Marozau, Radzivon

Article

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Modernization and development of Belarusian higher education institutions based on the entrepreneurial university framework

Radzivon Marozau, 2018

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In contrast to developed Western countries, higher education institutions (HEIs) in transition economies such as Belarus, do not have pretensions to being key actors in cutting-edge innovation and in creating entrepreneurship capital, rather they tend to educate jobseekers, knowledge workers, as well as to adapt, redevelop and disseminate existing knowledge and technologies. At the same time, policy makers in Belarus realized that transformation of HEIs is needed to respond to the global challenges. In this regard, the policy paper discusses prerequisites and factors conditioning the development of entrepreneurial HEIs in Belarus.

Capitalizing on state-of-the-art academic research, study of policy initiatives as well as on the custom-made survey of Belarusian faculty members, the policy paper concludes that Belarusian policy makers need to create a supportive institutional environment before requiring from HEIs outcomes of the entrepreneurial mission.

We revealed that he Belarusian academic community is not unanimous in understanding the concept “Entrepreneurial university” and demonstrated general misunderstanding or fragmented understanding of the phenomenon that may lead to a negative attitude from both HEI staff and policy makers.

First-priority measures for the current stance are delineated.

1 Introduction

Evidences of the social and economic impacts of higher education institutions (hereafter – HEIs) abound: decrease in unemployment; attraction and retention of talented students and faculty to a region or a country; radical product innovations; creating and upgrading industries; and the economic growth of regions and countries.

In the most developed countries that reached the innovation-driven stage, HEIs accept a new mandate to become key drivers in knowledge-based socioeconomic development[1]. These changes require embeddedness of HEIs into innovation systems as knowledge and entrepreneurship hubs.

In contrast to developed Western countries, HEIs in transition economies such as Belarus, do not have pretensions to being key actors in cutting-edge innovation and in creating entrepreneurship capital, rather they tend to educate jobseekers, knowledge workers, as well as to adapt, redevelop and disseminate existing knowledge and technology. At the same time, policy makers in many transition economies including Belarus realized that entrepreneurial transformation at HEIs is needed to respond to the global challenges.

In general, Belarus has a state-dominated well-developed, by some estimates, oversaturated higher education sector represented by 51 HEIs or 1 HEI for 190 000 citizens. As a result, Belarus outperformed all CIS and EU countries except Finland in terms of the number of students per 10 000 population in 2014[2] and has one of highest enrollment rates in tertiary education of about 90%. This opens the door to HEIs almost to everyone who can afford quite moderate prices of 600 $ per semester in average that is 120% of the average salary in the country or choose one of the uncompetitive specialties and receive scholarships. Similarly to other post-Soviet countries, a massification of higher education took place without much increase in teaching staff or funding. 42 Belarusian public HEIs are funded by the state: 45,4% of students at public HEIs study at the expense of the state and 60,1% of R&D[3] is directly financed by the state.

In general, the higher education system remains mostly rigid and unreformed since the Soviet times creating a daunting policy challenge that requires first of all an in-depth study

[1] Marozau, R., Guerrero, M., & Urbano, D. (2016). Impacts of universities in different stages of economic development. *Journal of the Knowledge Economy*, 1-21.

[2] Belstat (2017). Education in the Republic of Belarus. Statistical book.

[3] Belstat (2018) Science and Innovative activity. Statistical book.

to understand whether leading Belarusian HEIs are ready for entrepreneurial transformation, what prerequisites and obstacles exist.

In 2017, the Ministry of Education of Belarus initiated the Experimental project on implementation of "University 3.0" model for HEI development (hereafter – experimental project) that started in 2018. Within the framework of this project, the University 3.0 model is defined as development of research, innovation and entrepreneurial infrastructure of HEIs for creation of innovative products and commercialization of intellectual activities.

In this regard, the objectives of the study are:

- to raise awareness and understanding among policy makers at the Ministry of Education and HEI authorities about the concept of 'entrepreneurial university: facets of a HEI entrepreneurial environment and possible outcomes.
- to develop evidence-based recommendations for introducing and modernizing approaches to creating entrepreneurial environment at HEIs within the framework of the experimental project and afterwards.

In pursuit of these objectives, we conducted online and face-to-face surveys of 48 Belarusian HEI administrators and faculty members that were based on HEInnovate self-assessment tool widely used by policy makers and HEI authorities for example in Ireland[4] and Romania[5]. The sample included representative of both HEIs participating in the experimental project and that do not.

2 Conceptual framework

2.1 Conceptualizing the entrepreneurial university

The mandates of higher education institutions (HEIs) evolve alongside with the evolution of the growth theories (Figure 1). Thus, in the neoclassical growth theory, the drivers of economic growth were physical capital and labor that could be unskilled, HEIs mainly played the role of providers of human capital with a moderate contribution. Within

[4] https://www.oecd-ilibrary.org/docserver/9789264270893-en.pdf?expires=1542011446&id=id&accname=guest&checksum=8D4F4F8B1AD368A9E0E90549A2A9B0D5, Access date: 28.10.2018

[5] https://www.rafonline.org/en/programe/entrepreneurial-university/ Access date: 25.10.2018

the endogenous growth model, knowledge and technology were regarded as key factors of production, while educational attainment and skills of the population were defined as determinants of the capacity to transform research and development results into innovations[6]. This made HEIs to evolve from solely human capital suppliers into key sources of knowledge and technology.

As a productivity factor, an entrepreneurial activity started appearing in economic growth models at the beginning of the twenty-first century[7]. As a result, the role of HEIs has broadened to development of entrepreneurial thinking, action and institutions[8] – HEIs took on the third "entrepreneurial" mission. Well-studied outcomes of this mission are patents, new firms (academic spin-offs) and the development of entrepreneurial culture and attitudes among graduates and academics.

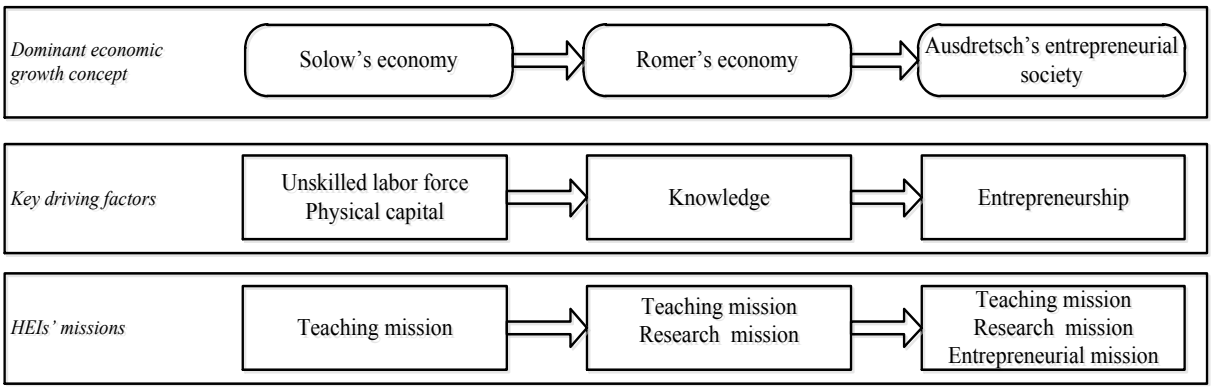

FIGURE 1: Evolution of the HEIs' missions[9][10]

The new mandate for HEIs preconditioned the development of so called 'entrepreneurial universities' also regarded as 'third generation universities' or 'universities 3.0'.

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[6] Bilbao-Osorio, B., & Rodríguez-Pose, A. (2004). From R&D to innovation and economic growth in the EU. Growth and Change, 35(4), 434-455.

[7] Wennekers, S., & Thurik, R. (1999). Linking entrepreneurship and economic growth. Small business economics, 13(1), 27-56.

[8] Audretsch, D. B. (2014). From the entrepreneurial university to the university for the entrepreneurial society. The Journal of Technology Transfer, 39(3), 313-321.

[9] Guerrero, M., & Urbano, D. (2012). The development of an entrepreneurial university. The journal of technology transfer, 37(1), 43-74.

[10] Marozau, R. (2015). Factors Conditioning the Role of Higher Education Institutions in Transition Economies: An Exploratory Study of the Republic of Belarus. Doctoral Dissertation, Universidad de Deusto (Spain).

Admittedly, political, economic, social, technological and legal (PESTL) conditions determine the path and the speed of the evolution of HEIs as well as their contribution to national economies in different stages of economic development. Thus, in Belarus – an efficiency-driven economy[11] – HEIs are expected to contribute to economic development if they successfully fulfil teaching and research missions. While the outcomes of the third mission are supposed not to be relevant at this stage[12].

The concept of an entrepreneurial HEI is multifaceted and is explored within different research streams: from knowledge transfer to entrepreneurship education (and HEI management. Similarly, there is no consensus in understanding of the term "entrepreneurial university" that can be defined as a HEI that acts entrepreneurially and is a natural incubator, creating a supportive environment for the startup of businesses by faculty and students, promoting an entrepreneurial culture and attitude for the purpose of responding to challenges of a knowledge-based economy, and facilitating economic and social development.

Meanwhile, the concept of "University 3.0" mostly corresponding the concept of "Entrepreneurial university" and adopted from Wissema[13] started appearing in Russian publications[14][15], where the number '3' corresponds to the three HEI missions or to the third generation of HEIs. A possible explanation of renaming is that, on the one hand, in the post-soviet context entrepreneurship per se still does not have a positive meaning in a broader society and it is not associated to HEIs. On the other hand, it was expected that such numbering makes the evolution visible. However, this led to speculation on this numbering and gave rise to publications on University 4.0[16] that should correspond somehow to Industry 4.0. This approach moved on the Belarusian academic society and policy makers.

[11] Own calculation based on the Global Competitiveness Report

[12] Marozau, R., Guerrero, M., & Urbano, D. (2016). Impacts of universities in different stages of economic development. Journal of the Knowledge Economy, 1-21.

[13] Wissema, J. G. (2009). Towards the third generation university: Managing the university in transition. Edward Elgar Publishing.

[14] Головко, Н. В., Зиневич, О. В., & Рузанкина, Е. А.) (2016). Университет третьего поколения: Б. Кларк и Й. Уисема. *Высшее образование в России*, (8-9).

[15] Карпов, А.О. (2017). Университет 3.0-социальные миссии и реальность. Социологические исследования, (9), 114-124.

[16] See for example Кузнецов, Е. Б., и Энговатова, А. А. (2016). «Университеты 4.0»: точки роста экономики знаний в России. Инновации, 5 (211), 3-9.

Admittedly, the entrepreneurial mission of HEIs is not any more associated or equaled to start-ups and knowledge transfer, but is increasingly considered as a procedural framework for HEI's and individual's behavior. This was one of the rationales behind the joined initiative by the European Commission and the Organisation for Economic Co-operation and Development (OECD) aimed at providing a holistic approach and guiding framework for HEIs and their stakeholders at the national and sub-national levels to support innovation and entrepreneurship – the HEInnovate tool. It enables assessing a HEI against a number of statements related to 8 areas reflecting entrepreneurial and innovative nature of a HEI environment:

- Leadership and Governance
- Organisational Capacity: Funding, People and Incentives
- Entrepreneurial Teaching and Learning
- Preparing and Supporting Entrepreneurs
- Digital Transformation and Capability
- Knowledge Exchange and Collaboration
- The Internationalised Institution
- Measuring Impact

2.2 Belarusian higher education system

Belarus has a well-developed, by some estimates, oversaturated higher education sector represented by 43 public and 9 private institutions with the student population of approximately 313,000[17]. The HEI are not uniformly distributed across the different regions of the country. Thus, 31 HEIs or about 56% of HEI are located in the capital city – Minsk, which hosts 8 out of 9 private HEIs. Public HEIs offer educational programs at all levels in a wide range of profiles and fields of study satisfying demand of the national economy.

According to World Bank data, the gross enrolment rate in tertiary education is extremely high, reaching 87% in 2016. As a result, Belarus outperformed all CIS and EU countries except Finland in terms of the number of students per 10 000 population in 2014[18].

[17] According to the Ministry of Education

[18] Belstat (2017). Education in the Republic of Belarus. Statistical book.

To a significant extend Belarusian Public HEIs are funded by the state: 60,1% of R&D[19] conducted by HEIs in 2017 was funded by the and 45,4% of students at public HEIs were funded from the budget (Figure 2).

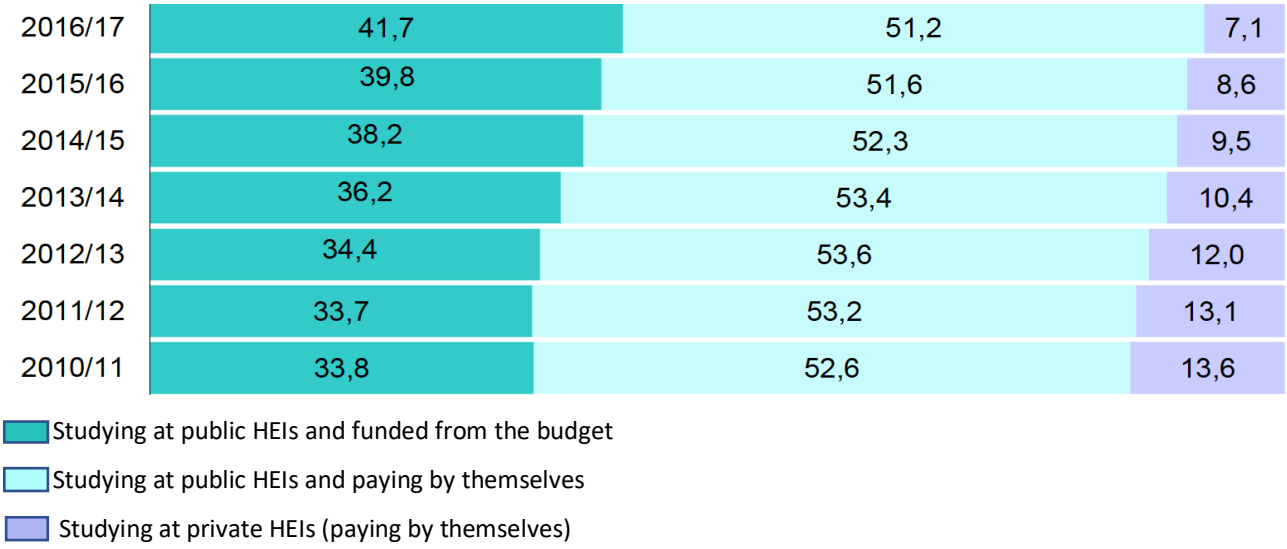

FIGURE 1: Composition of Belarusian students[20]

The Belarusian higher education sector operates as a technology infrastructure offering R&D and consultancy services to industrial enterprises and thus compensates for the underdevelopment of the consulting sector[21].

Belarusian HEIs do involve in international projects and programs such as Erasmus+, Horizon 2020, initiatives funded by USAID aimed at entrepreneurship development and facilitating entrepreneurial ecosystem development. However, as soon as a project is finished and/or key persons change jobs, most activities wane and project outcomes appear unsustainable.

On both bachelor and master levels, the most demanded area of education is "Communication. Law. Management. Economics" that accounts 31% and 44% respectively[22]. Belarusian students obtaining a specialty in these areas do not have higher entrepreneurial

[19] Belstat (2018) Science and Innovative activity. Statistical book.

[20] Belstat (2017). Education in the Republic of Belarus. Statistical book.

[21] Djarova, J., 2011. National innovation system and innovation governance. In UN Innovation Performance Review of Belarus. Geneva: United Nations. pp.21-42.

[22] Belstat (2017). Education in the Republic of Belarus. Statistical book.

intentions than other students, while the probability of doing business by alumni with such degrees is higher[23].

At the same time, the report by OECD[24] revealed that Belarus has the lowest score among Eastern Partnership countries in terms of enterprise skills and entrepreneurial learning.

Despite several unsupportive institutional factors, Belarusian students have quite high entrepreneurial potential in comparison to other countries participating in the GUESSS project. Thus, in five years after graduation – 56,8% of Belarusian students intend to be entrepreneurs, while the global average level in 2016 was 38,2%. In this report, it was also demonstrated that in terms of entrepreneurial environment, Belarusian HEIs are slightly above world average, while Belarusian students learn more with regard to entrepreneurship than students from around the world (4,4 vs. 4.0 out of 7)[25].

At the same time, the rigorous curricula of natural, technical sciences and IT specialties delivered at Belarusian HEIs are not supplemented with formal and experiential entrepreneurship education. Innovative methodologies and entrepreneurial approaches to teaching as well as faculty entrepreneurial role models are rare. Moreover, all changes in degree syllabuses need state approval that makes HEIs less flexible and nimble, while supporting entrepreneurial activity has not been an important part of the HEI culture.

Belarus continues to implement the State Programme on Education and Youth Policy and State Programme of Innovation Development for the period 2016-2020, both of which stress the importance of development of entrepreneurial competences at all education levels. Moreover, in 2017, the Ministry of Education initiated the Experimental project on implementation of "University 3.0 model for HEI development that started in 2018. Within the framework of this project, the University 3.0 model is defined as development of research, innovation and entrepreneurial infrastructure of HEIs for creation of innovative products and commercialization of intellectual activities. The project stipulates 2 directions: 1)

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[23] Marozau, R. (2015). Factors Conditioning the Role of Higher Education Institutions in Transition Economies: An Exploratory Study of the Republic of Belarus. Doctoral Dissertation, Universidad de Deusto (Spain).

[24] OECD (2015). SME Policy Index: Eastern Partner Countries 2016: Assessing the Implementation of the Small Business Act for Europe, SME Policy Index, OECD Publishing, Paris, https://doi.org/10.1787/9789264246249-en

[25] Marozau & Apanasovich, (2016) National GUESSS Report of the Republic of Belarus. Access mode: http://www.guesssurvey.org/resources/nat_2016/GUESSS_Report_2016_Belarus.pdf Access date: 29.10.2018.

implementation of changes to curricula on the bachelor level aimed at systematic learning of issues related to innovation, inventive and entrepreneurial activities, as well as changes in curricula at the master level aimed at start-up creation in business incubators and high-tech group project implementations; 2) creation of innovative infrastructure (science-tech parks, technology transfer offices, laboratories, business incubators) aimed at commercialization of innovative products and intellectual activity outcomes. 7 leading HEIs (4 - classical, 2 technical, 1 - economic) were selected to participate in the experiment.

It should be acknowledged that the document describing the experimental project is still not available to a wider community, while the implementation goes also in silence. Results of our survey provided in section 4 do confirm that.

In general implementation of measures indicated in the state programs and in the experimental project are not backed up with data and analytics. Some scepticism exists on whether some relevant measures will be undertaken against the backdrop of the lack of funding for such activities and absence of elaborate study in the field.

2.3 Examples of policy initiatives for modernization of traditional HEIs

Policy measures and initiative targeted at the development of the HEIs' third mission are designed and implemented worldwide especially in the most developed countries. Less developed countries continue imitating best practices adjusted to local context and relying on external funding.

Noteworthy examples of such measures are The Entrepreneurial Universities initiative in New Zealand, the program Entrepreneurial University – From Knowledge to Innovation in Romania, The National Centre for Entrepreneurship in Education (the National Council for Graduate Entrepreneurship) in Great Britain, development of Federal universities and the Ranking of entrepreneurial and inventive activity of universities in Russia.

In New Zealand, the intention was to strengthen the fast-growing innovation ecosystem through HEIs by attracting world-leading entrepreneurial academics with skills, networks and credibility to boost innovation and entrepreneurship within HEIs, and within industries they partner and collaborate with[26].

[26] For further information consult http://www.tec.govt.nz/assets/Forms-templates-and-guides/2108216d69/Entrepreneurial-Universities-Outcome-Assessment-Framework.pdf?r=1 Access date: 30.10.2018

In Great Britain – another developed country – an outstanding initiative was establishment of the National Centre for Entrepreneurship in Education (the National Council for Graduate Entrepreneurship) in 2004. This national body focuses on enhancing the entrepreneurial capacity of the higher education sector by supporting long-term cultural change at HEIs shaping the institutional environment to be more conducive to enterprises and entrepreneurship and informing national policy and practice[27].

Similarly to Belarus, the Romanian outsourcing-oriented IT sector is developing faster than any other traditional sector and is bleeding talents from other industries. To tackle these challenges, the program Entrepreneurial University – From Knowledge to Innovation was launched. This project provides Romanian HEIs with HEInnovate evaluation tool and a methodology for its application for the development of a national model. Another important outcome is expected to be specialized training curricula for HEI professors and administrators in entrepreneurial thinking as well as basic and extended entrepreneurship curricula for students designed in collaboration with local and national business stakeholders to both enhance the curricula as well as to contribute with specific mentoring and internship opportunities[28].

These examples of policy initiatives share at least two commonalities:

1) Wide involvement of local, national and international stakeholders and contributors (businesses, state bodies, academic community);
2) Strong focus on the development of awareness, competences and skills on entrepreneurial transformation among HEI leaders and faculty members.

The Decree of the President of the Russian Federation "On Federal Universities" resulted in several mergers and creation of 10 Federal universities with a higher level of financial and organizational autonomy[29]. The comprehensive program was aimed at human capital formation in regions based on creation, implementation and dissemination of knowledge, technologies and innovative products demanded in a region and consequent

[27] For further information consult http://ncee.org.uk/ Access date: 28.10.2018

[28] For further information consult https://www.rafonline.org/en/programe/entrepreneurial-university/ Access date: 29.10.2018

[29] For further information consult http://www.garant.ru/products/ipo/prime/doc/12065189/ Access date: 20.10.2018

innovation-driven development. During the period from 2007 to 2014 more than 1 billion euro was spent on this project[30].

Based on the existing literature on the topic, the HEInnovate approach and the Belarusian context, we propose a conceptual model (Figure 3).

As emphasized in the model, the specific post-Soviet context (Political, Economic, Social, Technological, Legal) influences the development of all the entrepreneurial university areas and moderates the relationships integrated into the model. It is worth noting that such context has a dual effect since it is characterized by factors that either facilitate or retard the development of entrepreneurial HEIs as well as their outcomes and contribution to socioeconomic development. These external conditions as well as the outcomes were in focus of the survey.

[30] Жураковский, В. М., Аржанова, И. В., & Воров, А. Б. (2015). Оценка результатов стартового этапа формирования сети федеральных университетов. Профессиональное образование в России и за рубежом, 3 (19), 25-31.

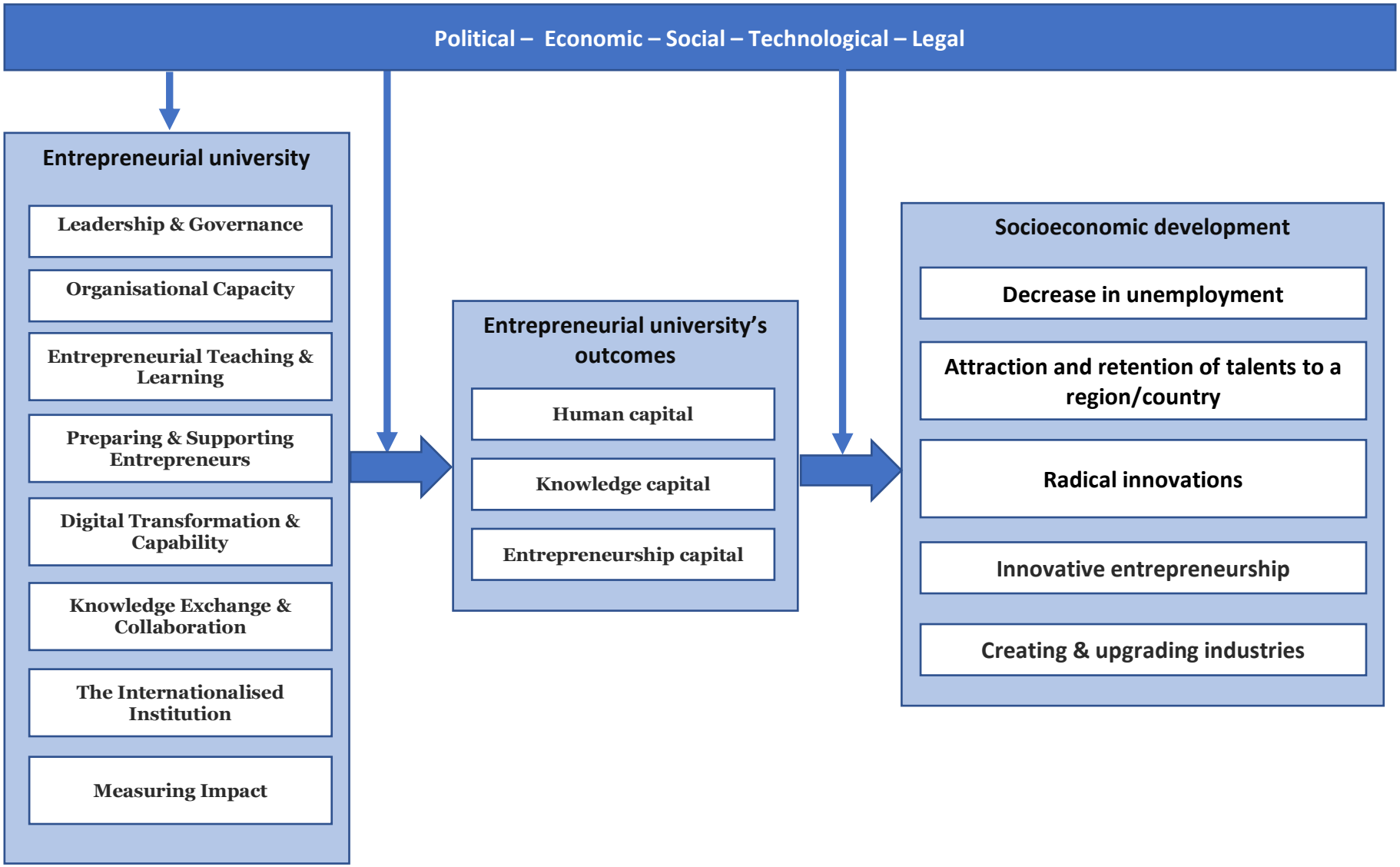

FIGURE 3: Conceptual Model

Source: own elaboration

3 Data collection and methodological approach

Quantitative data. For the purposes of our study, we capitalized on the HEInnovate[31] tool that is apt for both interviews and online survey (Annex 1).

Additional motivation behind this research was to familiarize HEI authorities and faculty members with the most important areas for intervention on the way to entrepreneurial HEI development and to demonstrate that the progress should be evaluated and benchmarked against multiple criteria. Using this tool, it is expected to allow HEI authorities to systemize their perceptions about an internal entrepreneurial environment.

The online survey and face-to-face interviews were conducted in October of 2018 using the Google Drive platform.

Overall, emails were sent out to a population of 284 representatives of Belarusian HEIs whose email addresses were available in the data bases of the Belarusian Economic Research and Outreach Center (BEROC) and Association of Business Education. It should be pointed out that the majority of faculty members in these data bases are pro-active and advanced representatives of the Belarusian academic community, since they participated in different outreach, educational and training activities.

We obtained 44 completed questionnaires with the resulting response rate of 15.5 percent. We obtained 4 more requests for meetings from HEI authorities to clarify the issues and purposes. As a result, we obtained 4 additional responses via interviews conducted from on October 5-18. As a result, the final sample included 48 observations. Descriptive statistics is provided in Annex 2.

Qualitative data. We benefitted from open-ended questions included in the questionnaire to study how representatives of Belarusian HEIs perceive University 3.0 (Entrepreneurial university) concept. In addition, we used different types of secondary data sources, such as reports, press releases, project descriptions, as well as the websites of the HEIs and the Republican Institute of Higher School. These sources appeared especially useful for defining external factors.

[31] For further information consult https://heinnovate.eu Access date: 18.10.2018

Since we used the same questionnaire for both the online survey and interviews, an interviewer wrote down answers to open-ended questions and ticked answers to HEInnovate questions.

The utilization of these sources of quantitative and qualitative data enabled methodological triangulation of the findings and enhancing the validity of the study. Based on the HEInnovate tool, we predefined areas of an entrepreneurial environment at a HEI that facilitated systematic collection and analysis of relevant qualitative data.

4 Results

4.1 Quantitative data analysis.

Figure 4 demonstrates the results of assessment of Belarusian HEIs against the categories proposed by HEInnovate. In general, the estimates for the eight areas are around average and vary from 2.11 (Measuring impact) to 2.73 (Knowledge exchange & collaboration).

FIGURE 4: Assessment of HEIs

Source: own elaboration

Next, we distinguished between HEIs that participate in the experimental project and those that do not (Figure 5). Surprisingly, representatives of HEIs that were left beyond the scope of the experimental project perceive their HEIs more advanced in all the areas. The initial explanation was that faculty members whose HEIs do participate in the project better understand the multifacetedness of the phenomenon and a level that a HEIs is on as compared to possible role models.

In this regard, we considered the estimates of faculty members that are aware of the University 3.0 (Entrepreneurial university) concept and those who are not (Figure 6). Our presumption was not confirmed when we differentiate between these 2 groups of respondents. Those who are aware, perceived their HEIs more advanced in all areas.

FIGURE 5: Assessment of HEIs that participate vs. do not participate in the experimental project

Source: own elaboration

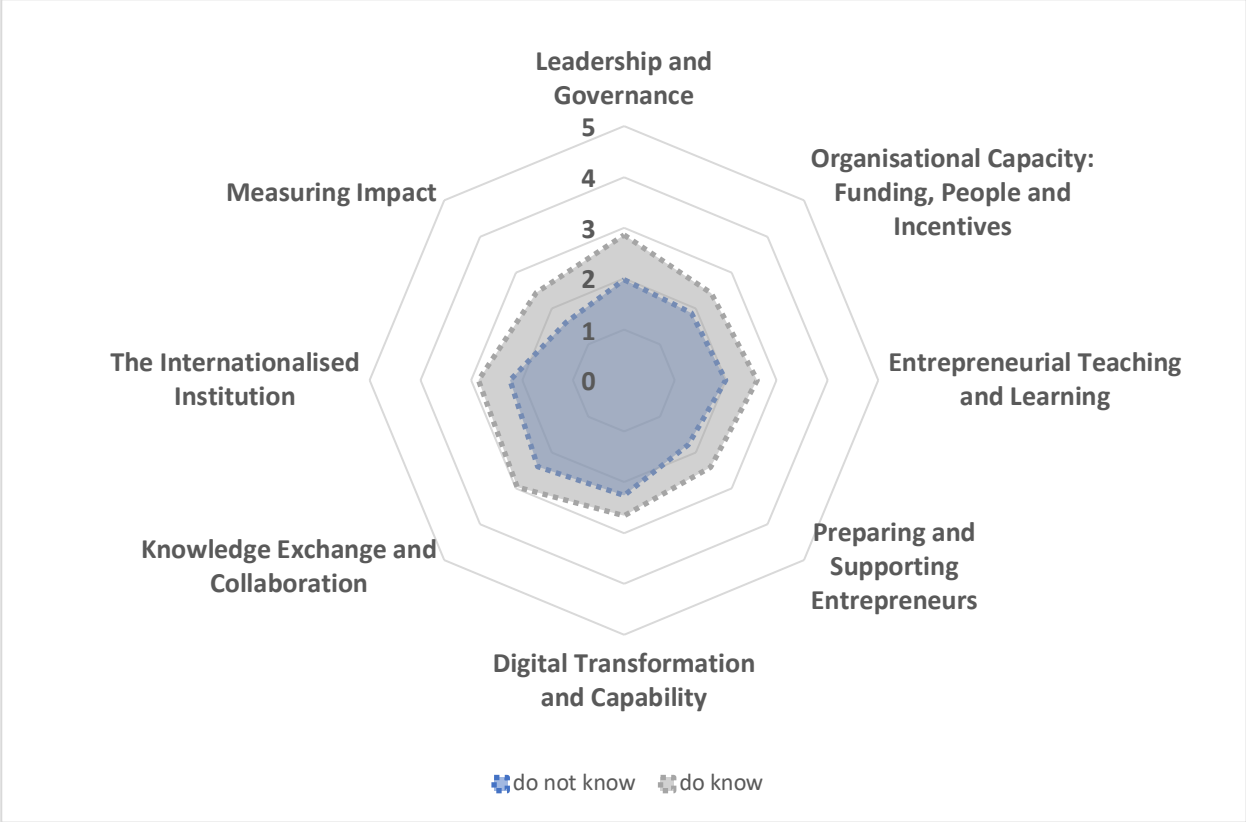

FIGURE 1: Assessment of HEIs by faculty members who are aware and who are not aware of the concept

Source: own elaboration

To understand this paradox, we used the chi-square test for independence, also called Pearson's chi-square test, to discover if there is a relationship between two categorical variables – awareness of the entrepreneurial university concept and employment at a HEI participating in the experimental project. Surprisingly, no statistically significant relationship was identified evidencing that implementation of the experimental project goes without raising awareness and wider involvement of faculty (Tables 1, 2).

Table 1. Crosstabulation of 'Participation' and 'Awareness'

		Awareness		Total
		.00	1.00	
Participation	.00	5	11	16
	1.00	14	18	32
Total		19	29	48

Table 2. Results of the Pearson's chi-square test

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.697[a]	1	.404		
Likelihood Ratio	.709	1	.400		
Fisher's Exact Test				.535	.303
N of Valid Cases	48				
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.33.					

4.2 Qualitative data analysis

We tried to systemize answers to the following open-ended questions of those who were aware of the concept (Table 3).

1) In your opinion, what is “Entrepreneurial university” (University 3.0)?
2) What is a measurable impact of “Entrepreneurial university” (University 3.0)?
3) What factors stimulate development of “Entrepreneurial university” (University 3.0) in Belarus?
4) What factors retard development of “Entrepreneurial university” (University 3.0) in Belarus?

Table 3. Summary of the open-ended questions

Meaning/Definition	Measurable impact	Stimulating factors	Retarding factors
— Commercialization of R&D results — Technology transfer — Relation of research in all fields with the commercial output — Conducting commercial applied research — Interweaving teaching, R&D, innovation and business cooperation — Facilitating student start-ups — Generating additional income — Development of affiliated SMEs — Forming entrepreneurial competences, having	— Income from knowledge and technology commercialization — Implementation of R&D results in production for innovative product development — Growing economic efficiency of R&D — Shortened cycle from R&D to manufacturing — High-quality graduates with practical skills due to HEI-industry relations — Number of patents & licenses — Graduates having positions in	— High demand from enterprises for qualified labor force. — Qualification of faculty — Hard-working and supportive staff — Growing interest in the topic from authorities and faculty — Interaction of HEIs and industrial enterprises in educating R&D specialists — Cooperation experience with IT-companies — Low quality of the education system as a stimulus for reforms	— Lack of initiative and motivation from HEI authorities and most of faculty members — No sustainable models for R&D commercialization, — Weak HEI-business ties — Low involvement of private enterprises in R&D and HEI-business collaboration — Archaic industries — Stagnation of the education system and no political willpower for reforms — Avoiding changes — Misunderstanding of the impact of fundamental research

Meaning/Definition	Measurable impact	Stimulating factors	Retarding factors
entrepreneurial structures — Providing interdisciplinary education — HEI – an innovative enterprise	accordance with their specialization — Graduates who are ready to solve real-live problems for enterprises — Entrepreneurial competences — New enterprises — Profit growth — Decrease in budget spending — Higher salaries of faculty — Extended international relations	— Administrative intervention — International relations	— Low salaries, rigid incentive systems — Qualification of faculty — Employment, remuneration, and promotion system, — Lack of financial autonomy and, as a consequence, of self-governance. — Lack of interpretation of the new concepts — Nobody knows what to do — Low selection barriers for post-graduate programs — No appropriate norms and regulations — Lack of funds — Dominating role of the Ministry of Education — Bureaucracy — Rigid organizational structures of HEIs — Old-fashioned approaches to teaching

When we codified perceived meanings of the “Entrepreneurial university” (University 3.0) according to the main emphasis provided by respondents, we got the following distribution:

- 12 respondents associated the concept with knowledge transfer and commercialization;
- 7 respondents stressed the interrelation of teaching, research and innovations;
- 5 respondents believed that the concept is about earning money;
- 1 respondent indicated that an entrepreneurial university means developing entrepreneurial competences.

These findings demonstrate an expected general misunderstanding or fragmented understanding of the phenomenon that may lead to a negative attitude from both HEI staff and policy makers and stresses the importance of raising awareness and providing trainings at least for decision makers and spokesmen.

4.3 PESTL analysis of Belarus for HEI development

Notwithstanding recent changes in formal (legislation) and informal (perception of entrepreneurs) institutions, the Belarusian economy is characterized by unsupportive institutional environment, the underdeveloped entrepreneurial sector and the innovation system that is not strong enough[32]. The summary of external environment based on examination of secondary sources and survey results is provided in Table 4.

Table 4. Summary of the external environment for HEI development

Opportunities
● *Political:* Entrepreneurship is acknowledged as a driver for socioeconomic development ● *Economic:* Macroeconomic stabilization, improving positions in the Doing Business Rankings ● *Social:* Growing interest in the topic of entrepreneurship and education in the field of technology; Improving perception of entrepreneurs in society; ● *Technological:* Fast-growing export-oriented IT-sector, traditional engineering potential inherited from the Soviet times ● *Legal:* Recent entrepreneurship-support measures; high level of contract enforcement.
Threats
● *Political:* Top-down policy initiatives that are not evidence-based; rigidity of the Ministry of Education; consideration of HEIs as state servants; lack of financial autonomy and, as a consequence, of self-governance; stagnation of the education system and no political willpower for radical reforms ● *Economic*: Decreasing budget expenditures on education as a share of total budget spending and R&D expenditures as a share of GDP; unstable economic growth; weak ties between HEIs and the private sector (especially SMEs); low involvement of private enterprises in R&D; archaic industries. ● *Social:* Aging staff in education and research, career in education and research is not attractive due to low salaries and vague perspectives; decreasing number of students

[32] Inzelt, A., & Apanasovich, N. (2017) Innovation in the enterprise sector. In Innovation for Sustainable Development – Review of Belarus. New York and Geneva: United Nations, 161 p, ISBN 978-92-1-117146-4

due to the demographic pitfall; low selection barriers on bachelor, master and doctoral level; obligatory first job placement

- *Technological:* Low demand for R&D results and advanced technologies from the enterprise sector, low absorptive capacity.
- *Legal:* Frequent changes in regulations; inefficiency of the judicial system; weak intellectual property protection system.

Source: own elaboration based on the survey results and secondary sources.

The results show that threats prevail and these threats jeopardize the sustainability of the higher education system in general. In this regard, the government should address the negative environmental factors before requiring from HEIs outcomes of the entrepreneurial mission.

5 Policy recommendations for HEIs and policy makers

We propose several initiatives to be implemented to develop an entrepreneurship-friendly environment at the state and HEI levels. However, it should be acknowledged that success stories of HEI transformation in transition economies are rare and were managed by a HEI itself rather than a government.

Raise awareness and transparency

Policy initiatives need to be clear in their objectives, tools, benefits and outcomes as well as evidence-based and open for awareness and discussion. The lack of transparency leads to misunderstanding, ignorance, resistance and speculations. Thus, due to wrong assumptions and absence of clear indicators, some Belarusian HEI authority claim that they have already implemented the 'University 4.0' model and ready for 'University 5.0'.

Establish collaboration among stakeholders

Comprehensive initiatives in this sphere should be developed and implemented in close collaboration with the Ministry of Economy that is responsible for entrepreneurship, business environment, entrepreneurial infrastructure as well as the State Committee for Science and Technology. For example, the Ministry of Economy may promote preferential terms for HEI-based enterprises. This may stimulate business creation by students and faculty as well as to bring established businesses to a HEI for spin-off development.

Reconsider target indicators for HEIs

The state should reconsider the key target indicators for HEIs such as growth of labor productivity and export of service, percentage of graduates who get obligatory first job placement etc. Instead, within the experimental project, it is worthy monitoring such indicators as number of start-ups/spin-offs founded by graduates/faculty members; number of patents, licenses, trademarks co-owned by a HEI, income from intellectual property; number of R&D projects funded by enterprises, number of joint international R&D projects and educational programs etc.[33] Some of these indicators were mentioned in the questionnaires but need to be reconciled with other indicators used for HEI rankings. Alternatively, the Ministry of Education could adopt the Ranking of entrepreneurial and inventive activity of universities in Russia[34]. This would enable improving the weakest area of Belarusian HEIs according to the HEInnovate tool – 'Measuring impact'.

Enable entrepreneurship-oriented educational trajectories

The Ministry of Education should promote entrepreneurship-oriented educational trajectories that enable students and faculty from different departments to work together on real-life projects. Study plans of different specialties should stipulate joined well-structured and formalized academic courses related to entrepreneurship and innovation when mixed teams of future engineers, physicists, biologists, web-designers, managers, PR specialists could develop business project proposals or even prototypes. A good case to study and to imitate is the Federal State-Funded Institution of Higher Education – Tomsk State University of Control Systems and Radioelectronics[35] demonstrating how a learning, research and business activities can be interwoven in the educational process.

[33] Secundo, G., Perez, S. E., Martinaitis, Ž., & Leitner, K. H. (2017). An Intellectual Capital framework to measure universities' third mission activities. Technological Forecasting and Social Change, 123, 229-239.

[34] For detailed information please consult http://www.acexpert.ru/analytics/ratings/reyting-predprinimatelskih-universitetov.html Access date: 25.10.2018

[35] For detailed information please consult https://tusur.ru/ru/nauka-i-innovatsii/innovatsionnaya-deyatelnost

Develop competencies of HEI authorities and faculty members

The main omission of the experimental project is human capital development. These problems were also mentioned many times by respondents: lack of motivation, initiative, qualification; aging faculty. However, educating and training of HEI authorities are not defined as first-priority measures. Changes to curricula as well as entrepreneurial infrastructure development are important objectives but it is not clear who will implement these initiatives. There many opportunities for that such as international programs and projects: Erasmus+, Community Connections, MOST that are used by the most advanced faculty members but the general impact is limited due to "top-down" policy development. Such faculty members should be considered, trained and stimulated and contracted to be 'Entrepreneurship Fellows' in their departments who develop and deliver entrepreneurship courses, participate in and support entrepreneurship events.

Develop entrepreneurship centers

The state should stimulate the development of entrepreneurship centers as organizational units at HEIs – 'one-stop shops' or 'single front doors' for students, faculty, businesses. The entrepreneurship center could integrate and coordinate the entrepreneurship-related activities within a HEI in order to increase their impact and visibility of these activities. At the organizational level, Belarusian HEIs could benefit from the experience of the Maastricht University (the Netherlands)[36] or the University of Information Technology and Management in Rzeszow (Poland)[37], the Center for Entrepreneurship and

[36] The Maastricht Centre for Entrepreneurship (MC4E) serves students throughout the university by providing opportunities to learn, by providing start-up support, and by helping young ventures to grow. MC4E offers entrepreneurship education across the university to students at all levels. They organize inspirational events, such as the Maastricht Week of Entrepreneurship and the Global Entrepreneurship Week, that allow students to network with international entrepreneurs, and help to prepare and launch high impact ventures. MC4E was created with the support of local entrepreneurs and businesses as an autonomous "academic venture" within the university.

[37] The university developed the Innovative Entrepreneurship Support System (IESS) headed by the Centre of Innovation Transfer and Entrepreneurship (CITE). IESS enabled to integrate entrepreneurial activities dispersed among departments and centralize the management of such activities under CITE which is an organizational unit of the university.

Innovation at the University of Potsdam (Germany)[38], the University of Rostock's Centre for Entrepreneurship[39] (Germany). These cases demonstrate how to start building entrepreneurial ecosystems when entrepreneurship-related activities are sparse and unsystematic. Implementation of these approach would help to advance in 'Preparing & Supporting Entrepreneurs' – another weak area of Belarusian HEIs. However, HEI authorities should be warned from just establishing "silo structures" for reporting and following trends, while a holistic strategic entrepreneurial development of a HEI as a whole is neglected.

Introduce of the entrepreneurial agenda into HEIs' strategic and business plans

The Ministry of Education should initiate the inclusion of "University 3.0"-agenda in business and strategic plans of HEIs with concomitant funding allocation and outcomes. A HEI's strategic plan should empower entrepreneurial actions, synergies and cooperation among individuals, organizational units as well as HEI-business relations. A good example of an entrepreneurial strategy incorporated at HEIs is the strategic plan of the University of Tartu in which an important module is devoted to the "Enterprising university"[40].

Reconsider the promotion and remuneration system

The promotion and remuneration system focused only on teaching, research, ideological and socially educational activities and inherited from the Soviet times is not apt for development of new-generation HEIs. As it was argued by respondents, this system complemented by low salaries, bureaucracy and much paper work make employment at HEIs unattractive, especially to people with a business background, while such people are of great importance in changing 'the hearts and minds' of students and colleagues and thereby creating an entrepreneurial environment within a HEI. In this regard, business/industry

[38] the Center for Entrepreneurship and Innovation at the University of Potsdam is active in entrepreneurship education, start-up services, and research into entrepreneurship. Its activities go beyond University borders and include financing partners (banks, VC, Business Angels), business support organizations and local firms.

[39] The University of Rostock's Centre for Entrepreneurship provides initial consultations for students, graduates and employees on entrepreneurial activities, scouting amongst research teams and technology transfer support, organizing business idea and start-up competitions as well as seminars and workshops on entrepreneurship development.

[40] Tartu's members' enterprising attitude that values entrepreneurship was designated as a key factor of the development of the university. It is claimed that the university aims at increasing the awareness of people of the importance of the role of knowledge-intensive entrepreneurship in the development of the economy and welfare of society.

experience should be officially recognized as testaments of qualification and even equaled to academic degrees under certain conditions. This would allow them to take not only the lowest positions. In addition, outreach activities that are beyond teaching and research, should be acknowledged as valuable for a HEIs and be reflected in the payroll.

Change employment conditions at HEIs

The state bodies should revise terms and conditions of employment in higher education – to stipulate industry sabbaticals for faculty members and academic sabbaticals for representatives of the business sector. These initiatives would enable staff mobility among education, research and industry as well as strong and deep engagement with external stakeholders and develop human capital at HEIs.

6 Conclusion

There is a general consensus that traditional HEIs will not be able to retain their place in education, knowledge creation and dissemination and to fit into entrepreneurial society if they do not reconsider their missions and are not deeply integrated into the economy. Frequently, teaching and research activities are not directed to a significant extent towards specific pressing economic and social objectives, while globalization and mass higher education require new forms of management and leadership, approaches to teaching and research as well as new self-sustainable HEI models. By now, HEIs are requested to play critical roles in creating an environment that encourages students to bear uncertainty, promotes alertness and risk-taking perception as well as the propensity to evaluate and exploit business opportunities. In the Belarusian context, where the enrollment rate in tertiary education is about 90%, the role of HEIs is even more determinative. However, Belarus has the lowest score among Eastern Partnership countries in terms of enterprise skills and entrepreneurial learning[41], while our survey has demonstrated that most of the estimates for the eight areas of the HEI entrepreneurial environment are around average and vary from 2.11 (Measuring impact) to 2.73 (Knowledge exchange & collaboration).

[41] OECD (2015). SME Policy Index: Eastern Partner Countries 2016: Assessing the Implementation of the Small Business Act for Europe, SME Policy Index, OECD Publishing, Paris, https://doi.org/10.1787/9789264246249-en

In this regard, Belarusian policy makers have started paying more attention to these issues to use potential of HEIs to create entrepreneurship capital and accelerate socioeconomic development. However, some skepticism exists on whether some relevant non-for-a-show measures will be undertaken against the backdrop of the lack of funding for such activities, absence of elaborate study in the field as well as half-way initiatives and sticking plaster solutions. However, reforms in the higher education system of the transition economies are incomplete and marginal if they are not accompanied by reforms of the whole public sector as well as formal and informal institutions.

The main obvious limitation of the study is the final sample of 48 observations that are not evenly distributed among all Belarusian HEIs, while we approached mostly pro-active and advanced representatives of the Belarusian academic community due to limited time and availability of email addresses.

Further academic research in the field should use HEI- and individual level data to study the influence of perceived formal characteristics of HEIs and individual characteristics of faculty members on outcomes associated with the entrepreneurial mission. Since most of these outcomes remain beyond the scope of the official statistical surveys and HEIs are not eager to design and accept additional “performance indicators”, it could be only custom-made surveys. Interviews with HEIs authorities appeared not applicable because their overestimation of the current stance and the lack of understanding of the phenomenon.

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Annex 1. Questionnaire

5) Name of your HEI _____
6) Your department _____
7) Your age _____
8) Are you familiar with the concept “Entrepreneurial university” (University 3.0)?
   If yes, move to question 5, if no move to question 9.
9) In your opinion, what is “Entrepreneurial university” (University 3.0)?
10) What is a measurable impact of “Entrepreneurial university” (University 3.0)?
11) What factors stimulate development of “Entrepreneurial university” (University 3.0) in Belarus?
12) What factors retard development of “Entrepreneurial university” (University 3.0) in Belarus?
13) Please evaluate to what extend statements describes you higher education institution (1- not at all, 5 – absolutely)

Leadership and Governance

1. Entrepreneurship is a major part of the HEI’s strategy.
2. There is commitment at a high level to implementing the entrepreneurial agenda.
3. There is a model in place for coordinating and integrating entrepreneurial activities across the HEI.
4. The HEI encourages and supports faculties and units to act entrepreneurially.
5. The HEI is a driving force for entrepreneurship and innovation in regional, social and community development.

Organisational Capacity: Funding, People and Incentives

1. Entrepreneurial objectives are supported by a wide range of sustainable funding and investment sources (Organization1).
2. The HEI has the capacity and culture to build new relationships and synergies across the institution (Organization2).
3. The HEI is open to engaging and recruiting individuals with entrepreneurial attitudes, behavior and experience (Organization3).
4. The HEI invests in staff development to support its entrepreneurial agenda (Organization4).
5. Incentives and rewards are given to staff who actively support the entrepreneurial agenda (Organization5).

Entrepreneurial Teaching and Learning

1. The HEI provides diverse formal learning opportunities to develop entrepreneurial mindsets and skills (Teaching1).
2. The HEI provides diverse informal learning opportunities and experiences to stimulate the development of entrepreneurial mindsets and skills (Teaching2).
3. The HEI validates entrepreneurial learning outcomes which drives the design and execution of the entrepreneurial curriculum (Teaching3).
4. The HEI co-designs and delivers the curriculum with external stakeholders (Teaching4).
5. Results of entrepreneurship research are integrated into the entrepreneurial education offer (Teaching5).

Preparing and Supporting Entrepreneurs

1. The HEI increases awareness of the value of entrepreneurship and stimulates the entrepreneurial intentions of students, graduates and staff to start-up a business or venture (Support1).

2. The HEI supports its students, graduates and staff to move from idea generation to business creation (Support2).
3. Training is offered to assist students, graduates and staff in starting, running and growing a business (Support3).
4. The HEI facilitates access to financing for its entrepreneurs (Support4).
5. The HEI offers or facilitates access to business incubation (Support5).

Digital Transformation and Capability

1. The HEI fosters a digital culture as a mean for innovation and entrepreneurship (Digital1).
2. The digital infrastructure is planned, managed and continuously improved to align with the vision, mission and strategy of the innovative HEI (Digital2).
3. The HEI is committed to digital teaching, learning and assessment practices (Digital3).
4. Open science and innovation practices are widespread across the HEI (Digital4).
5. The HEI has a dynamic digital presence supporting all its activities (Digital5).

Knowledge Exchange and Collaboration

1. The HEI demonstrates active involvement in partnerships and relationships with a wide range of stakeholders (Collaboration1).
2. The HEI has strong links with incubators, science parks and other external initiatives (Collaboration2).
3. The HEI provides opportunities for staff and students to take part in innovative activities with business / the external environment (Collaboration3).
4. The HEI integrates research, education and industry (wider community) activities to exploit new knowledge (Collaboration4).

The Internationalised Institution

1. International perspectives are reflected in the HEI's approach to teaching (International1).
2. The international dimension is reflected in the HEI's approach to research (International2).

Measuring Impact

1. The HEI regularly assesses the impact of its entrepreneurial agenda (Impact1).
2. The HEI regularly assesses how its personnel and resources support its entrepreneurial agenda (Impact2).
3. The HEI regularly assesses entrepreneurial teaching and learning across the institution (Impact3).
4. The HEI regularly assesses the impact of start-up support (Impact4).
5. The HEI regularly assesses knowledge exchange and collaboration (Impact5).
6. The HEI regularly assesses the institution's international activities in relation to its entrepreneurial agenda (Impact5).

Annex 2. Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Participation	48	0	1	.67	.476
Awareness	48	0	1	.60	.494
Age	48	28	67	41.29	10.181
Leadership1	48	1	5	2.92	1.182
Leadership2	48	1	5	2.79	1.398
Leadership3	48	1	5	2.21	1.091
Leadership4	48	1	5	2.48	1.271
Leadership5	48	1	5	2.15	1.220

Organization1	48	1	5	2.10	1.057
Organization2	48	1	5	2.77	1.292
Organization3	48	1	5	2.35	1.229
Organization4	48	1	5	1.85	1.111
Organization5	48	1	5	1.98	1.101
Teaching1	48	1	5	2.52	1.220
Teaching2	48	1	5	2.17	1.078
Teaching3	48	1	5	2.10	1.134
Teaching4	48	1	5	2.67	1.226
Teaching5	48	1	5	2.42	1.127
Support1	48	1	5	2.67	1.098
Support2	48	1	5	2.27	1.180
Support3	48	1	5	2.27	1.216
Support4	48	1	5	1.69	1.014
Support5	48	1	5	1.94	1.156
Digital1	48	1	5	2.58	1.145
Digital2	48	1	5	2.56	1.270
Digital3	48	1	5	2.67	1.136
Digital4	48	1	5	2.33	1.294
Digital5	48	1	5	2.38	1.214
Collaboration1	48	1	5	3.02	1.041
Collaboration2	48	1	5	2.65	1.246
Collaboration3	48	1	5	2.69	1.188
Collaboration4	48	1	5	2.58	1.217
International1	48	1	5	2.67	1.059
International2	48	1	5	2.56	1.270
Impact1	48	1	5	2.19	1.161
Impact2	48	1	5	2.12	1.231
Impact3	48	1	5	2.13	1.265
Impact4	48	1	5	2.02	1.158
impact5	48	1	5	2.06	1.192
Impact6	48	1	5	2.15	1.130
Valid N (listwise)	48				