

PRE-INCUBATION TOOLKITS FOR ACADEMIC ENTREPRENEURSHIP FOSTERING: BULGARIAN CASE

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Abstract. The economic growth and development becomes more and more dependent of the innovation and technology transfer nowadays. Thus, the focus of the common economical and educational policy is moved on development talents and the policy instruments are built to search for innovation signs from the students' bench. So, not just the Universities, but business as well, are given the priority to develop entrepreneurial training and to foster academic entrepreneurship. Accordingly, a lot of digital tools are developing not just to find academic entrepreneurs at their early stage but to create appropriate knowledge helping them to avoid the entrepreneurial "valley of death". The paper aims to give a discussion on the main characteristics of the academic entrepreneurs and academic entrepreneurship that are used as a focal point to foster the academic innovations development at the early stage of the pre-incubation. The main thesis is that the (Bulgarian) Universities could be a successful entrepreneurial pool as they develop and use appropriate digital pre-incubation tools.

Keywords: academic entrepreneurship; pre-incubation; entrepreneurial mindset; (Bulgarian) universities

1. Introduction: literature preview of the academic entrepreneurship background

Entrepreneurship and entrepreneur are explained as the heart and blood system of the contemporary economy. We have a lot of examples of people that succeeded as entrepreneurs and their entrepreneurial business is worthy not just for themselves but for society as well.

Researchers appoint the very first understanding of economic thoughts and business economics backward to the first economic theories. Thus, the recent business economics and understanding of economic development are grounded in the first economists (see. Cantillon, A. Smith, H. Devenport, F. Taylor, H. Fayol, J. Schumpeter and others) (Sterev and Penchev 2023). Accordingly, Hébert and Link (1989) summarize that "*The entrepreneur is a person, not a team, committee*

or organization. Entrepreneurial actions are performed in all societies by individuals whose judgement differs from the norm”.

As the common concept of entrepreneurship is strongly grounded to business activities, there could be found different “places” to find out entrepreneurs. As the focus of business economics changed from commodities (resp. land and machinery) via humans (resp. labor) to information and intellectual outputs, the role of the “intellectual properties’ owner” become more and more important for entrepreneurial development recently. Thus, the entrepreneurs’ foundation is messed out from “regular” business as practical invention centers to universities as knowledge creation centers. Accordingly, business entrepreneurship converts to academic entrepreneurship nowadays.

Academic entrepreneurship is not a new topic but it has been re-invented last decade. As the very first publication that gives the role of the universities to facilitating the entrepreneurship process (Lamont, 1972) the academic interest is focused on researching the entrepreneurs’ background and the role of the Universities in training entrepreneurs for more than 30 years. Therefore, the very first role of the Universities in supporting entrepreneurship is to train entrepreneurs.

In 2002, Huffman and Quigley set the role of the Universities to attract high-tech entrepreneurs through: “network events”, internships, business scholarships, and business incubators. Following Toole and Czarnitzki (2007) academic entrepreneurship is defined as a form of technology transfer. In that meaning, the academic entrepreneur is a researcher / scientific investigator that takes part in the commercialization of an originated technology. Furthermore, Feldman et al. (2002) found a connection between the commercialization of the intellectual property of American Universities and equity instruments for Technology transfer (as the first step to fostering academic entrepreneurship – a.n.).

The summary of the role of the universities to provide an academic environment that may serve as a catalyst for high-technology start-ups is given by Franke and Leuthje (2004) and Vutsova and Yalamov (2023). Furthermore, Vedovello and Godinho (2003) found that one of the main instruments for enforcing entrepreneurship is to support (academic) business incubators as they mainly support entrepreneurs and the so-called academic entrepreneurs. Some of the main mechanisms for positive linkage between universities and entrepreneurship are based on technology transfer opportunities (Table 1).

Table 1. Technology transfer mechanisms in universities

Process mechanisms – services	Process mechanisms – organizational arrangements	Output mechanisms
Consultation / Expert services	Centers of excellence / High-tech centers	Congresses, workshops, seminars
Continuing Education	Innovation centers, business incubators, research parks	Doctoral theses, Master’s theses

Contract Research	Technology transfer offices /TTOs/	Patents, licenses
Postgraduate education / Undergraduate education		Research databases
Research Projects		Scientific publications
Research laboratories and sponsored (business) research		
Teachers / Student exchange		

Source: based on Autio, E. and Laamanen, T., 1995. Measurement and evaluation of technology transfer: review of technology transfer mechanisms and indicators.

Int. J. Technology Management, Vol. 10, No. 7/8, pp.643 – 664.

In: Vedovello & Godinho (2003).

In summary, academic entrepreneurship covers different players: teachers, researchers, students, and university administration staff that are involved in different university processes (training process, research process, expertise process) and have high intention to academic-business results (e.g. patenting, licensing, scientific publication and etc.) by organizational help provision through: center of excellences, TTOs and etc.

2. Entrepreneurial development stages: pre-incubation stage

Adopting Witt and Zellner (2005) to become an academic entrepreneur it is the migration of academic persons (researchers, teachers, students) as a co-

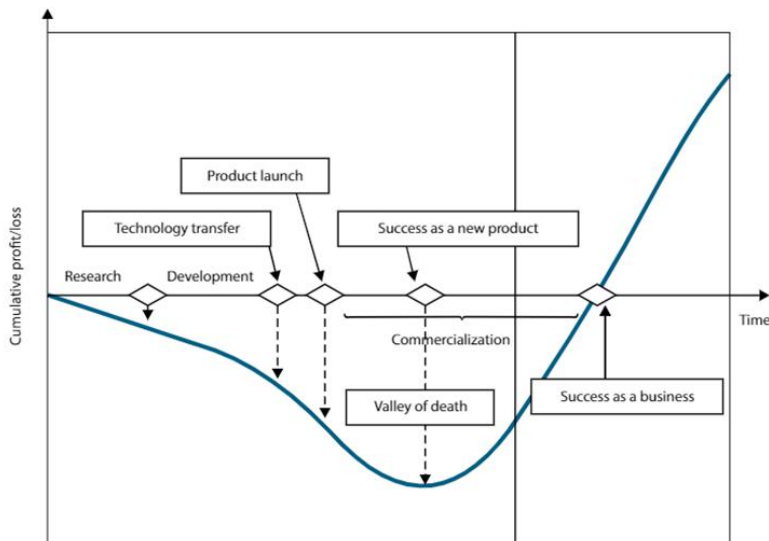


Figure 1. Valley of start-up death

Source: Osawa and Miyazaki, 2006

founder a technology-oriented start-up firm based on knowledge transfer from academic / public to the business sphere. But, as many researchers found just 3 – 5 % of academicians succeed nevertheless more than 25-28% to have an intent for starting up their “academic” business.

Furthermore, entrepreneurial training is the first step of recognition of the academic entrepreneurs. Thus, the traditional entrepreneurial education could be

Table 2. Content of pre-incubation entrepreneurial training

A. 21-session social entrepreneurship training			
1–2	Mutual acquaintance and team building	With simulation games and exercises	Helped young people understand themselves, including their character strengths and personality, and review their career interests, planning, and orientation
	- Team work activities		
	- Self-understanding and review - Career interests and orientation		
3–6	Entrepreneurship knowledge and skills	With start-ups and successful cases' sharing	Taught them entrepreneurship knowledge and skills, including economic and job market analysis, business set-up and development strategies, business administration, finance and human resources management, business innovation, and risk taking
	- Economic and job market		
	- Business set-up and development - Administration, finance, and human resources		
	- Business innovation and risk taking		
7–10	Entrepreneurship training		
	- Concept, knowledge, attitudes, and values		
	- Entrepreneurial problem analysis - Needs and problems of people		
	- Innovative business plans with social and economic goals		
11–15	Agency visits	Outdoor visit	social entrepreneurs' sharing on the concept and their experience in using their businesses to solve various social problems
	- 3D printing firm, VR and AR technology firm, wastes recycling company, organic farming, apps writing laboratory		
16–20	Business plan development	With mentorship support and guidance	to develop a business plan that is financially sustainable and conceptually contributory to solving a social problem
	- 3 young people a group to develop a business plan to solve a social problem - Successful start-ups play the role as mentors to guide each group of young people		
21	Pitching day	Social entrepreneurs form a jury	
	- Each group presents their business plan and receives questions from a jury - 3 groups of young people win the pitch and move to the 6-month pre-incubation training		
B. 60 h Pre-incubants consultations			Each plan was availed in seed money to start their business to solve a social problem. Mentorship advice and support were also offered by the French-based organization and the NGO.

Source: Tam, Asamoah and Chan (2021)

set as a preliminary stage before incumbents' start, resp. it is a pre-incubation stage.

According to Osawa and Miyazaki (2006) at the commercialization stage the entrepreneurial company is vulnerable because it loss increased and business success is looking too far away, so called "valley of Death" (Figure 1).

Hansen et al. (2022) set that many results from industry-academia research and innovations end up at the Valley of Death. They found that implementation of the agile principles could be a supporting tool that bridges out the Valley of Death in academic entrepreneurial projects.

Tam, Asamoah and Chan (2021) analyzed results from blended entrepreneurial training on the pre-incubation stage for social entrepreneurship development and they set a number of topics (four in 21 sessions) for bridging the valley of death on the pre-incubation stage (Table 2).

In summary, mainly the early-stage entrepreneurs could not survive, as they have not possessed the "right" entrepreneurial competencies. Passing by the entrepreneurial "valley of death" is a team work and group training in the pre-incubation stage is the possible decision of the "death problem". The question is: Could the common (academic) entrepreneurial training be used at the pre-incubation stage?

3. Methodology for finding an early stage academic entrepreneurs

Understanding the role of the universities for developing (academic) entrepreneurs is based on the debate: Could be entrepreneurs trained? And, there are two mainstreams of understanding entrepreneurs (Adcroft, Willis and Dhaliwal 2004):

- The entrepreneurs could be trained via post-graduate / under-graduate training.
- The entrepreneurs could not be manufactured, just recognized.

Despite the debate, entrepreneurial recognition could be done better at the time of training them as the process of finding young people that intend to be entrepreneurs never have been so hard. As the tradition of the training of entrepreneurship in USA is appoint backward to the 1930s in Harvard Business School, entrepreneurial education in the (German speaking) European universities become important at the mid-1990s (Franke and Leuthje 2004) and in Bulgarian Universities as well – in the mid-1990s (Yordanov 2019).

So, there is a long academic tradition to research the entrepreneurial intention of students. As it is not simplifying the process of identification of entrepreneurial students' intention with the research of their future behavior (resp. Do you think about starting and entrepreneurial business 4 years' prior to your graduation?), the entrepreneurial intention could be found in a bundle of internal factors (e.g., Bygrave 1989; Moore 1986).

As the personality and behavioral studies explained recently, there are some personal factors that inspire entrepreneurs as well as some behavioral attitudes

forcing the entrepreneurial start. Basically, all of them describe the main characteristics of entrepreneurship: risk taking need; locus of control; need of others achieving and others. The main question is: do they could be developed by training and education? The simple answer is: YES, and there are some studies analyzing the role of the Entrepreneurial training and the intention for entrepreneurship (Clark, Davis and Harnish 1984; Brown 1990; Gorman, Hanlon and King 1997; Vesper and McMullan 1997; Franke and Lutje 2004 and others).

Sousa (2018) based on previous research defines the “entrepreneurial leadership” as constructing a set of trained entrepreneurial skills that focused on innovations and value creation. Nieuwenhuizen and Groenewald (2008) and Nieuwenhuizen and Schachtebeck (2021) found that essential entrepreneurial skills are seldom addressed in entrepreneurial training. Accordingly, they analyzed individual entrepreneurial skills (self-concept, creativity and innovation, risk orientation, good human relations, and perseverance, and positive attitude) and entrepreneurial education that are more noticeable by students (innovativeness, proactiveness, and risk-taking).

Additionally, Coony (2012) and Moran and Cooney (2004) found that it is difficult to get the level of entrepreneurial content right for everyone in the group during the entrepreneurial training. And, it is needed an individual approach to any academic entrepreneur. Thus, following Kutzhanova et al (2009) there is a need for individual entrepreneurial skill measurement for

Table 3. EntreComp conceptual model

Areas	Competences	Hints
1. Ideas and opportunities	1.1 Spotting opportunities	Use your imagination and abilities to identify opportunities for creating value
	1.2 Creativity	Develop creative and purposeful ideas
	1.3. Vision	Work towards your vision of the future
	1.4 Valuing ideas	Make the most of ideas and opportunities
	1.5 Ethical and sustainable thinking	Assess the consequences and impact of ideas, opportunities and actions
2. Resources	2.1 Self-awareness and self-efficacy	Believe in yourself and keep developing
	2.2 Motivation and perseverance	Stay focused and don't give up
	2.3 Mobilizing resources	Gather and manage the resources you need
	2.4 Financial and economic literacy	Develop financial and economic know how
	2.5. Mobilizing others	Inspire, enthuse and get others on board
3. Into action	3.1 Taking the initiative	Go for it
	3.2 Planning and management	Prioritize, organize and follow-up
	3.3 Coping with uncertainty, ambiguity and risk	Make decisions dealing with uncertainty, ambiguity and risk
	3.4 Working with others	Team up, collaborate and network
	3.5. Learning through experience	Learn by doing

Source: Bacigalupo M, Kampylis P, Punie Y and Van Den Brande L. EntreComp: The Entrepreneurship Competence Framework. EUR 27939 EN. Luxembourg (Luxembourg): Publications Office of the European Union; 2016. JRC101581, <https://publications.jrc.ec.europa.eu/repository/handle/JRC101581>

better tailoring the entrepreneurial training of students according to their needs as well as continual monitoring of any change in their entrepreneurial skill.

Following the given points, we use **EntreComp**: The entrepreneurship competence framework, developed to describe entrepreneurship as a lifelong competence and to identify measure results of entrepreneurial learning. The focus is given to the exploration of connection “entrepreneurial training – entrepreneurial value creation” based on universal transversal skills (Table 3).

The next study is based on the EntreComp methodology and it is done on three steps¹:

Round 1. The research is done within an entrepreneurial training group just before the start of the entrepreneurial education. All of the evaluations are based on the personal knowledge and skills and present the personal understanding of the entrepreneurial skills.

As the group is formed with participants within 3 groups: students, teachers/researchers, and entrepreneurs, the *Hypothesis 1* is defined: *there is a difference between the three groups* (resp. between the average values).

Round 2. A blended entrepreneurial training is done according to the personal entrepreneurial intention of the participants. The training is based on discussion and role games that emphasize practical knowledge covering all 15 entrepreneurial skills areas.

Then, the second research is done to find out the difference to the entrepreneurial intention before and after the training. Thus the *Hypothesis 2* is defined: *there is a difference between entrepreneurial intention before and after the entrepreneurial training* (resp. between the average values)

Round 3. Statistical analysis of the results is done in order to divide the entrepreneurial skills that are notable for entrepreneurial training. The main *Hypothesis 3* is defined: *there are entrepreneurial skills that are more or less noticeable by students than others*.

The results could be summarized as follows.

– 30 trainees took part of the (pre-incubation) academic entrepreneurial training;

– the trainees fulfill one and the same questionnaire based on the EntreComp methodology before and after the training;

– the trainees cover 3 academic roles: teachers/professors, students, and researchers;

– the trainees cover 3 business roles: failed entrepreneurs, active entrepreneurs and “future” entrepreneurs.

The main demographic characteristics are given on Table 4.

Table 4. Characteristics of training group

1. Gender	woman	11
	man	11
2. Age	55-64	4
	45-54	7
	35-44	4
	25-34	7
	18-24	8
3. Academic role	teacher / professor / researcher	19
	student (Ba, Ma, PhD)	11
4. Business role	Yes, I have managed before	7
	No, I have never managed one	17
	Yes, I have managed before	6
5. Intention to start business	YES	8
	NO	22

The figures show that there is equity of gender and age inside the group as half of the group are “man” and other half – “Woman” as well as half of the group are young under 35 years old and other are matured – over 35 years old.

According to their academic roles: 37% are students, 23 % are business mentors/teachers, and 40% – professors / researchers. According to the business experience: 57% have no business experience, 20% - have previous experience in business and 23% – manage business at the time of training.

The intention for starting business shows: 27% expect to start business within next 4 years.

According the Round 1 research we built the entrepreneurial profile by the 15th entrepreneurial skills (Figure 2)

According to the figures (Figure 1) we could found 3 groups of entrepreneurial skills:

- Important skills:
- Creativity; visions; motivation; and taking the initiative.
- Average important skills:
- Self-awareness; planning and management; coping with risk; working with others; and learning by doing.

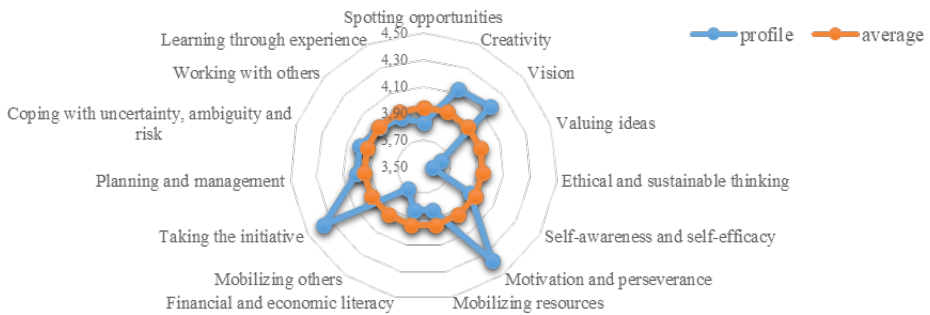


Figure 2. Entrepreneurial skills before training

- Unimportant skills:
- Sustainable thinking; valuable ideas; mobilizing others; mobilizing resources; financial literacy; mobilizing others; and spotting opportunities.

We found the next difference between the 3 groups (Figure 3):

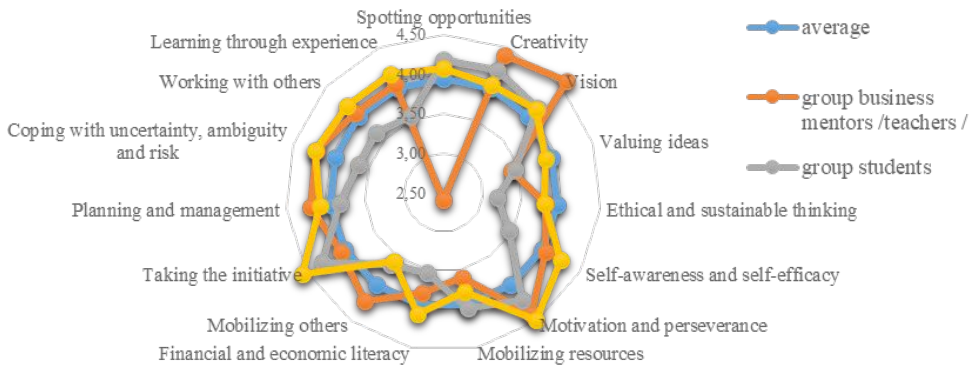


Figure 3. Entrepreneurial skills between groups before training

According to Figure 3, the students are skeptical about their entrepreneurial skills as the professors are optimistic. Nevertheless, students are best in spotting opportunities as the professors are best in motivation, self-awareness and taking the initiative and business mentors: in creativity, vision and mobilizing others. The figures show that there is a significant difference in entrepreneurial skills before training between the three groups. So we **CONFIRM Hypothesis 1**.

We found differences between the entrepreneurial skills as results of training (Figure 4.)

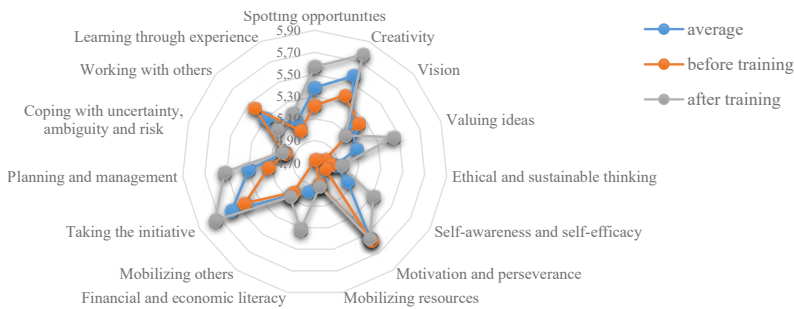


Figure 4. Entrepreneurial skills between groups before and after training

According to Figure 4. we found:

- Increase of skills:
- Creativity, valuable ideas, self-awareness, financial literacy, taking initiative;
- Decrease of skills:
- Coping with risk, working with others and visions.

The figures show that there is a significant difference in entrepreneurial skills before and after training so we **CONFIRM Hypothesis 2.**

According to the previous results we checked the difference of entrepreneurial competencies before and after training for the 3 groups (Figure 5).

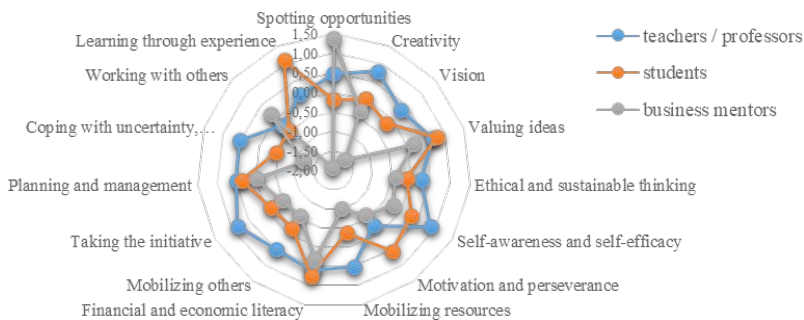


Figure 5. Difference of Entrepreneurial skills between groups after and before training

The figures show that the students have bettering their entrepreneurial skills more than other academic participants in three fields: learning through experience, valuing ideas and motivation as the teachers/professors improve their: creativity, visions, coping with risk and taking the initiatives. So we **CONFIRM Hypothesis 3.**

In summary, the pre-incubation (academic) entrepreneurial training shows that it changes the “entrepreneurial game” as the trainees are better motivated,

more creative and more oriented to taking initiatives. These entrepreneurial skills are positive to reduce the risk of falling down at the entrepreneurial “valley of death” as well as improve the numbers of successful academic entrepreneurial stories.

4. Conclusions: Digital pre-incubation instruments

Accordingly, we agree with the Huffman and Quigley (2002) who found that “*the university is important in attracting human capital to the local area and in stimulating entrepreneurial talent in the region*”. This is a result of highly concentration of the human capital that leads to straighten the link between universities and regional business.

As the conventional training problem is how to balance between individual mentoring and group support on academic entrepreneurial programmes, the digital development gives us the opportunity to do a tailored training meeting individual needs with combination of group working in entrepreneurial business networks.

The decision of the entrepreneurial training problem is: Digital Academic Entrepreneurial Platform. The platform is the digital place where:

- Academic people: teachers/professors/students/researchers, could test their entrepreneurial competencies and to observe it improvement.

- The entrepreneurial skills will be given at their average sum and the academic people could find the difference of their skills compared the average and average of different groups.

- An entrepreneurial training materials will be available to be read by academic people according to the “missing entrepreneurial skills”.

- An open group discussion will be found by using Social Network Chatrooms.

- A tailor made consultation addressed to some of the specific entrepreneurial issues will be given by live-chat meetings and chat-bots.

In conclusion, digital academic tailored entrepreneurial training is the key for the future success of the Universities to attract young people to become (academic) entrepreneurs. Such training with the participation of academic staff: teachers / professors / researchers, and business mentors gives better motivation and improve the idea generation skills that give better opportunity to trap out the entrepreneurial “valley of death”. And this will give the University of future to ogive additional added value to the Next generations of entrepreneurs.

Acknowledgments

The paper is prepared as a part of the research activities of project: “Survey of the level of entrepreneurial competencies among students in Bulgaria” (NID NI-19/2021) as well as by financial support of the project “EconEd 2030: BG05M2OP001-2.016-0004 “ECONOMIC EDUCATION IN BULGARIA 2030”.

NOTES

1. The pre-incubation entrepreneurial training is done as activity under the project: “ICT in textile and clothing higher education and business” (612248-EPP-1-2019-1-BG-EPPKA2-KA) (Sterev et al. 2021, 2022).

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