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TECHNOLOGY ENTREPRENEURSHIP ASPECTS ON THE MASTER'S DEGREE LEVEL OF EDUCATION

Oksana Evseeva (a)*, Svetlana Evseeva (a), Olga Kalchenko (a), Kristina Plis (a)

*Corresponding author

(a) Peter the Great St. Petersburg Polytechnic University, Polytechnicheskaya, 29, St. Petersburg, Russia,
yevoksana@inbox.ru

Abstract

Technology entrepreneurship plays a significant role in the emergence of new high-tech businesses and the development of the country's economy as a whole. Concerning technological development of a country there is a need for entrepreneurship training, which has certain specificity. Universities in this case generate and adopt elements from the traditional courses of entrepreneurship to the course of technology entrepreneurship. The aim of this study is to explore the present landscape of educational market on the course "Technology entrepreneurship" taught on master degree level programs. The authors took the example of Russian and American universities: Lomonosov Moscow State University, ITMO University, MIT and Stanford. A comparative analysis of MIT, Stanford university and collaboration of Russian universities was carried out according to the criteria of teaching methods and the set of topics covered in courses. Based on the analysis similarities and peculiarities of the course were discovered. The elements of teaching methodology in common were revealed - project approach, teamwork principle, use of case methodology, panel presentations and group discussions, mentoring and coaching. The distribution on topics taught on courses at different universities according to the methodology of Tony Bailetti' clusters was investigated. It showed that all the universities work in all the clusters teaching technology entrepreneurship.

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Keywords: Technology entrepreneurship, education, master degree level, innovative approaches in education.



1. Introduction

Technology entrepreneurship as a phenomenon in the global economy has grown out of traditional entrepreneurship. It became the object of significant research at the end of the 20th century that is relatively recently. It was due to the transition to the fifth technological order, when new technologies began to play a key role, which became widespread due to the development of a worldwide information network. At the moment, we are already talking about economic activity within the framework of the sixth technological order, where the trend for business development based on innovative technologies is meaningful and represented in almost all areas (Liliyana et al., 2017). We are talking about digitalization, automation of production (Shymchenko, Tereshchenko, Ryabov, Salkutsan, & Borovkov, 2017), development of social technologies through virtual communities, the transformation of the economy through new forms of capital movement (cryptocurrency) and the business process (blockchain, big data analysis), etc. Under these conditions, technology entrepreneurship plays a significant role in the emergence of new high-tech businesses and the development of the country's economy as a whole. There is a need in the country for entrepreneurship training, which has certain specificity, if we are talking about technological development. Universities, being the key points of personnel development for all areas of the country's economic activity, could not ignore this phenomenon and part of them were already involved in the process of offering educational programs on the subject of technology entrepreneurship.

At the same time, there is no generally accepted approach nowadays to the term “technology entrepreneurship” itself, however, there are a number of key aspects to those that are present in most of them. Tony Bailetti made a great contribution to the concept development in his work in 2012 “Technology Entrepreneurship: Overview, Definition, and Distinctive Aspects”, having reviewed the approaches from the first definition given by Purdue University at the First Symposium on Technology Entrepreneurship in 1970 and until 2011. Among the key themes that are present in most definitions, he singled out seven themes of technology entrepreneurship organized into three clusters:

- Technology venture formation (external factors that influence formation of technology firms, the influence of technology entrepreneurship on socio-economic development of a region, interdependence between technology path and small technology formation and growth and contributions to other fields)
- Small technology firms (cost reduction and revenue generation, operations and transformation of small firms)
- Mid-sized and large firms (corporate entrepreneurship)

The author himself has given the following definition: “Technology entrepreneurship is defined as “an investment in a project that assembles and deploys specialized individuals and heterogeneous assets that are intricately related to advances in scientific and technological knowledge for the purpose of creating and capturing value for a firm” (Bailetti et al., 2012, p. 9) He focuses on the fact that first of all we are talking about creating value, and not just about the activities of the company in which scientists and engineers work. It is also noted that technology entrepreneurship occurs as well in start-ups as in operating companies of small, medium and large businesses (Bailetti et al., 2012).

The technology entrepreneur differs from the traditional not only in that it works with technologies, but also searches for new ones and acts as a development leader (Schumpeter, 1947).

Technology entrepreneurs influence a significant change in the nature of the activities of their partners, changing the majority of business operations to an entrepreneurial nature, giving them the characteristics of innovative and technological development. They help engineers to reorient their business building — from a cost centre in vertically integrated corporations — to a profit centre in technology contracting companies. They enter into partnership with the management of global corporations, which, instead of increasing the cost of internal management costs, are beginning to buy regularly new technology start-ups. Also, they change the investment infrastructure of technology businesses and create start-up factories that mass-build new businesses. In this case, venture investors invest not in a single high-tech business, but spread risks by investing in a pool of potentially profitable start-ups.

2. Problem Statement

There is no uniform practice of teaching technology entrepreneurship in the world, but the set of topics is quite similar. At the same time, speaking about what and how to teach for further development of technology entrepreneurship, it should be noted that traditional methods and approaches do not work in this case. It occurs because this type of activity is focused on a combination of seven themes from Tony Bailetti, which are inherently more practically oriented, and where the result of the study should be practical business activity - the creation or development of a technology business. Taking into account the existing division in subject areas in management, the authors propose to consider the reflection of technology entrepreneurship topics in three aspects: innovation, technology, and business (management). The innovation aspect involves ideation processes, searching ideas. The technology aspect requires an understanding of what stage of readiness technologies (TRL) are and what development tools they require. The business aspect gives an understanding of which business models a technology entrepreneur can use, and what strategic management tools are applicable to existing technologies taking into account the value they create. Technology entrepreneurship education programs affect these aspects to some extent, but there is a different focus. The question arises if there are some common approaches and topics that are mandatory in all educational programs on technology entrepreneurship and that are used by leading universities.

3. Research Questions

The authors set up the task to find out what is common in the programs of the Russian Federation and the United States in universities, which are considered to be leading in terms of entrepreneurship development. Based on this, the following questions were formulated:

- 3.1. Find out what aspects are presented in the programs of the USA and Russia by topics. What particular topics are covered in each aspect and how do they relate to the three Tony Bailetti' aspects?
- 3.2. What are the teaching methods used on the program? Are there any peculiarities concerning technology orientation and innovation?
- 3.3. Are there any similar methodologies used on programs?

4. Purpose of the Study

The purpose of the study is to clarify similarities and peculiarities of teaching technology entrepreneurship on the master's degree level of education in leading American and Russian universities. That could be the basis for further constructing the system of common principles and efficient methodologies used to grow up successful technology entrepreneurs and the environment of its development all over the world.

5. Research Methods

This research follows a technology entrepreneurship aspects on the master's degree level of education by using a case study method. The case study is a method which focuses on understanding the dynamics present within single settings (Eisenhardt, 1989). This method in the research involves multiple cases. The study is based on data collected from the official websites of MIT, Stanford, Lomonosov Moscow State University and ITMO University. The subjects were selected on the basis of a fact that entrepreneurship education was started to popularize during the 1970s in the USA (Kuratko, 2005). In our research, we present the exploratory case of a technology entrepreneurship aspects at Universities by describing courses. So a unit of the analysis is a master degree course at the University. An exploratory case study follows what is to be explored, the purpose of the exploration, and the criteria by which the exploration will be judged successful (Yin, 1994).

First, programmes and courses related to aspects of technology entrepreneurship were identified at universities. The Massachusetts Institute of Technology programmes and courses on technology entrepreneurship were studied. MIT Sloan School of Management together with the School of Engineering, and in collaboration with the Emeritus Institute of Management programmes and courses are described. As part of the studying process a number of commercialisation centres, laboratories and teams actively working at MIT were reviewed. As a result of the analysis, 2 schools were identified for more detailed analysis and 3 courses in Stanford University. The content of the found programs and courses were described with teaching methods. Russian venture company, ITMO, Lomonosov Moscow State University and training course "Innovative Economics and technological entrepreneurship" were studied. The main purpose of the course was identified. The characteristics of the main teaching methods during the program were described and given. Then a comparison of teaching methods was made in 3 objects of study. The analysis of topics on technology entrepreneurship based on clusters extended by Tony Bailetti was also conducted.

6. Findings

6.1. Massachusetts Institute of Technology

The Massachusetts Institute of Technology or MIT is a research university based in the city of Cambridge, Massachusetts. MIT's current areas of research include digital learning, sustainable energy, Big Data, human health and technological innovation, entrepreneurship, & strategic management (TIES). TIES covers two areas, focusing on commercialization of technology-based innovation in existing firms

and growth of technology-based new enterprises. Students can include these areas in their studies or choose them separately (The World University Rankings, n. d.).

The master's degree generally requires a minimum of one academic year of study. The scope and impact of MIT's entrepreneurial ecosystem are enormous. A 2015 study underscores the substantial economic impact of the Institute's alumni entrepreneurs, whose companies have created millions of jobs. For 40 years, MIT Sloan School of Management (MIT Sloan) and their graduate students have distinguished themselves with the breadth and depth of their managerial research and curriculum on all aspects of the management of research, development, technology-based innovation, and technology entrepreneurship (About MIT Sloan, n. d.). This group also initiated and runs the MIT Entrepreneurship Center (*E-Center*). The E-Center, with its extensive multi-disciplinary curriculum and its wide-ranging program of student activities, also sponsors the nation's premier business plan competition, the MIT \$100K (Roberts, Murray, & Kim, 2015).

MIT's entrepreneurship educational program is based on three principles, which include different teaching methods:

- 1) **“Mind and Hand”** is based on the William Barton Rogers' conception. The entrepreneurship educational courses are focused on moving ideas to action, invention to the marketplace. This also means *collaboration between academicians and practitioners* to work on courses. Experienced and successful entrepreneurs and investors are bringing practical experience into education.
- 2) **“Teams, not individuals”** is based on the idea, that single entrepreneurs are not so effective in building successful companies than are teams. *Entrepreneurship Lab (E-Lab)* and *Global Entrepreneurship Lab (G-Lab)* are courses that focus on problem-solving and place student teams with companies all over the world.
- 3) **“Cross-disciplinary collaboration”** is based on the MIT entrepreneurship research, that showed better results in creating and developing good basis for later achievements of teams from a wide range of disciplines.

Technologists with marketing or sales experience co-founded the most successful start-ups. *The E-Center* was opened in 1990 to invite students from all Schools at MIT. It was the first attempt to connect MIT faculty research with student studies. The joint *Innovation Teams (i-Teams)* course was developed by the E-Center and the MIT Deshpande Center. Student teams from the MIT Sloan and the School of Engineering have taken semester commercialization projects involving early stage faculty studies. The i-Teams successes has resulted in the creation of courses in energy, linked-data systems, developmental ventures, neurological and brain sciences, and others. Students of all five of the MIT Schools were participating (Roberts et al., 2015).

MIT Sloan in collaboration with Emeritus Institute of Management offers business oriented Entrepreneurship Online Bootcamp program, which includes 8 Modules. Main topics: innovations and entrepreneurial opportunities, problem solving, market segmentation, customer analysis, value proposition, decision making process and pricing, sustainable business modelling and Unit Economics, business planning (MIT Entrepreneurship Online, n.d.).

Martin Trust Center for MIT Entrepreneurship is educating students in innovation-driven entrepreneurship. The Trust Center serves all MIT students, across all schools and all disciplines, providing proven frameworks, courses, co-curricular programs, state-of-the-art facilities, advisory services, and processes. Main topics: entrepreneurship in the built environment, small solutions with a large impact, engineering innovation and design, design and manufacturing, entrepreneurship in engineering, sports technology, the product engineering process, management in engineering, engineering systems design, introduction to making, professional perspective, principles and practice of drug development, revolutionary ventures, innovation teams, real estate finance and investment, financing economic development.

6.2. Stanford University

Stanford University is one of the world's leading research universities and holds a leading position in terms of academic entrepreneurial activity and the number of innovative enterprises created.

At the master's level, courses related to technology entrepreneurship can be studied in 2 programs at the Graduate School of Business (GSB) and Engineering School. All these courses are elective.

The master's curriculum of Stanford GSB offers a set of disciplines from both Stanford GSB and Stanford University and is designed for 1 year. A student starts with the fundamentals of business. The curriculum is tailored to the needs of students through elective courses from Stanford GSB and seven schools and specialized institutes at Stanford University. More than 50% of the curriculum consists of elective courses, which allows an in-depth study of one or more selected areas, including entrepreneurship. Students at Stanford Graduate School of Business (n. d.), have access to entrepreneurship courses from across the university:

- experiential courses (offer hands-on learning about the process of evaluating new venture opportunities);
- functional courses (learn critical functional skills from the perspective of new and growing ventures);
- industry courses (learn about innovating within industries);
- foundations in entrepreneurship (gain insight into starting and leading a new business);
- social innovation (explore strategies and methods for entrepreneurs to create an impact in the world beyond shareholder value);
- scaling (learn to navigate the challenges associated with rapid growth).

Stanford University also has a Management Science and Engineering master program where it is possible to study courses related to technology entrepreneurship. Students can choose an area of specialty - Technology and Engineering Management. According to the results of the program, students gain skills in managing technical companies, innovations, rapidly developing technologies and dynamic markets. In the process of learning, the implementation of specialized course work is provided. Flexibility is its distinguishing characteristic. For its successful implementation, students deeply study technical organizations. This deep understanding contributes to the development of an entrepreneurial culture and successful innovation (Etzkowitz, 2013). Also within the course, students study methods of decision-making in conditions of uncertainty, strategic planning, and financial analysis.

The Technology Entrepreneurship course itself is not in any master program, but it is in the undergraduate programs. Thus, students have the opportunity to gain knowledge of technology entrepreneurship immediately at the undergraduate level.

Courses related to technology entrepreneurship are available in Stanford University at master level (Stanford. Bulletin Explore Degrees 2018-19, n. d.). Management Science and Engineering, 2019:

- Strategy in Technology-Based Companies. Students study high technology firms' basic concepts of strategy. Main topics: competitive positioning, resource-based perspectives, co-opetition, standards setting, and complexity/evolutionary perspectives.
- Technology Venture Formation. Graduate students study technology-driven start-ups. Main topics: initial investment for an early-stage entrepreneur (team building, opportunity assessment, customer development, go-to-market strategy, and intellectual property), the business model, research and development plans, financial projections, milestones for raising and using venture capital.
- Technology Assessment and Regulation of Medical Devices. Students study regulatory approval and reimbursement for new health technologies as critical success factors for product commercialization. Main topics: the regulatory and payer environment in the United States and abroad, common methods of health technology assessment, frameworks to identify factors relevant to the adoption of new health technologies, and the management of those factors in the design, development phases of bringing a product to market.

All the above-mentioned courses are assigned to the Management Science and Engineering master program in the School of Engineering, although a student can choose them while studying in other programs.

At Stanford University, different teaching methods are used. As for GSB, guest speakers, case study trips, leadership development, coaching and career planning are all part of the program. Small groups foster lively discussions and deeper engagement with teachers. The courses are practical, experience-based and varied because teachers have the opportunity to choose a teaching method. Whether it's group projects, practice sessions, problem solving classes or lectures, Stanford GSB teachers choose the teaching method that best suits each subject, this provides flexibility (students learn in different ways and more effectively). Training in Stanford GSB is a highly configurable, adaptable, personal. Consultants and coaches strive to understand students and their goals.

The diversity of professional experiences, worldviews, and individual passions (MBA and Ph.D. students, faculty members, renowned practitioners, guest speakers, coaches, members of the Stanford University community, Silicon Valley business leaders, etc.) creates a unique learning environment.

Students may participate in different other activities to enhance entrepreneurial learning beyond the classroom:

- Stanford Venture Studio provides a vibrant learning community and coworking space for Stanford graduate students who want to learn about designing and creating sustainable, high-impact ventures by testing what they are learning in the classroom.

- Entrepreneurial Summer Program gives you a chance to gain rich insight into the early stage startup world.
- Entrepreneurial Workshop Series learn from entrepreneurial leaders how to refine product/market fit, to hire well, to handle the challenges of fundraising.
- Student clubs offer to connect with like-minded peers (the Entrepreneur Club, the Energy, Health Care, and High Tech clubs).

Also, Stanford School of Engineering has the Entrepreneurial Thought Leaders lecture series, hosted by the Stanford Technology Ventures Program.

The following methods are used in the courses related to technology entrepreneurship: lectures, project teams, participation of serial entrepreneurs and venture capitalists in teaching, final exam is an investment pitch delivered to a panel of top tier venture capital partners, teams interact with mentors and teaching team weekly, case studies, guest speakers from government and industry.

6.3. Russian universities: collaboration of Lomonosov Moscow State University and ITMO University

Russian venture company [RVC] (n. d.), in conjunction with the Faculty of Economics of Lomonosov Moscow State University and ITMO University has developed a training course "Innovative Economics and technology entrepreneurship".

ITMO University (St. Petersburg) is a national research university, a leading university in Russia in the field of information and photon technologies. Alma mater of the winners of international programming competitions: ACM ICPC (the only seven-time champion in the world), Google Code Jam, Facebook Hacker Cup, Yandex. Algorithm, Russian Code Cup, Topcoder Open, etc.

RVC - the state fund of funds and the institute for the development of the venture capital market of the Russian Federation.

Lomonosov Moscow State University (MSU) is the leading and largest university in Moscow, the center of national science and culture, one of the oldest universities in Russia.

The course "Innovative Economics and technological entrepreneurship" solves one of the most important tasks of modern engineering education - the development of natural science and technical specialties in entrepreneurial thinking among students, which is an important condition for graduates to meet the requirements of the modern labour market.

The purpose of the course is the formation of students' complex theoretical knowledge and practical skills in the field of economics, technology entrepreneurship and management of innovative projects. The course "Innovative Economics and technological entrepreneurship" solves many important tasks of modern engineering education and allows students to get the following educational results:

- knowledges: the basic theory of the functioning of an innovative economy and technology entrepreneurship, principles of organization, management and evaluation of innovative business activities; government support measures for innovation and the development of the innovation ecosystem; basis for the commercialization of innovation and the development of high-tech business.

- ownership: working methods in the high-tech commercialization market using product development and customer development models; using lean start-up technologies and agile management techniques; developing a financial model for a project; negotiating with investors and public presentations of projects.

The course covers the following topics: introduction to innovative development; formation and development of the team; business – idea, business model, business plan; marketing. Market valuation; product development. Product development; customer development. Product launch on the market; intangible assets and intellectual property protection; technology transfer and licensing; creation and development of a startup; commercial R & D; funding attraction tools; evaluation of the investment attractiveness of the project; project risks; project presentation; innovation ecosystem; state innovation policy; final presentation of the group project. At the heart of entrepreneurial thinking are three qualities: initiative, creativity and responsibility. These qualities are developed only in the framework of practice-based learning based on: project teamwork: joint work of students on a project under the guidance of a teacher, aimed at solving a common task, taking into account the division of powers and responsibilities; case-study: analysis of situations that occurred in the practical area of professional activity, and the search for options for the best solutions; problem learning: the motivation to independently acquire knowledge to solve a specific problem; contextual learning: motivating students to learn by identifying the links between specific knowledge and its application; knowledge, skills, abilities are given not as a subject for memorization, but as a means of solving professional tasks; learning based on experience: enhancing the student's cognitive activity through association and personal experience with the subject of study; interdisciplinary education: the use of knowledge from different areas, grouping and concentration in the context of the problem being solved. This course allows students to develop practical skills and turn them into sustainable entrepreneurial competencies.

The implemented master program is unique to the Russian educational program market, since it is based on the world's best educational practices from leading world universities such as Stanford University, Babson College, Harvard University.

6.4. Comparative analysis of Universities

On the basis of the treated results, a comparative analysis of MIT, Stanford university and collaboration of Russian universities was carried out according to the criteria of teaching methods and the set of topics covered in courses. Table 01 shows similarities and peculiarities in teaching methods in technology entrepreneurship.

Table 01. Teaching methods in Universities

University	Similarities	Peculiarities
MIT	- collaboration between academicians and practitioners to deliver courses (mentoring and coaching), -problem-solving approach, -case studies, -project teamwork, -panel presentation and discussion of the	- cross-disciplinary collaboration between MIT Sloan and the School of Engineering, - business oriented Entrepreneurship Online Bootcamp - program from MIT Sloan in collaboration with Emeritus Institute of Management, - MIT Entrepreneurship Center,

	teams business idea to to faculty and coaches in form of a pitch	- E-Center, i-Teams, E-Lab, G-Lab
<i>Stanford University</i>		- teaching teams include serial entrepreneurs and venture capitalists, - final exam is an investment pitch delivered to a panel of top tier VC partners, teams interact with mentors and teaching team weekly, - guest speakers from government (FDA) and industry. - highly developed activities beyond the classroom
<i>Russian case: collaboration of Lomonosov Moscow State University and ITMO University</i>		- contextual learning - interdisciplinary education

Table 02 reflects distribution on topics taught on courses at different universities. It shows that all the universities work in all the clusters teaching technology entrepreneurship.

Table 02. Topics by clusters

University	Cluster 1 (Technology venture formation)	Cluster 2 (Small technology firms)	Cluster 3 (Mid-sized and large firms)
<i>MIT</i>	Environments, situations, mindsets and behaviors that foster entrepreneurial opportunities, field of user innovation, concepts of need, problem, idea, value, and opportunity. Frameworks for entrepreneurial creativity, entrepreneurial opportunity. Market segmentation and beachhead market; estimate the total addressable market size for product or service; explore the foundations of Primary Market; research in order to learn to understand the voice of the customer.	Problem discovery, definition, characterization, and analysis. Problem types; conducive to innovation; concepts of lead user, sticky information, “just right”, and low-cost innovation niche. End user profile; build on the prior learning of primary market research with more interviews of prospective customers; crystallize the customer understanding through the customer persona.	The sustainable business model for venture and the Unit Economics of business. Full life cycle use case and high level product specification; estimate the quantified value proposition; chart the competitive position of the startup. Decision making unit and decision making process; understand the intricacies of sales to consumers and businesses; develop the pricing framework.
<i>Stanford University</i>	Focused on tech-startups. Main topics: initial investment for an early-stage entrepreneur (including: team building, opportunity assessment, customer development, go-to-market strategy, and IP), the business model, R&D plans, financial projections, milestones for raising and	Main topics: the regulatory and payer environment in the United States. and abroad, common methods of health technology assessment, basis for identifying actors adopting new health technologies, and design factors management, development phases of bringing a product	Focused on strategy in Technology-Based Companies. Main topics: competitive positioning, resource-based perspectives, co-opetition and standards setting, and complexity or evolutionary perspectives.

	using venture capital.	to market.	
<i>Russian case: collaboration of Lomonosov Moscow State University and ITMO University</i>	Business – idea, business model, business plan; creation and development of a startup; commercial R & D; marketing, market valuation; funding attraction tools; evaluation of the investment attractiveness of the project	Innovation Ecosystem; product development; customer development; product launch on the market; project Presentation	-

7. Conclusion

Entrepreneurship education programs have gained great importance and interest from academics and businessmen in the modern world (Kuratko, 2005; Nabi, Liñán, Fayolle, Krueger, & Walmsley, 2016). Existing studies are dedicated to such aspects as entrepreneurship education, individual growth, inclinations and intentions for entrepreneurship, interrelation with social aspects (Bae, Qian, Miao, & Fiet, 2014), differences between countries in terms of goals, target audience, format of pedagogical approach for the development of entrepreneurial thinking among university students. A number of scientists are exploring entrepreneurial thinking in universities and entrepreneurial centers in universities (Ndou, Secundo, Schiuma, & Passiante, 2018).

It should be noted that the priority of business entrepreneurship education has changed. Technology entrepreneurship has become an important aspect that needs to be revealed at all levels of education and for various disciplines. Due to the rapid development of new technologies, entrepreneurship is expanding on other disciplines and programs (for example, science and technology). The development of such skills is crucial for the launch and development of fast-growing, technological enterprises (Boocock, Frank, & Warren, 2009). This led to the development of programs in the field of technology entrepreneurship (Cassia, De Massis & Meoli, 2014; Mian, Lamine, & Fayolle, 2016; Shih & Huang, 2017).

Technology entrepreneurship can be understood as the ability, competence and attitude to the transformation of new ideas, technologies and inventions into commercially viable products and services to create economic and social value through innovative business models (Ratinho, Harms, & Walsh, 2015; Villani, Linder, & Grimaldi, 2018). This concept has a fundamental importance in modern business; that’s why it is necessary to take it into account in the field of education, teaching and learning (Henrekson & Rosenberg, 2001; Passiante & Romano, 2016).

Based on the findings we can conclude that teaching technology entrepreneurship in different countries and universities has in common following elements of teaching methodology - project approach, teamwork principle, use of case methodology, panel presentations and group discussions, mentoring and coaching. It has some peculiarities based on different institutions participating in processes like MIT has the collaboration with its particular Sloan, using online instruments such as online Bootcamp. Stanford has very diversified infrastructure of collaboration with venture capitalists, industries and government. It creates the course on the basis of this infrastructure and involves all the participants of entrepreneurial activities in its support and development. Russian case shows us that we use universities’

collaboration in teaching this course providing connection between student teams from different universities.

As for the topics according to the distribution methodology of Tony Bailetti American universities affect in all the clusters whether Russian universities do not involve the third cluster - mid-sized and large firms. We can suppose that Russia has not enough high-tech mid-sized and large firms' history to analyze currently at the moment to evolve it into the teaching processes. Global trends of digitalization, automation, technology-driven innovations influence on Russia as well as on the other countries. The development of high-tech mid-sized and large firms is moving forward. Based on it we recommend to use international experience on the third cluster and include it in the course of technology entrepreneurship for Russian universities. The main focus of study in all the universities is surely the first one that is dedicated to technology venture formation. It could be suggested that it occurs because nowadays one of the main global goals in the leading countries is economic development via technologies that are based on new tech ventures.

Turning to limitations we should mention that information about the courses was taken from the open resources in the Internet. Developing the analysis we suppose to organize interviews with teaching staff and students to get the holistic view. Also there should be more cases to get more data from other leading universities. It could be used for example the analysis of universities' world rankings to create the representative sample covering all the continents.

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