

Digital Engineering Entrepreneurship as New Direction of Master Studying in Belarus

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Abstract

In the paper an experience of cross-disciplinary master studying in Belarus and EU universities is analyzed. The analysis of the European educational system development have allowed to reveal such relevant direction of capacity building in master training development as a combination of engineering sciences with management and entrepreneurship knowledge. Unlike other narrower directions, the master programs combining engineering and business is demanded practically in all branches of business, irrespective of the size of the enterprises, and at the different administrative levels – from top management to project management. Most of the modern enterprises in the world passed and pass to digital form of business, in combination with traditional form or without it. Therefore the business development strategy, both in the European countries, and in the CIS, includes such obligatory element as digital entrepreneurship development. At the same time the higher education as the supplier of personnel resources for business, has to follow this strategy. On the base of this research results new direction of master education – digital engineering entrepreneurship – is supposed. Innovation character of digital engineering entrepreneurship master program is described. Qualitative effects from new master graduation are revealed.

Keywords: entrepreneurship, engineering, digitalization, master studying, Bologna Process, innovations

1. Introduction

Entry of the Republic of Belarus in Bologna Process, on the one hand, promotes integration of the national educational environment of Belarus and Europe, however, on the other hand, imposes new requirements to development of the Belarusian higher education. In EU countries the tendency of cross-disciplinary synthesis in the higher education is

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distributed widely, especially during master training. It is caused, first of all, with total digitalization of public life, economic activity and science. Along with the traditional directions of master training (masters of business administration, applied science, laws, philosophy, theology, public administration, engineering, etc.), there are new master programs combining two different but interconnected directions, for example: master in financial technical analysis, master in management and engineering of water resources, master in management and design in electrical power systems. In such programs one of the directions is connected with engineering or digital technologies, and the second – with narrow subject domain where digital technologies are applied.

In the last 5 years, empirical evidence suggests the rise of a new category of Entrepreneurship: Digital Entrepreneurship (Elsevier, 2017). It is a relevant socio-economic and technological phenomenon, which can be considered as the joining of traditional entrepreneurship with an emphasis on leveraging new digital technologies in novel ways, such as social, mobile, analytics, cloud and cyber-solutions, all in order to shift the traditional way of creating and doing business in the digital era. Digital Enterprises are characterized by a high intensity of utilization of new digital technologies to improve business operations, invent new (digital) business models, sharpen business intelligence, and engage with customers and stakeholders through new digital channels. There are two directions of Digital Entrepreneurship activity: “digital start-ups” and “digital scale-ups”. Scale-up means expansion of activity scale of already existing enterprises due to use of digital technologies. Digital scale-ups differ from digital start-ups on its level of maturity and growth pattern, and represent ventures that have stabilized its digital business model. Expansion of the activity scale assumes employment of a large number of new staff. Such situation demands new functions of management, marketing, strategic development. Scale-up enterprises make the significant contribution to the general economic development. However the big number of staff and expansion of activity scales demands also new digital infrastructure of business (Elsevier, 2017).

All the abovementioned demonstrates relevance of creation of the new direction of master training – digital engineering entrepreneurship.

The goal of this research is analysis of the experience of European Union and Belarusian universities in master training in the cross-disciplinary spheres (economic and engineering), their participation in the international projects, and substantiation of digital engineering entrepreneurship master program as new innovative direction of master studying and perspective ERASMUS+ project of international technical assistance.

2. Experience of European Union universities in cross-disciplinary master studying

EU universities have big positive experience in training of Masters of Engineering (M.Eng.) or Masters of Applied Science (M.A.Sc.) with additional knowledge in business and management. For example, there are such master programs as “Blockchain & Distributed Ledger Technologies (DLT)”, “Industrial Management”, “Project Management and Process Management”, “Strategic Enterprise Management” in Mittweida University of Applied Sciences (Germany). Managerial and engineering

training directions are combined in these master programs including new digital technologies. University of Applied Science in NYSA (Poland) have “Management and product engineering” master specialty. This experience is very useful for Belarus universities. In synthesis with Belarusian universities own experience in M.Eng. training (BNTU, BSU, MIU, BSUR, etc.) and using of the new educational technologies participation of EU partners will create synergetic effect.

Experience of European Union universities in cross-disciplinary master studying, with synthesis of economic (business) and engineering (technical) education, is generalized in table 1. This research is based on the data from the resource [masterstudies.com, 2018].

Table 1. Experience of European Union universities in cross-disciplinary master studying, with synthesis of economic (business) and engineering (technical) education

Master specialty (program) title	Countries, universities	Short description of master specialty (program)
1	2	3
Master in Digital Solutions Development	Spain (Barcelona Technology School)	Curriculum includes such main courses as web and mobile development, big data, cloud computing, digital and mobile business, entrepreneurship, etc.
Master In Digital Business	Spain (ESIC Business & Marketing School, Universidad Católica de Murcia, Zigurat Global Institute of Technology, Spain, ESDEN, The Valley Digital and GBSB Global Business Schools), Switzerland (EU Business School)	Master program includes following main modules: digital management, technology and innovation, digital marketing, digital sales and e-commerce, digital business development, etc. Students study new businesses, technological and legal foundations applied to Internet products, digital consumer and e-commerce, marketing in all its forms (digital, mobile, social networking, loyalty client), online content management, web analytics, advertising, digital management.
Master in Digital Transformation	Spain (Castelldefels School of Social Sciences)	Master program provides the participant with the knowledge and skills necessary to exploit the digital environments in a business environment, always with a global vision of the business. The program is designed to show the new Internet professionals the key drivers required to be successful both in launching a new business and in transforming those businesses that still operate outside the digital world.

Master in Digital Entrepreneurship	Spain (Zigurat Global Institute of Technology, ESEI International Business School of Barcelona)	Master program is focused on teaching and mentoring entrepreneurs or people who are willing to found a technology-based start-up. Their main courses are entrepreneurship and lean startups, business models, digital marketing, product management, startup finances, agile prototyping, quality assurance, business management leadership.
Master in E-Business & Information Security	France (ESAIP Graduate School of Engineering)	Master program includes following key courses: software & database engineering, network & security management, cultural integration. Graduates can work as project managers (ITIL, CMMI), cyber-security experts, network & systems experts (CISCO CCNA, LPI or Windows Server), mobile development experts (Android, IOS or Windows Mobile).
Master in Digital Business Innovation and Transformation	Austria (IMC University of Applied Sciences Krems)	Graduates have the skills needed to coordinate and manage digital transformation in any industry. This master program focuses on the required business administration skills, in combination with core competences such as communication, cooperation, data mining and design thinking.
1	2	3
Master in Smart and Connected Enterprise (I-ENG SCE)	France (Centrale Nantes)	The aim of this master program is to introduce the new paradigms of company management based on new information environments and systems, including cyber-physical systems. At the conclusion of the program, students should be able to model an enterprise, to simulate and optimize its performance, to model and develop solutions for interoperability between information systems, based on ontologies and multi-view models at different scales.
Master in Electronic Business Management	Lithuania (Mykolas Romeris University)	Master program includes management, economics disciplines and interdisciplinary subjects analyzing key aspects of cyberspace in a knowledge-based society,

		among them – the legal environment of e-business, models, strategies of knowledge management, e-services, entrepreneurship in cyberspace, etc. This study program also provides fundamental knowledge about the information environment and processes of knowledge-based society.
Master in Information Architecture and Innovation	Sweden (Jönköping University)	This program provides knowledge and skills in three key areas: project management, the use of IT in business, organizational and technological innovation, and the evaluation of IT in organizations. After successfully completing the program, students will have acquired good analytical skills and the ability to think strategically in terms of both business and technology and be qualified to work in as IT managers, chief information officers, researchers.
Master in Strategic Management in Information Technology	Spain (Fundación Universitaria Iberoamericana (FUNIBER))	Master program allows acquiring knowledge, skills and capabilities needed to executive position in ICT spheres. Master students learn tools and techniques that enable strategic business design, build and deploy a business strategy based on ICT.
Master in Digital Project Management & Consulting	Spain (ESCP Europe Business School)	Master program covers management, financial, economic and strategic issues, with an emphasis on the development of negotiation skills. Students have a two-week international seminar where they visit key companies and institutions and work on case studies.
Master of Management in Marketing & Digital Business	Spain (Istituto Europeo di Design Madrid)	Master program equips students with the knowledge and skills to start a career in business management, from strategy to change management in order to prepare professionals to be the business leaders of tomorrow. Students learn how to use and measure existing tools to optimize business and increase its turnover, whether for companies aimed at the end consumer (B2C) and to resellers or distributors (B2B).

1	2	3
Master In Digital Marketing & E-commerce	Spain (Instituto Internacional de Marketing, GBSB Global Business School)	Master students learn tools and methodologies to boost a business in online sales or start a business from scratch. It is the most complete training devoted to the dynamics of Digital Marketing in depth and specialized in the E-Commerce sector. Master program includes such narrow disciplines as Google Adwords, Google Tag Manager, Topic Search Engine Optimization, Agenda Creativity in Digital Environments, Mobile Marketing, etc.
Master in Strategic Digital Transformation	Spain (Seeway – Barselona)	Graduates will be able to design and manage digital transformation strategy for any business, define objectives and KPI's and analyze the results and develop the ability for decision-making. Curriculum includes such courses as team management and leadership, digital communication, social media and reputation online marketing analytics, etc.
Master In Digital Marketing	Spain (INESDI, Digital Business School)	Master program includes such modules as Principles and foundations of the Digital Economy, Digital Marketing and Social Media, Social Networks, Online Reputation Marketing and monitoring tools, Content Management, Web analytics and profitability, Mobile Marketing, Entrepreneurship in the digital economy, etc.
Master in Digital Business Informatics	Macedonia (University For Information Science And Technology)	The master program includes various courses such as Fundamentals of Economics, Financial mathematics, Stochastic Processes, Databases, Algorithms, Theory of Decision Making, Cognitive Science, etc. While studying the courses such as software engineering, quality control, and assurance, the students will be introduced to the possibility of reaching higher cognitive levels and look at the information

		science from different aspects.
Master in Marketing Management, Creativity and Digital Business	Spain (Istituto Europeo di Design Madrid)	Master program created with the aim of providing students with all the tools and knowledge necessary for the management of traditional businesses that need to migrate to the digital environment, launch a new business unit within the digital environment or open a newly created company.
Master in Digital Business Strategy	France (Grenoble Ecole de Management)	Master program gives possibility to enable middle and top management as well as future managers to make the right technology choices for a digital transformation and deploy them effectively within their organizations. It combines topics in management sciences, information technology and other web-related fields of study.
1	2	3
Master in Marketing, Communication and Digital Strategy	Italy (Il Sole 24 ORE Business School)	The Master program follows a modular structure and offers a complete and thorough overview of the issues of Marketing and Communication: preparatory courses (business system, business strategy, fundamentals of business administration, the legislative framework), market, consumer and digital media, marketing and competitive analysis, marketing accounting, services marketing< international marketing, digital strategy, etc.
Master in Management of Innovation for ICT professionals	Spain (La Salle International Graduate School IGS)	The master specialty includes such modules as Innovation in Business Ethics and environmental analysis, Financing, taxation and protection of innovation, Cooperate eICT Innovation, Innovation in Business Ethics and environmental analysis, etc.

This review allows finding following tendencies in EU education in the field of economic, business, and entrepreneurship in synthesis with engineering and digital technologies:

- the graduates are able to use innovation technologies (digital, mobile, cloud, web) in entrepreneur and start-up activity;
- master programs include economic disciplines as necessary components of curricula;
- traditional disciplines (economics, marketing, project management) are considered with emphasis on entrepreneurship activity;
- e-business and e-marketing are included in study process in most of the programs.

Earlier researches, for example [Navitskaya and Zhalezka, 2016] and international and own experience allow revealing also that decision making disciplines are also integral part of education in the area of strategic management, engineering and entrepreneurship.

The Digital Engineering Entrepreneurship master program will join best practices of Belarusian and EU master training in technical and business spheres. The Belarusian representatives of business, famous in the world IT market (in particular, the SaM-Solutions company, EPAM Systems, IBA, War Gaming, etc.) acting as bases of practice for undergraduates and consultants when developing curricula and courses may be also involved in the study process. Despite the need of business in the professional digital entrepreneurs their training is only a potential capacity of higher education development now. Opening of the Digital Engineering Entrepreneurship master program will be the new perspective direction of master studying in Belarus, and participation of EU higher education institutions will allow to develop the curriculum according to requirements of Bologna Process and to harmonize masters training with the European educational space.

2. Experience in the master training in Belarus

Such biggest Belarusian HEIs as BNTU, BSU, BSUIR have experience of engineering education, implementation of the entrepreneurship training on the first stage of higher education, and wide international relations. The analysis of enterprises requirements to the HEIs' graduates was the prerequisite for initiation of new master program. This analysis shows that besides engineering competences, knowledge in digital entrepreneurship is welcomed. In Belarus labor market there is a shortcoming of Digital Entrepreneurs at the high need for them. During the period from September, 2017 to January, 2018 BNTU and BSU held several joint meetings, with participation of partners from Germany. Within these meetings an idea of Digital Engineering Entrepreneurship master program was initiated. Later BSUIR, non-state higher education institution (MIU), regional higher education institutions, IT-companies and EU partners have shown interest in participation in this educational project.

Belarus HEIs have the necessary experience and resources for opening new master specialty representing synthesis of engineering and digital entrepreneurship training. So, BSU is versatile HEI in which the innovative-oriented directions of education are presented: applied mathematics, radio-physics, cybernetics, nano-mechanics, etc. In BNTU the new faculty of marketing, management and

entrepreneurship is created where engineering training is combined with elements of economic. At this faculty discovery of new master specialty “Digital Engineering Entrepreneurship” is planned. BSUIR is the leader in training of IT specialists in Belarus, there is also an engineering economics faculty [Zhivitskaya, Lukashevich and Smirnou, 2015]. The Minsk Innovative University (MIU) represents the non-state sphere of the higher education for which Digital Engineering Entrepreneurship is very relevant, and the range of MIU specialties also has innovation character. The regional HEIs entering into consortium provide branches of the large IT-companies in regions with the engineering staff. Training of Masters in Digital Engineering Entrepreneurship in them will contribute to the small business development in regions in the sphere of information technologies that will positively affect regions development in general, will create additional jobs and will contribute stable growth of regional economy.

Belarusian HEIs have a big experience of participation in international projects including TEMPUS and ERASMUS+ projects, some of them are described in [Khmialnitski, Zhalezka, and Siniauskaya, 2016; Zhalezka and Siniauskaya, 2015; Zhalezka, Siniauskaya and Khmialnitski, 2014; Zhivitskaya,, Lukashevich and Smirnou, 2015].

TEMPUS projects help to organize effective interaction between universities and business in different spheres with accordance of EU experience. For example, UNITE (“University and Industry for the modernization of textile manufacturing sector in Belarus”) project is devoted to cooperation between higher education and textile industry representatives and has allowed to create on-line courses for education in this sphere based on the experience of Greece, Spain, Portugal, Belgium and Lithuania [UNITE, 2014]. FKTBUM (“Fostering the knowledge triangle in Belarus, Ukraine and Moldova”) project is the structure measure project which has allowed initiating the modernization of legislation in the spheres of higher education, innovation and research to improve interaction of these three spheres [Khmialnitski, Zhalezka, and Siniauskaya, 2016].

Also 3 Belarusian HEIs (BSU, BSEU and BSUIR) take part in the international education project SAP University Alliance, which concerned with the cooperation between SAP company, university and business partner. Business partner in this project is IT-company which finances purchasing of licensed SAP software for university and get from university graduated specialist with deep knowledge in SAP. Such cooperation more cheap for the business partner IT-company than organization of the SAP courses on the base of company with involvement of own employees as SAP teachers [SAP University Alliance, 2018; Zhalezka, Siniauskaya and Mironenko, 2013].

BSU also have an experience of participation in the project supported by International Bank. This project has allowed opening of “Engineering of Complex Integrated Systems” master program. This master program is differs from others by involving in educational and organization processes many partners: IT-companies as financial partners and curricula co-authors, IT-specialist as both master students and teachers, lawyers and international consultants as experts [Practical oriented

magistracy "Engineering of Complex Integrated Systems", 2017]. All of the participants form education cluster in which master studying is realized.

Another innovation experience of Belarusian HEIs is opening of master programs in English language for foreign and Belarusian master students. For example, in BSEU there are 5 English language master programs: "Event Marketing", "Business Administration (MBA)", "International Bookkeeping", "International Economics and Commercial Diplomacy", "International Economics and Trade Policy".

Such wide experience in master education will allow Belarusian HEIs to create its new innovation directions, which will be correspond to European level of master education.

Another best practice of higher education is dual education. It is distributed widely in EU, and some elements are implemented in Belarusian HEIs also. Dual education is popular form of education in EU countries, especially in Germany, which assumes that classes partially take place at the enterprises [Wegweiser Duales Studium, 2017].

From the European side higher education institutions (University of Applied Sciences in Nysa (Poland), Mittweida University of Applied Sciences (Germany)) which already have experience of master preparation on digital engineering can participate in this educational project and plan to transfer their experience to the Belarusian partners. The partner from Bulgaria – the Technical University of Gabrovo (TUB) – has experience of bachelors and masters training on such specialties, as "Industrial management", "The communication equipment and technologies". As a result of participation in the project TUB plans to broaden own sphere of masters training in Digital Engineering Entrepreneurship, taking into account Belarusian HEIs and own experience.

EU partners will hold the training seminars in EU for the purpose of transfer their experience to representatives of the Belarusian HEIs and also to partially give classes with d-EEng master students in Belarus.

Project partner SaM-Solutions is a big IT-company which will be as employer of graduated Masters of Digital Engineering Entrepreneurship and also it will be consultant for HEIs during educational standard and curricula development. That will ensure correspondence between new master specialty content and requirements of labor market. Besides, SaM-Solutions is a foreign enterprise with head office in Germany that will create additional conditions for synergy with EU not only education but also in entrepreneurship practice.

Despite some experience of teaching the disciplines connected with entrepreneurship in the Belarusian HEIs, knowledge of universal tendencies of digital enterprises infrastructure development is insufficient, and their studying in EU demands financial support. The budgetary financing of HEIs activity in Belarus is limited, and financing from internal funds is directed generally to scientific developments, but not educational activity. Therefore use of international technical assistance is optimum for creation of the new potential directions of the higher education development.

Consultations and participation in educational process of EU HEIs representatives will create opportunities for harmonization of education in the field of Digital Entrepreneurship in Belarus and in the EU that is especially important in connection with the entry of Belarus in Bologna Process.

3. Innovation character of Digital Engineering Entrepreneurship Master Program

The innovation character of Digital Engineering Entrepreneurship master program consists in the following:

- 1) new educational technologies will be implemented in the Belarusian HEIs with accordance of best practice of EU HEIs;
- 2) innovative methods of entrepreneurship in digital environment (cloud, cybernetic, social, etc.) will be implemented in curricula of new master program;
- 3) master competences will be developed on the basis of new data of both national, and European labor markets;
- 4) electronic educational tools will be widely used during master training.

4. Effects from new master graduation

Opening of new master program in Digital Engineering Entrepreneurship may give results which will be used by following target groups during the life of the educational project.

- 1) The universities will get additional profit due to discovery of new specialty and master students enrolling, will improve demand of master program graduates from IT-companies because of correspondence of their competences to enterprises employers requirements, will improve quality of master training due to innovative educational technologies.
- 2) The teachers will improve their educational skills in the EU.
- 3) The master students will improve the competence and demand in labor market, including on international; those who had engineering training at the first step of education will be able to complement it with knowledge in the field of entrepreneurship; graduates of economic and administrative specialties will be able to improve engineering training.
- 4) The employers companies will receive graduates possessing not only narrow professional knowledge, but also in digital entrepreneurship.
- 5) The state also will have positive effect, because discovery of new specialty will contribute to the development of small business in the sphere of digital technologies that in general will positively influence economy.

At the local level (HEIs, master students, employers) the master program in Digital Engineering Entrepreneurship will promote improvement of master training quality and increasing employers' demand of graduates.

At the regional level new educational project will contribute to the development of small business in the sphere of digital technologies in regions of Belarus (through participation of regional HEIs).

At the national level development of Digital Engineering Entrepreneurship will positively influence on economy.

At the European level Digital Engineering Entrepreneurship education will increase the level of digital educational space harmonization, improve Belarusian education system in accordance with the principles of Bologna Process.

After the Digital Engineering Entrepreneurship accreditation and first graduates issue target groups will have following advantages.

1) The universities will improve the image in the international education market due to existence of the perspective specialty and the master program conforming to the European standards; as a result demand from foreign citizens will appear (including due to low cost of studying, in comparison with Europe, and high training quality); will get additional profit due to enrolling master students on popular and perspective specialty. The results of the educational project will be disseminate not only in project participants, but also on other HEIs.

2) The teachers will be experts in innovative educational technologies.

3) The master students will have an opportunity of recognition of master diploma in EU.

4) The employers companies will have a possibility of retraining of the employees in the field of Digital Engineering Entrepreneurship.

5) The state will have following advantages: support the national education image of Belarus as European educational center; involvement of foreign citizens for master studying; acquisition of the European experience in education and digital entrepreneurship.

5. Advertisement directions

Dissemination ways and events for Digital Engineering Entrepreneurship master program advertising and popularization will include:

1) presentation of intermediate results of the educational project on the international conferences in Belarus and abroad;

2) publications about the Digital Engineering Entrepreneurship master program in the Internet;

3) development and support of the website devoted to Digital Engineering Entrepreneurship master program;

4) publications about the Digital Engineering Entrepreneurship master program on the websites of the HEIs and IT-companies;

5) interviews of master program initiators about the Digital Engineering Entrepreneurship for mass media;

6) dissemination of the master education results on internal meetings, seminars, round tables in partner HEIs;

7) organization of Digital Engineering Entrepreneurship hack-a-thon.

6. Sustainability

For sustainability purposes the overall sustainability program of the educational project will be established. The main indicators for effectiveness for Digital Engineering Entrepreneurship master program will be involvement of business community in monitoring of key competences for effective planning of academic courses, involvement of business analytics in tuning and adjusting Master program during the flow of the project, the capacity building and consulting the staff and teachers working for new Master Program. The overall sustainability will be based on effective management with monthly tasks for all partners and actors. The principal product that will be obtained as the factor of successfulness of realization of all structural objectives is the accreditation and official registration of Master Program in the Ministry of Education of the Republic of Belarus. The subsequent integration of the Master program in Belarusian Universities Curricula will indicate the positive results. In the end of training will be conducted the challenge, with the help of it can define the practical importance of the Master Program and the efficiency of digital methods of education.

Sustainability will be provided with following factors:

- 1) purchasing of special equipment for use of innovative educational methods;
- 2) compliance of the educational project purposes and results to final document "Innovation for Sustainable Development: the review of Belarus", prepared by State Committee of Science and Technology and United Nations Economic Commission For Europe;
- 3) following conditions are needed for successful state accreditation of new Master Program:
 - a) presence of teachers with academic degrees and ranks for ensuring educational process;
 - b) development of educational and methodical documentation (educational standard, curricula, etc.);
 - c) availability for master students textbooks and other relevant literature;
 - d) drawing up tests and control testing of master students knowledge;
 - e) existence of necessary material and technical base and resources.

7. Objectives and plan of master training

Wider objective of the new educational project is developing of master program in Digital Engineering Entrepreneurship for harmonization of EU and Belarus digital business environment through offering students innovative teaching / learning experiences and promoting digitalization strategies in Belarusian higher education;

Specific objectives of this educational project are:

- to develop Master program in Digital Engineering Entrepreneurship in accordance with Bologna principles and to implement it at Belarusian universities;
- to develop teaching and learning materials based on innovative teaching methods and e-learning tools;

- to improve lectures' qualifications and skills in innovative teaching methods and promote digitalization strategies at BY HEIs ;
- to create teaching & learning infrastructure;
- to bring real-life situations into the classroom and apply real situation as a part of problem based learning;
- to disseminate the know-how and developed materials to Belarusian HEIs.

The Educational project will include following stages.

1. Preparation of the curriculum.

1.1. Creating the concept of master program.

1.2. Drafting and approving education standarts, opening the master program.

2. Development of master program modules.

2.1. Forming of development groups.

2.2. Seminar in EU with the purpose of experience exchange.

2.3. Developing courses and practical trainings assignments.

3. Improvement of digital strategies and innovating teaching.

3.1. Starting training seminar in EU on E-Learning tools.

3.2. Developing skills to use innovative teaching and learning methodologies.

4. Implementation of Digital Engineering Entrepreneurship master program.

4.1. Purchaising of the hardware and software.

4.2. Enrolling of the students.

4.3. Organization of the Digital Engineering Entrepreneurship hack-a-thon.

4.4. Master specialty accreditation

5. Quality control and monitoring of the educational process.

6. Dissemination of the results of Digital Engineering Entrepreneurship master education.

6.1. Developing of web-site about Digital Engineering Entrepreneurship master program.

6.2. Organising of dissemination events.

6.3. Running of the promoting campaign.

Management of the new educational project will include organization meetings, operational and financial management, holding of the conferences.

8. Conditions for master program realization

Internationalization is the main tendency of development of modern business, information space and entrepreneur activity [Yakushenko, 2013; Danilchenko, Bertosh and Malashenkova, 2015]. This tendency is actual for educational sphere also. That's why creation of Digital Engineering Entrepreneurship master program should be considered in international context.

In view of our target groups, a group like lecturers will have an impact via trainings, methodological tools and library and shared experience. Lectures from Belarusian universities will become capable to deal with different tasks related to international activity, such as strategic planning and management of international cooperation on the faculty level, academic mobility (in terms of assisting in planning

studies abroad which could be later recognized); tutoring international students; running of the international events, etc.

The participants of the educational project in the long run will ensure that voice of professionals is being heard by policy makers thus removing bureaucratic obstacles and making procedures more coherent. Project will give an opportunity for implementation of the modern teaching methods in the developed courses.

Belarusian universities-participants (both from Minsk and regional) will be directly involved in developing a master program via holding roundtables, discussions, and workshops. The lectures from these universities will participate in several workshops organized by European partners to get acquainted with the best practices.

The lecturers of Belarusian Universities will obtain additional but nevertheless very useful methodology for creating, implementing in the curricula new Master Programs. The lecturers will be trained in EU for better understanding the Bologna principles and according to the European methodologies.

On regional Belarusian Universities, their lecturers, administrative, technical staff and students will be involved in preparation and monitoring new Master Programs and as the result all stakeholders in this level will have the access to the new educational product.

Within the area studied, Digital Engineering Entrepreneurship master's graduates are expected to possess advanced knowledge of specialized areas of theoretical and applied topics; high order skills in analysis, critical evaluation, or professional application; and the ability to solve complex problems and think rigorously and independently. They will enhance the quality of projects implemented with participation of researchers. Digital Engineering Entrepreneurship master program will give opportunity for master students to introduce themselves and their project to the employer. Studying foreign classes not taught in the Republic of Belarus. In the end of training will be conducted the challenge, with the help of it can define the practical importance of the Master Program and the efficiency of digital methods of education. Digital Engineering Entrepreneurship will be unique master program on the use of materials that links experimental and computational perspectives of materials science and engineering.

Regarding the target group business community, it can impact possibility for enterprises to acquire potential consumers and potential intermediaries. Business community will be able to get qualified employees.

Scientific and research institutes from different fields both in the Republic of Belarus and in Europe can take the possibility of acquiring more qualified lecturers and cooperation with foreign universities.

Belarusian and foreign master students will have an opportunity to obtain knowledge and skills required by European business. Practice held during the master program will increase their competitiveness at the labor market.

Belarusian universities will be able to implement the obtained procedure of program developing in their future practice (can be spread by the whole university via electronic libraries and department's sites). They will also get a unique master program

that will increase their attractiveness for both Belarusian and foreign students. All Belarusian universities will have an opportunity to receive the description of the program developing procedure on the site of the Digital Engineering Entrepreneurship educational project and implement the obtained results in their practices.

Belarusian and foreign (mainly European) companies will have an opportunity to reduce extra spending on training of new employees as far as the master program will provide a course on specifics of running business in the European region as well as the best managerial practice.

The participants of the Digital Engineering Entrepreneurship educational project will use different channels for dissemination purposes. The project dissemination aimed at spreading the project results within target groups and whole society through the program of activities. The dissemination strategy will be defined during the public seminars. The web site of the project will be public available during the entire project. The web site will be used as a source of useful information during the project, will make the results of the project publicly available. The universities will use both the Digital Engineering Entrepreneurship project web site and their sites for dissemination purposes and the project web site as a communication platform. All recommendations, estimations from the experts, annual and final reports, intermediate monitorings of the project flow, meeting minutes, analytical project documentation and other documents will be collected on the project web site. All materials developed during the project will be available in both electronic and printed form. In addition, all the dissemination events will be accompanied by the distribution of the printed materials. During operation of the project will be organized promotion activities, hack-a-thon and conference. The dissemination of new practices, methods, tools and instruments received will be supported inside the country by Ministry of Education, monitored by experts from universities with full analysis of attainments and effective acquisitions that can be integrated in following in curriculum in universities.

The participants and project actors' feedback will be collected both during piloting, implementation and running of Digital Engineering Entrepreneurship master program for improvement on the spot and providing all-round dissemination. The dissemination plan will be oriented towards stakeholders and their needs.

9. Scientific and Technological Park of BNTU Politehnik as main base for education

Republican Innovation Unitary Enterprise "Scientific and Technological Park of BNTU "Polytechnic" (further – Technopark) was established in 1992. Today Technopark offers informative, consulting, engineering and other innovative services at its own cost and expense and thus facilitates innovative development of enterprises. Key functions are as follows: R&D; manufacture of high-tech products including those based on the R&D conducted at the Technopark; Informational and marketing support; Business incubation (facilitation of creation high-tech enterprises and industries). Nowadays the enterprise is operating as a distributed Technopark consisting of centers of technology transfer, informational and marketing centers, scientific and production

subsidiary enterprise, which are located in universities and industries. Since 1993 Technopark has founded a number of enterprises. Nowadays Technopark is a founding shareholder of 7 innovative enterprises, and cofounder of 2 private limited liability companies. The infrastructure of the Technopark includes the Marketing and Technology Transfer Center, which is focused on informational support of Technopark's scientists as well small and medium scale innovative enterprises, consultancy, informing about promotion opportunities, information provision regarding grant opportunities, facilitation of cooperation of universities and innovative enterprises, higher educational establishments, students, other parties of innovative infrastructure. Students of Belarusian universities have an internship at the Technopark, applying their knowledge in such areas as project management, planning and building management systems, positioning the products of the Technopark at the international level. Annually the Technopark's employees hold large-scale marketing activities gathering students, graduate students, postgraduates and young scientists from Belarus and other countries: forums, conferences, project competitions, business matchmaking events etc.

The main role of Polytechnic in the Digital Engineering Entrepreneurship project is to provide the link between the University and Business, which consists in following:

- involvement of business representatives to improve the expert level at the stage of developing the training program;
- providing interaction of teachers, students with business for the purpose of practical application of the acquired knowledge within the framework of the Digital Engineering Entrepreneurship master program;
- receiving feedback from business in the form of responses to questionnaires;
- organization of events, dissemination and promotion of project results.

10. Conclusion

With accordance of abovementioned, business partners' support and EU international technical assistance is needed for initiation and organization of Digital Engineering Entrepreneurship master education, and the project may be realized as ERASMUS+ project of Capacity Building in the field of higher education.

Also following best practices may be used when master studying, that will be profitable both for universities and their business partners: elements of dual education; experience of education cluster functioning; experience of earlier international projects concerned with interaction between business and higher education.

The development of the Master Program in Digital Engineering Entrepreneurship in accordance with the Bologna principles will provide increased opportunities for students to acquire new knowledge as well as drawing on the experience and competence of experts from EU universities through the development and provision of modern educational tools; it will reveal the real needs of potential employers by involving them into the Digital Engineering Entrepreneurship project through carrying out activities, surveys, analytical studies.

Mutual development of Belarusian and EU universities' training programs and their implementation into the educational process will promote the convergence and joint integration of the European and Belarusian education systems on the experience of the proposed Digital Engineering Entrepreneurship master program, will accelerate the transformation of the Belarusian education system in terms of improving its competitiveness by increasing student mobility, access to modern information technologies during training and decision-making.

All this corresponds with the national interests of Belarus and the EU countries in the convergence and harmonization of education systems within the framework of the Bologna Process. The developed Digital Engineering Entrepreneurship master program is absolutely new for Belarusian educational organizations, when not only theoretical material is used during the educational process of engineers-economists but also a digital approach that takes into account the current requirements of potential employers, competencies, experience and best practices of specialists from EU universities.

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