Entrepreneurship and Student Projects - Experiences from an European Project for Virtual Collaboration

Markus Helfert, Igor Lyutak, Howard Duncan

Abstract: *The paper describes a framework developed within a European Project that can help to include Entrepreneurship into study programs. The framework is built following a process-oriented view of innovation and entrepreneurship and outlines key activities and capabilities. We present and discuss feedback received from the project partners and describe some student projects and experiences. The work in this paper can be useful for other universities and similar projects, to compare their effort and receive some justification or ideas for their initiatives.*

Key words: *Entrepreneurship, Innovation, Study Programme, Curriculum, European Project.*

INTRODUCTION

Over the last decades there has been an increased demand to include innovation and entrepreneurship into educational programs, emphasising the importance of engagement between industry and academia. Higher education, innovation and entrepreneurship are long established as key pillars to provide various ways of engaging with enterprises. However the inclusion in curricula and educational programmes still seems to be challenging, although some successful examples illustrate how collaboration between academia and industry can be beneficial. There is no doubt that links between training, research and innovation by means of introducing advanced training in entrepreneurship and innovation capabilities are beneficial. In relation to the education domain, comparable professional standards, frameworks and curricula are important but less well established. Furthermore, although e-learning concepts seem to be particularly suited for collaboration and entrepreneurship, it appears that in e-learning programmes collaboration between academia and industry is less prominent. Furthermore, training entrepreneurship in an e-learning environment is challenging. In particular support for student projects is less well-developed.

This paper provides a framework and description of an open infrastructure for student projects that can facilitate collaboration between students and enterprises. The framework was developed with consideration of training and advance key entrepreneurship skills for students. This research was developed in the context of a European Project: NEFESIE "The National Education Framework for Enhancing IT Students' Innovation and Entrepreneurship" [1]. A consortium of four universities from EU countries and the five Ukrainian Universities have worked together since 2012 to build this framework. The objective of the project is to promote the synergy between academic programs, research expertise and businesses in Information Technology (IT). Critical objectives for the NEFESIE are

- Identification of the best models and frameworks for university – company cooperation;
- Development of an infrastructure that enables the sustainability of a new ecosystem of university-company cooperation;
- Development of a web portal called Virtual Innovative Space to maintain contacts between students, companies and universities as well as to enable knowledge transfer between the actors.

ENTERPRENEURSHIP, INNOVATION AND STUDENT PROJECTS

Introducing entrepreneurship and aiming to provide insights into innovation processes in organisations many researchers have discussed innovation management and the role of Information Systems (IS) and Information Technology (IT). The body of

research is, in general, concerned with the impact of IT and the successful application of IS to support businesses become more innovative [2]. Entrepreneurship and innovation are closely linked [3, 4]. Recently the concept of Open Innovation have been discussed in many papers [3, 5, 6]. Innovation can be seen as an outcome (product) or a process (activity) or a combination of both. Process innovation has been described as any new way of developing, implementing and maintaining IS in an organisational context [8]. In his seminal work, Drucker focused on two aspects of innovation: the process of innovation i.e. how innovators search for opportunities and transform them into a new practice in the marketplace; and the practice of "entrepreneurship" i.e. how institutional ways and processes embed the practice of innovation into an organisation [6].

A process can be described as a repeatable set of value-adding activities with a discrete beginning and a discrete ending that produces desired, predetermined, measurable outcomes. This view posits that all work is a process and all products or services are the outcomes of processes. A so-called "resource-based" view of IS/IT innovation has been popular in the literature [9] and more recently a "capability-oriented" view of IS [10]. Following current research, students should have a good understanding of the different stages and aspects of the entrepreneurial process. They should be to understand how and why exposure to the main dimensions of the entrepreneurial process stimulates entrepreneurial competence development, for the individual IT entrepreneur as well as for the entrepreneurial IT team. They should also be able to assess the potential and feasibility of a new IT-based venture, with a specific focus on how to identify and make use of different entrepreneurial financing models and alternatives, and what role entrepreneurial judgment and entrepreneurial identity plays in this decision-making processes.

RESEARCH APPROACH

In our work to build a framework for including entrepreneurship and student projects into the curricula we follow the principles of engaged scholarship. Van de Ven [11] describes engaged scholarship as a participative form of research for obtaining the views of key stakeholders to understand a complex problem. By exploiting differences between these viewpoints, he argues that engaged scholarship produces knowledge that is more penetrating and insightful than when researchers work alone. Engaged scholarship has a number of facets; a form of inquiry where researchers involve others and leverage their different perspectives to learn about a problem domain; a relationship involving negotiation, mutual respect, and collaboration to produce a learning community and an identity of how scholars view their relationships with their communities and their subject matter. We follow this approach in order to develop the proposed framework within the European Project. In the following we describe our framework together with some experiences. We conclude our paper by outlining some further research directions.

EXPERIENCES FROM A EUROPEAN PROJECT

One of the goals of our Tempus project is to develop an eco-system for enabling students', universities' and companies' continuous interaction and exchange of experiences. Based of the best experience of the universities involved in the project and results of similar international projects we have developed a set of guidelines for how to effectively organize objects in regional eco-system. These recommendations have the form of algorithms by following which a university, a student, or an IT company can organize their own resources in the best way to cooperate with others.

In order to connect all these substructures, we have proposed four steps:

- Nationwide training seminars for acceptance and understanding of the improved guidelines produced in the project.

- Awareness campaigns for students. Running an innovation competition for students.
- Organizing "The first student innovation forum in Ukraine". Create an advisory board based on a consortium of IT companies.
- Involving companies (associations of companies) as a support network for student/company contacts for good innovation.

Furthermore, for involving students, we have designed course packages for boosting innovation and start-up projects within the university environment. The courses are in-line with the establishment of a virtual collaboration platform described below. The courses have already been implemented in the study process in the Ukrainian universities. In addition, the proposed eco-system was established regionally involving five Universities from the Ukraine. The five universities have been selected due to their technical focus and the importance of their IT departments. They have established experience in cooperating with the IT industry.

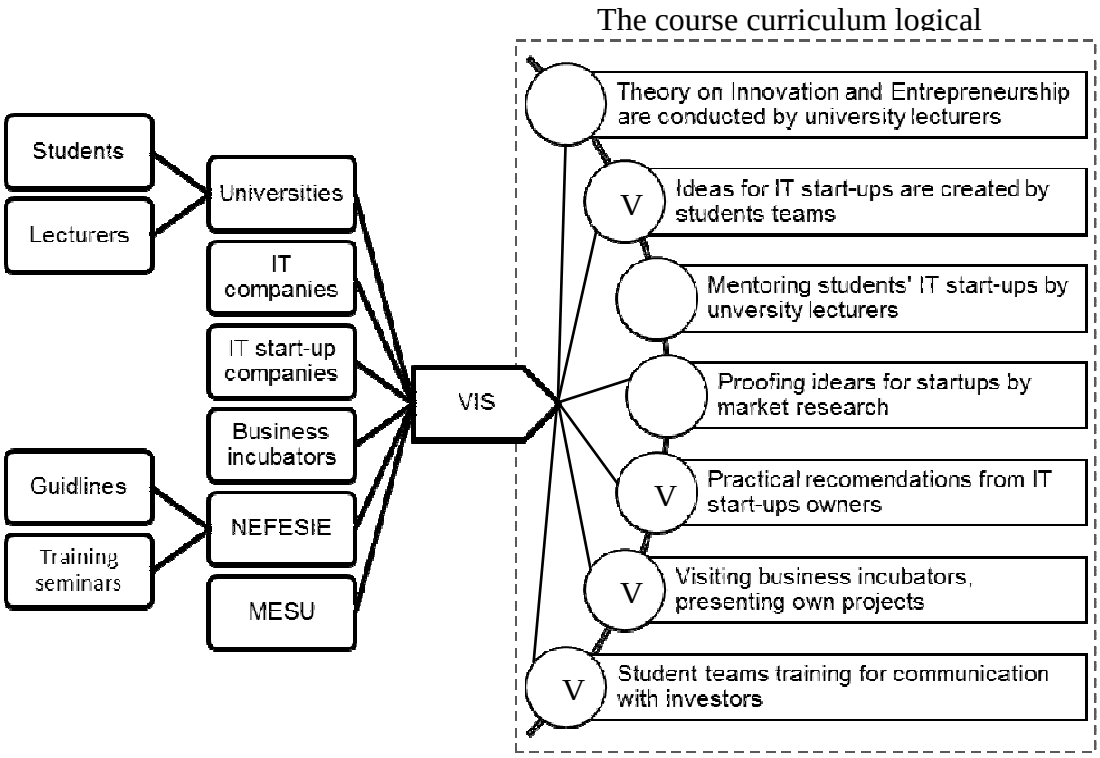

Fig. 1: NEFESIE Framework and Virtual Innovation Space

Fig.1 illustrates the overall framework. The course on innovation and entrepreneurship is supported by the Virtual Innovation Space (VIS). The course chapters marked by V are supported by native activities of the VIS. The chapters that are not marked by V can be supported by VIS partially or mediated by additional regional structures. For example, the theoretical material will be part of the VIS but lectures will be conducted by university lecturers.

Virtual Innovation Space

In addition, to in order to facilitate virtual collaboration we have developed an online tool called a Virtual Innovation Space (VIS), aiming to facilitate the company-university-student cooperation service. In trends of increasing the role of e-learning in the Tempus project an approach to create a virtual innovation space as a website was introduced. The VIS is seen as a single network source of information, collaborative environment, mutual

assistance and finding investors, e-help for improving the reliability of realisation of innovation and entrepreneurship potential of IT students and increase the quantity of successful start-ups, organized by university graduates. As the e-learning tool VIS enables IT students to: 1) enrol in innovation and entrepreneurship courses, 2) carry out their diploma project activities, 3) join in company projects, 4) present and discuss their ideas and build a team around the idea. For lecturers in universities the VIS can offer a tool for cooperation with IT companies, finding research partners, and carrying out the students' diploma projects. IT companies can see the VIS as a resource for promoting themselves and establishing connection with IT departments in universities through collaboration with lecturers. VIS provides an infrastructure and mechanisms that supports interaction and knowledge transfer between students, universities and companies.

Key functionalities that this tool provides, includes:

- Competence databases, for companies, students and universities;
- Projects and assignment suggestions and support for their formation;
- Connecting people and projects, matching services;
- Collaborative space for supporting project start-ups;
- Founding mechanisms.

EXAMPLE STUDENT PROJECTS AND VIRTUAL COLLABORATION

The main goal of the course is to teach students to create their own start-up projects in IT and train students in entrepreneurship. During the course the students need to learn several different approaches essential for new company creation. They have to form groups to develop an IT project to a level of getting the first potential customers.

For students, reaching the goal of having customers during one or two semesters is a hard task. From one side they do not have enough knowledge and have to constantly learn as usual students. From another side they deal with the real market and have to obtain experience with gaps in knowledge. To solve the problem of the first steps in start-up we use the VIS. We have organized the students' innovation projects competition within the VIS. The students' projects were assessed by professionals from well-known IT companies and professors. During the first competition the students had submitted several hundred IT innovation projects. A few of the best projects were:

- Spectrex: The intellectual system of pulmonary survey. New unique technique for diagnosing diseases of the respiratory system will speed up and simplify the diagnostic process in medical facilities! The project aims to improve the quality of human respiratory system diagnosis by developing an expert pulmonology diagnostics system based on modern methods of analysis of macromolecular structure of moisture in exhaled air.
- An application for learning foreign words "Words with Frog". This is an effective method, based on associative memory and creating visual images. It provides quick learning of foreign words while preserving quality. The application combines a scientific approach and gaming principles for effective and rapid learning of foreign words.
- MeViCS. It offers you one of the ways to prevent slouching at home - a device «MeViCS». «MeViCS» should be applied to align the spine and preventive curvature of the spine.
- YouDrop: Architecture and software tools for building the infrastructure of distributed cloud. The idea of YouDrop is based on Peer-to-Peer (P2P) technology as a means of providing Cloud services to individuals, companies and organizations, with the view to facilitating cost-effective scalability, flexibility and efficiency and enhancing the experience of creating, organizing, publishing and sharing content.

Let us show how the VIS helps a student project by an example of a "Learning Circle" that is developing by one group of five people. In the first stage students organised a group to prepare an application announced on the VIS website. In the process of preparing the application they have to describe technical and financial aspects of their idea. The application made them to be more realistic in terms of resources and values they want to produce in the project. But the process of filling in the application form is rather creative than realistic. It describes more students' desires then their capabilities.

The second stage was after assessment of the project by a jury. There were two processes during competition that had an impact on the project. The first was competition results and comments from the experts. Those comments were rather critical based on different experiences from technical to financial aspects. The second was the possibility to compare their own project with others. They could see their own mistakes and incompleteness have made by others and therefore more visible. We have developed a way to improve their own project. From the first two stages they had an internal vision of changes but from the course they took direction and tools.

FEEDBACK AND DISCUSSION

In practice, we have found that boosting integration processes between IT companies and a university on a regional level requires a kind of additional effort that we can call "an introduction". We do not mean that a university does not know about regional IT companies or vice versa. They do not use with full potential all possibilities of each other's internal structures. In order to receive further feedback we have conducted a series of interviews and surveys among key stakeholders.

In 2016 a survey involving 546 students of all years of study of Ukrainian universities was carried out. Fig. 2 shows that more than 66% of respondents thought it necessary to introduce new university courses on innovation and entrepreneurship. Negative answers can be explained that students previously had a course on basics in economy science that is in the list of compulsory courses in the most of universities. Analysis of responses distribution per years of study shows a tendency that students of third and fourth year of study are more interested in innovation and entrepreneurship courses than second-year students. This can be explained that the students of the fourth-year of study have more technological competences in IT to develop a software projects. The survey results allow the conclusions to be drawn that the Ukrainian students have high entrepreneurial and innovative potential and a tendency of the growing experience of practical activities. The analysis of the survey responses has shown an overwhelming importance in development and implementation of the disciplines on innovation and entrepreneurship into University courses list for IT students in the educational and vocational training programs for "master" level.

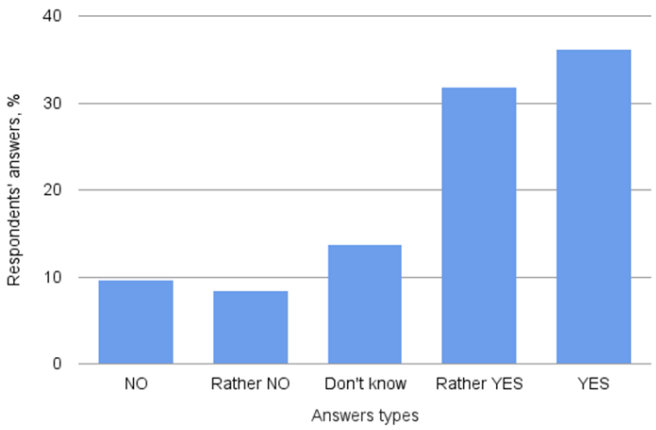

Fig. 2. The respondents' answers to the question "Do you consider it necessary to introduce new disciplines on innovation and entrepreneurship into the curriculum?"

In trends of increasing the role of e-learning in the Tempus project was introduced an approach to create a virtual innovation space (VIS) as a website. The VIS is seen as a single network source of information, collaborative environment, mutual assistant and finding Investors e-help for improving the reliability of realisation of innovation and entrepreneurship potential of IT students and increase the quantity of successful start-ups, organized by university graduates. Surveys among students and university staff show that undeveloped innovation and entrepreneurship in both educational and research activities in universities. In summary the feedback highlights:

- Lack of courses for IT students in innovation and entrepreneurship in the majority of Ukrainian universities
- Low level or absence of infrastructure for implementing institutional innovation and entrepreneurship policies
- Inefficient managerial capacities, (lack of well-trained management personnel) in Ukrainian universities for supporting innovation and entrepreneurship activities of IT students at the level of the modern IT market.
- Low level of research cooperation with IT companies and participation in international projects.

In the project to solve stated challenges we had decided not to follow a traditional approach like building innovation and entrepreneurship offices in partner universities or make a network among partner universities for implementing some changes in internal university policies.

In relation to the VIS collaboration platform, we tried to meet the challenge of boosting the VIS among potential users by conducting a contest for IT students. The contest had two nominations for IT idea and IT solution. For judging the contest, experts from IT companies and lecturers were invited. Up to now two contests had been conducted. To increase popularity each contest was conducted in a different city in the Ukraine. As a result of contest, more than 60 university and IT company representatives, 29 universities, and 18 IT companies were registered in the VIS. During the last contest more than 200 applications were submitted by students' teams.

From a survey of lecturers that are users of the VIS we got positive and very positive responses regarding increasing knowledge and skills for implementing innovation and entrepreneurship activities among IT students.

CONCLUSION AND FURTHER RESEARCH DIRECTIONS

The running of VIS project shows that modern students got into the habit using online resources for learning and easy combine them with traditional university courses. We found that at least Ukrainian IT students from the fourth-year of study and later are interested in implementing own ideas as real start-up projects, but they do not have needed competences. Therefore, we can conclude that the perspective approach is to involve in traditional education online resources that can be seen as theoretical and practical tools for connecting IT students with different aspects of real market activities.

Further research should be directed towards establishing more trust connection with big IT companies through involving them into VIS activities.

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The paper has been reviewed.