intensity, which is the main criterion of the proposed typology. Entrepreneurial pedagogy consists of class room practices (entrepreneurial curriculum development, case studies, games) and activities undertaken with university partners (e.g. start-up incubators, student probation in firms). Academic entrepreneurship is still undeveloped although training and probation for academics have been also introduced in Poland.

The authors conclude that further development of university entrepreneurship in Poland, based on closer university-business cooperation, is required. The authors recommend main paths and rules.

Keywords: entrepreneurial university, student & academic entrepreneurship, B2U, U2B, case research.

I. INTRODUCTION

In the literature there are two approaches to entrepreneurship. One emphasizes the importance of new ventures by individual entrepreneurs. The other stresses the role of corporate entrepreneurship and intrapreneurship in the renewal of large organisations (Hagedoorn 1996, 883). In the literature on entrepreneurial university there is also **broader perspective** which combines both mentioned approaches. Entrepreneurship education encourages the formation of high-growth enterprises, supports innovative behaviour, and equips individuals to be productive, entrepreneurial employees for large firms and public enterprises (Solymossy 2008, 2).

Referred perspective is consistent with **Third Generation University** (3GU) concept and implementation of the European Qualifications Framework (EQF) which constitute modern trends in academic industry in Poland.

3GUs are network universities, collaborating with industry, private research and development (R&D), financiers, professional service providers and other universities via their know-how hub. **Exploitation of know-how** becomes the third 3GU objective as universities are seen as the cradle of new entrepreneurial activity in addition to the traditional tasks of research and education (Wissema 2005, 17-28).

The EQF aims to relate different countries' national qualifications systems to a common European reference framework. Individuals and employers will be able to use the EQF to better understand and compare the qualifications levels of different countries and different education and training systems. Agreed upon by the European institutions in 2008, the EQF is being put in practice across Europe. It encourages countries to relate their national qualifications systems to the EQF so that all new qualifications issued from 2012 carry a reference to an appropriate EQF level (European Commission 2012, online).

The National Qualifications Framework in Poland (called *Krajowe Ramy Kwalifikacji*, KRK) emphasizes, among others, the **new role of lecturer** - academics, who become rather a leader supporting students' learning processes than just a presenter of information (Chmielecka 2010, 103-104). This function at the universities of economics and in management schools requires both academic and business experiences. Therefore, an entrepreneurial university should encourage both student and academic entrepreneurship since they are complementary to each other.

II. STUDENT & ACADEMIC ENTREPRENEURSHIP STIMULATION – RESEARCH ASSUMPTIONS & FINDINGS

The authors aimed to identify effective paths of university entrepreneurship development (among students and academics) in Poland. To achieve this, a typology of methods of university entrepreneurship development is proposed (see figure 1).

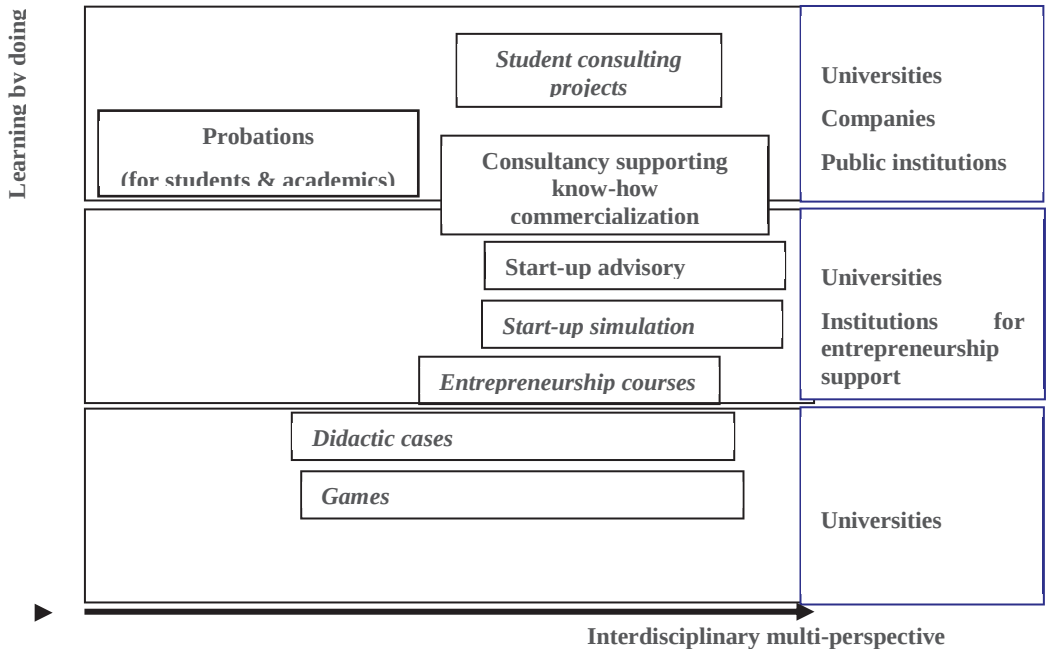

Figure 1. Partners and paths for student & academic entrepreneurship development

Authors were inspired by Henry Mintzberg views: „Managing is a natural practice that cannot be reproduced in the classroom – you need experience to appreciate it. No simulation, no HBS case study can replicate the experience, can communicate the complexity – or rather the intricacy – of managing" (Allio 2011, 4-5).

Therefore both interdisciplinary multi – perspective as well as **learning by doing intensity** became the main criteria of the mentioned typology. Action learning approach or action & experiential-based learning (terms used for learning by doing) (Ardley and Taylor 2010, 847-848) are crucial for entrepreneurial universities.

The exploration of entrepreneurial incentives targeted at students and academics which are undertaken in Poland indicates that the portfolio of methods has been already quite developed here. It includes both basic methods, located on the lowest level of learning by doing intensity, well grounded in pedagogy, as well as more sophisticated ways, located on the higher levels. Research findings suggest that methods for increasing student entrepreneurship in Poland are quite diversified (methods which are limited only to students are marked out in italics on figure 1). Entrepreneurial pedagogy consists of class room practices (entrepreneurial curriculum development, case studies, games) and activities undertaken with university partners (e.g. start-up incubators, student probation in firms). Academic entrepreneurship is still undeveloped although training and probation for academics have also been introduced in Poland.

Below six examples of pro-entrepreneurial activities located on the second and third level of our typology are described.

A. Subject Entrepreneurship in the teaching standards of courses in Management

One of the basic, most common forms of entrepreneurship education is lectures on entrepreneurship during the study. According to the regulation of the Minister of Science and Higher Education the subject Entrepreneurship is in the standards of education at Master Management Studies (MNiSW 2012, online).

The content of training courses include such issues as types of entrepreneurship and entrepreneurial organizations, internal and external entrepreneurship, characteristics of entrepreneurial individuals, implementation of an entrepreneurial plan, the infrastructure to support entrepreneurship, international entrepreneurship. The objective of teaching should be to understand the importance of entrepreneurship in

management, as well as the formulation and implementation of entrepreneurial solutions.

B. Elective subject Innovative Entrepreneurship as an example of the promotion of entrepreneurship among students of Warsaw University of Technology

Another example of activities supporting the development of entrepreneurship among students is an elective subject Innovative Entrepreneurship. The concept of the subject was successfully tested in 2007-2011 in several (mostly non-economic) polish academic centers. This course was conducted for instance at the Faculty of Electrical Engineering at the Warsaw University of Technology (Politechnika Warszawska 2012, online). During classes engineering students can get to know the basics of entrepreneurship and acquire skills to set up and run their own innovative companies. They learn about the sources of financing for new ventures, financial and accounting systems, legal forms of business, franchising, etc.. Each year 30 students may participate in the class.

C. „How to start your own business" training and advisory program for students

Another form of support is optional academic entrepreneurship training for students planning to start their own business. A project of this kind was, for example, the training and advisory program for students, "How to start your own business", which was implemented from January 2006 to April 2007 and financed by the European Social Fund. The program was attended by 120 students representing 32 universities from Mazovia. Half of the participants were educated at universities with an economic focus, 30% at technical universities, and 20% were students of other disciplines. Overall, 61 students graduated from the training in June 2006. To participate in the next stage of the program, it was necessary to start their own business, which was done to 21 students. More than half of them, 12 young entrepreneurs, received a grant (in the amount of 24600 PLN) to start the business. In the following months, until April 2007 participants benefited from the free consultation that was offered in three forms (Cieślik 2012, online). The first of these were individual meetings with project consultants, during which the progress of program participants in developing own business was monitored. The second form of support was group meetings, which were the place for discussion and the exchange of experiences. During the program, there were 6 such meetings. The last way to support students' projects was a portal internet forum, where participants were able to exchange their views and consult with experts.

D. Academic Enterprise Incubators

Well-developed forms of business support are Academic Enterprise Incubators associated in the AIP Group, one of the entities of Foundation Enterprise Poland (AIP 2012, online). The statutory objectives of the business incubators are: consultancy in establishing and running new businesses, entrepreneurship education among young people, as well as implementation and dissemination of modern technology based on innovation.

In the first quarter of 2012, incubators associated with AIPGroup operated at 49 academic research centers in Poland (in 23 cities) and support 1100 business start-ups (see Table 1).

Nr	Province	City	Number of incubators
1.	Dolnośląskie	Wrocław	2
2.	Kujawsko-pomorskie	Bydgoszcz	4
		Toruń	1
		Włocławek	1
3.	Lubelskie	Lublin	3
4.	Lubuskie	none	0
5.	Łódzkie	Łódź	2
6.	Małopolskie	Kraków	4
7.	Mazowieckie	Płock	2
		Warszawa	10
8.	Opolskie	Opole	1
9.	Podkarpackie	Rzeszów	1
		Stalowa Wola	1
10.	Podlaskie	Białystok	2
11.	Pomorskie	Gdańsk	1
12.	Śląskie	Bielsko-Biała	1
		Chorzów	1
		Częstochowa	2
		Katowice	2
		Rybnik	2
13.	Świętokrzyskie	Kielce	1
14.	Warmińsko-mazurskie	Olsztyn	1
15.	Wielkopolskie	Poznań	3
16.	Zachodniopomorskie	Szczecin	1

Table 1. Academic Enterprise Incubators in the regions of Poland

E. Ventures Program

Another example of a program aimed at young scientists is Ventures Program run by the

Foundation for Polish Science, one of the biggest sources of non-public financing of science in Poland, which supports academic activities applicable in the economy (FNP 2012, online).

Ventures Program is designed to not only popularize scientific work among young people, but also to support the commercialization of its results. Program participants may be graduate students (in the case of the 5-year Master's Course it is a prerequisite to complete the third year of study), full-time faculty graduates (for three years from the completion of studies) or PhD students, and it can be implemented with the participation of scientific institutions, and the institutions employing full-time faculty members. Funded projects may be related to any branch of science and the key determinant of the grant money is the project's importance to the economy. Duration of the work should be longer than one year and not exceed 36 months. Support to the Foundation is in this case, the payment of a personal grant for a project manager (from 1500 to 3000 PLN per month) and a research grant award of up to 35 thousand PLN.

F. "R+D for Wielkopolska" Project

Another project supporting the academic enterprise aimed at young researchers is an initiative implemented by the Western Institute in Poznan, in cooperation with the Association of Private Employers of Wielkopolska (BR 2012, online).

The project aims to strengthen the relationship between academics and businesses from the area of province Wielkopolska, upgrading the skills of researchers from the management of research projects and commercialization of research results. The project involves about 100 scientists and academics (including 60 women) employed in research centers in Wielkopolska. The first phase (conducted in the spring of 2012) includes the training of foresight project management, presentation and commercialization of research results and intellectual property protection. Workshop participants will prepare their own research projects, consulted with experts on an ongoing basis. The best training students (40 persons selected in the stage-1 final test) will be able to implement designed studies in one of the companies from Wielkopolska in the form of three-month training period, while receiving a salary of 2500 PLN per month.

Summing up, our research findings also indicate that not only HEIs develop student & academic entrepreneurship in Poland. The higher the level of learning by doing intensity, the **higher the need for HEIs to cooperate with external partners**, i.e. institutions for entrepreneurship support, companies and other organizations.

III. DISCUSSION

We assume that the activities located at the highest level of figure 1 are the most effective paths for increasing student entrepreneurship (particularly in **business and management schools** which we represent). They are also effective ways to academic entrepreneurship stimulation and enriching business experiences of academics (incl. know-how transfer) which are essential for the new role imposed by National Qualifications Framework in Poland.

Therefore we claim that development of student & academic entrepreneurship (using action learning approach and know-how transfer) requires close cooperation between universities and businesses. However, **objectives and results of this cooperation should be precisely formulated** as relationships Business to Universities (B2U) and Universities to Business (U2B) are analogical to relationship in co-opetition strategy.

Universities should understand the business perspective, where **even philanthropic activities are perceived to improve competitive context** of the company and are aligned with a company's strategy (Kaplan and Norton 2004, 186-187). At the same time, companies should follow some rules managing B2U relationships if they want to **extract business value from university research**. The seven keys to collaborative success are as follows (Pertuzé, Calder, Greitzer, Lucas 2010, 85-90):

1. Define the project's strategic context as a part of the selection process: B2U collaboration must be aligned with the company's research and development strategy and address a tangible need of the company. If not, there is a risk of investing in projects that have little or no impact;

2. Select boundary-spanning project managers with three key attributes: in-depth knowledge of the needs in the field, inclination to network across functional and organizational boundaries and the ability to make connections between research and opportunities for its results application;

3. Share with the university team the vision of how collaboration can help the company: academic research is more likely to have positive impact on a company if the university researchers have a strong knowledge of business settings,

company practices and how the research fits the company's strategy;

4. Invest in long-term relationships: both parties need to be upfront and realistic about their time expectations. Over longer time periods, members of research teams develop better joint understanding of the research problem and common vocabulary in which to communicate the research results;

5. Establish strong communication linkage with the university team: conduct face-to-face meetings on a regular basis, encourage extended personnel exchange, both company to university and university to company;

6. Build broad awareness of the project within the company by promoting university team interactions with different functional areas of company and promote feedback to the university team on project alignment with company needs;

7. Support the work internally both during the contract and after, until the research can be exploited: include accountability for company uptake of research results as part of the project manager role.

The approach described above fills the **outcome – impact gap** in B2U cooperation. Based on survey of 106 projects at 25 multinational companies, Pertuzé et al. revealed that roughly 50% of B2U projects resulted in major outcomes (i.e. produced new ideas, solutions to problems, developed new methods of analysis or generated new intellectual property of potential benefit for the company). But only 40% of those projects were exploited in ways that led to major impact, defined as an observable and generally agreed-upon positive effect on company's competitiveness or productivity. That means **only 20% of total B2U projects led to major impacts on the company** that participated in the collaboration (Pertuzé et al. 2010, 84).

Apart from companies following the above mentioned rules of the cooperation with researchers, also universities should adopt such an "impact perspective". One of the model which could be apply in Polish universities was designed by Science-to-Business Marketing Research Centre. This is an approach for a successful commercialization of research competencies, capacities and results (Science-to-Business Marketing Research Centre 2012, online). It allows, among others, to identify the actual level of U2B collaboration basing on a few criteria:

1. number / regularity of collaboration

2. time orientation of collaboration

3. number of people involved

4. management level.

IV. CONCLUSIONS AND IMPLICATIONS

Based on the research findings we recommend applying more learning by doing methods in Polish business and management schools and universities. Predominantly we recommend introducing **experimental based learning method** called student consulting project. Although its advantages are already known, for example in Great Britain (Ardley and Taylor 2010, 847-861), we did not discover it among the practices of Polish business and management schools.

Introducing more learning by doing methods requires close cooperation between universities and businesses. Both parties should be able to formulate **measurable objectives** of such cooperation, similarly to co-opetition strategy rules.

Some important implications for increasing the effectiveness of B2U relationships where discussed in the paper.

Furthermore, we argue that more research is necessary to establish the best rules and practices in measuring effects of U2B strategies. Aside from analysing U2B relationships intensity effectiveness measures grounded on **impact perspective** should be designed and tested. That would correspond to 3GU objective of being cradle of new entrepreneurial activity in addition to the traditional tasks of research and education.

V. REFERENCES

AIP 2012. http://inkubatory.pl/pl/aip/o-nas

Ardley, B., Taylor, N. 2010. The student practitioner. Developing skills through the marketing research consultancy project. Marketing Intelligence & Planning", vol. 28, no. 7, 847-861.

BR 2012. http://br.projekty-iz.pl/

Chmielecka, E. (ed.) 2010. Autonomia programowa uczelni. Ramy kwalifikacji dla szkolnictwa wyższego. Ministry of Science and Higher Education, Warszawa.

Cieslik, J. 2012. http://www.seipa.edu.pl/index.php/ida/395/

European Commision 2012. http://ec.europa.eu/education/lifelong-learning-policy/doc44_en.htm

FNP 2012. http://www.fnp.org.pl/programy/aktualne_programy_fnp/wspieranie_transferu_technologii/program_venture

Hagedoorn, J. 1996. Innovation and Entrepreneurship: Schumpeter Revisited. Industrial and Corporate Change 1996; vol. 5, no. 3, 883-896.

Kaplan, R.S., Norton, D.P. 2004. Strategy Maps. Converting Intangible Assets into Tangible Outcomes, Harvard Business Scholl Press, Boston.

MNiSW (Ministry of Science and Higher Education) 2012. http://www.bip.nauka.gov.pl/_gAllery/24/33/2433/116_zarzadzanie.pdf

Pertuzé J.A., Calder E.S., Greitzer E.M., Lucas W.A. 2010. Best Practices for Industry – University Collaboration. MIT Sloan Management Review, vol. 51, no. 4, 82-90.

Politechnika Warszawska 2012. http://www.ee.pw.edu.pl/text/464/pl/

Science-to-Business Marketing Research Centre, 2010. http://en.fh-muenster.de/science-marketing/index.php.

Science-to-Business Marketing Research Centre, 2012. https://en.fh-muenster.de/science-marketing/index.php.

Solymossy, E. 2008. Balancing Entrepreneurial Education: Challenges in Constructing a Program. Conference Proceedings, ICELM-3, International Conference On Economics, Law And Management, Petru Maior University of Tîrgu-Mureş, Romania, June 4-7 2008, 2-14.

Wissema, J.G. 2005. Technostarterzy - dlaczego i jak?, Polish Agency for Enterprise Development, Warszawa.

TOWARDS A NATIONAL APPROACH TO ENGAGEMENT IN IRISH HIGHER EDUCATION

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Tracing the evolution of the various missions of higher education institutions within their regions and contexts, this paper details the convergence towards a national approach to facilitate and support the broad engagement agenda in Ireland. The shift towards more collaborative inter-institutional projects over the last decade in Irish higher education has uncovered the breadth of existing relationships between higher education institutions, enterprises and communities. The Higher Education Authority (HEA) through the Strategic Innovation Fund (SIF) (2006-2012) sought through collaborative projects to effect reform in the structures and processes within higher education institutions in Ireland. The potential economic, social and cultural impacts of enhanced engagement of the higher education sector formed the stimulus for the evolution from a short-term project approach to a proposed structured national framework for engagement. The research on which this work is based draws from the exploration and sharing of existing practice in engagement and is informed by a multi-dimensional view including external agencies and employers, students and higher education staff. The approach to engagement was one of knowledge exchange and partnership spanning the range of learning, research and development interactions with enterprises and communities. The Irish national strategy envisages the establishment of a platform which will act to ensure that shared practice, structures and toolkits to support engagement can be developed. Looking to the immediate future, the Irish higher education system aspires to move intentionally and collectively beyond piecemeal disparate activity towards a comprehensive set of mission-driven interventions to support a broad and dynamic spectrum of engagement.

Keywords: Engagement, knowledge exchange, partnership, higher education, Ireland

I. CONTEXT AND BACKGROUND

Consideration of the role and mission of the higher education provider within its region and community is not new. While the early European medieval universities were primarily teaching institutions committed to extending the frontiers of learning, the development of the research mission of universities is commonly attributed to Wilhelm von Humbolt in the mid-19th Century. Over time the role of the university evolved to include both teaching and research and it is widely accepted that the modern university contributes both to the spreading of learning and the generation of new knowledge. However, as the mission of the university continues to evolve universities are no longer viewed as dedicated teaching and research institutions; they are now regarded as engines of the knowledge economy (Vorley and Nelles 2008). This emphasis on an alternative mission of higher education incorporating a level of engagement or service is not new. In the United States of America service to the community was a clear part of the founding mission of the Land Grant Universities. In the traditional University sector the focus was often seen to be the pursuit of knowledge without regard to the particular context or surrounding environment however, this is changing. Policy responses which had been initially concerned with building opportunities for interactions between higher education institutions and enterprises for the purposes of enhancing technology transfer are now broadening to include consideration of a wider range of possibilities for engagement within the wider social and economic context (OECD 2007).

The more recent shift in focus of higher education is considered by Etzkowitz & Leydesdorff (2000) to be something of an academic revolution. This revolution marks the adoption of 'external engagement' as the third mission of the university along with teaching and research. Defining this 'third mission' of the higher education sector Molas-Gallart, Salter, Patel, Scott, & Duran, (2002) posit that engagement activities are concerned with the generation, use, application and exploitation of knowledge and other university capabilities outside academic environments. Alternatively, the OECD (2007) considers regional engagement of higher education in several dimensions, including knowledge creation through research and technology transfer, knowledge transfer through education and human resources development, and cultural and community development, which can, among other things, create the conditions in which innovation thrives.

There is a growing understanding that the world's "grand challenges" require collaborative solutions

and inter-locking innovation systems. They are not bound by borders and disciplines, but require bi-lateral, inter-regional and global networks to tackle (Hazelkorn, E. 2009: 68)

II. Higher Education Strategy in Ireland

The sustainability of the Irish economy relies on our success in nurturing indigenous enterprise as well as our ability to remain an attractive destination for leading multi-national companies. With the pace of change in global economics, a deep consensus is emerging across academia, enterprise and community that future skills needs can best be addressed through broader foundations of knowledge to facilitate adaptability and innovation. Whether as employees of established leading companies or as entrepreneurs of new start-up enterprises, Irish graduates need to be 'job shapers' and not just job seekers (European Commission 2010: 9). The emphasis has switched away from over-specialisation towards deeper and broader disciplinary foundations accompanied by learning objectives which explicitly seek to nurture creativity in students and the enthusiasm and skills required for continual engagement with learning. There is a renewed emphasis on the importance of core transferable skills such as quantitative reasoning, critical thinking, communication skills, team-working skills and the effective use of information technology.

As the knowledge economy develops, the quality of Ireland's workforce increasingly depends on the quality, relevance and responsiveness of our education and research system, particularly at higher education levels. As a small, open economy, Ireland's long term enterprise strategy aims to achieve sustainability through commercialising and exporting goods, services and ideas. Ireland has a strong tradition of industry-academic partnership as illustrated in the development in the 1970s and 1980s of a regional network of institutes of technology established to provide vocational and technical education and training for the economic social and cultural development of the State with particular reference to their regions. The institutes' vocational and scientific orientation, as well as their mission to promote regional economic development, has contributed substantially to the development of the Irish economy. The seven universities in Ireland have varying historical backgrounds and a variety of institutional missions and modes of engagement including some innovative practice in enterprise and community development.

The *National Strategy for Higher Education to 2030* (Department of Education Skills 2011) emphasises the importance of the engagement dimension of the mission and role of higher education institutions. It states that over the coming years the links and activities between higher education institutions and their local communities will be strengthened, extended and formalised. It also points to the onus on higher education institutions to influence national and regional competitiveness and, through community partnerships, to progress equality and community development and further social innovation. The National Strategy considers that engagement '*…resonates with current thinking on the renewal of the higher education mission'* and that the multidisciplinary scope of higher education institutions renders them '*uniquely well placed'* to address the multidimensional challenges facing society. At the current stage of development of Irish higher education, there is strong awareness of the potential for and of collaboration between higher education, enterprise and communities to contribute to economic renewal and social innovation but this is accompanied by a recognition that *'higher education institutions could be more dynamic and coherent in their approach to collaboration'* (Department of Education and Skills, 2011: 75).

III. Foundations

In seeking to advance and enhance the engagement agenda, Irish higher education institutions can build on the successes of a number of initiatives funded over recent years through the Strategic Innovation Fund (SIF). The *Education in Employment* project focused on ensuring that the higher education partners can serve the learning needs of those in the workplace in a partnership model, recognising the role of the individual learners and the employers in creating relevant, inclusive and accessible pathways to learning. The collaborative *Education in Employment* project explored specific enablers of broader participation in education for those in the workforce. The *Roadmap for Employment Academic Partnerships* (REAP) project was initiated to consider and to advance a broader range of potential engagement with external enterprises. In recognising the breadth of engagement possibilities the REAP project consortium developed a partnership continuum which saw the possibility of academic-enterprise relationships ranging from mutual awareness to strategic partnership similar to the '*Stairway Model to Strategic Partnership'* described by Baaken & Schröder (2008).

This concept of a partnership approach to learning development, with the recognition that the external enterprise partner can make a significant and valuable contribution to higher education, forms the basis of 'knowledge exchange' and 'knowledge co-creation' versus 'knowledge transfer' model of operation. For example, the good practice guidelines for undergraduate work placement were developed on the basis of research on the perspectives of the higher education staff (through workshops and an on-line forum), the employer (through interview and survey) and the student (through focus groups) undertaking the placement (Sheridan and Linehan 2011). Another project characterised by active engagement with industry was the Accelerating Campus Entrepreneurship (ACE) initiative. This project explored and developed entrepreneurship education through a range of curricular innovations and through changes in organisational culture and programme design.

In addition to these views of engagement between Higher Education Institutions and enterprises or business, there is also an emphasis on the role of universities in developing social value and providing students with opportunities to become active citizens. Student community engagement often involves opportunities within the curriculum for students to work with, and learn from, community-based organisations or to integrate community partnerships in research and development. There is significant evidence of the value to the curriculum and the value to the community that derives from these closer working relationships. The interdisciplinary and situated nature of the learning from these endeavours provides a rich learning and knowledge development environment. The universities' sense of their role is evolving, from that of the production and dissemination of knowledge, to appreciating the value of different forms of knowledge and forming the connections to stimulate knowledge brokerage and application whether in the enterprise or community domain (Millican and Bourner 2011).

Irish higher education institutions are active in civic and community engagement and a number of institutions have established initiatives, in collaboration with their local communities, through which to address educational disadvantage and to achieve greater equity of access to higher education: Dublin Institute of Technology's Community Links programme, the DCU in the Community programme, and the Shannon Consortium's initiatives in Limerick city are examples of academic–community partnerships which have been hugely successful in addressing social disadvantage. In addition, the establishment of the Campus Engage Network has made a huge impact on the provision of service learning, community-based learning, and volunteering opportunities for students, as well as on the promotion of active citizenship within Irish higher education.

This work has not been happening in isolation. Internationally, the relationship between higher education institutions and business and communities has been the focus of a number of different projects by a number of different agencies. The Good Practices in University-Enterprise Partnerships (GOODUEP) project funded by the EU has explored university-enterprise partnerships in six countries in 18 different universities (Mora, Detmer, & Vieira 2010). The EU University-Business Forum has explored the sharing of good practice across a wide range of engagement activities (European Commission 2011).

IV. ENGAGEMENT AND THE TEACHING AND RESEARCH MISSIONS

The interactive scholarships of discovery, teaching, engagement and integration proposed by Boyer (1990) presented the most dynamic and enduring view of the nature of scholarship that has broadened the role and responsibilities of higher education in society. This corresponds well with the emphasis on collaborative knowledge relationships that is reflected in the more recent literature on national innovation ecosystems. It also resonates with current thinking on the renewal of the higher education mission in which the institution assumes major responsibility for the economic, social and cultural vitality and well-being of the community.

While the 'engagement' part of a HEI mission encompassing the full range of external interactions with enterprises, individuals and communities is often presented as distinct from the first two missions of teaching and research, it is only effective if it is closely interlinked with them. In fact, if it is considered as a separate, distinct function it is diminished in potential and impact. Vorley and Nelles (2008) describe the third mission as a 'thread that has the capacity to weave together teaching and research, while assuming a more economic and societal focus'. The question becomes one of how to ensure that the engagement aspirations are fully integrated into the HEI mission and are not 'bolted-on'. Goddard clearly articulates the dangers associated with disjointed approaches.

'Insofar as external engagement is taking place, the academic heartland is protected by specialist units dealing with technology transfer and continuing education. However the external engagement agenda… requires institutional responses, co-ordination and transversal mechanisms.' (Goddard 2005: 30).

Burns (2005) regards the process of embedding the engagement mission as an opportunity for organisational learning. Vorley and Nelles (2008) stress that engagement between industry and academics in collaborative research and commercial experience can make a significant contribution to teaching and curriculum development and that the students themselves can become the bridge for the engagement through industry sponsored projects and cooperative placements.

V. LESSONS AND INSIGHTS

The shift towards more collaborative inter-institutional projects over the last decade in Irish higher education has uncovered the breadth of existing relationships between higher education institutions, enterprises and communities. The work initiated under REAP, ACE and Campus Engage highlights the potential of collaborative approaches to advance community-academic partnership and they also uncovered some of the barriers to effective engagement. In transitioning from a decade of innovation and early stage collaboration through to a more connected and coherent approach to the enhancement of engagement in Irish higher education, there is much to learn from our own endeavours and from the international literature on engagement. Some of the key lessons and insights that can inform and guide us are now outlined

A. Institution-wide approaches

Higher Education Institutions tend to operate not as single homogenous entities but as a series of separate and distinct units - the experience from the perspective of an external partner then, is one not a single seamless relationship but of many disparate and different relationships with different parts of the institution. Professor John Goddard stresses the importance of institution-wide approaches:

Engagement has to be an institution wide commitment, not confined to individual academics or projects. It has to embrace teaching as well as research, students as well as academics, and the full range of support services. All universities need to develop strategies to guide their engagement with wider society, to manage themselves accordingly and to work with external partners to gauge their success." (Goddard 2009: 4)

The REAP project team have developed an approach to underpin engagement activity involving the establishment of clear points of contact, matrices of expertise and an institution-wide professional approach to the flows of knowledge and interaction between higher education institutions and enterprises or communities.

B. Leadership and culture

Engagement, when viewed not as separate activity but rather as an underlying motivation, leads to the reconsideration of the entire institutional mission through a new filter or lens. To achieve this level of integration requires that senior management explicitly recognise and overtly value engagement activities (Vorley and Nelles 2008). Research by the Council on Competitiveness (2008) has found that where engagement activity is championed by a senior university officer it is more likely to be adopted as a priority. Culture change is the most difficult to effect and can only be brought about through clear vision and leadership.

C. Effective Partnership

According to Duke (2008) the language of the engagement or 'outreach' traditionally implied the one directional parcelling out of knowledge by the higher education institution to those outside its walls. However, recognising that the workplace is a valuable environment for the development and support of reflective higher level learning and knowledge generation, the relationship has shifted from an expert or 'delivery' model towards one of partnership and 'co-creation' (Lester and Costley 2010). The locus of innovation in learning and in technology extends well beyond the campuses of universities. Working together in partnership over the last year in Ireland, higher education institutions and industry partners have jointly developed graduate skills conversion programmes in ICT, life sciences and in other areas where high-end employment opportunities continue to grow within the Irish economy.

VI. TOWARDS A NATIONAL PLATFORM

Arising from the aspirations of the National Strategy for Higher Education (Department of Education and Skills, 2010), and building on the work of a number of successful projects it is proposed that a platform to stimulate and support engagement and shared learning will be

established. The platform will support development of scholarship and of practice in the broad spectrum of engagement and will provide higher education institutions and current and potential external partners with exemplars and practical supports for engagement. The scholarship and the execution of engagement will be a key component of academic excellence in 21st century higher education in Ireland.

*A. **Building international links***

Higher education now operates in an entirely global environment and a key contribution that higher education institutions can make is in bridging the local and the global *"by bringing the best of the world's intellectual resources to bear on the geographic, economic, social, cultural and political community of which it is a part"* (Bringle, Hatcher & Holland 2007). The national platform will build awareness of and capacity for international partnership as well as shared learning opportunities through publication and conferences.

Supporting the broad spectrum of engagement

Embracing the broadest concept of civic engagement, the national platform will serve as a portal to the whole range of engagement, encompassing community and enterprise engagement and international partnerships. This is in recognition of the transferability of experiences and expertise across engagement activities and the importance of linking engagement relating to learning, research, development and community involvement to ensure that the full potential benefits accrue. The level and nature of engagement will vary across institutions according to their historical missions, context, academic strengths, scholarly culture and the knowledge resources and capabilities available through their external collaborations.

Underlying Principles

The National Strategy (Department of Education and Skills, 2010), encompasses diversity of missions and the mode of engagement adopted by each higher education institution will be an expression of the mission of the institution. By providing a forum for shared exemplars of successful engagement the national platform will allow institutions to build on good practice and to contribute to broader organisational learning.

The underlying principles upon which the platform will be established will include:

Recognition and valuing of the knowledge generated outside of the higher education system – supporting a knowledge exchange culture

Broad range or continuum of possible partnership interaction

Transferability of experiences and expertise across engagement activities

Consideration of the engagement interaction from the perspective of all partners

Importance and value of planning and clear communications in engagement

Recognition and valuing of engagement activity and practice development

Realisation of the Platform

In supporting these principles it is recognised that the platform will need to support institutional and system-wide learning through exploration and dissemination of good practice. It will support the simplification and professionalization of the interface to ensure that the external partner has a consistent experience across the system while recognising the variety of institutional missions. The platform will include the following features:

- Web portal offering roadmaps and exemplars of good practice in engagement to community groups, enterprises, higher education institutions
- Repository of relevant data and documentation to support engagement
- Dissemination through annual conference and on-line journal
- National awards to promote and celebrate good practice in engagement
- Transferable toolkits including systems to support and stimulate engagement
- Development of metrics to support engagement

VII. CONCLUSIONS

According to Goddard:

The engaged civic university….provides opportunities for the society of which it forms part. It engages as a whole with its surroundings, not piecemeal; it partners with other universities and colleges; and it is managed in a way that ensures it participates fully in the region of which it forms part. While it operates on a global scale, it realises that its location helps form its identity and provides opportunities for it to grow and help others, including individual learners, businesses and public institutions, to do so too. (Goddard, J. 2009: 4)

Holland (2005) has highlighted the potential of engagement to "lead to greater institutional intentionality and consequently, more specific and focused agendas for research and teaching and

more distinctive academic strengths". The complementarity of these distinctive strengths is enhanced through the national platform for engagement. Irish universities and institutes of technology will serve not as ivory towers but as national neurons, nodes, open networks and conduits of knowledge and opportunity.

The national platform, through the development of a system-wide support structure for engagement in the Irish higher education system, will facilitate changes in practices and internal business processes of institutions. The developing national and international landscape within which engagement is clearly valued will expedite the changes in culture and mindset needed. The need for institutional transformation was clearly recognised in the National Strategy for Higher Education:

Institutions need to be internally adaptive in order to be externally responsive, and strong engagement with the wider community will require:

Strong institutional leadership;

Change in the culture and internal business processes of institutions; and

- *Recognition of the importance of engagement activities in resource allocations, in promotion criteria and in the metrics used to assess progress at institutional, regional and national level.*

(Department of Education and Skills, 2010: 78)

VIII. REFRENCES

Baaken, T. & Schröder, C. 2008. The Triangle for Innovation in Technology Transfer at University of Applied Sciences, In Laine, K., Van der Sijde, P., Landeniemi, M., Tarkkaned, J. (Eds.): Higher Education Institutions and innovation in the Knowledge Society, Helsinki, 103-116.

Benner, M. & Sandstrom, U. 2000. Institutionalising the Triple Helix: Research Funding and Norms in the Academic System, Research Policy; 29. 291-301.

Boyer, E.L. 1990. Scholarship Reconsidered. Priorities of the Professoriate. Princeton: The Carnegie Foundation for the Advancement of Teaching.

Bringle, R.G., Hatcher, J.A. & Holland, B. 2007. Conceptualizing civic engagement: Orchestrating change at a metropolitan university, Metropolitan Universities; 18(3), 57-74

Burns, P. 2005. Corporate Entrepreneurship: Building an Entrepreneurial Organisation. Palgrave Macmillan, Hampshire.

Council on Competitiveness. 2008. Cooperate: A Practitioners Guide for Effective Alignment of Regional Development and Higher Education. Council on Competitiveness. Available online at: http://www.compete.org/images/uploads/File/PDF%20Files/Cooperate%20Final.pdf

Department of Education and Skills. 2011. National Strategy for Higher Education to 2030. Report of the Strategy Group. Available online at: http://www.hea.ie/files/files/DES_Higher_Ed_Main_Report.pdf

Duke, C., 2008. University engagement – avoidable confusion and inescapable contradiction, Higher Education Management and Policy, 20 (2) 87-98

Etzkowitz, H. & Leydesdorff, l. 2000. The Dynamics of Innovation: From National Systems and Mode 2 to a triple Helix of University-Industry-Government relations, Research Policy 29(2). 109-123.

European Commission. 2011. The State of European University-Business Cooperation. Directorate-General for Education and Culture. Münster University.

European Commission. 2010. New Skills for New Jobs: Action Now, A report by the Expert Group on New Skills for New Jobs prepared for the European Commission (February 2010).

Goddard, J. 2009. Reinventing the Civic University, Provocation 12: September 2009, NESTA

Goddard, J. 2005. Institutional Management and Engagement with the Knowledge Society. Higher Education Management and Policy; 17 (1) 23-44. OECD 2005.

Hazelkorn, E. 2009. Community Engagement as Social Innovation, in Weber, L.E., Duderstadt, J.J. (Eds), 2010, University Research for Innovation, Economica, Glion Colloquium Series No. 6.

Holland, B. A. 2005. Scholarship and Mission in the 21st Century University: The Role of Engagement, Keynote Address to the Australian Universities Quality Agency Forum, July 2005, Sydney. Available online at: http://depts.washington.edu/ccph/pdf_files/AUQA_paper_final_05.pdf

Lester, S. and Costley, C. 2010. Work-based learning at higher education level: value, practice and critique. Studies in Higher Education; 35(5), 561 - 575

Millican, J. & Bourner, T. 2011. Student-Community engagement and the changing role and context of higher education. Education and Training 2011; 53 (2/3) 89-99.

Molas-Gallart, J. & Castro-Martinez, E. 2007. Ambiguity and conflict in the development of 'Third Mission' indicators. Research Evaluation; 16 (4). 321-330.

Molas-Gallart, J., Salter, A., Patel, P., Scott, A. & Duran, X. 2002. Measuring Third Stream Activities; Final Report to the Russell Group of Universities, SPRU, University of Sussex.

Mora, J.G., Detmer, A. &Vieira, M.J. 2010, Good Practices in University-Enterprise Partnerships. Report of the GOODUEP project for the European Commission. Available online at:

http://www.gooduep.eu/documents/GOODUEP-Final%20Report%20UEPS.pdf

OECD 2007. Higher Education Institutions and Regions: Globally Competitive, Locally Engaged, OECD, Paris.

Sheridan, I. & Linehan, M. 2011. Work-placement in Third Level Programmes. CIT Press. Cork

Vorley, T. & Nelles, J. 2008. (Re)Conceptualising the Academy: Institutional Development of and Beyond the Third Mission. Higher Education Management and Policy 2008; 20 (3).

ENTREPRENEURIAL ORIENTATION IN STUDENT POPULATION

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The paper explores what, if any, differences there are between students in their entrepreneurial orientation (EO). The EO is measured by a survey in 17 academic programs in three different universities of applied sciences in Finland. The results are analysed statistically. They reveal the existence of significant differences in entrepreneurial orientation based on gender, age, prior work experience and academic program. The reasons for the last differentiator are considered in detail and some practical implications are proposed.

Keywords: Entrepreneurship, student, academic program, higher education

I. INTRODUCTION

Teaching for entrepreneurship is a task to get the students interested in entrepreneurship as a career option, empower them to believe in their possibilities and to get them to acquire the concrete skills needed in their business. Educators must "…let students know of the skills necessary to successfully start a business and help build their confidence in being able to perform those activities" (Engle, *et al.*, 2010, p. 51). The task is thus very much about motivation and empowerment (Krueger;Reilly;& Carsrud, 2000).

In order to create a learning environment through which the students would be self-efficated for entrepreneurial career a teacher needs to know the students' original disposition towards entrepreneurship. It is a totally different task to work with students who are already enthusiastic about entrepreneurship to teaching students for whom entrepreneurship represents all that is evil in the world.

While the differences based on national cultures have been studied extensively (e.g. Acs, *et al.*, 2004; Engle, *et al.*, 2010; Hayton, *et al.*, 2002; Orford, *et al.*, 2003; Pruett, *et al.*, 2009; van Eeden, *et al.*, 2005), the publications with the emphasis on comparing entrepreneurial orientation between different regions of one culture are considerably rarer. Mazzarol *et al.* (1999) did not find a significant difference between people living in rural vs. urban region in Australia. Franco *et al.* (2010) found some difference between student groups in eastern and western Germany, but their results could also be explained by the share of respondents on different academic disciplines. These studies can be understood so that the within a relatively homogenous main culture, like Germany, Australia – or Finland -, the effect of regional sub-cultures does disappear, thus leading into hypothesis:

H1: There are no statistically significant differences between student groups studying in different regions in Finland.

However, as Franco *et al.* (2010) noted, there were differences in entrepreneurial orientation based on professional cultures. This follows also from the more general results, which show that there are significant differences in the value priorities of different vocational populations (Knafo & Sagiv, 2001; Sagiv, 2002). The differences between professional cultures are already evident in student population as students in different academic disciplines hold different value priorities (Myyry & Helkama, 2001; Verkasalo, *et al.*, 1994). The field of study has a larger effect on the personal values than the national cultures (Verkasalo;Daun;& Niit, 1994). For example, the business students are more achievement and power oriented than their counterparts in social sciences and humanities (Verkasalo;Daun;& Niit, 1994), and technology students value tradition, conformity and security more than students of social sciences (Myyry & Helkama, 2001).

The disciplinary differences are reflected in the entrepreneurial activities. For example, Tackey and Perryman (1999) found the highest self-employment rates in creative arts and design courses. Franco *et al.* (2010) found out that in their sample from German and Portuguese universities the business administration students had a significantly higher preference to be self-employed than students of other disciplines. Taatila and Down (in review) noticed that students in nursing, social work and IT were significantly less interested in entrepreneurial career than students in service management and business development. This leads us into the following hypothesis:

H2: There are statistically significant differences in entrepreneurial orientation between student groups based on their field of study.

The demographic variables provide also an interesting view to the entrepreneurial orientation. There is some evidence that gender has some effect on the entrepreneurial intention of university students with women scoring lower results than men (e.g. Mazzarol, *et al.*, 1999; Shay & Terjesen, 2005; Wilson, *et al.*, 2004), though Pruett *et al.* (2009) or Franco *et al.* (2010) did not find evidence on this in their research. Neither did the two latter studies find any affect based on the student's status (year of studies) or age on entrepreneurial intent. This view is supported by the results of Mazzarol *et al.* (1999). They studied the effect of 16 different demographic variables and found out that only gender, previous employment in governmental job and recent redundancy produced significant results - two latter ones correlating negatively with the propensity to start a business. For example age, education level, prior general job experience and rural vs. urban location did not produce significant differences.

For this research we have selected to study the following control variables: gender, age, year of studies, level of studies (bachelor/master), and prior work experience. From these control variables the following hypothesis were constructed:

H3: The gender has an effect on the entrepreneurial orientation with men scoring higher than women.

H4: The age does not effect on the entrepreneurial orientation.

H5: The year of studies does not have an effect on the entrepreneurial orientation.

H6: The level of studies does not have an effect on the entrepreneurial orientation.

H7: The prior work experience does not have an effect on the entrepreneurial orientation.

II. ENTREPRENEURIAL ORIENTATION

Entrepreneurial orientation in an organizational context has been studied extensively with numerous different research instruments (e.g. Autio, *et al.*, 2001; Engle, *et al.*, 2010; Louw, *et al.*, 1997; Pruett, *et al.*, 2009; Reynolds, *et al.*, 1994; Shane, 1992; van Eeden, *et al.*, 2005). In general, these survey-based instruments measure the individuals' entrepreneurial traits in the cultural context. One of this class of instruments was developed by Covin and Slevin (1989) based on earlier approaches on strategic management (Khandwalla, 1977; Miller & Friesen, 1982; Mintzberg, 1973). Their theory proposes that a firm has a competitive orientation, which can be located on a continuum between conservative and entrepreneurial.

On one end of the scale, conservative firms are risk-averse, non-innovative and reactive, or adaptive to the needs of the markets (Mintzberg, 1973). Entrepreneurial orientation on the other hand, is related to the extent to which top managers are "inclined to take business-related risks", "favour change and innovation in order to obtain a competitive advantage for their firm" and "compete aggressively with other firms" (Covin & Slevin, 1988, p. 218), i.e. entrepreneurial orientation requires 1) risk taking, 2) innovation, and 3) pro-activeness. The importance of these three dimensions have been stressed also in numerous other studies, like: risk-taking by Campbell (1992), McClelland (1961), Levesque, *et al.* (2002), Praag & Cramer (2001), and Segal, *et al.* (2005), innovation by Schumpeter (1926), Covin & Miles, (1999), Jennings & Young (1990), Schollhammer (1982), and Zahra (1993), and pro-activeness by Knight (1997), Lieberman & Montgomery (1988), Lumpkin & Dess (2001), Shapero (1982), and Stevenson & Jarillo (1990).

Even though Covin and Slevin (1989) wrote their paper about attributes of a firm, their research was aimed at studying the behavior of individuals within a firm – owners, executives, top management. The competitive orientation of a firm was seen to be based mainly on their attitudes and actions, their personal entrepreneurial orientation. It is, as van Eeden *et al.* (2005, p. 26) noted, that "entrepreneurship is not just about establishing a new enterprise (entrepreneurial activity); it is also about the psychological make-up behind this endeavor". Thus the presented approach can be taken as a starting point also when studying entrepreneurial orientation of individuals.

In addition to the three dimensions of entrepreneurial orientation proposed by Covin and Slevin (1989) there are also other similar personal psychological attributes of entrepreneurial behavior. For example, there is plenty of evidence that active networking produces competitive advantage to entrepreneurial activities and firms (Davis, 1969; Hautamäki, 2003; McAdam & McClelland, 2002; Myint, *et al.*, 2005; Shane & Stuart, 2002).

Another sub-dimension, confrontation tolerance, was found out by Taatila and Down (in review) as

they tested the original Covin's and Slevin's (1989) instrument in student population. The founding was not surprising considering all the confrontational situations the entrepreneurs face on constant basis. They have to overcame, for example, constant and over-powering learning needs in solving open-ended problems (Shane, 2000; Shane & Venkataraman, 2000). Ataman (2002, p. 447) has proposed that the entrepreneurs use confrontation tolerance also as a tool to gain more social power in order to be able to produce better results.

Thus the scale for measuring entrepreneurial orientation has five sub-dimensions: 1) risk taking, 2) innovation, 3) pro-activeness, 4) networking, and 5) confrontation tolerance. These sub-dimensions should, according to previous discussion, differ between entrepreneurs (or entrepreneurially working individuals) and non-entrepreneurs (or conservatively working individuals). In order to verify the method and the scale two reliability and validity hypothesis are constructed:

H8: There is a statistically significant difference in total entrepreneurial orientation between students with and without entrepreneurial experience.

H9: There is a statistically significant difference for each sub-dimension of entrepreneurial orientation between students with and without entrepreneurial experience.

If H8 will be falsified, then the results cannot be considered reliable, as the scale would not measure actual orientation towards entrepreneurship. If H9 will be falsified for any of the sub-dimensions, then that sub-dimension cannot be considered reliable for the same reason as for H8.

III. METHODOLOGY

The study was conducted via an internet questionnaire which took about 10 minutes to complete. The students were invited either by their tutor teachers or, in the case of graduating students, by the student information office. Participation in the study was voluntary and no remuneration was provided to the respondents.

The survey form was designed by Taatila and Down (in review). The main part of the survey consisted of questions related to the five sub-dimensions of entrepreneurial orientation (22 statements) as well as the respondent's overall desire (2 statements) toward entrepreneurial career. The scale is based on Covin's and Slevin's (1989) scale. Respondents make similarity judgments by comparing the stated portrait to themselves and indicating how much like them the characterized person is on a six-point scale (0=not like me at all; 5=very much like me).

The respondents were both from Finnish- and English-speaking programs. The questions were translated from English to Finnish in a double back translation process, which is consistent with the guidelines regarding the equivalence in language translations in research projects (Brislin, 1980).

In addition to the questions about entrepreneurial orientation, a set of demographic variables was measured. These included age, gender, academic program, level of studies (bachelor/master), phase of studies (in academic years), nationality, university, institute within the university, work experience and entrepreneurial experience.

After collecting the data, the entrepreneurial orientation variables were formed by calculating the mean value of all the items related to the sub-dimension in question (Taatila & Down, in review).

The statistical analysis of the responses was conducted by using SPSS version 18. H8 and H9 were tested by an independent samples t-test between the respondents with entrepreneurial experience and the respondents lacking it. Independent samples t-test was also done to test H7, H6 and H3 based respectively on work experience, level of studies and gender.

Due to inequalities in the size of samples from three universities H1 was tested by conducting two independent samples t-tests. Both t-tests between regions were made within a shared field of study, i.e. by comparing SAMK sample to Laurea students in business administration and comparing LAMK students to Laurea students in well-being (social work, nursing and physiotherapy) to avoid the effect created by orientation differences of academic programs.

H4 and H5 were tested by calculating the correlations between entrepreneurial orientation variables and age and year of studies respectively. The correlation interpretation guidelines suggested by Cohen (1988, p. 79-81) were followed:

$.10 \leq r \leq .29$ = small correlation

$.30 \leq r \leq .49$ = medium correlation

$r \geq .50$ = large correlation

A one-way analysis of variance (ANOVA) was performed to investigate H2. Six dependent

variables were used: total entrepreneurial orientation, entrepreneurial desire, innovativeness, risk taking, pro-activeness and confrontation.

To investigate whether the possible statistically significant differences found out between the academic programs were actually created by some demographic variables, a two-way between-groups ANOVA was also used. The dependent variables were the ones in which differences were found and the independent variables were academic program and the demographic variables that differed considerably between programs.

IV. RESULTS

The sample consisted of 768 students from three universities of applied sciences in Finland (Laurea University of Applied Sciences N = 663, Satakunta University of Applied Sciences N = 41, Lahti University of Applied Sciences N = 64). They answered the questionnaire between September 2010 and November 2011.

Program	fem.	male	N	%	N (e)	% (e)
Business Ventures	14	18	32	4,2	7	22
Hotel and Restaurant Management	60	13	73	9,5	2	3
Service Management	42	10	52	6,8	4	8
Information Technology	28	55	83	10,8	10	12
Security Management	7	10	17	2,2	0	0
Nursing	155	10	165	21,5	14	9
Physiotherapy	46	14	60	7,8	4	7
Social work	121	11	132	17,2	7	5
Business management	92	47	139	18,1	15	11

Table 1: The academic programs with more than 15 respondents (> 2% share of responses) and number and share of entrepreneurs in each program as well as the gender distribution. “e” in the columns “N(e)” and “% (e)” refers to entrepreneurs.

Of the respondents 74,7% (n=574) were female and 25,3% (n=194) male, 77,5% (n=595) first year and 13,3% (n=102) 4th year students, 95,1% (n=730) Finnish and 97,7% (n=750) bachelor-level students. 8,6% (n=66) had previous entrepreneurial experience and 24,1% (n=185) had no or less than a year of work experience. The mean age was 25 years and the standard deviation 7,4 years. Out of 19 academic programs 9 had more than 2% share of the sample (n > 15). Eight of these programs had two or more students with entrepreneurial experience and they will be looked into when addressing H2. The academic programs in question are presented in table 1.

In order to test the internal consistency of the variables Cronbach’s alpha was calculated for each variable. Alpha values were total entrepreneurial orientation = 0,83 (24 items), entrepreneurial desire = 0,78 (2 items) , innovation = 0,78 (5 items), risk taking = 0,76 (6 items), pro-activeness = 0,63 (4 items), networking = 0,61 (5 items) and confrontation tolerance = 0,65 (2 items).

The alphas for pro-activeness, networking and confrontation fell under the suggested level of 0,7 (DeVellis, 2003). However, the scales have only few items and in these cases it is common to find quite low Cronbach values (Briggs & Cheek, 1986). Thus we will use the variables in the analysis, but will keep in mind the potential problems related to their reliability.

The validity of the metrics was tested by hypotheses H8 and H9 – do the variables show differences between students with and without entrepreneurial experience. The results of the t-tests based on this differentiator are provided in table 2

	Entrepreneurs (66)		Non entre-preneurs (702)				
	M	SD	M	SD	t (766)	p (2-tail)	eta sqr
Total EO	3,17	,60	2,69	,60	-6,30	<,005	,05
Desire	3,30	1,27	2,30	1,25	-6,25	<,005	,05
Innovation	3,60	,98	3,10	,91	-4,30	<,005	,02
Risk taking	2,89	,83	2,27	,81	-5,98	<,005	,04
Pro-activeness	3,10	,93	2,58	,85	-4,66	<,005	,03
Networking	3,06	,99	2,92	,97	-1,16	,25	,00
Confronta-tion	3,16	1,11	2,86	1,11	-2,07	,04	,01

Table 2. The results of the independent samples t-tests in comparing students with and without entrepreneurial experience.

As can be seen from the table 2, all the other variables but networking produced a significant

difference between two groups. The magnitudes in the differences in the means in the variables with statistical significant had effects between small and moderate (Cohen, 1988). Thus we can verify H8; there is a statistically significant difference in total entrepreneurial orientation between students with and without entrepreneurial experience. We can also verify H9 for all the other variables except networking. When this information in combined with the low Cronbach's alpha value, networking as a separate variable will be omitted from further analysis.

The effect of gender was also tested by an independent samples t-test. The results are provided in table 3.

	Female (574)		**Male (194)**				
	M	SD	M	SD	t (766)	p (2-tail)	eta sqr
Total EO	2,72	,60	2,76	,63	-,97	,33	,00
Desire	2,26	1,26	2,76	1,27	-4,84	<,005	,03
Innovation	3,20	,92	2,98	,94	2,75	,01	,01
Risk taking	2,26	,82	2,50	,82	-3,58	<,005	,02
Pro-activeness	2,58	,87	2,77	,85	-2,71	,01	,01
Confronta-tion	2,88	1,12	2,91	1,08	-,42	,68	,00

Table 3: The results of the independent samples t-tests in comparing the variables between female and male students.

As can be seen from the table 3, entrepreneurial desire, innovation, risk taking and pro-activeness produced statistically significant differences between men and women. Thus we can partially verify H3. The gender has an effect on the entrepreneurial orientation with men scoring higher than women, but only in their entrepreneurial desire, risk taking and pro-activeness. Innovation produced also a statistically significant difference, but with women scored higher than men.

An independent samples t-test was also conducted to compare the effect of level of studies (master/bachelor) on the dependent variables. The sample sizes were rather unequal with N(bachelor) = 750 and N(master) = 18. According to Levene's test the equal variances could not be assumed for entrepreneurial desire and pro-activeness but they could be assumed for the rest of the variables (Pallant, 2010). The results of the independent samples t-test are provided in table 4.

	Bachelor (750)		**Master (18)**				
	M	SD	M	SD	t (766)	p (2-tail)	eta sqr
Total EO	2,72	,60	3,19	,72	-3,30	<,005	,01
Desire	2,37	1,27	2,75	1,68	-,94	,36	,00
Innovation	3,12	,92	3,69	,91	-2,57	,01	,01
Risk taking	2,31	,81	2,83	1,09	-2,68	,01	,01
Pro-activeness	2,61	,85	3,38	1,29	-2,57	,02	,01
Confrontation	2,88	1,11	3,14	1,01	-,97	,33	,00

Table 4: The results of the independent samples t-tests in comparing the variables between bachelor-level and master-level students. The equal variances are assumed for total entrepreneurial orientation, innovation, risk-taking and confrontation. The equal variances are not assumed for entrepreneurial desire and pro-activeness.

Following table 4, total entrepreneurial orientation, innovation, risk taking and pro-activeness produced statistically significant differences between bachelor- and master-level students. Thus we can falsify H6. The level of studies does have an effect on the entrepreneurial orientation with master-level students in several sub-dimensions.

The effect of work experience was also tested by an independent samples t-test. The results are provided in table 5.

	Work experience =< 1 year (485)		**Work experience > 1 year (283)**				
	M	SD	M	SD	t (766)	p (2-tail)	eta sqr
Total EO	2,60	,60	2,80	,60	4,41	<,005	,02
Desire	2,20	1,26	2,49	1,28	3,02	<,005	,01
Innovation	2,95	,91	3,24	,92	4,27	<,005	,02
Risk taking	2,16	,80	2,41	,82	4,11	<,005	,02
Proactiveness	2,41	,79	2,74	,89	5,31	<,005	,04
Confrontation	2,95	1,15	2,85	1,09	-1,25	,21	,00

Table 5: The results of the independent samples t-tests in comparing the variables between students with one or less years of work experience to students with longer work

experience. The equal variances are assumed for all the other variables except pro-activeness.

As can be seen from the table 5, there were statistically significant differences between groups in total entrepreneurial orientation, entrepreneurial desire, innovation, risk-taking and pro-activeness. Thus we can falsify H7. The prior work experience does have an effect on the entrepreneurial orientation; students with prior work experience produce higher results in several sub-dimensions.

The relationships of age and year of studies to the dependent variables were investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. The results are presented in table 6.

	Age		**Year of studies**	
	corr.	**p (2-tail)**	**corr.**	**p (2-tail)**
Total EO	,14*	<,005	-,03	,42
Desire	,03	,37	-,06	,09
Innovation	,25*	<,005	,00	,91
Risk taking	,11*	<,005	,05	,19
Pro-activeness	,25*	<,005	,02	,53
Confrontation	-,04	,23	-,10	<,005

Table 6: The correlations of age and year of studies to total entrepreneurial orientation, entrepreneurial desire, innovation, risk taking, pro-activeness and confrontation. N for each calculus was 768. The significant correlations are marked by asterisk (*).

Regarding the age, there was a statistically significant positive correlation with four variables: total entrepreneurial orientation, innovation, risk taking and pro-activeness. All of the correlations were relatively weak. However, since there were several significant correlations present in the sample, it is possible to falsify H4; the age does have effect on the entrepreneurial orientation with older persons showing higher scores.

Regarding the year of studies, there was only a weak negative correlation on one of the variables, confrontation. There was no correlation with other variables. Thus we can overall agree with H5. The year of studies does not have an effect on the entrepreneurial orientation.

H1 was tested by making two independent samples t-test. Firstly by comparing business administration students in SAMK (n = 41) to business administration students in Laurea (n = 98) and secondly by comparing well-being students in LAMK (n = 64) to well-being students in Laurea (n = 293). Neither comparison found any statistically significant differences for any variable. Thus we can accept H1 for this sample. No statistically significant differences were found between student groups studying in different regions in Finland.

H2 was tested by one-way between-groups analysis of variance (ANOVA). The test compared eight academic programs listed in table 1 to the components of entrepreneurial orientation. The test of homogeneity of variances showed that the sample did not violate the assumptions except for innovation, which will be omitted from further discussion in this topic. There was a statistically significant difference between the factors in total entrepreneurial orientation ($F(8,744) = 4,17$; $p < 0,005$), entrepreneurial desire ($F(8,744) = 11,78$; $p < 0,005$) and risk taking ($F(8,744) = 3,38$; $p < 0,005$).

Post-hoc comparisons were made using Tukey HSD test for the three mentioned variables. Two of the variables showed only few significant differences between academic programs. For the risk taking, there was a statistically significant difference from social work (N = 132, Mean = 2,06, SD = 0,87) to business ventures (N = 32, Mean = 2,66, SD = 1,03) and business management (N = 139, Mean = 2,43, SD = 0,75). For total entrepreneurial orientation there was a statistically significant difference from business ventures (N = 32, Mean = 3,08, SD = 0,66 to information technology (N = 83, Mean = 2,56, SD = 0,68, nursing (N = 165, Mean = 2,72, SD = 0,55) and social work (N = 132, Mean = 2,59, SD = 0,59).

The biggest differences surfaced in the entrepreneurial desire. They are presented in table 7.

	Business ventures	**Hotel/restaurant man.**	**Service man.**	**IT**	**Security**
N	32	73	52	83	17
Mean	3,40	2,94	2,84	2,28	1,91
SD	1,29	1,12	1,25	1,21	1,32
Business Ventures	-			*	*
Hotel/restaurant man.		-		*	*
Service man.			-		
IT	*	*		-	
Security	*	*			-
Nursing	*	*	*		
Physio-theraphy.					
Social	*	*	*		

work					
Business man.	*				
	Nursing	**Physioth.**	**Social work**	**Business man.**	
N	165	60	132	139	
Mean	1,90	2,62	2,03	2,62	
SD	1,18	1,25	1,23	1,21	
Business Ventures	*		*	*	
Hotel/restaurant man.	*		*		
Service man.	*		*		
IT					
Security					
Nursing	-	*		*	
Physio-theraphy.	*	-	*		
Social work		*	-	*	
Business man.	*		*	-	

Table 7: The statistically significant differences in entrepreneurial desire between students of different academic programs. The significant differences are marked with an asterisk (*).

The results verify H2. They present statistically significant differences in entrepreneurial orientation between student groups based on their field of study. However, while there are some differences in total entrepreneurial orientation and risk taking, the majority of difference lies in the entrepreneurial desire. Thus it is possible to conclude that while there are differences in entrepreneurial desire based on the academic programs, there are only very few differences in the entrepreneurial traits.

One of the demographic variables, gender, differed greatly between academic programs as presented in table 1. In order to investigate whether the differences between groups in entrepreneurial desire and total entrepreneurial orientation were mainly created by academic program or differences in gender distribution a two-way between groups ANOVA was conducted. In investigating the entrepreneurial desire, the interaction effect between academic program and gender was not statistically significant, $F(10, 744) = 0,93$, $p = 0,51$. As found out earlier via t-tests and ANOVA, there were statistically significant main effects both for gender $F(10, 744) = 13,95$, $p < 0,005$ and academic program $F(10, 744) = 4,90$, $p < 0,005$. The effect sizes, measured in partial eta squared were 0,02 (small) for gender and 0,07 (moderate) for academic program. In investigating the total entrepreneurial orientation, the interaction effect between academic program and gender was not statistically significant, $F(10,744) = 1,34$, $p = 0,21$. The gender did not produce any statistically significant difference, $F(10, 744) = 2,07$, $p = 0,15$. There was a significant difference between academic programs $F(10, 744) = 1,80$, $p = 0,04$ with rather small effect size, 0,03.

Based on the ANOVAs we can conclude that the academic program is the main part in creating differences between student groups. While the gender does play a role in entrepreneurial desire, the psychological and social mechanism that selects relatively homogenous people to academic programs takes the center stage.

V. CONCLUSIONS AND RECOMMENDATIONS

The key goal of the article was to find out if there were some group-based characteristics that would make some student groups more entrepreneurially oriented than other ones. The first question was, if there were any differences in entrepreneurial orientation based on geographical region in which the students were studying. No significant differences were found between students groups studying in these three regions. However, the selected sample was rather narrow both in Lahti and in Huittinen, thus decreasing the reliability of the results. All three regions are also located into southern parts of Finland, thus having relatively similar cultural backgrounds, which decreases the validity of the results. Still, the results are in line with the conclusions of Franco, *et al.* (2010) and Mazzarol, *et al.* (1999. It would seem that there are no major differences between regions within rather homogenous cultures.

When looking at the demographic effects, they had major effects on the entrepreneurial orientation. Unlike Mazzarol, *et al.* (1999) or Franco, *et al.*, (2010) it was found out that age did play a significant role in determining the entrepreneurial orientation of the respondents. This may or may not be partly explained by the sample. In Franco *et al.*'s case the age distribution was very limited, and as Mazzarol *et al.* studied people in all walks of life, the sample of this study was collected amongst the university students. It is quite possible that the older students have selected additional education in order to pursue their personal goals more than the younger students, who are still looking for their walk of life. Thus the older students would be more focused on entrepreneurial characteristics – they know that in order to advance in their professional path they need innovation, risk taking, pro-

activeness and confrontation tolerance. However, when designing an entrepreneurial study program, one should note the age variation within the group.

Another effect on entrepreneurial orientation followed from the level of studies, with master-level students being more entrepreneurially oriented than their colleagues on bachelor-level. However, this can be partly explained by the age distribution of the students. Master-level students in universities of applied sciences must have a bachelor-degree and at least three years of work experience. Thus they are considerably older and more experienced than average bachelor-level students. It is possible that this effect can be explained to an extent as an extension of age.

Another area in which there was a disagreement with the findings of Mazzarol *et al.* (1999) was work experience. In their sample only work experience that had an effect on entrepreneurial tendencies was employment in in government, and that had a negative effect. According to the presented results the prior work experience had a significant positive effect on the entrepreneurial orientation.

The gender question followed the findings of Mazzarol, *et al.* (1999), Shay & Terjesen (2005) and Wilson *et al.* (2004) – it does have an effect on the entrepreneurial orientation. Interestingly the mentioned studies found that men were more entrepreneurial than women, but the presented sample agreed with this only on total entrepreneurial orientation, entrepreneurial desire, risk taking and pro-activeness. In innovation women scored statistically significantly higher results than men. However, overall we can still agree that men consider themselves to be more entrepreneurial than women.

In conclusion, the sample presented a relatively traditional picture of an entrepreneurially oriented student. He is older than average student, with prior work experience, preferably studying in master-level.

To continue following of the traditional view, the differences between the students on different academic programs seem to follow the findings of Tackey & Perryman (1999) and Franco *et al.*, (2010): entrepreneurial orientation differs between student groups based on their field of study. However, the students in business management were not found to be as distinctively entrepreneurial as Franco *et al.* (2010) reported. This can be explained by a difference in categorization. The sample used in the presented research included a special entrepreneurial program, business ventures, as a separate from business management program. It is possible that the entrepreneurial students have been pulled into this special program, thus starving some entrepreneurial drive from business management program. This conclusion is supported by the results, according to which the students in business ventures scored the highest entrepreneurial orientation. Also the students in hotel and restaurant management and service management scored significantly higher results than students in nursing, security management and social work.

The major part of the difference is based on the entrepreneurial desire, not the components of entrepreneurial orientation. The students in the programs scoring low on entrepreneurial desire are not below their counterparts in innovation, pro-activeness or confrontation tolerance. The risk taking was the only sub-variable of entrepreneurial orientation in which there were some differences and even in that case the differences were very few.

The results related to the year of studies offer more light to this result. They agree with the findings of Franco *et al.* (2010) and Pruett *et al.* (2009) that the year of studies does not have an effect on the entrepreneurial orientation. It seems that this quality does not change considerably during the years in the university. The reasons for the differences between academic programs must lay in some other mechanism than the pedagogic process. The collected sample does not allow us to make clear conclusions on the reasons for the presented phenomenon. However, it is possible to build several hypotheses that should be studied further.

Firstly, what is the effect of the admission tests? Could it be, that in nursing and social work, for example, they do not favour potential students with entrepreneurial desire? Or are the applicants already polarized in their entrepreneurial desire even before they apply to an institution.

It is quite possible that the revealed situation is due to selective mechanisms already before applying and to academic programs. For example, in order to enter a challenging program an applicant has to have chosen early on in life to study subjects relevant to that field. The future student has selected, for example, natural sciences over social sciences in high school – and hobbies and networks that support competence development in the chosen field. Then the applicant has to have considered the discipline interesting for her personally and show enough

commitment to apply and prepare herself properly for the tests.

There may also very well be even stronger background currents affecting the selective mechanism. It is possible that nurture has some effects on the preferences the future students show on academic programs. The affect created on personal value priorities (Verkasalo;Daun;& Niit, 1994) by parents, relatives, friends and our whole social environment is likely be huge. It is a totally different situation to grow up in a family of successful enterprisers to a family of publicly (under)funded care-takers. The available resources, the exemplary patterns and measures of personal success etc. differ greatly thus effecting on the personal view of life of the young individual, effecting on the subjects she studies in the high school and on the academic programs she applies to - or whether she will even apply to academia at all.

There is also some evidence that nature plays its role in entrepreneurial orientation. For example, White *et al.* (2006) has shown that there is a positive relationship between the testosterone levels and the interest towards new venture creation. More generally, Dabbs (1992) has verified that the people in different occupations have different levels of testosterones. It is most unclear, how large an effect do this type of natural phenomenon have on entrepreneurial desire and how they interact with nurturing processes in order to produce such clear differences between student populations of different academic programs.

Whatever the selection mechanism is, the differences between academic programs do exist while possible region-based differences were too delicate to be surfaced by the used research methodology. How, then, should the teachers and programs developers take the differences into account? At least it would sound plausible to accept that there may be some major differences in entrepreneurial desire. Using considerable time to motivate students already interested in entrepreneurship is a waste of time, while not finding ways to overcome the personal values inhibiting entrepreneurial interest in another group may prove to be disastrous. The teacher should understand whether entrepreneurship is favoured of feared in the group and act accordingly. As a rule of thumb, the older, more experienced and more male dominant the group is, the more positive view they have on entrepreneurship. However, the biggest effect lays on the academic program, with nursing and social work –programs having low interest on entrepreneurial career.

Simultaneously the teacher should keep in mind that the difference lies mainly in the entrepreneurial desire, not the variables affecting on entrepreneurial orientation. The academic programs do not differ considerably in innovation, pro-activeness or confrontation tolerance, and only very little in risk taking propensity. It is very possible to develop the entrepreneurial traits, while possibly camouflaging them under different titles, like "innovation" or "development" exercises. Introducing entrepreneurship as one means of taking effective use of innovation processes could, for example, be a good way of motivating entrepreneurship negative students into that potential path.

VI. References

Acs, Z. J., Arenius, P., Hay, M. & Minniti, M., 2004. Global Entrepreneurship Report: 2004 Executive Report. Babson Park: Babson College.

Ataman, G., 2002. İşletme Yönetimi Temel Kavramlar & Yeni Yaklaşımlar. 2. ed. Istanbul: Türkmen Kitabevi.

Autio, E. ym., 2001. Entrepreneurial Intent among Students in Scandinavia and in the USA. Enterprise and Innovation Management Studies, 2(2), pp. 145-160.

Briggs, S. R. & Cheek, J. M., 1986. The role of factor analysis in the development and evaluation of personality scales. Journal or personality, 54, pp. 106-148.

Brislin, R. W., 1980. Translation and content analysis of oral and written materials. Teoksessa: H. C. Triandas & J. W. Berry, ed. Handbook of cross-cultural psychology. Boston: Allyn & Bacon, pp. 389-444.

Campbell, C. A., 1992. A decision theory model for entrepreneurial acts. Entrepreneurship Theory and Practice, 17(1), pp. 21-27.

Cohen, J. W., 1988. Statistical power analysis for the behavioural sciences. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates.

Covin, J. G. & Miles, M. P., 1999. Corporate entrepreneurship and the pursuit of competitive advantage. Entrepreneurship Theory and Practice, 23(3), pp. 47-63.

Covin, J. G. & Slevin, D. P., 1988. The influence of organization structure on the utility of an entrepreneurial top management style. Journal of Management Studies, 25(3), pp. 217-259.

Covin, J. G. & Slevin, D. P., 1989. Strategic management of small firms in hostile and benign environments. Strategic Management Journal, 10, pp. 75-87.

Dabbs, J. M., 1992. Testosterone and occupational achievement.. Social Forces, 70, pp. 813-824.

Davis, J. H., 1969. Group Performance. Reading: Allison-Wesley.

DeVellis, R. F., 2003. Scale development: Theory and applications. 2nd ed. Thousand Oakes, CA: Sage.

Engle, R. L. ym., 2010. Entrepreneurial intent. A twelve-country evaluation of Ajzen's model of planned behavior. International Journal of Entrepreneurial Behaviour & Research, 16(1), pp. 35-57.

Franco, M., Haase, H. & Lautenschläger, A., 2010. Students' entrepreneurial intentions: an inter-regional comparison. Education + Training, 52(4), pp. 260-275.

Hautamäki, A., 2003. Kyllä Amerikka opettaa. Hyvinvointivaltio muutosten edessä. Helsinki: Edita.

Hayton, J. C., George, G. & Zahra, S. A., 2002. National culture and entrepreneurship: a review of behavioral research. Entrepreneurship Theory and Practice, 26(4), pp. 33-53.

Jennings, D. & Young, D., 1990. An empirical comparison between objective and subjective measures of the product innovation domain of corporate entrepreneurship. Entrepreneurship Theory and Practice, 15(1), pp. 53-66.

Khandwalla, P. N., 1977. Some top management styles, their context and performance. Organization & Administrative Sciences, 7(4), pp. 21-51.

Knafo, A. & Sagiv, L., 2001. Values and Work Environment: Mapping 32 Occupations. European Journal of Psychology of Education, XIX, pp. 255-273.

Knight, G. A., 1997. Cross-cultural reliability and validity of a scale to measure firm entrepreneurial orientation. Journal of Business Venturing, 12, pp. 213-225.

Krueger, N., Reilly, M. & Carsrud, A., 2000. Competing models of entrepreneurial intentions. Journal of Business Venturing, 15(2), pp. 411-432.

Levesque, M., Shepherd, D. A. & Douglas, E. J., 2002. Employment or self-employment? A dynamic utility-maximizing model. Journal of Business Venturing, 17(3), pp. 189-210.

Lieberman, M. & Montgomery, D., 1988. First-mover advantages. Strategic Management Journal, 9, pp. 41-58.

Louw, L., Du Plessis, A. P., Bosch, J. K. & Venter, D., 1997. Empirical perspectives on the entrepreneurial traits of undergraduate students at the University of Port Elizabeth: An exploratory study. Management dynamics, 6(4), pp. 73-90.

Lumpkin, G. T. & Dess, G. G., 2001. Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. Journal of Business Venturing, 16, pp. 429-451.

Mazzarol, T., Volery, T., Doss, N. & Thein, V., 1999. Factors influencing small business start-ups. A comparison with previous research. International Journal of Entrepreneurial Behaviour & Research, 5(2), pp. 48-63.

McAdam, R. & McClelland, J., 2002. Individual and team-based idea generation within innovation management: Organizational and research agendas. European Journal of Innovation Management, 5(2), pp. 86-97.

McClelland, D. C., 1961. The Achieving Society. Princeton: D. Van Nostrand Co..

Miller, D. & Friesen, P. H., 1982. Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. Strategic Management Journal, 3, pp. 1-25.

Mintzberg, H., 1973. Strategy-making in three modes. California Management Review, 16(2), pp. 44-53.

Myint, Y. M., Vyakarnam, S. & New, M. J., 2005. The effect of social capital in new venture creation: the Cambridge high-technology cluster. Strategic Change, 14(3), pp. 165-177.

Myyry, L. & Helkama, K., 2001. University Students' Value Priorities and Emotional Empathy. Educational Psychology, 21(1), pp. 25-40.

Orford, J. ym., 2003. Global Entrepreneurship Monitor. South African Executive Report. Cape Town: Graduate School of Business.

Pallant, J., 2010. SPSS Survival manual. 4th ed. Maidenhead: McGraw-Hill.

Praag, C. M. & Cramer, J. S., 2001. The roots of entrepreneurship and labor demand: Individual ability and low risk. Economica, 68(269), pp. 45-62.

Pruett, M. ym., 2009. Explaining entrepreneurial intentions of university students: a cross-cultural study. International Journal of Entrepreneurial Behaviour & Research, 15(6), pp. 571-594.

Reynolds, P., Scorey, D. J. & Westhead, P., 1994. Cross-national comparisons of the variation in new firm formation rates. Regional studies, 28(4), pp. 443-456.

Schollhammer, H., 1982. Internal corporate entrepreneurship. Teoksessa: C. Kent, D. Sexton & K. Vesper, (eds.) Encyclopedia of entrepreneurship. Englewood Cliffs, NJ: Prentice Hall.

Schumpeter, J. A., 1926. Theorie der wirtschaftlichen Entwicklung. Leipzig: Duncker & Humblot.

Segal, G., Borgia, D. & Schoenfeld, J., 2005. The motivation to become an entrepreneur. International Journal of Entrepreneurial Behaviour & Research, 11(1), pp. 42-57.

Shane, S., 2000. Prior knowledge and the discovery of entrepreneurial opportunities. Organization Science, 11(4), pp. 448-469.

Shane, S. A., 1992. Why do some society invent more than others?. Journal of Business Venturing, Osa/vuosikerta 7, pp. 29-46.

Shane, S. & Stuart, T., 2002. Organizational Endowments and the Performance of University Start-Ups. Management Science, 48(1), pp. 154-170.

Shane, S. & Venkataraman, S., 2000. The promise of entrepreneurship as a field of research. Academy of Management Review, 25, pp. 217-226.

Shapero, A., 1982. Social Dimensions of Entrepreneurship. Englewood Cliffs, NJ: Prentice-Hall.

Shay, J. & Terjesen, S., 2005. Entrepreneurial aspirations and intentions of business students: a gendered perspective. Boston, Babson Entrepreneurship Conference.

Stevenson, H. & Jarillo, J., 1990. A paradigm of entrepreneurship: Entrepreneurial management. Strategic Management Journal, 11, pp. 17-27.

Taatila, V. P. & Down, S., in review. Measuring entrepreneurial orientation of university students. Education + Training.

Tackey, N. D. & Perryman, S., 1999. Graduates Mean Business: A Study of Graduate Self-employment and Business Start-ups. Grantham: Grantham Book Services Ltd..

van Eeden, S., Louw, L. & Venter, D., 2005. Entrepreneurial traits of undergraduate Commerce students: A three-country comparison. Management dynamics, 14(3), pp. 26-43.

Verkasalo, M., Daun, Å. & Niit, T., 1994. Universal Values in Estonia, Finland and Sweden. Ethnologia Europaea, 24(2), pp. 101-117.

White, R. E., Thornhill, S. & Hampson, E., 2006. Entrepreneurs and evolutionary biology: The relationship between testosterone and new venture creation. Organizational behavior and human decision process, 100, pp. 21-34.

Wilson, F., Marlino, D. & Kickul, J., 2004. Our entrepreneurial future: examining the diverse attitudes and motivations of teens across gender and ethnic identity. Journal of Developmental Entrepreneurship, 9(3), pp. 177-197.

Zahra, S. A., 1993. New product innovation in established companies: Associations with industry and strategy variables. Entrepreneurship Theory and Practice, 18(2), pp. 47-69.

LIVING LABS AS INNOVATION-INCREASING ENVIRONMENTS FOR SCIENTIFIC START-UPS

Explorative Analysis

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Nowadays, external knowledge exploration is increasingly used by companies, because the integration of the user into the innovation process has proven to reduce business risks, such as the acceptance of new science-based products and services (Lichtenthaler 2005; Schumacher & Feurstein 2007). Furthermore, research has shown that the users of products and services are the developers of many important innovations (Lichtenthaler 2005; Harhoff, Henkel & von Hippel 2003). Therefore, users should be involved as co-creators in the whole innovation process to add monetary value to technological knowledge and creativity through open innovation (van der Meer 2007). This can be achieved with the help of Living Labs, open innovation and real testing environments in real life contexts, in which user-driven innovation is fully integrated into the co-creation process of new science-based products and services.

The objective of this paper is to exploratively analyse the potentials of Living Labs for increasing innovation in start-ups and for finding out which of these potentials are exploited in practice. The potentials have been elaborated on conceptually with regard to a framework given by the scientific entrepreneurship value chain. To find out to what extent these elaborated potentials are exploited in practice, the websites of the 22 effective members of the European Network of Living Labs (EnoLL) have been analysed by means of a content analysis. The results have been used to establish the elaborated potentials of Living Labs for increasing innovation in start-ups with regard to the primary activities of the scientific entrepreneurship value chain.

Living Labs facilitate the innovation process in cooperation with the users, and start-ups will gain a better insight into the possibilities and restrictions of their products and services (Schumacher & Feurstein 2007). This will increase the probability that start-ups can transfer technology-intensive and knowledge-based inventions into innovations that markets accept in the long run.

Keywords: Innovation; real testing environment; potentials

I. REAL TESTING ENVIRONMENTS FOR SCIENTIFIC INVENTIONS

In the past, the development of new science-based products and services was mostly driven by experts and scientists. Nowadays, external knowledge exploration is increasingly used by companies (Lichtenthaler 2005). Companies have ventured a step toward user-driven innovation by starting to experiment with the set-up of innovation ecosystems, integrating their users into the innovation process (Schaffers & Santoro 2010). The reason for this step is that the integration of the users into the innovation process has proven to reduce business risks, such as the acceptance of new products and services (Schumacher & Feurstein 2007). This assumption is based on the fact that many newly developed products and services did not fail due to a lack of advanced technology, but due to failure to understand the users' actual needs (Chen, Tsui, Yang, Ting & Houng 2010). Today, the users' experiences, valuation of usability, and suggestions for improvements or for completely new science-based products or services have become important components in the innovation process. Furthermore, "a large body of research has shown that users of products and processes are the developers of many important innovations that are later produced and sold by manufacturers" (Harhoff et al. 2003, p. 1753). Therefore, the users should be involved as co-creators in the innovation process very early - ideally from the beginning – so that the company may benefit from the users' knowledge and creativity. This "management of innovation is in essence the process of bringing monetary value to technological knowledge and creativity" (van der Meer 2007, p. 193) and has been popularized as open innovation. "Open Innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, an internal and external paths to market, as they look to advance their technology" (Chesbrough et al. 2006, p. 1).

Open innovation can be achieved with the help of a Living Lab to respond to the challenges of the start-ups' and users' realization of the innovation potential. Responding to the challenges of the realization of innovation potential and for the purpose of improving the efficiency and effectiveness of policy instruments to support innovation in start-ups, a change in the nature of innovation policy towards a stronger orientation to interactive learning within companies and within the region is necessary (Nauwelaers/Wintjes, 2006, p. 1). Such a view addresses issues such as organizational capabilities, interaction among companies and users, creating networks for learning and openness for external sources of knowledge and for collaboration. Living Labs offer a unique opportunity to effectively involve users at all stages of an innovation process by offering real testing environments (Directorate-General for the Information Society and Media 2009; Mulder & Stappers 2009). They can be seen as a step forward in stimulating user-driven innovation, because they "bring the users early into the development process of products and services in order to discover new and emerging behaviours and user patterns" (Mulder & Stappers 2009, p. 2). They bridge the innovation gap between technology development and the uptake of new products and services (Mulder & Stappers 2009).

Living Labs are still a very young research field and still largely unknown in scientific entrepreneurship research as well as in entrepreneurship practice, although the Living Lab concept could help to create the necessary user-centred and real testing environments that bring stakeholders and players of the value network early into the innovation process to discover new and emerging user patterns, to allow early experimentation and validation of new products and services and to customize or improve existing products and services. Nevertheless, it is not yet clear how great the precise potential of Living Labs is. Therefore the objective of this paper is to exploratively analyse the potentials of Living Labs for increasing innovation in start-ups with regard to the primary activities of the scientific entrepreneurship value chain and to find out which of these potentials are exploited in practice. After a brief description of the characteristics and the theoretical foundation of Living Labs, the potentials of Living Labs for increasing innovation in start-ups have been elaborated on conceptually with regard to a framework given by a model (see table 2), in which the primary activities of the scientific entrepreneurship value chain (see figure 2) are interrelated with the characteristics of Living Labs (supportive activities). To find out to what extent these potentials are exploited in practice, the websites of the 22 effective members of the European Network of Living Labs (ENoLL; see table 4) - a community of Living Labs with a sustainable strategy for enhancing innovation on a systematic basis - have been analysed by means of a content analysis. The results of the content analysis have been used to discuss the exploitation of potentials of Living Labs in practice and end with implications for entrepreneurship research.

II. CHARACTERISTICS AND THEORETICAL FOUNDATION OF LIVING LABS

The objective of this chapter is to give an overview on the characteristics and the theoretical foundation of Living Labs.

A. Charateristics of Living Labs

To identify the characteristics of Living Labs, secondary literature was analysed, and most commonly used and frequently cited definitions were compared with regard to keywords of single definitions (see table 1). As a result, the following characteristics were identified: user-centred, real testing environment, regionality, information and communication technology (ICT), public-private partnership (PPP) and open innovation.

Definition	User- centred	Real testing environment	Regionality	ICT	Public-Private Partnership	Open innovation
"Living Labs represent a user-centric research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real life contexts" (Livinglabs 2012).	x	x				
"A Living Lab is a city area which operates a full-scale urban laboratory and proving ground for inventing, prototyping and marketing new mobile technology applications" (Living Lab Europe, 2010, p. 2).		x	x	x		

"Living Labs are open innovation environments in real-life settings, in which user-driven innovation is fully integrated within the co-creation process of new services, products and societal infrastructures in a regional harmonized context (the 'Open Innovation Functional Region') catalyzing the synergy of SMEs Collaborative Networks and Virtual Professional Communities in a Public, Private, People Partnership" (Santoro, 2009, p. 1).	x	x	x		x	x
"Living Labs are open innovation environments in real-life settings, in which user-driven innovation is fully integrated within the co-creation process of new services, products, and societal infrastructures" (Mulder et al. 2009, p. 1).	x	x				
"Living Labs represents a research methodology for sensing, validating and refining complex solutions in multiple and evolving real life contexts. Here, innovations, such as new services, products or application enhancements, are validated in empirical environments within specific regional contexts" (Schumacher & Feuerstein 2007, p. 1).		x				
"Living Labs are environments for involving users in innovation and development, and are regarded as a way of meeting the innovation challenges faced by information and communication technology (ICT) service providers" (Følstad, 2008, p. 99).	x	x		x		
"The living lab concept creates innovation ecosystems that bring policy stakeholders and players of the value network including SMEs and end-users (citizens) early into the innovation process to discover new and emerging user patterns and allow for early experimenting and validating new products and services" (Schaffers & Santoro 2010, p. 2).	x	x			x	
Sum	5	7	2	2	2	1

Table 1: Analysis of the Most Commonly Used and Most Frequently Cited Living Lab Definitions

The number of ticks in table 1 shows that "real testing environment" and "user- centred" are the lowest common denominators and therefore influence the Living Lab definition for this contribution. Therefore, our research is based on the following own definition of Living Labs: *Living Labs are open innovation and real testing environments in real life contexts, in which user-driven innovation is fully integrated into the co-creation process of new services and products.*

B. Theoretical Foundation of Lving Labs

The Living Lab methodology is based on the open innovation concept that can be seen as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively" (Chesbrough, Vanhaverbeke & West 2008, p. 1). With regard to entrepreneurship literature, further theoretical anchors can be identified due to the characteristic of "real testing environments". These environments are directed towards trial-and-error, back-and-forth between development phases, massive action and intensive interaction, iterative planning etc. Therefore, we see further conceptual anchors in the concepts of lean start-ups (Ries 2009; Ries & Blank 2009), effectuation (Sarasvathy 2001; Sarasvathy 2008), improvisation (Mooreman & Miner 1998, Ciborra 1998; Hutchins 1991) and bricolage (Lévi-Strauss 1962; Baker & Nelson 2005).

III. EXPLORATIVE ANALYSIS OF THE POTENTIALS OF LIVINGLABS FOR SCIENTIFIC ENTREPRENEURSHIP

Every company "is a collection of activities that are performed to design, produce, market, deliver, and support its product. All of these activities can be represented using a value chain" (Porter 1998, p. 36). Von Kortzfleisch, Mokanis, Magin & Bernasconi (2010b) seized on the idea of Porter's value chain and developed the scientific entrepreneurship value chain in analogy. The respective activities are derived from the integrative approach to scientific entrepreneurship from Magin & von Kortzfleisch (2008). Their framework "includes 13 action fields which than allow to put respective methods and tools in place in order to support scientific entrepreneurship" (Magin & von Kortzfleisch 2008, p. 19; see figure 1).

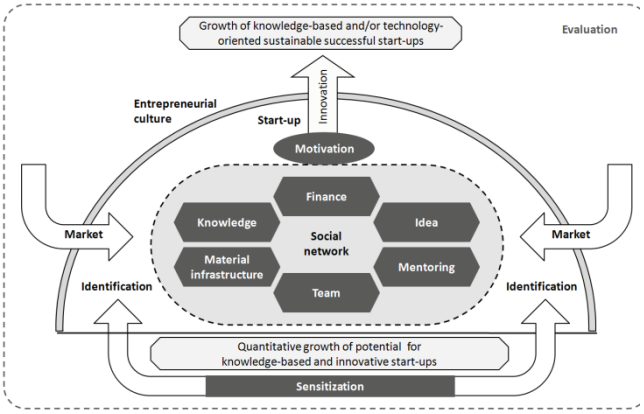

Figure 1: Integrative Approach to Scientific Entrepreneurship (von Kortzfleisch et al. 2010a, p. 8)

Based on these 13 action fields, four primary activity and five supportive activity bundles were derived to answer the question of how the action fields can be connected with each other and exploited as a scientific entrepreneurship value chain.

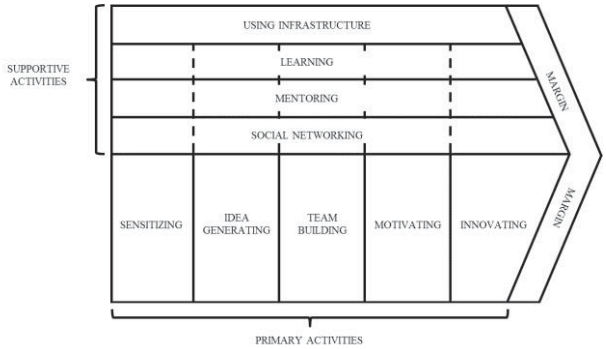

Figure 2: Scientific Entrepreneurship Value Chain (von Kortzfleisch et al. 2010)

Since Living Labs as open innovation, real life and user-centred testing environments can be understood as specific topological infrastructures, especially supporting learning, mentoring and social networking in the context of scientific entrepreneurship, these supportive activities gain instrumental infrastructure character for the primary activities also in the case of the scientific entrepreneurship value chain. The conceptual framework for the analysis of the potentials of Living Labs for increasing innovation in start-ups have been given with the help of a model, in which the primary activities of the scientific entrepreneurship value chain are interrelated to the characteristics of Living Labs; the latter characteristics are labelled the supportive activities of the scientific entrepreneurship value chain (see table 2).

		Characteristics of Living Labs (supportive activities)			
		Using infrastructures	Learning	Mentoring	Social Networking
Scientific entrepreneurship value chain (primary activities)	Sensitising	Potential X	Potential X	Potential X	Potential X
	Idea generating	Potential X	Potential X	Potential X	Potential X
	Team building	Potential X	Potential X	Potential X	Potential X
	Motivating	Potential X	Potential X	Potential X	Potential X
	Innovating	Potential X	Potential X	Potential X	Potential X

Table 2: Framework for the Analysis of Potentials of Living Labs for the Scientific Entrepreneurship Value Chain

In the following chapter "A. Conceptual Analysis", we will explain which potentials for scientific entrepreneurship can be realized through Living Labs. It has been shown how the characteristics of Living Labs can affect the primary activities of the scientific entrepreneurship value chain. Afterwards, the websites of the 22 effective members of the European Network of Living Labs (ENoLL) have been analysed in chapter "B. Content Analysis" by means of a content analysis to find out which of the potentials are exploited in practice. ENoLL is a community of Living Labs with a sustainable strategy for enhancing innovation on a systematic basis. According to the website of ENoLL, "the overall objective is to contribute to the creation of a dynamic European innovation system. ENoLL aims to support co-creative, human-centric and user-driven research, development and innovation

in order to better cater for people's needs" (see http://www.openlivinglabs.eu/).

A. *Conceptual Analysis*

In the following, the obvious potentials that can be realized through Living Labs will briefly be presented. These potentials have the distinction of having direct effects, so that such effects are in the nature of things and for that no more assumptions and artificial requirements have to be supposed.

1) Using Infrastructures

The usage of infrastructures affects three primary activities (PA):

Real Testing and Prototyping Environments for Users (*PA Sensitizing*): The environment should support the users' involvement "in order to better understand the relationship between new innovative concepts and related users' behaviour within specific situations as well as potential cognitive workload in interpreting received signals" (Trousse, Senach, Richir, de Ruyter, Prinz, Rerolle & Katzy 2010). A Living Lab "encompasses the fields of human factors, human-computer interaction, socio-emotional interaction, cognitive psychology, cognitive ergonomic, computer science, artificial intelligence and other related fields" (Trousse et al. 2010). It enables a realistic depiction of the users' behaviour within specific situations while they become sensitised to innovation and test and prototype.

New Models and Techniques for User Observation (*PA Idea Generating*): Start-ups have to deal with the management of large, complex and heterogeneous socio-technical systems that arise while ideas are being generated. Therefore, they have to apply models that incorporate human, technological and environmental aspects. This entails growing data sets, and data acquisition and mining techniques have to be improved. The models and techniques could be provided by a consultant within Living Labs. An increase in the quality of user experience and observation could be achieved through scenario and session models and user models, for example. An improvement of techniques to deal with growing data sets could be achieved through data acquisition techniques, data mining techniques, for example.

Open Space (*PA Innovating*): Living Labs as open spaces realistically depict the situation of innovating users in particular, thus making it tangible for the company. They can be understood as spatial governance structures that make the user-driven innovation configurable, controllable and manageable. With regard to the virtual and real space metaphor, the rooms offer orientation and distinction. The users are in a testing and prototyping environment where learning by trial and error is desirable. The physical integration of the different stakeholders in a room can reduce complexity.

2) Learning

Learning affects four primary activities:

User-Centred Design Research (*PA Sensitising*): User-centred design research is conductive to the establishment of a scientific entrepreneurship culture, because the users become sensitized to scientific entrepreneurship, participate in the innovation process and experience that they exercise influence and are shown appreciation for their requirements, criticism and improvement suggestions. Developers welcome this participation, because they recognize the potential of the users' requirements, criticism and improvement suggestions.

Interdisciplinary Teams (*PA Team Building*): A Living Lab "not only opens-up the perspective for the real user problems, other disciplines and related problem-solving perspectives but also for potentially completely new team members" (von Kortzfleisch et al. 2010a, p. 2). The involvement of users in the team is very important, because in order to solve a problem, the needed information and problem-solving capabilities must be identified and brought together (von Hippel 1994).

Entrepreneurial Design Thinking (*PA Motivating*): Entrepreneurial design thinking is a suitable methodology to motivate users to participate. It is "a team-diversity-based approach for treating user-centred problems as entrepreneurial opportunities within an iterative open process supported by the use of creativity fostering tools and open environments as it is common in Living Lab concepts" (von Kortzfleisch et al. 2010a, p. 2).

Co-Creation (*PA Innovating*): Holtzblatt wrote that "great product ideas come from a marriage of the detailed understanding of a user's need with the in-depth understanding of technology. The best product designs happen when the product's designers are involved in collecting and interpreting user data and appreciate what real people need" (Holtzblatt 2001, p. 19). A Living Lab supports the innovation of products and services and the innovations' validation in

collaborative and empirical real-world environments. Implicit knowledge is transported through participation. At the same time,,the connection of the detailed understanding of a user need with the in-depth understanding of technology is fostered.

3) Mentoring

Mentoring affects two primary activities:

The Roles of Researchers and Designers (*PA Motivating*): Researchers and designers usually serve as translators for users and designers. Within Living Labs they:

- ”lead people who are on the ‘doing’ level of creativity,
- guide those who are at the ‘adapting’ level,
- provide scaffolds that support and serve peoples’ need for creative expression at the ‘making’ level, and
- offer a clean slate for those at the ‘creating’ level” (Sanders et & Stappers 2008, p. 11)

They change between being translators and facilitators for new tasks.

User Integration Methods (*PA Innovating*): In order to facilitate innovation through co-creation, each stage of the innovation process has to be supported by traditional and collaborative working environment (CWE) methods (see figure 3).

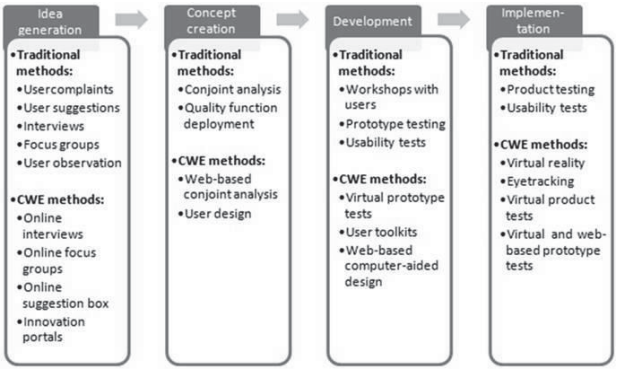

Figure 3: User Integration Methods (Reichart 2002, Mulder et al. 2009 and Schumacher et al. 2007)

All of these methods can be implemented within a Living Lab.

4) Social Networking

Social networking affects three primary activities:

Informal Way of Networking (*PA Sensitising*): Tidd & Bessant (2009) wrote that “as its simplest networking happens in an informal way when people get together and share ideas as by-product of their social and work interactions” (Tidd & Bessant 2009, p. 289). Within a Living Lab, users become sensitised to the idea generating process, and a network can be set up to help develop or customise products or services and pursue ideas more effectively within start-ups (Tidd & Bessant 2009).

Organisational Learning (*PA Idea Generating*): Organisational learning within Living Labs can help start-ups innovate, because it allows for different relationships to be built across knowledge frontiers and opens up the company to new stimuli and experience for idea generating.

Sources of Knowledge and Experience (*PA Team Building*): Networking in a Living Lab fosters team building that facilitates “a shared learning process in which partners exchange experiences, challenge models and practices, bring new insights and ideas and support shard experimentation” (Tidd & Bessant 2009, p. 283).

5) Summary of Results of the Conceptual Analysis

The conceptual analysis showed that nearly every potential of Living Labs for stimulating innovation in start-ups can be exploited when the primary activities are combined with the characteristics of a Living Lab in the scientific entrepreneurship value chain (see table 3).

		Characteristics of Living Labs (supportive activities)			
		Using infrastructures	Learning	Mentoring	Social Networking
entrepreneurship value chain (primary activities)	Sensitising	Real testing and prototyping environments for users	User-centred design research	X	Informal way of networking
	Idea generating	New models and techniques for user observation	X	X	Organisational learning
	Team building	X	Interdisciplinary teams	X	Sources of knowledge and experience

	Motivating	X	Entrepreneurial design thinking	Roles of researchers and designers	X
	Innovating	Open space	Co-creation	User integration methods	X

Table 3: Potentials of Living Labs for Scientific Entrepreneurship

A Living Lab facilitates the development, validation and integration of new ideas. Start-ups gain a better insight into the possibilities and restrictions of their products and services by utilising the innovation potential of the users (Schumacher & Feurstein 2007).

B. Content Analysis

After the analysis of the potentials of Living Labs for increasing innovation in start-ups with regard to the primary activities of the scientific entrepreneurship value chain, the descriptions of the Living Labs of the 22 effective members of ENoLL (see table 4) that were published on the website of ENoLL were analysed by means of a content analysis.

Country	**Effective members of "The European Network of Living Labs"**
Belgium	IBBT-iLab.o
	Flemish Living Lab Platform
Finland	Northern Rural-Urban Living Lab (NorthRULL)
	Laurea Living Labs Network
	HumanTech LivingLab
	Suuntaamo Tampere Central Region Living Lab
	Helsinki Living Lab - Forum Virium
France	LEVIER (Laboratoire d'Expérimentation et Valorisation Images Et Réseaux)
	Ways Of Learning for the Future (WOLF LL)
Greece	Thessaly Living Lab
	Telecommunication Networks and integrated Services Laboratory
Italy	Trentino as a Lab
Netherlands	Amsterdam Living Lab
Portugal	Lighting Living Lab
Spain	i2Cat Catalonia Digital Lab
	LIVING LAB SALUD ANDALUCÍA
	espaitec Living Lab (eLiving Lab)
	BIRD LIVING LAB
Sweden	Botnia Living Lab
UK	Manchester Living Lab
	Social Informatics Lab (SILab)
	City Lab Coventry

Table 4: Effective Members of ENoLL (Source: http://www.openlivinglabs.eu/livinglabs/effectivemembers)

The explorative character of the research in this paper implied to use a qualitative research approach. Content analysis is a common scientific research method that is used in several disciplines, for example psychology, political science, sociology and economics (Krippendorf 2003). The coding scheme (see table 5) corresponds to the potentials elaborated in chapter "A. Conceptual Analysis of the Potentials of Living labs for Scientific Entrepreneurship" (see table 3).

Main category	**Subcategory**
Using infrastructures	Real testing and prototyping environments for users (19 codings), new models and techniques for user observation (15 codings), open space (9 codings)
Learning	User-centred design research (14 codings), interdisciplinary teams (24 codings), entrepreneurial design thinking (5 codings), co-creation (9 codings)
Mentoring	Roles of researchers and designers (1 coding), user integration methods (13 codings)
Social Networking	Informal way of networking (2 codings), organizational learning (16 codings), sources of knowledge and experience (4 codings)

Table 5: Coding Scheme

Examples for the coding are provided in the following table.

Main cate-gory	Subcategory	Living Lab	Example for the coding
Using infrastructures	Real testing and prototyping environments for users	Social Informatics Lab	”Augment existing media-rich spaces within the University so they provide access to the tools and services and the contexts and resources to study and theorise the innovation processes that take place in and around them.”
		espaitec Living Lab	”The aim of e'LivingLab, the Living Lab created by espaitec -Science and Technology Park (STP) of Castellon (SPAIN)- is to provide diverse scenarios for the companies linked (physically or virtually) to the STP to design, develop and test their products in the most real environment.”
		Thessaly Living Lab	”Provides a unique validation environment for ICT based products and innovative services, strengthening industrial growth of region and business dexterity.”
	New models and techniques for user observation	Social Informatics Lab	”Assemble and develop the technical visualisation, instrumentation and simulation tools required to support mutual sense making and the co-production of visions and plans. A consequence of the use of these tools, in the form which we propose, is the configuration and governance of a set of information and communications services and applications on which collaborative working can be delivered.”
		i2Cat Catalonia Digital Lab	”Create platforms for collaboration between the business sector and universities.”
		Amsterdam Living Lab	”This is done by a strong focus on tools, methodologies and knowledge on measuring and understanding behavior and experience.”
	Open space	LEVIER	„A broadband infrastructure interconnecting fixed and mobile areas allowing new deployment and usages around broadband and mobile TV. A Virtual Reality “infrastructure” where collaborative design and innovation can take place between the different stakeholders.“
		IBBT-iLab.o	”IBBT-iLab.o overcomes systemic failures in the innovation process by involving users at an early stage of the development phase, and by creating a trusted environment where small as well as large business stakeholders can meet in a trusted environment, and test out innovative products, services and business models.”
		Botnia Living Lab	”The Botnia Living Lab system for open, user-centric innovation encompasses the expertise, methods and tools necessary for end-user communication and management of innovation processes and related information such as demography and user action profiles.”
Learning	User-centred design research	Laurea Living Labs Network	”End users are developers during the whole R&D process.”
		Suuntaamo Tampere Central Region Living Lab	”Moreover, the TCR-LL contributes to the development of new industrial R&D tools and aims to develop a deeper understanding of the human requirements and characteristics of human activities in relation to new technology products and services.”
		LEVIER	“... wanting to practice user centric R&D.”
	Interdisci-plinary teams	HumanTech LivingLab	”Ideas will be created, new services and business models will be produced and tested, and competence and technology will be produced in collaboration with public development organizations, companies, research institutes, employees, students, and the residents of and visitors to the region. Service design methods, experience management, ICT and sustainability are important themes for HumanTech LL.”
		LIVING LAB SALUD ANDALUCÍA	”Creating favourable social, cultural, technological and financial conditions that stimulate multidisciplinary collaboration”
		Trentino as a Lab	Trentino as a Lab (TasLab) is a cooperation cluster whose goal is to develop user-centric innovation and which involves all the three main innovation actors, namely research centers, enterprises and users.
	Entrepre-neurial design thinking	Manchester Living Lab	“… aims to ensure that local people can develop the skills to participate fully in the emerging information society and to be able to take advantage of the new training and employment opportunities …”
		HumanTech LivingLab	“… operates by using Service design methods. Ideas will be created, new services and business models will be produced and tested, and competence and technology will be produced … .”
		LEVIER	“… collaborative design and innovation […] between the different

			stakeholders …"
	Co-Creation	Social Informatics Lab	"... co-production of visions and plans ..."
		Amsterdam Living Lab	"Services consist of complex combinations of other services, linked together through advanced ICT, assembled and configured by users themselves."
		Laurea Living Labs Network	"End users are developers during the whole R&D process. Students are developers and creators of new professional knowledge together with other actors."
		Lighting Living Lab	"The necessary change of behaviour and attitudes towards energy consumption can only be achieved by understanding the reason behind them, through the integration and active collaboration of the end-user."
Mentoring	Roles of researchers and designers	Social Informatics Lab	"… provide the tools, facilities and the capacity to actively initiate, support and deliver multidisciplinary partnership based working."
	User integration methods	Laurea Living Labs Network	"Research and data collection methods and tools vary from project to project, including ethnographical methods, participatory observation, interviews and focus groups."
		Trentino as a Lab	"The plan is to reduce the digital divide, and at the same time to experiment new ICT solutions, with deep user involvement, all over the Trentino mountainous territory. "
		Thessaly Living Lab	"Creates the necessary mechanisms for the transfer of the knowledge created in the main bodies of LLT, and assist in the development of the Thessaly prefecture, as an innovative high-level research centre."
Social Networking	Informal way of networking	Amsterdam Living Lab	"The creation of change encounters between people living in the same city area and thereby re- enforcing the social fabric of society with the help of digital media and ubiquitous communication."
		Lighting Living Lab	"Beyond this the Lab is viewed as space of interaction between the Aveiro region main stakeholders and an opportunity to develop there the concept of Triple Helix – an interactive, rather than linear, model of cooperation and innovation process between the university, the enterprises and the government (Etzkowitz, H. 2001)."
	Organiza-tional learning	Suuntaamo Tampere Central Region Living Lab	"The mission of the TCR-LL is to create an ecosystem, in which complementary actors, i.e. research entities, users and companies can work together harmoniously to create and exploit their synergies."
		Northern Rural-Urban Living Lab	The formulation "Northern Rural-Urban Living Lab" states our intention to experiment with, learn from, and put into effect forms of innovative interplay between ICT-intensive growth- hubs on the one hand and rural areas on the other.
		Social Informatics Lab	"Collaboration is a core business modality of a research led university and the creation and sustenance of collaborative structures and mechanisms are one of its core means of acting in and as a community. [...]Deliver and evaluate a series of internal initiatives in active partnership formation, multidisciplinary development and innovation across the University with particular reference to the multi-agency partnership and innovation challenges of Science City."
	Sources of knowledge and experience	Flemish Living Lab Platform	"A strong consortium consisting of large companies [..], strong innovative SME's [..], a research organisation experienced in Living Lab research [..] and interface organisations [..] having access to a broad network of relevant stakeholders.´"
		City Lab Coventry	"Use of the consortium's critical mass of expertise, facilities and resources to accelerate route to market"
		Northern Rural-Urban Living Lab	"The mission of NorthRULL is to offer a new, integrated, user-centred approach to innovative economic and social development, in order to efficiently tackle the central challenges to the vitality of the rural areas of the North of Finland, northern Scandinavia, and eventually the circumpolar regions. This is to be achieved by combining cross-disciplinarity with the extant know-how and experience into a holistic approach to the implementation of the Lisbon strategy."

Table 6: Examples for the Coding

According to the content analysis, in practice, all of the elaborated potentials are known and exploited by the effective members of ENoLL, but to a varying degree. Considering the four characteristics of Living Labs in sum, the content analysis has shown that the potentials of learning as a supportive activity are most common (52 codings), followed by using infrastructures (43 codings), social networking (22 codings) and mentoring (14 codings). Considering each potential of the four characteristics of Living Labs, the content analysis has shown that interdisciplinary teams (24 codings) play the most important role, followed by real testing and prototyping environments for users (19 codings), organisational learning (16 codings), new models and techniques for user observation (15 codings), user-centred design research (14 codings) and user integration methods (13 codings). All of these potentials are widely used to increase innovation in start-ups. Besides, Living Labs provide several other potentials, which are not that much exploited by the effective members of ENoLL: open space (9 codings) and co-creation (9 codings), followed by entrepreneurial design thinking (5 codings), sources of knowledge and experience (4 codings), an informal way of networking (2 codings) and the roles of researchers and designers (1 coding). It is not clear whether the effective members of ENoLL are not aware of these potentials or whether they just do not emphasise this aspect on their website.

In the following, the results of the content analysis will be used to establish in detail to what extent our elaborated potentials of Living Labs for increasing innovation in start-ups with regard to the primary activities of the scientific entrepreneurship value chain are exploited in practice. Therefore, it will be described which of the four characteristics of Living Labs (using infrastructures, learning, mentoring and networking) as supportive activities of the scientific entrepreneurship value chain affect which primary activities in practice.

1) Using Infrastructures

We have shown in chapter "A. Conceptual Analysis of the Potentials of Living labs for Scientific Entrepreneurship" that using infrastructures affects three primary activities through

- real testing and prototyping environments for users,
- new models and techniques for user observation and
- open space.

The content analysis revealed that in practice all of these three potentials are exploited by the effective members of ENoLL and that **real testing and prototyping environments for users** are the most common potentials for the primary activities that are supported by using infrastructures and realised in practice. The content analysis confirmed that the Living Labs of effective members of ENoLL provide a unique validation environment to test and prototype innovative products and services. Start-ups can measure the behaviour and experiences of users in real life, because media-rich environments enable access to tools, services and the context to study and theorize the innovation process that takes place within and around the start-ups. Living Labs sensitise users to innovativeness and creativity. Furthermore, they foster innovation processes by offering trusted environments where users and employees of start-ups can meet, test and prototype innovative products and services by using **new models and techniques for user observation**. The extent of the exploitation of this potential (see table 5) shows that the effective members of ENoLL are firstly aware that it is necessary to focus on such models and techniques to measure and understand the real-life behaviour of users. Secondly, they are aware that it is necessary to transfer the knowledge created in the Living Labs to generate ideas. Start-ups need a suitable equipment of models and techniques for user observation, because only with a suitable equipment can Living Labs help start-ups in the product and service development: Living Labs can enable start-ups to develop a deeper understanding of the human requirements and characteristics of human activities in relation to new products and services - related to everyday situations taking place in the home.

Besides, Living Labs as **open spaces** provide adequate environments – real as well as virtual - and technologies to innovate and generate ideas and solutions. On the one hand, for example, infrastructures interconnecting fixed and mobile furnishings allow for new usages of the environments. On the other hand, collaborative design and innovation can take place within a virtual infrastructure among the different stakeholders. Nevertheless, this open space-metaphor is rarely mentioned on the websites of the Living Labs.

2) Learning

Learning affects four primary activities through

- user-centred design research,
- interdisciplinary teams,

- entrepreneurial design thinking and
- co-creation.

The content analysis revealed that in practice the users gain centre stage in design research and are sensitised to a culture of open and user- centred innovation. **User-centred design research** and therefore a change of behaviour and attitudes is inevitable, because customised products and services require an understanding of the reasons behind the users' needs, resulting from their integration and active collaboration with the user.

Apart from user-centred design research, in practice **interdisciplinary teams** play a very important role. Interdisciplinary teams are widely used as part of the primary activity 'learning' - also as part of all of the potentials of Living Labs for increasing innovation in start-ups. The mission of a Living Lab is to create an environment, in which interdisciplinary teams can work together to create innovative products and services. It is a very common objective of the Living Labs to exploit the synergies of the interdisciplinary teams as complementary source. Therefore, it is very important to involve all the relevant stakeholders in the team-building process, for example start-ups, citizens, public administrations and research institutions in order to create an interdisciplinary team with complementary knowledge.

Furthermore, the content analysis revealed that e**ntrepreneurial design thinking** is a suitable methodology used in Living Labs to motivate users to participate in the development process of innovative products and services, but that – in spite of this suitability - entrepreneurial design thinking is not very well known in practice.

In addition**, co-creation** is a potential for the primary activities that is supported by using infrastructures. It is partially realised in practice. The Living Lab concept improves and enriches the development of innovative products and services by introducing the users to the innovation process to foster co-creation. The users innovate and are the developers and creators of new professional knowledge and products and services together with other actors during the whole R&D process.

3) Mentoring

Mentoring affects two primary activities through

- roles of researchers and designers and
- user-integration methods.

In practice, the role of researchers and designers is not of particular interest on the websites of the effective members of ENoLL. Although the **roles of researchers and designer** are to motivate, to intermediate, to provide support for the translation of new ideas into products and services and to stimulate creativity, the importance of their special role is rarely mentioned.

Since it is one of the core services of a Living Lab to foster innovation and facilitate co-creation of innovative products and services, each of the phases in the innovation process has to be supported by **user integration methods** The content analysis has shown that different methods for integrating the user into each phase of the innovation process (idea generation, concept creation, development and implementation) are applied within many Living Labs.

4) Social Networking

Finally, the analysis of the potentials that can be realised through Living Labs has shown that social networking affects three primary activities through

- an informal way of networking,
- organizational learning and
- sources of knowledge and experience.

In practice, only organisational learning is commonly realised. In Living Labs, start-ups get the chance to learn in an **informal way of networking** about the present and future needs of users from an ICT perspective as well as a cultural and social point of view. Nevertheless, setting up a network does not seem to be a typical action of the effective members of ENoLL within the innovation process.

Another potential for the primary activities that is supported by social networking and realised in practice several times is **organizational learning.** Living Labs provide the tools, facilities and the capacity to actively initiate, support and deliver multidisciplinary partnerships based on the working and the generation of ideas of innovative products and services. A Living Lab is a great place to promote innovation among the start-ups and users involved - real as well as virtually. Ideas will be created, innovative products and services will be produced and tested, and competence and technology will be produced in collaboration between the start-ups and users. The different stakeholders will take advantage of the benefits of organisational learning, exemplarily that there is great potential for structured critical reflection from different perspectives and that these different perspectives can bring in new ideas for innovative products and services.

Besides, Living Labs offer a new, integrated, user-centred approach to innovative product and service development in order to efficiently tackle the central challenges to the innovation capacity. This can be achieved by combining the internal know-how of start-ups with **the users' sources of knowledge and experience**. As a consequence, Living Labs enable users to develop their skills in order to fully participate y in the development process of new products and services. Nevertheless, the effective members of ENoLL do not emphasise this aspect on their website. .

IV. DISCUSSION AND CONCLUSIONS

An innovation begins with either the discovery or the perception of an environment or market need or opportunity. Many new products and services "addressing tacit and latent needs, come about, not through a new technical possibility, or a visible demand from buyers, but through increased insight in the needs and dreams of possible future users" (Mulder & Stappers 2009, p. 7). Therefore, users' involvement can serve as a rich source for ideas.

Living Labs facilitate the innovation process in cooperation with the users, and start-ups will gain a better insight into the possibilities and restrictions of their products and services (Schumacher & Feurstein 2007). As laboratories, they simulate individual contexts and potential behaviour, and the technological complexity decreases through learning by doing.

The conceptual analysis has shown that nearly every potential for the scientific entrepreneurship value chain can be exploited when the primary activities are combined with the characteristics of a Living Lab. Nevertheless, the content analysis has shown that in practice all of the elaborated potentials are known and exploited but to varying degrees, as described in chapter "E. Summary of Results". Awareness must be raised for all of the potentials that can be exploited by start-ups, because Living Labs are still a very young research field and in research as well as in practice still often unknown. Even so, they have great potential, especially for scientific entrepreneurship, because they bring scientists together with the later users early on. This will increase the probability that start-ups can transfer their technology-intensive and knowledge-based inventions into innovations, which the markets accept for the long run.

V. LIMITATIONS AND FURTHER RESEARCH NEEDS

The research results presented in this contribution provide starting points for the development of hypotheses. It is just a selection of issues for further research, and the question whether the effective members of ENoLL are not aware of all the potentials of Living Labs for increasing innovation in start-ups or whether they just do not emphasise this aspect on their website has to be discussed. Furthermore, there are more Living Labs existing beyond the ones within ENoLL, and they should be considered, too. Consequently, it should be examined if those Living Labs carry out a uniform mission and offer. From a methodology perspective as a next step, the empirical validation of the hypotheses is necessary for the purpose of constructing a theory. For the validation, both qualitative (for example interviews with the Living Lab-operators or Living Lab-users within ENoLL) as well as quantitative surveys about already existing Living Labs (for example the effective members of ENoLL) are required.

VI. REFERENCES

Baker, T. & Nelson, R. E. 2005. Creating Something from Nothing: Resource Construction through Entrepreneurial Bricolage. Carbondale/Raleigh: Southern Illinois University and Universidade de São Paulo/North Carolina State University.

Chen, B., Tsui, H.-L., Yang, C.-T., Ting, L- H. & Houng, H. 2010. A Living Lab Model for User Driven Innovation in Urban Communities. Taipei, Taiwan: Institute for Information Industry (III), IDEAS.

Ciborra, C. U. 1998. Notes on improvisation and time in organizations. Amsterdam: Universität van Amsterdam.

Chesbrough, H., Vanhaverbeke, W. & West, J. 2006. Open Innovation: Researching a New Paradigm. New York: Oxford University Press.

Directorate-General for the Information Society and Media. 2009. Living Labs for user-driven open innovation. An overview of the living labs methodology, activities and achievements. Brussels: Directorate-General for the Information Society and Media.

Følstad, A. 2008. Living Labs for Innovation and Development of Information and Communication Technology: A Literature Review. The Electronic Journal for Virtual Organizations and Networks 2008; 10. 99-131.

Harhoff, D., Henkel, J. & von Hippel E. 2003. Profiting from voluntary information spillovers: how users benefit by freely revealing their innovations. Research Policy 2003; 32. 1753–1769.

Holtzblatt, K. 2001. Contextual Design: Experience in Real Life. In Oberquelle, H., Oppermann, R. & Krause J. (eds.), Mensch & Computer 2001: 1.

Fachübergreifende Konferenz. Stuttgart: B.G. Teubner . 71-89.

Hutchins, E. 1991. Organizing Work by Adaptation. Organization Science 1991; 2. 14-39.

Krippendorff, K. 2003. Content analysis: An introduction to its methodology. 2nd Edition, Beverly Hills: Sage.

Lévi-Strauss, C. 1962. The savage mind. Chicago: University of Chicago Press.

Lichtenthaler, U. 2005. External commercialization of knowledge: Review and research agenda. International Journal of Management Reviews; Volume 7 Issue 4. 231–255.

Livinglabs. 2012. http://www.livinglabs.com.tw/En/index.html; Jan. 21, 2012.

Living Labs Europe. 2010. What´s this thing called Living Labs Europe? User-Driven Innovation Environments in the 'Information Society'. Denmark: Living Labs Europe.

Magin, P. & von Kortzfleisch, H. F. O. 2008. Methoden und Insturmente des Scientific Entrepreneurship Enginieering. Lohmar: Josef EUL Verlag GmbH.

Moorman, C. & Miner, A. S. 1998. "The Convergence of Planning and Execution: Improvisation in New Product Development." Journal of Marketing; Vol. 62 (July 1998). 1-20.

Mulder, I. & Stappers, P. J. 2009. Co-creating in Practice: Results and Challenges. Delft/Rotterdam: ID-StudioLab, Delft University of Technology and Rotterdam University.

Nauwelaers, C., and Wintjes, R. 2006. SME policy and the Regional Dimension of Innovation Towards a New Paradigm for Innovation Policy? Maastricht: University of Maastricht.

Porter, M. E. 1998. Competitive Advantage: Creating and sustaining superior performance. New York: Free Press - A Division of Simon & Schuster, Inc.

Reichart, S. V. 2002. Kundenorientierung im Innovationsprozess. Wiesbaden: Gabler.

Ries, Eric. 2009. http://gigaom.com/2009/08/11/ the-promise-of-the-lean-startup/; Aug. 11, 2009.

Ries¸E. & Blank, S. 2009. The Lean Startup: Low Burn by Design not Crisis. Palo Alto: FLOODGATE (MAPLES investments).

Sanders, E. B.-N., and Stappers, P. J. 2008. Co-creation and the new landscapes of design. http://www.informaworld.com/.

Santoro, R. 2009. Living Labs in Open Innovation Functional Regions. Rome: ESoCE-Net.

Schaffers, H., and Santoro, R. 2010. The Living Labs Concept Enhancing Regional Innovation Policies and Instruments. Rome: ESoCE Net, Via Cortina D'Ampezzo.

Sarasvathy, S. D. 2008. Effectuation: Elements of Entrepreneurial Expertise (New Horizons in Entrepreneurship). Cheltenham/Camberley (UK) and Northampton/Massachusetts (USA): Edward Elgar Publishing.

Sarasvathy, S. D. 2001. What makes entrepreneurs entrepreneurial? Seattle: University of Washington - School of Business.

Schumacher, J. & Feurstein¸ K. 2007. Living Labs – the user as co-creator. Vorarlberg: Research Centre for Process- and Product-Engineering.

Tidd, J., and Bessant, J. 2009. Managing Innovation. Integrating Technological, Market and Organizational Change. 4th Edition. West Sussex: John Wiley & Sons Ltd.

Trousse, B.; Senach, B.; Richir, S.; de Ruyter, B.; Prinz, W.; Rerolle, O. & Katzy, B. 2010. http://www.ami-communities.eu/wiki/ECOSPACE_Newsletter_No_5.

van der Meer, H. 2007. Open Innovation – The Dutch Treat: Challenges in Thinking in Business Models. Creativity and Innovation Management; Volume 16 Number 2. 99-131.

von Hippel, E. 1994. "Sticky Information" and the Locus of Problem Solving: Implications for Innovation. Management Science; 40; 4. 429-439.

von Kortzfleisch, H. F.O., Mokanis, I., Magin, P. & Bernasconi, M. 2010 a. Entrepreneurial Design Thinking – A Living Lab Methodology for Scientific Entrepreneurship. Cologne: University of Koblenz-Landau/Skema Business School.

von Kortzfleisch, H. F.O., Mokanis, I., Magin, P. & Bernasconi, M. 2010b. Entrepreneurial Design Thinking – A New Methodology for Scientific Entrepreneurship, G-Forum 2010. 14th Annual Interdisciplinary Entrepreneurship Conference. 21.-22. October 2010. Cologne: University of Koblenz-Landau/Skema Business School

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