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**EVALUATION OF ENTREPRENEURIAL CAPACITY OF  
UNIVERSITIES - A CASE OF ESTONIA**

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*Abstract*

The growing societal expectations on universities emphasize not only the provision of academic education and research, but development of wide range of entrepreneurial capacities. The paper studies what kind of entrepreneurial activities are supported by the Estonian public universities? To what extent the availability of entrepreneurship education is supported? The purpose of the paper is to evaluate different entrepreneurial activities in Estonian universities. The study was carried out in three universities in 2016 as a part of the program “Systemic Development of Entrepreneurship Education Throughout All Educational Levels” implemented by Estonian Ministry of Education and Research and supported by European Social Fund. The HEInnovate self-assessment tool was used to evaluate the entrepreneurial activities in three areas: Entrepreneurial Teaching and Learning; Preparing and Supporting Entrepreneurs; Measurement of Impact. Data was collected with a questionnaire survey of academic and administrative staff. T-test and ANOVA are used to study the differences between various groups. The universities have provided most support to the development of entrepreneurial teaching and learning. The importance of preparing and supporting entrepreneurs and systematic measurement of the impact of university activities have not been acknowledged enough by universities under study. Entrepreneurship education has mostly been focused on providing learning opportunities and training, promoting awareness on entrepreneurship and curriculum development. Results show that Estonian universities have significantly different entrepreneurial capacities.

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**Keywords:** Entrepreneurial university, entrepreneurship education, HEInnovate, entrepreneurial teaching and learning



## 1. Introduction

Entrepreneurship drives economic growth and job creation, increases competitiveness and facilitates the development of new skills and capabilities, thus helps to adjust to the ongoing social and economic changes (EC 2013). Therefore, entrepreneurship and policies for facilitating entrepreneurship development have started to receive high level of political attention around the world (Barreneche-Garcia 2014; Westlund et al. 2014). In response to the institutional and legislative changes, and increased expectations towards universities to contribute to the economic growth, over the last decades, universities worldwide have increased their attention to commercialization of academic knowledge, collaboration with industry, development of incubators, accelerators, science parks etc. (Grimaldi et al. 2011). Universities are hubs of creativity, and with best minds of the world and with a culture that encourages creation of new knowledge and putting it into a practical use, universities have pivotal role in helping to solve the pressing problems the world faces today (Thorp, Goldberg, 2010).

Although entrepreneurship and innovation in the academic setting has been the subject of multidisciplinary research for more than 40 years, there has been a significant increase in the number of publications in the last decade (Schmitz et al. 2017). Various aspects of entrepreneurial activities of universities have been addressed by a growing body of theoretical and empirical research (e.g. Clark 1998; Etzkowitz, Webster 1998; Etzkowitz et al. 2000; Etzkowitz 2003, 2013; Rothaermel et al. 2007; Thorp, Goldberg 2010; Grimaldi et al. 2011; Kirby et al. 2011; Mainardes et al. 2011; Guerrero, Urbano 2012; Hannon 2013; Sam, van der Sijde 2014; Guerrero et al. 2014; Kalar, Antoncic, 2015; Guerrero et al. 2016; Schmitz et al. 2017, etc.). The present analysis focuses on the entrepreneurial activities in public universities in Estonia. Although the universities have acknowledged its importance, this topic has so far received very limited research attention in comparison with teaching and research activities, on the basis of which universities have been traditionally evaluated.

On the basis of a questionnaire survey in three Estonian public universities, the paper studies how do Estonian universities evaluate their present capacity for entrepreneurial teaching and learning; preparation and support for entrepreneurs; and measurement of impact of their entrepreneurial activities.

### 1.1. Literature review on entrepreneurial university

Universities find themselves in a rapidly changing environment, where they face expectations from government, employers, students and their parents to provide variety of solutions to economic challenges, environmental and societal problems; drive innovation and technology development; provide students with more than basic skills and knowledge to prepare them for an uncertain labour market (Hannon 2013). For the latter universities are responsible for designing learning environments and providing learning opportunities that stimulate entrepreneurial mindsets, thinking and action (Hannon 2013). Abreu and Grinevich (2013) define entrepreneurial activities as activities beyond the traditional research and academic activities, that are innovative and risky and can lead to financial rewards to the individual or the institution.

In the recent decades, university mission has expanded beyond teaching and research activities and includes regional economic and social development goals (Etzkowitz 2003). Etzkowitz (2013) sees the

academic involvement in technology transfer, venture creation and regional development as indicators for transformation from a research to an entrepreneurial university. The ongoing transformation is characterized by the universities increasing involvement in creating economic and social value, and emphasis on the knowledge transfer by more active commercialization of research, and patenting and licensing, spin off activities, and collaboration with industry etc. (Van Looy et al. 2004).

Clark (1998) defines entrepreneurial university as a university that seeks to innovate how it operates. It seeks to change its organizational character in order to improve its future prospects and to distinguish itself as a significant actor. An entrepreneurial university is oriented toward innovation and entrepreneurial culture (Kirby et al. 2011). Entrepreneurial universities are also characterized by entrepreneurial activities like the creation of new business ventures by faculty and students (Chrisman et al. 1995, Etzkowitz 2003, 2013; Jacob et al. 2003); search for new financial resources (Etzkowitz et al. 2000; Yokoyama 2006; Thorp, Goldberg 2010; Kirby et al. 2011; Mainardes et al. 2011).

The transformation into an entrepreneurial university is affected by interrelated environmental and internal factors (Guerrero, Urbano 2012). Formal and effective structures supporting technology and knowledge transfer and new venture creation; inclusion of entrepreneurial courses to curricula and focus on the development of entrepreneurial skills; ties to industry are factors that facilitate development of more entrepreneurial university (Kirby et al. 2011). Jacob et al. (2003) emphasize that entrepreneurial universities develop a wide range of infrastructural support mechanisms that foster entrepreneurship within their organizations, promotion of entrepreneurship courses, development of structures that promote student and faculty entrepreneurship. The informal factors include attitudes of faculty and students, presence of role models and existence or absence of incentives for nurturing entrepreneurship, that can hinder or encourage development of entrepreneurial university (Kirby et al. 2011). The internal factors refer to the different resources (human capital, finances, infrastructure etc.) and capabilities (networking abilities, alliances, status and prestige, localization) that are required for an entrepreneurial university (Guerrero, Urbano 2012).

A comparative analysis of entrepreneurship education in universities (Wilson 2008) shows the role of universities in economic development, which is a challenging mission especially in the context of development of entrepreneurship education, increasing the interdisciplinary collaboration and (project-based) learning, developing study programmes for building and supporting networks with business community (Gramescu, Bibu, 2015). This creates several challenges and opportunities for entrepreneurship education in balancing the needs of very different stakeholders, regulations, traditions and multiple responsibilities going beyond the basic, educational first mission. In this context, the universities which find solutions to innovate and overcome these challenges are the key actors for driving change in entrepreneurship education. The organisational structure has to support entrepreneurial development as well as provide the right tools for delivering education and training opportunities both internally and via the external environment (EC, OECD 2012). Besides of supporting the venture creation it is important also to support "intrapreneurs" in their career development or enterprising individuals on their pathway to becoming an entrepreneur. The decision to commit to entrepreneurship is not a single act but a process. For universities to be entrepreneurial they need to support the pathways taken by would-be entrepreneurs (staff and students) from ideas to market growth or into employment. This is not just a

process internal to the university but one where a pluralistic approach is necessary providing access to internal and external opportunities and expertise (EC, OECD 2012).

The external relationships with enterprises for knowledge exchange means a building and sustaining relationships with key partners and collaborators in achieving the full potential of a university, in entrepreneurship, in research, teaching and in other third mission activities (Charles, 2006; Etzkowitz, 2008; Arbo, Benneworth, 2008). The influence of the international environment on the entrepreneurial aspects of teaching, research, talent development, new opportunities and culture are of high importance.

A strong leadership and good governance are crucial in order to develop an entrepreneurial culture in universities. Many universities include the words „enterprise“ and „entrepreneurship“ in their mission statements but this needs to be more than a reference (Etzkowitz 2004; Kirby 2006; Bridgeman, 2007). The transition towards entrepreneurial university may be supported by the financial strategy, attracting and retaining the right people and incentivising entrepreneurial behaviour in individuals (Gibb 2005; Barrie 2007). In most cases the measurements for identifying whether the university is entrepreneurial found in the literature relate to spin-offs, IP and research outcomes rather than graduate entrepreneurship, retaining talent, local economic development or the impacts of the broader entrepreneurial strategy (EC, OECD 2012; Gibb 2012).

## **2. Problem Statement**

[The role of entrepreneurship and innovation in economic development and the need to support it through facilitating entrepreneurship education, and R&D collaboration between universities and industries has been well acknowledged at Estonian governmental level (e.g. MEAC 2013, MER 2014). However, the transformation of a university into an entrepreneurial university occurs at the university level, where the combination of external factors and internal resources and capabilities determine whether the university manages to develop its entrepreneurial capacity.

Transformation to an entrepreneurial university neither occurs rapidly nor as a result of solitary action, as it takes collective and organized effort of persons across the university over the years to change the institution (Clark 1998). The present research studies how do the staff of Estonian public universities evaluate the present state of their universities, including the formal and informal factors that support the development of an entrepreneurial universities.

## **3. Research Questions**

[The present paper focuses on the two questions:

- What kind of entrepreneurial activities are supported by the Estonian public universities?
- To what extent the availability of entrepreneurship education is supported?

## **4. Purpose of the Study**

[The aim of present research is to assess entrepreneurial capacity of Estonian universities. Entrepreneurial capacity can generally be viewed as a skill to identify, recognize and use opportunities

(Clarysse et al. 2011). In present research, entrepreneurial capacity is defined as the ability of the university to recognize and implement entrepreneurial activities. The present research focuses more narrowly on capacities of universities to carry out three types of entrepreneurial activities: entrepreneurial teaching and learning; support of entrepreneurs; and the measurement of impact of their entrepreneurial activities.

## 5. Research Methods

Faced with volatile economic environment, Estonian government has been paying more attention to entrepreneurship development through adoption of variety of policy measures aimed at creating a more entrepreneur-friendly business climate as well as promoting development of entrepreneurial skills, attitudes and knowledge in population. In 2016, Estonian Ministry of Education and Research implemented program “Systemic Development of Entrepreneurship Education Throughout All Educational Levels”, financed by the European Social Fund. The general aim of the program is to foster entrepreneurship education in Estonia across all levels of education (HTM, 2016).

As part of the entrepreneurship education program a questionnaire survey studying entrepreneurial capacities of universities was carried out in 2016. The present paper studies the survey results in three Estonian public universities: University of Tartu, Tallinn University of Technology and Estonian University of Life-Sciences. At present, Estonia has six public universities, and the three universities studied are accordingly, the 1st, 2nd and 4th largest public universities in Estonia in terms of the students.

For the survey, HEInnovate self-assessment tool was used to study the assessments of universities’ leadership, faculty and administration to the entrepreneurial capacities of their universities. HEInnovate is an initiative of the European Commission’s Directorate General for Education and Culture and the OECD Local Economic and Employment Development Programme (HEInnovate, 2017). HEInnovate self-assessment tool was developed for higher education institutions (HEIs) to provide them with a comprehensive framework to assess their different entrepreneurial and innovative activities. In HEInnovate self-assessment tool, respondents are asked to rate how much they agree with different statements about their institution in a Likert-type of five-point scale (5 being the highest score). The statements are divided into seven dimensions.

The present analysis concentrates on the three dimensions that were most of interest in relation to entrepreneurship education development in universities. The entrepreneurial teaching and learning refers not only to teaching and learning about entrepreneurship, but to innovative teaching methods, exposure to entrepreneurial experiences, development of skills and competencies for entrepreneurial mindset (HEInnovate Seven ... 2017). In the present study, this dimension contained 4 questions about formal and informal learning opportunities for the development of entrepreneurial mindset and skills, involvement of external stakeholders, integration of results of entrepreneurship research into the curriculum. The 6 questions covering the preparation and support of entrepreneurs studied how the universities support their students’ and staff’s entrepreneurial intentions and venture creation, access to financing, mentoring and business incubation. The measurement of impact dimension studied areas where the university might measure the impact of its entrepreneurial activities. The section consisted of 6 questions about whether the university regularly assesses the impact, personnel and resources, teaching and learning, support for

start-ups, collaboration and internationalization activities connected with its entrepreneurial agenda (HEInnovate Seven ... 2017).

The survey was conducted in the fall of 2016 and it had 212 respondents (Table 1).

**Table 1.** Descriptive statistics of the respondents (N=212)

<b>University</b>	<b>N</b>	<b>%</b>
Tallinn University of Technology	117	55
University of Tartu	44	21
Estonian University of Life-Sciences	51	24
<b>Field of science</b>	<b>N</b>	<b>%</b>
Social sciences and humanities	132	65
Natural sciences and technology	70	30
<b>Position</b>	<b>N</b>	<b>%</b>
Leadership	14	7,3
Faculty	138	71,9
Administration	40	20,8

Descriptive statistics and T-test and ANOVA are used to study the differences in assessments between the universities, field of science, position of the respondent.

## 6. Findings

On average, the respondents gave the highest scores to entrepreneurial teaching and learning (M=3,54; SD=1,04; Table 2). This dimension included statements about involvement of external partners in the development of the curriculum and the provision of diverse set of learning opportunities for the development of entrepreneurial mindset and skills that received the highest scores out of all questions studied in this analysis. In both questions over half of respondents agreed that those activities characterized their universities.

**Table 2.** Mean scores for entrepreneurial teaching and learning

	<b>Mean</b>	<b>SD</b>
<b>Entrepreneurial teaching and learning</b>	<b>3,54</b>	<b>1,04</b>
The HEI provides diverse formal and informal learning opportunities to develop entrepreneurial mindsets and skills	3,64	1,10
The HEI validates entrepreneurial learning outcomes which drives the design and execution of the entrepreneurial curriculum	3,43	1,23
The HEI co-designs and delivers the curriculum with external stakeholders	3,65	1,20
Results of entrepreneurship research are integrated into the entrepreneurial education offer	3,47	1,25

Out of all questions, the lowest score was given to the question about facilitating access to funding (Table 3) that was part of the section about preparing and supporting entrepreneurs. 46% of respondents assessed that their university does not have this kind of capacity. The main activity for preparing and

supporting entrepreneurs was raising awareness and stimulating entrepreneurial intentions of faculty and students to create a business (M=3,58; SD=1,12), followed by provision of training for starting and managing a business and facilitation of access to business incubation.

**Table 3.** Mean scores for preparing and supporting entrepreneurs

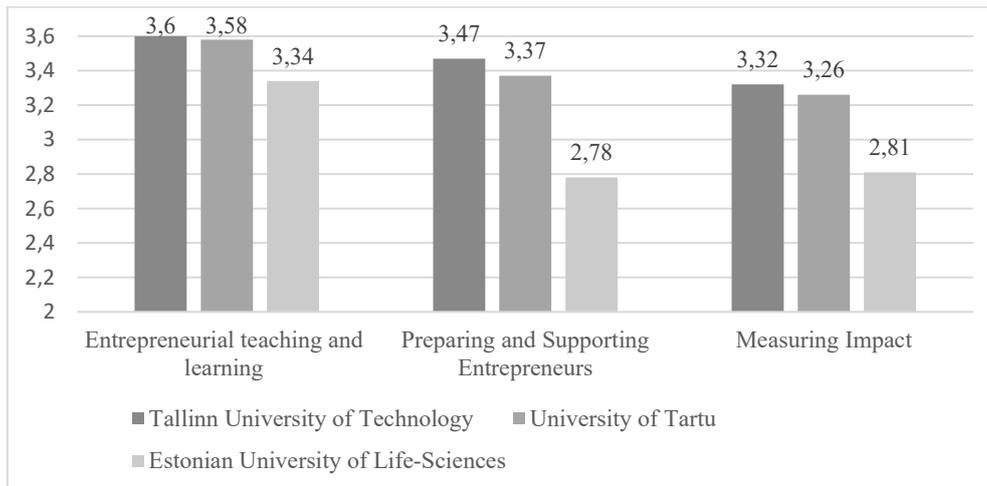
	Mean	SD
<b>Preparing and Supporting Entrepreneurs</b>	<b>3,29</b>	<b>1,04</b>
The HEI increases awareness of the value of entrepreneurship and stimulates the entrepreneurial intentions of students, graduates and staff to start-up a business or venture	3,58	1,12
The HEI supports its students, graduates and staff to move from idea generation to business creation	3,29	1,24
Training is offered to assist students, graduates and staff in starting, running and growing a business	3,55	1,23
Mentoring and other forms of personal development are offered by experienced individuals from academia or industry	3,33	1,24
The HEI facilitates access to financing for its entrepreneurs	2,70	1,38
The HEI offers or facilitates access to business incubation	3,48	1,29

The lowest scores were given in the section about measurement of impact (M=3,19; SD=1,15; Table 4). In comparison with other statements, respondents agreed less with statements about the university regularly assessing the personnel and resources that support its entrepreneurial activities, and about regular evaluation of knowledge exchange and collaboration. The highest mean score was given to the question about assessment of institutions international activities as over half of the respondents agreed that this characterizes their university.

**Table 4.** Mean scores for for measuring impact

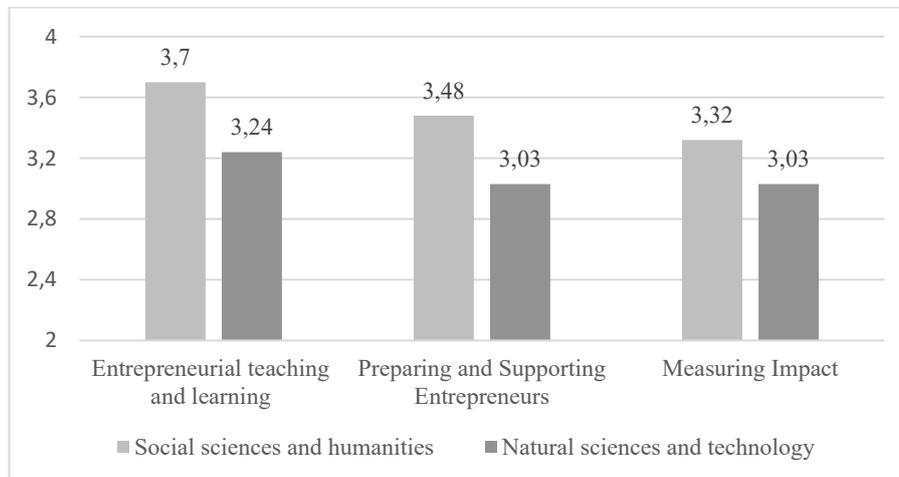
	Mean	SD
<b>Measuring Impact</b>	<b>3,19</b>	<b>1,15</b>
The HEI regularly assesses the impact of its entrepreneurial agenda	3,25	1,27
The HEI regularly assesses how its personnel and resources support its entrepreneurial agenda	2,95	1,37
The HEI regularly assesses entrepreneurial teaching and learning across the institution	3,26	1,27
The HEI regularly assesses the impact of start-up support	3,34	1,16
The HEI regularly assesses knowledge exchange and collaboration	2,98	1,30
The HEI regularly assesses the institution's international activities in relation to its entrepreneurial agenda	3,41	1,22

The activities connected with entrepreneurial teaching and learning and systematic measurement of the impact of university activities received lowest scores. The awareness of the staff on those activities that were not part of their everyday work was limited. The integration of entrepreneurial education into curricula of universities is proposed with the aim of increasing the entrepreneurial capacity of universities.



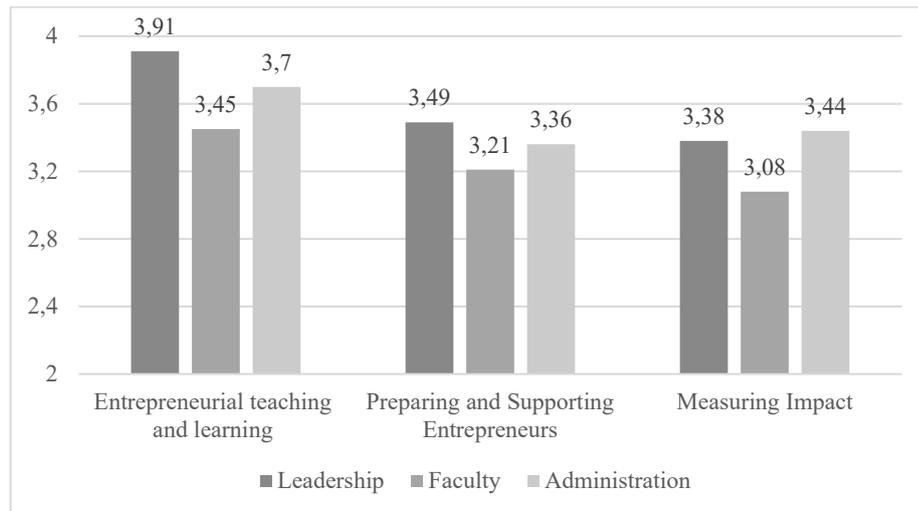
**Figure 1.** Mean scores to the three areas studied by the university of the respondents

ANOVA was used to study the differences in the scores of the universities (Fig.1). Respondents from Estonian University of Life-Sciences gave on average the lowest scores and respondents from Tallinn University of Technology the highest scores to the three dimensions studied. The difference was statistically significant in the assessments given to the preparation and support of entrepreneurs [ $F(2, 207)=8,5, p<.00$ ], and to measuring impact [ $F(2, 199)=3,4, p<.05$ ].



**Figure 2.** Mean scores to the three areas studied by the respondents' field of science

Respondents' field of science impacted their opinions on the entrepreneurial capacity of their university (Fig. 2). University employees, whose specialty was in social sciences or humanities gave higher scores to entrepreneurial teaching and learning capacities [in t-test  $t(201)=3,08, p<.05$ ] and to preparing and supporting entrepreneurs [ $t(199)=2,93, p<.05$ ]. In case of measuring the impact, the difference in mean scores was not statistically significant.



**Figure 3.** Mean scores to the three areas studied by the respondents' position

Respondents who were part of the faculty (professors, researchers, lectures etc) gave somewhat lower scores to the three dimensions studied (Fig. 3), however, in the ANOVA the differences between the groups were not statistically significant.]

## 7. Conclusion

[The self-assessment of entrepreneurial capacities of Estonian universities showed that at present the focus entrepreneurship education in Estonian universities has been on providing learning opportunities and training, raising awareness of entrepreneurship and on the curriculum development. In the areas studied, the universities have provided most support to the development of entrepreneurial teaching and learning. The importance of preparing and supporting entrepreneurs and the monitoring of progress have not been acknowledged enough by universities under study.

The present analysis concentrated on a fraction of possible entrepreneurial activities in the universities. However, it still indicated to several shortcomings that Estonian universities have to address.

Estonian universities display significantly different entrepreneurial capacities. The self-assessments of the faculty and administration show that the smallest university studied – Estonian University of Life-Sciences – has significantly lower capacity for supporting and preparing entrepreneurs as well as in regularly monitoring the entrepreneurial activities in the university. In comparison with Tallinn University of Technology and University of Tartu, Estonian University of Life-Sciences does not have its own start-up centre providing pre-incubation and support for students and faculty, although the business incubation services are available to the Estonian University of Life-Sciences' students at the University of Tartu start-up centre.

As previous research (Jacob et al. 2003; Kirby et al. 2011) has shown, the suitable infrastructure, sufficient resources and incentives are necessary for the development of entrepreneurial university. So, the lack of infrastructure and resources might explain the lower scores to a certain extent. However, Estonian University of Life-Sciences has also paid less attention to the assessment of the impact of different measures and to entrepreneurial teaching and learning, thus indicating that the importance of

those factors have not been acknowledged enough. In comparison with others, Tallinn University of Technology seems to be the forerunner in developing the entrepreneurial capacities.

The scores given in the section about measurement of the impact, demonstrated lack of acknowledgment of the role of necessary resources, incl. personnel. As emphasized by Kirby et al. (2011), the administration needs to be aware that personnel needs incentives for the development of entrepreneurial university. However, without analysing the present situation the university lacks information about what are the obstacles and challenges and how to use its resources in the most efficient way.

A study by Kalar and Antoncic (2015) in four European universities indicated that faculty in the natural sciences perceived their departments as more entrepreneurially orientated than social scientists. In the present analysis respondents in the fields of natural sciences and technology gave lower scores to the entrepreneurial capacities in Estonian universities. One explanation is that those working in social sciences, that include economics, are better informed about the development of entrepreneurship education as that is usually organized by the faculty of economics. However, the lower scores of the respondents involved in natural sciences and technology also indicate that their involvement in entrepreneurship education and development of universities' entrepreneurial capacities has so far been limited. This is a cause for concern, because the societal expectations are that technology and natural sciences should lead the creation of innovative solutions, knowledge transfer and commercialization.]

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