

Individual entrepreneurial orientation: comparison of business and STEM students

Individual
entrepreneurial
orientation

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Abstract

Purpose – The present study has been designed with the aim to determine whether there are differences in individual entrepreneurial orientation (IEO) between students, doing their major in business studies and the ones whose areas of study are science, technology, engineering, and mathematics (STEM).

Design/methodology/approach – The theoretical research methods comprise the review of secondary sources to build a sound theoretical framework for the research activities. The empirical research method is a survey in Latvia and Poland applying non-parametric inferential statistical methods as well as linear regression analysis to investigate which factors and components contribute to EO orientation development among different groups of students, and, thus, verify the research hypotheses.

Findings – The yielded research results demonstrate that there are significant differences between business and STEM students when they analyze their IEO. It turned out that STEM students obtain significantly lower scores for risk-taking and innovation but higher for proactiveness. Additionally, it was detected that the chosen field of study affects students' perception of educational support, thus, influencing their innovation, proactiveness, and risk propensity characteristics.

Research limitations/implications – In this research, the authors focused on exploring IEO among business and STEM students in Latvia and Poland, hence the findings cannot be one-to-one applied to other countries.

Practical implications – The topicality of the theme is determined by the fact that changes in external environment require higher educational institutions (HEIs) in Latvia and Poland to foster their entrepreneurial ecosystems and re-master study programs both for business and STEM students as well as conduct projects that include students, academic staff, and business representatives – the transformation is necessary to create positive attitude towards entrepreneurship among the students and help them to consider entrepreneurial career path later.

Originality/value – Factors and components which contribute to IEO development among different groups of students are under-researched in the Baltic countries, experiencing systemic transformation. The authors believe that universities can use the analysis of their students' IEO to allocate their resources in a better way, adjust curricula to the real needs of students and facilitate entrepreneurship.

Keywords Business education, STEM, Higher educational institution (HEI), Individual entrepreneurial orientation (IEO), Perceived educational support

Paper type Research paper

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Introduction

Nowadays organizations seek innovation to be competitive and sustainable on the market. They have become more technologically sophisticated; however, the cornerstone of the organization's success is its human resource abilities and skills (Aparicio *et al.*, 2016). Educational bodies adjust their curricula to prepare graduates for challenges in the volatile environment where entrepreneurship skills have become more demanded over the last decades. Many higher educational institutions (HEIs) foster their entrepreneurial ecosystems by re-mastering study programs or conducting projects that include students, academic staff, and business representatives (Manning, 2018; Ozoliņš *et al.*, 2018) to enforce cooperation between educational institutions and the industry. The steps are required to increase the value of human capital and consequently contribute to the growth of entrepreneurial companies, as researchers are unanimous - education, new firms, and business services are strongly correlated to each other and make an impact on the quality of the ecosystem (Stam and van de Ven, 2021). The initiatives supporting entrepreneurial efforts are especially valuable in developing countries where stakeholders need to focus on informing young people about start-up activities to ensure the innovation-driven type of entrepreneurial behavior (Iakovleva *et al.*, 2011). Researchers have a common opinion - entrepreneurial education plays a significant role in the formation of individual entrepreneurial orientation (IEO) – it was identified that innovativeness, risk-taking, and proactiveness are correlated with IEO (Bolton and Lane, 2012; Koe, 2016; Covin *et al.*, 2020; Santos *et al.*, 2020; Howard, 2020). Thus, the authors of the paper narrowed their focus to the competences that form IEO, considering these competences as a key factor in the formation and development of the individual business activity.

Describing the research setting, it should be noted that the development of entrepreneurship competence is assumed as a part of national policy in EU countries. Latvian national educational guidelines stress the importance of developing transversal competences, such as critical thinking, problem-solving, creativity, and entrepreneurialism (OECD, 2020). In Latvia, the young generation can improve their business competences by getting involved in Erasmus + youth exchange projects, mobility projects for youth workers, and projects promoting youth entrepreneurship, especially social entrepreneurship. For pupils in grades 4–12, a special training program was developed aiming to help the kids to acquire skills to establish and manage an enterprise, marketing, and product development. 22% of graduates of the program went in for business. In Latvia, the program is represented by Junior Achievement Latvia which holds a license of the Junior Achievement Worldwide program. It is a public organization and an expert on practical business education in Latvian schools. Annually, the organization provides practical business education programs to 60,000 pupils in Latvia, apart from it, the body ensures education programs to the teachers (EUYouthwiki, 2019). Apart from it, there is a few ongoing initiatives addressing entrepreneurship education of secondary or even primary level, such as the Innovative Business Motivation Program, supported by the Investment and Development Agency of Latvia, and Euroskills Students Competition, supported by the Ministry of Education of Latvia (EU Erasmus+ School Education Getaway, 2015).

The abovementioned has determined the topicality of the present research, which is determined by the fact that changes in the external environment require HEIs in Latvia and Poland to foster their entrepreneurial ecosystems and re-master study programs both for business and STEM students as well as to conduct projects that include students, academic staff, and business representatives to create a supportive environment for entrepreneurship and help students to consider entrepreneurial career path later.

It has also shaped the aim of the present study, namely impact of training the entrepreneurial competences, included in the scope of educational programs for business and STEM students, taking into account certain barriers in entrepreneurial mindset development

for STEM students, hence business students assumed as a basis for IEO assessment in the educational institution; evaluation of the perceived educational support is included in the study as well to measure students' perception about the supportive environment.

The significance of the study stems from the fact that the authors who explored entrepreneurship in Latvia and the Baltic countries in the post-Soviet era from 1996 to 2014, acknowledged that entrepreneurial activity adjusted relatively quickly in these countries, but at the same time entrepreneurial activity in Latvia "tends to increase owing to the fall in corruption and greater financial development." (Brás, 2020) Later researchers pointed out that gradual economic recovery between 2005 and 2015 encouraged "a fertile ground for examining how entrepreneurship is affected by the business cycle" that resulted in rising of early-stage entrepreneurial activities mostly by necessity-driven entrepreneurship (Krūmiņa and Paalzow, 2017).

As for the entrepreneurial behavior and attitude in Latvia in 2020, Global Entrepreneurship Monitor (GEM) reported that entrepreneurial activity in the year 2020 was steady compared to 2019; however, the COVID-19 pandemic has had a negative impact on a significant number of potential Latvian entrepreneurs (Global Entrepreneurship Monitor, 2021). In comparison to other European countries, Latvia was also reasonably fortunate on the economic front - just 36% of Latvian adults (18–64) stated that they had suffered a loss in household income during the last year; this rate was below that of both Croatia (40%) and Slovenia (45%), taken as reference points. At the same time, the rate of entrepreneurial intentions declined to 17% in 2020 in comparison to 23% in 2019. Of those Latvian adults stating that they intend to start a business within the next three years, 84% acknowledged that their intention was influenced by the pandemic, this rate is the highest in European economies. Given the results of the previous period, it is possible to state that many potential entrepreneurs from 2019 evaluated the new pandemic landscape and decided to postpone or decline their intentions to start a business soon. Latvia's Total early-stage Entrepreneurial Activity (TEA) rate remained without changes - 15.4% in 2019 and 15.6% in 2020. However, the rate may decrease in the future, as only a third of those involved in TEA indicated that they saw new opportunities due to the pandemic. At the same time, despite the challenges in educating people during the pandemic, Latvia's education-related scores increased. "Entrepreneurial education at school" improved from 4.2 in 2019 to 4.5 in 2020 and is considered in the top ten among economies (Global Entrepreneurship Monitor, 2021). The score for "Entrepreneurship education post-school" also improved from 4.6 in 2019 to 4.8 in 2020 and is positioned in 18th place in the GEM economies ranking. It is important to note that the "Ease of entry: market dynamics" score improved from 4.8 in 2019 to 5.2 in 2020 (23rd overall) while "Ease of entry: market burdens and regulations" score decreased significantly from 5.0 in 2019 to 3.4 in 2020 (38th place). Obviously, this could be explained by the fact that regulations, perhaps due to COVID-19, are restricting opportunities for new entrants.

In the discussion of the factors of economic development of the regions which experienced systemic transformation, a considerable amount of attention is devoted to individual competences, which is expressed in terms of individual abilities, skills, and individual characteristics (Wasilczuk, 2004). In Poland, the growth of scientific interest in individual competences began in the 1990s and was largely due to the transformation of the economy. The new-born market economy generated a demand for skilled specialists necessary for active participation in the various stages of transformation, including restructuring of the industry, the emergence of new types of enterprises, development of financial institutions, and the process of Poland's integration with the European Union (Byczkowska *et al.*, 2020). In 2002, a school subject named the basics of entrepreneurship was introduced to Polish secondary schools. According to the Regulation of the Department of National Education (Ministry of Science and Higher Education, 2002), secondary school students should learn entrepreneurial attitudes and prepare for active participation in socio-economic life. The basics of

entrepreneurship should help the schoolchildren to understand the mechanisms of the functioning of the market economy, prepare them for future professional careers, and help to develop communication skills.

Given this, the present research aims to bridge the gap and explore the output of changes in HEIs curricula in terms of entrepreneurship development HEIs by measuring entrepreneurial orientation among Latvian and Polish students. The theoretical basis for it and the methodology of research, followed by the results, are described in the next chapters. Next, a discussion of the results is presented. The paper culminates with conclusions of the study, its limitations, and a discussion of further research.

Research context description - entrepreneurship

Latvia

The entrepreneurship ecosystem in Latvia is shaped by three principal stakeholders: the government, the capital, and HEIs who aim to develop and support the entrepreneurial environment and start-up ecosystem due to the rising number of small enterprises in the national economy. As per the Central Statistical Bureau of Latvia, up to 94% of companies are registered as small and medium enterprises employing up to ten employees (Latvian Statistics bureau, 2019). The number is in line with the average European data, as Eurostat reported on 93% for 28 European countries in the year 2016 (Eurostat, 2021).

In accordance with the Latvian official Register of Enterprises, the number of newly registered companies has declined by 30% from 14,965 in 2014 to almost 10,443 in 2019, while the mirror trend is observed with the closed companies where the number of closed companies has multiplied by four during the same period, from 6,401 in 2014 to 23,881 in 2019 as it is seen on Figure 1 below (Figure 1) (Lursoft, 2019). These patterns could be explained by the reforms in Latvia’s financial sector, especially by the changes in domestic regulations caused by the Anti Money Laundering and Combating the Financing Terrorism International Monetary Fund’s policies; another factor is Latvia’s population decline – this limits labor market and gives rise to a long-term growth challenge (Emerging Europe, 2019). However, in total, the cumulative number of the enterprise register’s transactions increased approximately by 61% (from 21,366 in 2014 to 34,324 in 2019) which could be interpreted as one of the signs of an active entrepreneurial environment.

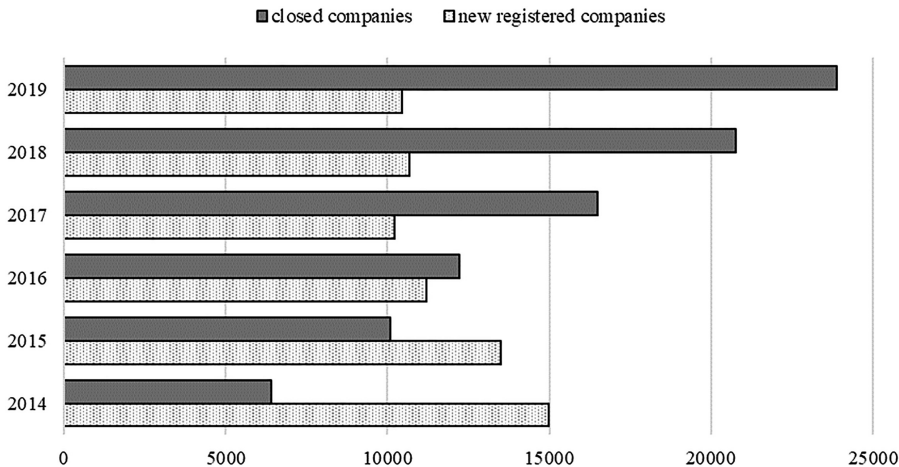


Figure 1.
New registered and
closed companies in
Latvia, in 2014–2019

Source(s): Lursoft database

During the last five years, the public in Latvia has become more educated and interested in entrepreneurial activities. In Q1 2019 Ministry of Economics reported about 346 established start-ups, businesses until their fifth year of existence, or older businesses that have a highly innovative product or service (Ministry of Economics, 2019a). The main industries represent digital technologies (27%), AI, Big data, and analysis (15%), sustainable solutions in energy, water, transport, farming, and production industries (10%), smart technologies, and robotics (9%). Other popular areas are FinTech, advertising, health, consumer electronics. Less popularity is observed in the industries of chemistry, video gaming, and digital technology application in health and science.

It should be noted that apart from the bodies mentioned above there are public bodies that shape the entrepreneurial environment in Latvia: The Ministry of Internal Affairs, the Ministry of Justice, the Ministry of Finance, and the Ministry of Education and Science. The last one significantly contributed towards entrepreneurial education implementation across the whole formal education process from kindergartens to universities and afterward. Junior Achievement Latvia programs are a common practice in primary and secondary schools, while in six universities, 21 HEIs, 19 colleges, and two foreign university branches entrepreneurship as a discipline is integrated into transdisciplinary curricula and in extracurricular activities (Ministry of Education and Science, 2020). Notably, academic-based business supporting organizations play a great role in entrepreneurial initiatives after students' graduation – there are 25 business incubators in different Latvian regions, 44% of them are based in HEIs. It should be also stressed that eight technology transfer centers are located within universities and 59 scientific institutions, of which 81% are private and the rest are financed by the state (Ministry of Economics, 2019b).

Poland

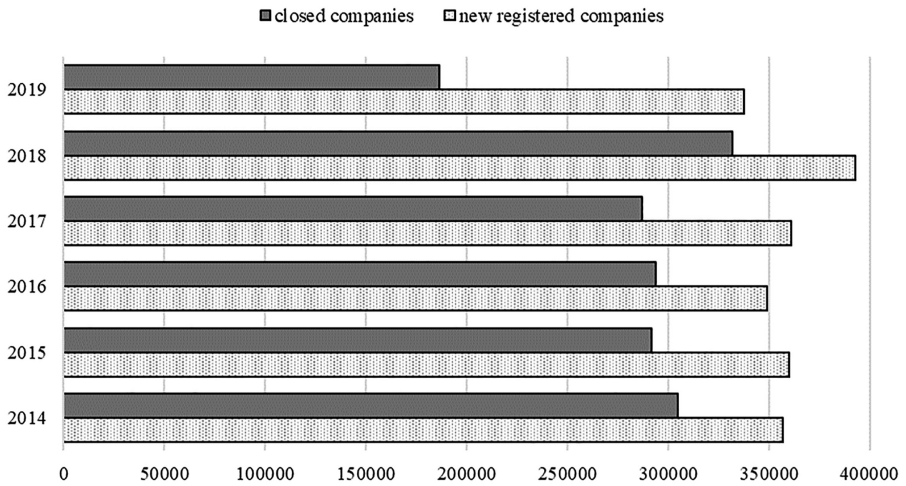
Entrepreneurship in the last few decades has grown considerably (Statistics Poland, 2021), after surviving a very difficult period of the Polish People's Republic, where at first the entrepreneurs were perceived as enemies, then barely tolerated, after transformation of the political system, appeared in the public debate. The breakthrough of 1989/1990 had a revolutionary course, mainly in the economic sphere (Huntington, 1991). Polish modern entrepreneurship, even though it arose and evolved in chaos, followed the rules of a democratizing country. Entrepreneurial people are viewed as very valuable and named as the foundation of the economy.

The number of firms in Poland in recent years has been growing and in 2018 exceeded 2.1 million (Statistics Poland, 2021). Most of them (99.8%) are micro, small, and medium-sized enterprises (SME). Among them, the most numerous group (96.7%; 2.08 million) are micro-enterprises. The share of small companies in the structure of Polish enterprises is 2.4% (52.7 thousand), medium – 0.7% (15.2 thousand), and large – only 0.2% (3.7 thousand).

Analysis of SME industry structure enterprises shows that the largest group are companies from the services sector (52.1%). Every fourth company operates in trade (23.6%), and every eighth in building and construction (14.1%). Every tenth enterprise from the SME sector (10.3%) operates in the production industry. The structure of large companies operating in Poland differs significantly from that of the SME sector. More than half (52.0%) of large companies run industrial activity. On the other hand, large companies operate in the services less frequently than SMEs (30.7%), trade (13.7%), and construction (3.6%).

According to data from the Polish Central Statistical Office register, 337,620 new enterprises were registered in 2019, while 186,401 were closed. Compared to the previous year, the number of newly-established enterprises decreased by 14%, while the number closed by 44%. Over the analyzed years, the number of newly-established enterprises was higher than the number of closed enterprises (Figure 2). This category is characterized by a tendency growth. The number of deregistered enterprises shows greater fluctuations.

Figure 2.
New registered and
closed companies in
Poland, in 2014–2019



Source(s): Statistics Poland database

The firms' sector produces nearly three-quarters of the Gross domestic product (GDP) (72.3%), small and medium-sized enterprises generate nearly every second zloty of GDP (49.1%). Micro-enterprises have the largest share in generating GDP and it is about 30.3% (Statistics Poland, 2021).

Analyzing Poland data for 2017 (Global Entrepreneurship Monitor, 2021), we can observe, those younger companies are more likely to use the newest technologies. In Poland, 3% of young companies declare the use of technologies available on the market up to a year, 13% – technologies available from one to five years, and 84% – technologies older than five years. In the group of mature companies, which are presented on the market at least 3.5 years, the percentages are respectively 1%, 4%, and 96%. There is a big gap between Polish companies and those from Western Europe, where on average 22% of young and 11% of mature firms operate on the technology available on the market from one to five years, and as many as 16% of young and 8% of mature adults use the newest technology.

The results of the analysis of the GEM report for 2018 (Global Entrepreneurship Monitor, 2021) indicate that Polish society presents a favorable attitude towards entrepreneurship, and most Poles see business opportunities in their environment. Currently, every tenth Pole declares a willingness to set up a company. Expert assessment of the conditions for the functioning of enterprises indicates a significant improvement in many areas, including cultural and social conditions, access to financing, or public policy in the field of entrepreneurship. Much remains to be done in the areas of entrepreneurship education in the higher education, vocational and lifelong learning phases, and the burden of entry costs (Statistics Poland, 2021).

Literature review

The authors are interested in whether the changes make an impact on the students who are doing their major in business studies contrary to the ones who have chosen technical and engineering fields of study. In the research on the role of competences in the effectiveness and quality of individuals' functioning in society, great importance is given to competences in the field of entrepreneurship (Taatila, 2010). In the scope of the recent studies, Reis *et al.* identified 98 entrepreneurial competences including the ability to learn with feedback, strategic

foresight, flexible emotional stability, business passion, leadership, communication, facing innovation challenges, market forecasting, self-confidence with optimism and ambition (Reis *et al.*, 2021). IEO is considered as a strong basis for creating new jobs, successfully entering the hired labor market, or building a professional career by business and STEM students (Klofsten *et al.*, 2019). Thus, the aim of this research is to determine whether there are differences in IEO between business and STEM students. The current research investigates which factors and components contribute to IEO development among different groups of students.

The entrepreneurial orientation (EO) framework was originally developed by Miller (1983), who introduced innovation, proactiveness, and risk-taking as measurable extents for entrepreneurship. Bird (1988) continued the thought declaring that an individual becoming an entrepreneur demonstrates certain entrepreneurial intentions. In later studies, researchers concluded that understanding a person's intention towards entrepreneurship is crucial for the increase in the number of entrepreneurs in the economy because the "entrepreneurs are made not born" (Boulton and Turner, 2005). Kollmann *et al.* (2007) proposed a framework explaining IEO and transferring EO construct to the individual level. The researchers revealed the following factors having an impact on the entrepreneurial individuals acting in distinct countries: 1) an individual striving for a high degree of autonomy in his/her life; 2) an individual's attitude towards innovation determines his/her entrepreneurial behavior; 3) propensity towards risk; 4) exploiting business opportunities, and 5) competitive aggressiveness or "need for achievement". The authors concluded that individuals are more likely to act entrepreneurially if they demonstrate a high degree of aptitude for the dimensions. Apart from that, the authors emphasized the importance of social context for entrepreneurial capabilities and EO facilitating, hence they named a hierarchy of cultural, political/legal, macro-economic, micro-economic layers as a precondition affecting "individual nucleus from the outside to the inside" (Kollmann *et al.*, 2007). Levenburg and Schwarz (2008) explored an interest in entrepreneurship among Indian and American business undergraduates and found that those with entrepreneurial intentions scored higher on creativeness, not risk-taking. Parnell *et al.* (2003) conducted research in the USA and China and found that the Need for Achievement is a driver for EO, and this is different between student groups. Researchers (Baughn *et al.*, 2006; Kollmann *et al.*, 2007) assumed that social, cultural, political, and economic context makes a significant impact on an individual propensity to entrepreneurship, hereafter to identify the impact of the layer to the undergraduate's perception IEO. Kollmann *et al.* (2007) state that high educational level is one of the factors in the environment that contributes to IEO development. As per the Global Entrepreneurship report (Autio, 2005), the educational level has an even more important impact on entrepreneurial decisions than economic factors. In accordance with the previous research of the authors, entrepreneurs from Finland, Latvia, and the Netherlands highly evaluated the importance of competence for Coping with Uncertainty, Ambiguity, and Risk as well as Motivation and Perseverance competence in conducting their regular entrepreneurial activities (Nikitina *et al.*, 2020). The research contributes to the previous research projects of the authors to find out what skills and competences are required by the modern labor market for current and future jobs, and the needs experienced in practice (Nikitina and Lapiņa, 2018, 2019). As was already mentioned, most of the studies in IEO with regards to social context measures is as the intersection of cultural, economic, and political contexts, hence the authors included in the questionnaire the questions to identify the role of HEI on IEO and recognize whether business education has more influence on EO than STEM education. For this reason, further research will be focused on the measurement of IEO components already proved by the other researchers: Proactiveness, Risk-taking, and Innovativeness.

Saiden (2017) argued that there is a link between entrepreneurship education and STEM training, and this relationship is reflected in the country's success and economic development in general. It is believed that sustainable growth and development come from people's ingenuity and innovativeness, and develop best practices, which only STEM can generate. Other researchers identified certain barriers in entrepreneurial mindset development for STEM students (Sitaridis and Kitsios, 2019). The barriers are summed up as lack of finance (Atieno, 2009; Schoof, 2006), unawareness of government programs supporting STEM students' start-ups (Maas and Herrington, 2006), and lack of training and education in the business field (Orford *et al.*, 2004; Schoof, 2006).

Nevertheless, it should be noted that while the great significance of STEM in economic development is undeniable, the neglect of other disciplines can create serious consequences for whole societies soon. Therefore, HEIs in both countries have made notable changes in curricula to train entrepreneurial competences in the scope of educational programs as business as STEM students and develop a vision of their own business as a possible future. Acknowledging that the obstacles mentioned above could distort the efforts carried out by the institutions in developing entrepreneurial orientation among different groups of students, assuming that business students might be treated as benchmarks. The purpose of this study is to analyze whether there are differences in IEO between business and STEM students. Consequently, the authors hypothesize that:

H1. IEO differ between business and STEM students.

However, the authors do not expect statistically significant differences between two analyzed countries in this respect, so the next hypotheses are as follows:

H2a. IEO do not differ between Latvian and Polish business students.

H2b. IEO do not differ between Latvian and Polish STEM students.

Given that people are unlikely to achieve the desired professional status based solely on natural abilities, different researchers investigate the extent to which environmental factors influence their attitudes (Byars-Winston and Fouad, 2008; Fayolle and Gailly, 2015). Previous research in entrepreneurship shows that individual input, like prior work experience, shapes people's perceptions of themselves, thereby supporting stronger presented attitudes connected with entrepreneurship (Liñán and Santos, 2007; Matthews and Moser, 1995; Miralles *et al.*, 2016). However, many of the contextual factors that influence IEO are still under-researched. Therefore, the authors believe that it is worth focusing on the perceived educational support, which can be considered as an environmental contribution. As learning about students' views on their current educational context is critical for understanding their IEO and potential differences between business and STEM students, the study employs Perceived Educational Support theory construct, proposed by Turker and Selcuk (2009).

Research by Souitaris *et al.*, (2007) showed that educational programs can positively influence entrepreneurial traits. Other researchers also point to a link between entrepreneurship education and entrepreneurial behavior (Liñán *et al.*, 2018; Pittaway and Cope, 2007). HEIs do not provide only entrepreneurship courses but go beyond that by supporting the entrepreneurial attitudes of students (Bell, 2019; Kassean *et al.*, 2015; Pinto Borges *et al.*, 2021). However, the sheer list of courses, workshops, or other forms of support available at the university, even a very long list, may not reflect the way students view and feel this support. Therefore, it is important to ask students how they regard educational support. Thus, the following hypothesis is proposed:

H3a. Perceived educational support has a positive impact on the students' IEO.

H3b. The impact of perceived educational support on the students' IEO differs between business and STEM students.

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Methodology

The goals set at the beginning of the research determined the research methodology, namely, use a quantitative approach as this study tries to seek empirical support for created hypotheses that have been developed based on the consistent review of the secondary sources. The empirical research method is a survey, with the data collection tool being a questionnaire that was constructed to measure IEO with the seven items that was applied by other researchers in different environments (Bolton and Lane, 2012; Koe, 2016; Howard, 2020). IEO components in Table 1 represents statements pertaining to innovativeness (items from N1 to N4), proactiveness (items N5 and N6), and risk-taking (item N7) that were included in the survey. Perceived Educational Support was measured with three items based on Turker and Selcuk (2009). The authors developed questions for the questionnaire to validate the findings in the samples of Latvian and Polish students doing their major in business and STEM undergraduates. The measures, their sources, their correspondence to the developed questionnaire and IEO components are presented in Table 1 below.

The research unfolded by investigating the measures in the sample of students doing their major in business and STEM undergraduates. The studies were performed as a part of the SEAS Project (Survey on Entrepreneurship Attitude of Students) which has been an ongoing project at the Faculty of Management and Economics at Gdansk University of Technology since 2008 while Riga Technical University (Faculty of Engineering Economics and Management) joined the project as a research partner in 2019 – the year 2019 edition, for the first time, became international. A sample of 1,416 students took part in the study. No data

Bolton and Lane (2012)	Koe (2016)	Howard (2020)	IEO components
I like to try new activities that are not typical but not risky	Try unusual activities	I like to try new activities that are not typical but not necessarily risky	(1) You are the one who uses new products
I prefer a strong emphasis on unique approach rather than revisiting old approaches	Prefer one-of-a-kind approach	I prefer a strong emphasis on unique approaches rather than revisiting approaches used before	(2) You prefer a strong emphasis on unique approaches not the used before
I prefer to try my own way when learning new things	Try my own unique way	I prefer to try my own way when learning new things	(3) When you learn new things, you prefer your unique way
I favour original approaches to problem solving not using methods others use	Favour experimentation and original approach	n/a	(4) You prefer original approach to problem solving
I like to take bold action by venturing into unknown	Take bold action by venturing into unknown	I like to take bold action by venturing into unknown	(5) You like to make bold decisions going into unknown actions
I am willing to invest a lot of resources on something that gives benefit	Invest resources on something that yield high return	I am willing to invest a lot of resources on something that might yield a high return	(6) When you need to decide with uncertainty you take a bold attitude to maximize profit
I usually act in anticipation of future changes	Act in anticipation of future problems	I usually act in anticipation of future changes	(7) You usually act in anticipation of future problems

Table 1.
The measures, their sources, their correspondence to the developed questionnaire and IEO components

was statistically input, and incomplete and invalid questionnaires were rejected. The sample population comprised first-year undergraduate students from two technical universities: Gdansk University of Technology (GUT), Poland ($n = 1,023$), and Riga Technical University (RTU), Latvia ($n = 393$). The difference in the sample size could be explained by the difference in population: in accordance with Eurostat (2021) in 2019 population in Poland was 37.97 million while in Latvia the number was less than two million. Regarding the Latvian sample, the survey was conducted among 1st year RTU students in the period from June 2019 till February 2020. In the research participated both students doing their major in business and students studying STEM disciplines, seven different fields of studies in total, the number of respondents were 393 or 3% of total RTU students. 40% of the sample are female students, 60% are male students; in accordance with RTU internal data, the proportion is very close to the RTU male and female students' ratio that has remained unchanged within the last three years: 33% of female and 67% of males from the total number of 13,653 RTU in 2017/2018 academic year to 14,272 students in 2019/2020. All the students who were present received a questionnaire in a paper version. All responses were anonymous and were analyzed in a summative way. Regarding the Polish sample, the survey was conducted online with the use of the Qualtrics tool during regular lectures and seminars among 1st-year students in the period from June 2019 till February 2020. In the research participated students doing their major in business and students studying STEM disciplines, altogether from seven different faculties. The sample comprised 1,023 students (approximately 8% of total GUT students), where 55% were male and 45% were female students, which is the ratio for the whole population of GUT students as well.

There were no specific titles for each section of the questionnaire. At the beginning of the survey, it was told to students that there are no right, or wrong answers and it was suggested to fill in the questionnaire in accordance with their best feelings. The survey was not a part of the exam and had no impact on the assessment of overall student performance. Students' agreement with the statements was measured by a five-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("definitely agree"). A categorical (Yes/No) scale was also used for some questions.

To guarantee semantic equivalence of all the measure items, which were originally in English, a back-translation procedure was adopted to produce Polish and Latvian versions of the measures. The authors with all the research partners first translated the English version of the measures into their native languages. Then the Polish and Latvian versions of the measures were independently back-translated into English by two professional translators in each language. The differences between the back-translated and the original versions were discussed by the bilingual experts and the authors, to evaluate their semantic accuracy. The final questionnaire required gender, nationality, university, a field of study, and included the measures to assess IEO and Perceived Educational Support. The preliminary screening of the measures' reliability was conducted among 200 GUT students.

The next move outlines the seven specific questions listed in the last column of Table 1 above were included in the questionnaire and were used to measure IEO, the first four items pertaining to Innovativeness (Cronbach's alpha (α) = 0.710), the next two items – to Risk-taking (α = 0.653), and the last, seventh item – to Proactiveness. The whole IEO scale has acceptable internal reliability (α = 0.718). The Perceived Educational Support was measured with three items of the questionnaire (α = 0.834). Then non-parametric inferential statistical methods and linear regression analysis were applied to verify the research hypotheses.

Results

Conducting the analysis determined the means, standard deviations, and intercorrelations of variables displayed in Table 2. The yielded data demonstrated that respondents of this study

rated themselves highest for Proactiveness, followed by Innovativeness and Risk-taking, and, in general, their IEO was at the average level. The results of correlation analysis indicated that all pairs of variables recorded a positive and significant correlation, except between Proactiveness and Perceived educational support.

Similar patterns were observed when separately analyzing Latvian and Polish samples (Table 3) with one exception – in the Latvian sample, there was a significant correlation between Proactiveness and Perceived educational support. In addition, it should be noted that correlations between Innovativeness and each of two variables – Proactiveness and Perceived educational support – were higher in the Latvian sample.

H1 postulating the differences in IEO scores of business and STEM students was tested with the help of Mann–Whitney Test. The results are shown in Table 4. As can be seen, this hypothesis was supported. The significant differences were also exposed in subscales of IEO – Innovativeness and Proactiveness.

Mann–Whitney test revealed that IEO scores were significantly lower in the group of STEM students (median (*Md*) = 3.29, *n* = 1,175) compared to the group of business students (*Md* = 3.43, *n* = 240) (Figure 3), with a small effect size $r = 0.06$.

Mann–Whitney test also indicated that STEM students were characterized by lower Innovativeness scores and higher Proactiveness scores (Figure 4).

H2a and H2b were tested in the same way. As can be seen in Table 5, both hypotheses were supported. There was no significant effect of the field of study and the country on IEO scores.

H3a proposed the positive impact of Perceived educational support on IEO and was tested with linear regression. Preliminary data screening did not suggest substantial problems with assumptions of normality and linearity. The overall regression was statistically significant, adjusted $R^2 = 0.902$, $F(1, 1406) = 12906.373$, $p < 0.001$. Therefore, H3a was supported. The Perceived educational support predicts the IEO, using the following equation, $IEO = 1.058 \times$ Perceived educational support.

A linear multiple regression analysis was conducted to test H3b that Perceived educational support interact with Field of study to predict IEO. To avoid potentially problematic high multicollinearity, the independent variables were standardized. Additionally, an interaction term between Field of study and Perceived educational support was created by multiplying the standardized scores of both variables. So, three independent variables were included in the model.

The overall regression was statistically significant, adjusted $R^2 = 0.082$, $F(3, 1404) = 42.832$, $p < 0.001$. There was a significant Field of study $\times$ Perceived educational support interaction, $\beta = -0.325$, $p < 0.001$. There were also significant effects for Field of study, $\beta = 0.152$, $p < 0.001$, but not significant effect for Perceived educational support. Thus, H3b was supported. The impact of Perceived educational support on IEO is moderated by students' field of study.

As can be seen in Figure 5, IEO of business students was accompanied by higher Perceived educational support. The lower IEO and Perceived educational support were more probable for STEM students.

	Mean	SD	(1)	(2)	(3)	(4)
(1) IEO	3.34	0.55				
(2) Innovativeness	3.32	0.66	0.88**			
(3) Risk taking	3.12	0.81	0.69**	0.36**		
(4) Proactiveness	3.84	0.85	0.38**	0.19**	0.12**	
(5) Perceived educational support	2.90	0.90	0.13**	0.145**	0.10**	−0.05

Note(s): ** Correlation is significant at the 0.01 level (2-tailed)

Table 2.
Means, standard
deviations and
Spearman's rank
correlation coefficients
of study variables (for
the whole sample)

Table 3.
Means, standard
deviations and
Spearman's rank
correlation coefficients
of study variables (for
subsamples – Latvian
and Polish)

	Latvian sample (LV)			Polish sample (POL)		
	Mean	SD	(1) (2) (3)	Mean	SD	(1) (2) (3)
(1) IEO	3.34	0.52		3.34	0.56	
(2) Innovativeness	3.42	0.61	0.87**	3.29	0.68	0.89**
(3) Risk taking	3.12	0.77	0.69**	3.12	0.83	0.69**
(4) Proactiveness	3.46	0.85	0.52**	3.98	0.81	0.36**
(5) Perceived educational support	3.23	0.81	0.23**	2.78	0.90	0.19**
Note(s):			0.22**	0.15**	0.08**	0.10**
** Correlation is significant at the 0.01 level (2-tailed)			0.11*			0.10**
* Correlation is significant at the 0.05 level (2-tailed)						0.03

Discussion

The overall objective of this paper was to observe if there any differences between business and STEM students when we compare their IEO. The theory concept of IEO was tested through a survey of 393 Latvian and 1,023 Polish University students where we examined the relationship between IEO score and their choice of a field of study. Such measurements are important for the success of students who are or who can become entrepreneurial students, employees, or even future entrepreneurs. Even if they do not want to start their own businesses, it is crucial to make them aware of how entrepreneurial attitudes, such as innovativeness, risk-taking and proactiveness are important in everyday life, and that they are favorable in almost every sphere of life, personal and professional. For example, innovativeness or passion for inventing is assumed as a resource in complex problem-solving knowledge work (Toth *et al.*, 2021). Analysis like this is also relevant for teachers, who want to enhance their students' entrepreneurial qualities and employers looking for entrepreneurial

	Individual entrepreneurial orientation	Innovativeness	Risk- taking	Proactiveness	Perceived educational support
Mann– Whitney <i>U</i>	127279.500	123831.000	130054.000	128221.000	76709.000
Wilcoxon <i>W</i>	818179.500	812382.000	812750.000	157141.000	759405.000
<i>Z</i>	–2.386	–2.960	–1.693	–2.327	–11.053
<i>p</i>	0.017	0.003	0.091	0.020	0.000

Table 4.
Mann–Whitney Test
statistics (grouping
variable: Field of study)

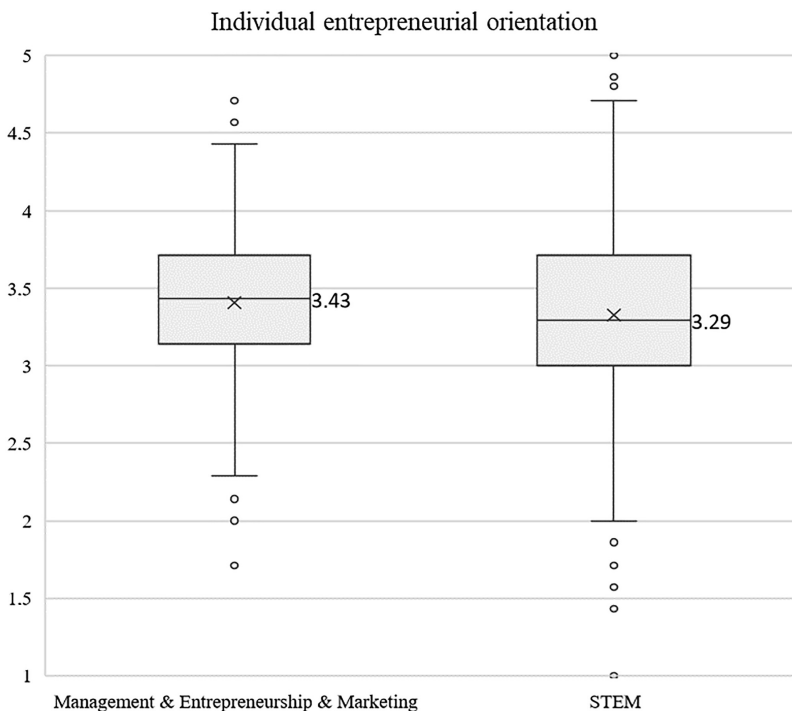


Figure 3.
Comparative boxplots
of IEO for subsamples
“Management and
Entrepreneurship and
Marketing”
and “STEM”

employees. The study also contributes to the previous findings where students with a high level of IEO may better assimilate the opinions of the closer environment even if they are negative – the disclosure suggest that understanding about closer environment having an influence on entrepreneurial intentions and they also influence the IEO (Martins and Perez, 2020), that is why support from university is so important.

Many of the entrepreneurship researchers have focused on the concept of IEO in supporting entrepreneurial intentions (Awang *et al.*, 2016; Frunzaru and Cismaru, 2018; Koe, 2016; Rahim *et al.*, 2018). Many of them assessed the measures of reliability and validity of the IEO construct and its dimensions, without considering other predecessors influencing the IEO dimensions, like the field of study or perceived educational support. Therefore, there is a call (Bolton and Lane, 2012; Gupta *et al.*, 2016) for further research to investigate IEO in the presence of other predecessors in different contexts. Based on the suggestions of entrepreneurship researchers, this study adopted a different approach for analysis, studying IEO influenced by contextual predecessor in the university setting which is perceived educational support, searching for differences between business and STEM students in the insufficiently researched context of central and eastern European countries.

Figure 4. Comparative boxplots of IEO subscales and Perceived educational support for subsamples “Management and Entrepreneurship and Marketing” and “STEM”

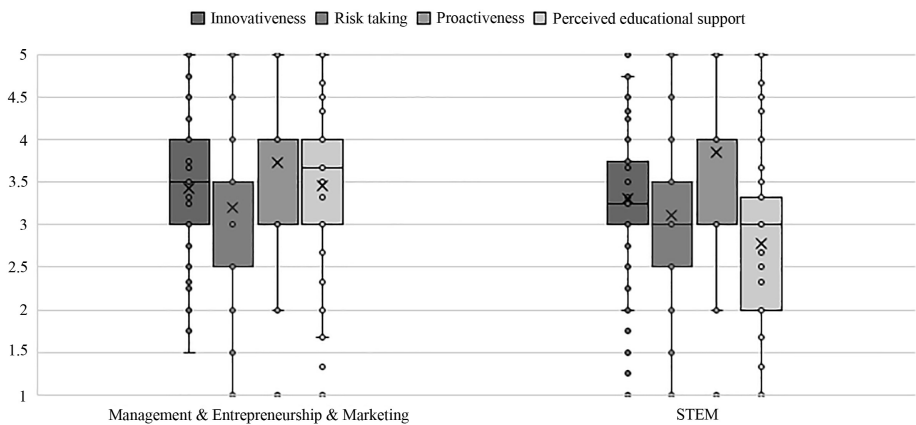


Table 5. Mann–Whitney Test statistics (grouping variable: Country)

Field of study		Individual entrepreneurial orientation	Innovativeness	Risk-taking	Proactiveness	Perceived educational support
MEM	Mann–Whitney <i>U</i>	6371.500	6564.000	6518.500	4806.500	5800.000
	Wilcoxon <i>W</i>	10836.500	17295.000	10889.500	9271.500	10171.000
	<i>Z</i>	–0.938	–0.572	–0.529	–4.285	–1.925
	<i>p</i>	0.348	0.567	0.597	0.000	0.054
STEM	Mann–Whitney <i>U</i>	129194.500	115040.500	127109.000	84994.500	82816.000
	Wilcoxon <i>W</i>	514197.500	500043.500	169887.000	128950.500	466942.000
	<i>Z</i>	–0.293	–2.949	–0.160	–9.619	–9.090
	<i>p</i>	0.769	0.003	0.873	0.000	0.000

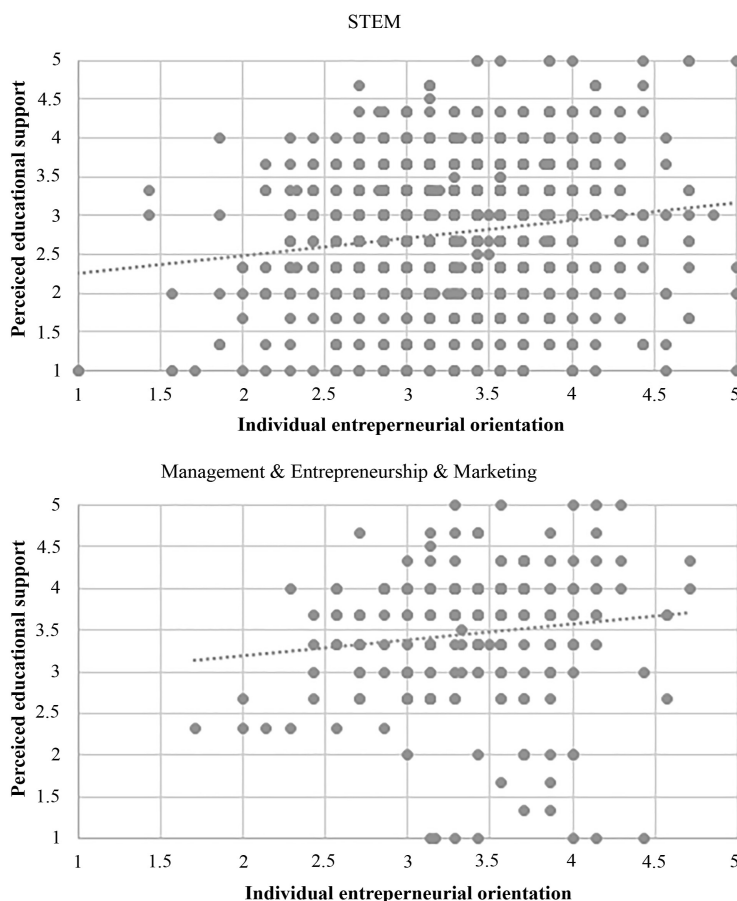


Figure 5.
Comparative
scatterplots of IEO and
Perceived educational
support for
subsamples
“Management and
Entrepreneurship and
Marketing”
and “STEM”

According to the results of this study, there are significant differences between business and STEM students when we analyze their IEO. It turned out that STEM students obtain significantly lower scores for innovativeness but higher for proactiveness. The results also confirm that the chosen field of study affects the perception of educational support, thus influencing their innovativeness, proactiveness, and risk propensity. The finding about innovativeness is interestingly interplaying with Kropp *et al.* disclosure that risk taking and proactiveness are both important in establishing the international entrepreneurial business venture, but innovativeness is not (Kropp *et al.*, 2008).

A significant positive relationship between perceived educational support and IEO suggests that universities should seek to become more supportive. They should consider their offered support in the form of not only the list of courses offered, their quantity and content but above all – their quality. They should constantly make sure that students know about this support and that they can always take advantage of it. The finding of significantly lower scores for innovativeness as well as higher in proactiveness in the sample of students doing their major in engineering disciplines contrary to the business students – this brings an important insight for the HEIs and is considered by the authors as input for a critical assessment of the educational programs. A critical role of HEI was already stressed by other

researchers concluding that a supportive university environment is compulsory “to nurture entrepreneurial competences and boost their confidence” (Sahoo and Panda, 2019). Hueso *et al.* suggested research options of design of educational interventions to affect personal values and personal values in general in entrepreneurship education as the values are predecessors in the formation of entrepreneurial intentions (Hueso *et al.*, 2021). It is possible to conclude that STEM students are more confident in their studies and are inclined to collaborate and pursue a start-up in the fields of their expertise that enlightens again the role of HEIs in the collaboration with industry and triple helix model of innovation (Etzkowitz and Leydesdorff, 1995). What is more, when a company is founded, it has the resources to start up, it has a business idea and first customers. At some point, the funds run out and there comes a point when entrepreneurs need to acquire new customers, formulate a new strategy, change their portfolio, or take a risk and find new finance sources. Those who do not take care of it in the advance face a difficult decision. For many companies, it is too late to make any moves, but higher IEO can significantly help to avoid such a situation.

Interestingly, the collected data provided new insight into students’ entrepreneurial intentions in the context of global entrepreneurship research. In accordance with the latest Global University Entrepreneurial Spirit Students’ Survey (GUESS), 32.3% of the students plan to be an entrepreneur within 5 years after completion of studies, however in Latvia, an intention to start their own business in 3 years was reported by 18.7% of the respondents and in Poland – by 8.4%, that is significantly lower than average in the world. In addition, if on a global level each 10th student already owns and runs their own business, i.e. act as an active entrepreneur, the numbers are notable lower for Latvia and Poland where only 3% and 1.3% of students runs their businesses. The latest finding is especially surprising as GUESS reports on 7.2% of active entrepreneurs among the Polish students, but the sample collected in Gdansk University of Technology enlighten different perspective on the previous study (GUESS, 2021). At the same time, Latvian and Polish students, like many other students in the world, prefer organizational employment directly after university (30% in Latvia and 22% in Poland) and many do not exclude an option to change to an entrepreneurial career path later (38% and 59% accordingly).

It is worth mentioning that contrary to other Baltic countries, Latvia was not researched in the scope of the global data collection conducted by the Swiss Institute of Small Business and Entrepreneurs, hence the particular SEAS research provides new and original insights on students’ entrepreneurship in the countries recently less researched.

Conclusions

Implications

The yielded research results suggest that universities can use the analysis of their students’ IEO to allocate their resources, adjust curricula to the real needs of students in a better way because undeniably future societies need entrepreneurial people. To motivate the students and train the required skills, HEI might be interested in a tool to reallocate their resources, update curricula, and systematic education and training programs (Sahoo and Panda, 2019). Changes in the educational process, such as reflecting thinking practice to enhance judgmental abilities, are necessary to create a bridge between theory and practice in venture creation programs that take an experience-based pedagogical approach (Hägg, 2021). The level of competences developed through the educational process at the university is an intangible resource of the university, and one of the tools to compete for new candidates (Klofsten *et al.*, 2019). The dissemination of information about their scope and level can be stimulated by candidates for studies, students, graduates, other HEIs, accreditation committees, local authorities, employers, and non-governmental organizations as external stakeholders of universities. Based on the diagnosis of IEO, decision-makers could organize

entrepreneurial education and training programs more effectively to motivate students from different fields of studies, especially those from STEM, to strengthen entrepreneurial skills. Diagnosing IEO could become a compulsory element in the construction and implementation of the educational process at HEIs and could be the basis for potential employees to be employed or to create a start-up. Taatila and Down (2012) argued that diagnosing IEO levels in students could help create a more enriching educational process at the universities by developing an activity offered for different students based on the IEO result. Students with a lower IEO score should be provided with entrepreneurial classes which would focus on strengthening entrepreneurial abilities such as innovativeness, proactiveness, and risk-taking (Taatila and Down, 2012). As it was already identified by other researchers, the above-mentioned abilities are assumed as one of the dimensions of an entrepreneurial mindset (Krueger, 2015). Development of the growth mindset or entrepreneurial cognition requires new learning and teaching methods (Dweck, 2012; Krueger and Day, 2010) to do not teach entrepreneurship, but grow entrepreneurial brains (Krueger and Day, 2010).

Efficiency and satisfaction at work, not only for entrepreneurs but also for employees, depend, among other things, on the ability to operate in a completely new, rapidly changing reality. During the pandemic, the needs in the areas of soft skills resonated very strongly, i.e. the ability to use one's own potential, perceiving the opportunities that individuals have around them or the ability to navigate in changing, complex and uncertain times effectively and efficiently. Being aware of one's potential in the form of IEO, companies can respond much better to what the future holds for them. Growing awareness of students and academic teachers about the role of IEO, supported during studies in building the graduate's competitiveness in the labor market and quality in functioning in adult life, may cause that this university learning outcome has a great chance for a real, lasting functioning in the philosophy of education of universities in Latvia, Poland, and other countries, and will sign up permanently in the minds of decision-makers. The project researchers' team is interested in continuous improvement and developing the entrepreneurship training methodology for transdisciplinary students to enhance entrepreneurial competence dissemination. Observations made in the context of the study help HEI to reflect on entrepreneurial education and improve methodology applied – as entrepreneurship is not necessarily a new venture set-up, but acquisition of entrepreneurial competences, hence entrepreneurship education design tools included, for example, in handbook and method that was developed by "European Entrepreneurship Training Community" (Priem *et al.*, 2021).

Limitations

In this research, the authors focused on exploring IEO among business and STEM students in Latvia and Poland, hence the findings cannot be one-to-one applied to other countries. The paper is also limited to the research of IEO index measurement among 1st-year students.

The authors of the paper are aware that we research students at the end of their first year at the university and they may not have the knowledge of possible forms of support from the university. Apart from this, as was mentioned above, IEO might be changed over time due to some external and internal factors.

Another drawback is that the data are cross-sectional and therefore it is not possible to establish causality. Students' IEO may be influenced over time by other factors such as entrepreneurial experience (Kasouf *et al.*, 2015).

Further research

The topics for further research might comprise IEO change over time, hence future research could conduct longitudinal tracking studies to receive data from different time points. Therefore, the authors plan to proceed with further research by asking the same questions to

the same students in their final semester to especially examine if their level of IEO and perceived entrepreneurial education support results have changed.

The research design might also be attributed to comparative analysis of the driving forces of entrepreneurship in diverse contexts and countries, for example, the Baltic States, Nordic countries, and post-Soviet countries.

References

- Aparicio, S., Urbano, D. and Audretsch, D. (2016), "Institutional factors, opportunity entrepreneurship and economic growth: panel data evidence", *Technological Forecasting and Social Change*, Vol. 102, pp. 45-61, doi: [10.1016/j.techfore.2015.04.006](https://doi.org/10.1016/j.techfore.2015.04.006).
- Atieno, R. (2009), "Linkages, access to finance and the performance of small-scale enterprises in Kenya", *Accounting and Business Research*, Vol. 3 No. 1, pp. 33-48.
- Autio, E. (2005), *Global Entrepreneurship Monitor (Gem) - 2005 Report on High-Expectation Entrepreneurship*, University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship, available at: <https://ssrn.com/abstract=1509966>.
- Awang, A., Amran, S., Nor, M.N., Ibrahim, I.I., Fazly, M. and Razali, M. (2016), "Individual entrepreneurial orientation impact on entrepreneurial intention: intervening effect of PBC and subjective norm", *Journal of Entrepreneurship, Business and Economics*, Vol. 4 No. 2, pp. 94-129, available at: <http://www.scientificia.com/index.php/JEBE/article/view/45>.
- Baughn, C.C., Cao, J.S.R., Le, L.T.M., Lim, V.A. and Neupert, K.E. (2006), "Normative, social and cognitive predictors of entrepreneurial interest in China, Vietnam and the Philippines", *Journal of Developmental Entrepreneurship (JDE)*, Vol. 11 No. 1, pp. 57-77, doi: [10.1142/S108494670600026X](https://doi.org/10.1142/S108494670600026X).
- Bell, R. (2019), "Predicting entrepreneurial intention across the university", *Education + Training*, Vol. 61 Nos 7/8, pp. 815-831, doi: [10.1108/ET-05-2018-0117](https://doi.org/10.1108/ET-05-2018-0117).
- Bird, B. (1988), "Implementing entrepreneurial ideas: the case for intentions", *Academy of Management Review*, Vol. 13, pp. 442-453, doi: [10.5465/amr.1988.4306970](https://doi.org/10.5465/amr.1988.4306970).
- Bolton, D.L. and Lane, M.D. (2012), "Individual entrepreneurial orientation: development of a measurement instrument", *Education + Training*, Vol. 54 Nos 2/3, pp. 219-233, doi: [10.1108/00400911211210314](https://doi.org/10.1108/00400911211210314).
- Boulton, C. and Turner, P. (2005), *Mastering Business in Asia: Entrepreneurship*, John Wiley & Sons, Singapore.
- Brás, G.R. (2020), "Determinants of entrepreneurship in Latvia and Baltic countries in general: an empirical approach", *European J. International Management*, Vol. 14 No. 5, doi: [10.1504/EJIM.2020.109818](https://doi.org/10.1504/EJIM.2020.109818).
- Byars-Winston, A.M. and Fouad, N.A. (2008), "Math and science social cognitive variables in college students: contributions of contextual factors in predicting goals", *Journal of Career Assessment*, Vol. 16 No. 4, pp. 425-440, doi: [10.1177/1069072708318901](https://doi.org/10.1177/1069072708318901).
- Byczkowska, M., Poplavska, Z., Majzel, A., Zięba, K., Komarynets, S. and Stukalina, Y. (2020), *Entrepreneurship Today: Selected Aspects*, Politechnika Gdańska, Gdansk.
- Covin, J.G., Rigtering, J.C., Hughes, M., Kraus, S., Cheng, C.F. and Bouncken, R.B. (2020), "Individual and team entrepreneurial orientation: scale development and configurations for success", *Journal of Business Research*, Vol. 112, pp. 1-12, doi: [10.1016/j.jbusres.2020.02.023](https://doi.org/10.1016/j.jbusres.2020.02.023).
- Dweck, C.S. (2012), *Mindset: How You Can Fulfil Your Potential*, Robinson, London.
- Emerging Europe (2019), *IMF: Latvian Economy Increasingly Resilient*, Emerging Europe, available at: <https://emerging-europe.com/news/imf-latvian-economy-increasingly-resilient/> (accessed 15 April 2020).
- Etzkowitz, H. and Leydesdorff, L. (1995), "The triple helix – university-industry-government relations: a laboratory for knowledge based economic development", *EASST Review*, Vol. 14 No. 1, pp. 14-19, available at: <https://ssrn.com/abstract=2480085>.

- EU Erasmus+ School Education Getaway (2015), *Entrepreneurship Education in Latvia*, EU Erasmus+ School Education Getaway, available at: https://www.schooleducationgateway.eu/downloads/entrepreneurship/Latvia_151022.pdf (accessed 23 May 2021).
- Eurostat (2021), available at: <https://ec.europa.eu/eurostat/data/database> (accessed 23 May 2021).
- EUYouthwiki (2019), *Youth Policy in Latvia*, EUYouthwiki, available at: <https://national-policies.eacea.ec.europa.eu/youthwiki/chapters/latvia/38-development-of-entrepreneurship-competence> (accessed 23 May 2021).
- Fayolle, A. and Gailly, B. (2015), "The impact of entrepreneurship education on entrepreneurial attitudes and intention: hysteresis and persistence", *Journal of Small Business Management*, Vol. 53 No. 1, pp. 75-93.
- Frunzaru, V. and Cismaru, D.-M. (2018), "The impact of individual entrepreneurial orientation and education on generation Z's intention towards entrepreneurship", *Kybernetes*, Vol. 50 No. 7, pp. 1969-1981, doi: [10.1108/K-05-2018-0272](https://doi.org/10.1108/K-05-2018-0272).
- Global Entrepreneurship Monitor (2021), available at: <https://www.gemconsortium.org/> (accessed 23 May 2021).
- GUESSS Global Report (2021), available at: <https://www.guesssurvey.org/> (accessed 18 November 2021).
- Gupta, V.K., Ibrahim, S., Guo, C., Grace and Markin, E. (2016), "Entrepreneurship research in management and organizational studies: a contribution-based assessment of the literature", *New England Journal of Entrepreneurship*, Vol. 19 No. 1, pp. 70-87, doi: [10.1108/NEJE-19-01-2016-B005](https://doi.org/10.1108/NEJE-19-01-2016-B005).
- Hägg, G. (2021), "The entrepreneurial diary – a reflective learning activity to enhance the judgmental abilities of student entrepreneurs", *International Journal of Entrepreneurial Behavior and Research*, Vol. 27 No. 5, pp. 1142-1165, doi: [10.1108/IJEBR-07-2020-0496](https://doi.org/10.1108/IJEBR-07-2020-0496).
- Howard, M.C. (2020), "Using the HEXACO-100 to measure individual entrepreneurial orientation: introducing the HEXACO-IEO", *Journal of Business Venturing Insights*, Vol. 13, e00163, doi: [10.1016/j.jbvi.2020.e00163](https://doi.org/10.1016/j.jbvi.2020.e00163).
- Hueso, J.A., Jaén, I. and Liñán, F. (2021), "From personal values to entrepreneurial intention: a systematic literature review", *International Journal of Entrepreneurial Behavior and Research*, Vol. 27 No. 1, pp. 205-230, doi: [10.1108/IJEBR-06-2020-0383](https://doi.org/10.1108/IJEBR-06-2020-0383).
- Huntington, S.P. (1991), "Democracy's third wave", *Journal of Democracy*, Vol. 2 No. 2, pp. 12-34, doi: [10.1353/jod.1991.0016](https://doi.org/10.1353/jod.1991.0016).
- Iakovleva, T., Kolvereid, L. and Stephan, U. (2011), "Entrepreneurial intentions in developing and developed countries", *Education + Training*, Vol. 53 No. 5, pp. 353-370, doi: [10.1108/004009111111147686](https://doi.org/10.1108/004009111111147686).
- Kasouf, C.J., Morrish, S.C. and Miles, M.P. (2015), "The moderating role of explanatory style between experience and entrepreneurial self-efficacy", *Int Entrep Manag J*, Vol. 11, pp. 1-17, doi: [10.1007/s11365-013-0275-2](https://doi.org/10.1007/s11365-013-0275-2).
- Kassean, H., Vanevenhoven, J., Liguori, E. and Winkel, D.E. (2015), "Entrepreneurship education: a need for reflection, real-world experience action", *International Journal of Entrepreneur Behaviour and Research*, Vol. 21 No. 5, pp. 690-708, doi: [10.1108/IJEBR-07-2014-0123](https://doi.org/10.1108/IJEBR-07-2014-0123).
- Klofsten, M., Fayolle, A., Guerrero, M., Mian, S., Urbano, D. and Wright, M. (2019), "The entrepreneurial university as driver for economic growth and social change-Key strategic challenges", *Technological Forecasting and Social Change*, Vol. 141, pp. 149-158, doi: [10.1016/j.techfore.2018.12.004](https://doi.org/10.1016/j.techfore.2018.12.004).
- Koe, W.L. (2016), "The relationship between individual entrepreneurial orientation and entrepreneurial intention", *Journal of Global Entrepreneurship Research*, Vol. 6 No. 13, doi: [10.1186/s40497-016-0057-8](https://doi.org/10.1186/s40497-016-0057-8).
- Kollmann, T., Christofo, J. and Kuckertz, A. (2007), "Explaining individual entrepreneurial orientation: conceptualisation of a cross-cultural research framework", *Int. J. Entrepreneurship and Small Business*, Vol. 4 No. 3, pp. 325-340, doi: [10.1504/IJESB.2007.013255](https://doi.org/10.1504/IJESB.2007.013255).

- Kropp, F., Lindsay, N.J. and Shoham, A. (2008), "Entrepreneurial orientation and international entrepreneurial business venture startup", *International Journal of Entrepreneurial Behavior and Research*, Vol. 14 No. 2, pp. 102-117, doi: [10.1108/13552550810863080](https://doi.org/10.1108/13552550810863080).
- Krueger, N.F., Jr. and Day, M. (2010), "Looking forward, looking backward: from entrepreneurial cognition to neuroentrepreneurship", in Acs, Z.K. and Audretsch, D.B. (Eds), *Of the Handbook of Entrepreneurship Research*, 2nd ed., Springer, New York, pp. 321-357.
- Krūmiņa, M. and Paalzow, A. (2017), "The business cycle and early-stage entrepreneurship in Latvia", in Sauka, A. and Chepurens, A. (Eds), *Entrepreneurship in Transition Economies. Societies and Political Orders in Transition*, Springer, Cham, pp. 135-152, doi: [10.1007/978-3-319-57342-7_8](https://doi.org/10.1007/978-3-319-57342-7_8).
- Krueger, N. (2015), *Entrepreneurship 360 Thematic Paper. Part 1 – the Entrepreneurial Mindset*, OECD Publishing.
- Latvian Statistics bureau (2019), available at: <http://data.csb.gov.lv/> (accessed 4 April 2019).
- Levenburg, N.M. and Schwarz, T.V. (2008), "Entrepreneurial orientation among the youth of India: the impact of culture, education and environment", *Journal of Entrepreneurship*, Vol. 17 No. 1, pp. 15-35, doi: [10.1177/097135570701700102](https://doi.org/10.1177/097135570701700102).
- Liñán, F. and Santos, F. (2007), "Does social capital affect entrepreneurial intentions?", *International Advances in Economic Research*, Vol. 13 No. 4, pp. 443-453, doi: [10.1007/s11294-007-9109-8](https://doi.org/10.1007/s11294-007-9109-8).
- Liñán, F., Ceresia, F. and Bernal, A. (2018), "Who intends to enroll in entrepreneurship education? Entrepreneurial self-identity as a precursor", *Entrepreneurship Education and Pedagogy*, Vol. 1 No. 3, pp. 222-242, doi: [10.1177/2515127418780491](https://doi.org/10.1177/2515127418780491).
- Lursoft (2019), available at: <http://blog.lursoft.lv/2019/01/02/2018-gada-jauns-likvideto-uznemumu-skaita-rekords/> (accessed 4 April 2019).
- Maas, G. and Herrington, M. (2006), *Global Entrepreneurship Monitor (GEM) South African Report 2006*, University of Cape Town, Cape Town.
- Manning, L. (2018), "Enabling entrepreneurial behaviour in a land-based university", *Education + Training*, Vol. 60 Nos 7/8, pp. 735-748, doi: [10.1108/ET-03-2017-0036](https://doi.org/10.1108/ET-03-2017-0036).
- Martins, I. and Perez, J.P. (2020), "Testing mediating effects of individual entrepreneurial orientation on the relation between close environmental factors and entrepreneurial intention", *International Journal of Entrepreneurial Behavior and Research*, Vol. 26 No. 4, pp. 771-791, doi: [10.1108/IJEBR-08-2019-0505](https://doi.org/10.1108/IJEBR-08-2019-0505).
- Matthews, C. and Moser, S. (1995), "Family background and gender: implications for interest in small firm ownership", *Entrepreneurship and Regional Development*, Vol. 7, pp. 365-378, doi: [10.1080/08985629500000023](https://doi.org/10.1080/08985629500000023).
- Miller, D. (1983), "The correlates of entrepreneurship in three types of firms", *Management Science*, Vol. 29, pp. 770-791, doi: [10.1287/mnsc.29.7.770](https://doi.org/10.1287/mnsc.29.7.770).
- Ministry of Economics (2019a), *EM Pētījums: Jaunuzņēmumu Ietekme Uz Tautsaimniecību Pieaug.*, Ministry of Economics, available at: <https://www.em.gov.lv/lv/em-petijums-jaunuznemumu-ietekme-uz-tautsaimniecibu-pieaug> (accessed 30 April 2020).
- Ministry of Economics (2019b), *Latvijas Jaunuzņēmumu Ekosistēmas Novērtēšana, Pašreizējā Stāvokļa Identificēšana Un Uz Tās Bāsi Priekšlikumu Izstrāde*, Ministry of Economics, available at: <https://www.em.gov.lv/lv/media/2620/download> (accessed 30 April 2020).
- Ministry of Education and Science (2020), available at: <https://www.izm.gov.lv/en> (accessed 30 April 2020).
- Ministry of Science and Higher Education (2002), *Regulation of the Ministry of National Education and Sport of 26 February 2002 on the Core Curriculum for Preschool Education and General Education in Particular Types of Schools*, Ministry of Science and Higher Education, available at: <https://www.gov.lv/web/science> (accessed 20 May 2021).
- Miralles, F., Giones, F. and Riverola, C. (2016), "Evaluating the impact of prior experience in entrepreneurial intention", *International Entrepreneurship and Management Journal*, Vol. 12 No. 3, pp. 791-813, doi: [10.1007/s11365-015-0365-4](https://doi.org/10.1007/s11365-015-0365-4).

- Nikitina, T. and Lapiņa, I. (2018), "The concept of manager: critical analysis and competencies required", *10th International Scientific Conference 'Business and Management 2018', Selected Papers, Vilnius, Lithuania*, May 3-4, 2018, Technika: Vilnius, pp. 236-244, VG TU Press, doi: [10.3846/bm.2018.27](https://doi.org/10.3846/bm.2018.27).
- Nikitina, T. and Lapiņa, I. (2019), "Creating and managing knowledge towards managerial competence development in contemporary business environment", *Knowledge Management Research and Practice*, Vol. 17 No. 1, pp. 96-107, doi: [10.1080/14778238.2019.1569487](https://doi.org/10.1080/14778238.2019.1569487).
- Nikitina, T., Lapiņa, I., Ozoliņš, M., Irbe, M.M., Priem, M., Smits, M. and Nemilentsev, M. (2020), "Competences for strengthening entrepreneurial capabilities in Europe", *J. Open Innov. Technol. Mark. Complex.*, Vol. 6, p. 62, doi: [10.3390/joitmc6030062](https://doi.org/10.3390/joitmc6030062).
- OECD (2020), "OECD educational policy outlook Latvia", available at: <https://www.oecd.org/education/policy-outlook/country-profile-Latvia-2020.pdf> (accessed 23 May 2021).
- Orford, J., Herrington, M. and Wood, E. (2004), "Global entrepreneurship monitor", South African Report, available at: <https://www.gemconsortium.org/report/gem-south-africa-2004-report> (accessed 13 May 2021).
- Ozoliņš, M., Stensaker, B., Gaile-Sarkane, E., Ivanova, L., Lapiņa, I., Ozoliņa-Ozola, I. and Straujuma, A. (2018), "Institutional attention to European policy agendas: exploring the relevance of instrumental and neo-institutional explanations", *Tertiary Education and Management*, Vol. 24 No. 4, pp. 338-350, doi: [10.1080/13583883.2018.1459820](https://doi.org/10.1080/13583883.2018.1459820).
- Parnell, J., Shwiff, S., Yalin, L. and Langford, H. (2003), "American and Chinese entrepreneurial and managerial orientations: a management education perspective", *International Journal of Management*, Vol. 20 No. 2, pp. 125-137.
- Pinto Borges, A., Lopes, J.M., Carvalho, C., Vieira, B.M.M. and Lopes, J. (2021), "Education as a key to provide the growth of entrepreneurial intentions", *Education + Training*, Vol. 63 No. 6, pp. 809-832, doi: [10.1108/ET-03-2020-0052](https://doi.org/10.1108/ET-03-2020-0052).
- Pittaway, L. and Cope, J. (2007), "Entrepreneurship education—a systematic review of the evidence", *International Small Business Journal*, Vol. 25, pp. 479-510, doi: [10.1177/2F0266242607080656](https://doi.org/10.1177/2F0266242607080656).
- Priem, M., Smits, M., van der Zouwen, A., Ozoliņš, M., Irbe, M.M., Nemilentsev, M., Baldry, M. and Martin, L. (2021), *Transdisciplinary Entrepreneurship Education Design. A Handbook and Method for Teachers*, Rotterdam University of Applied Sciences, Rotterdam.
- Rahim, A.W.P.A., Ismail, W.K.W., Thurasamy, R. and Abd, I. (2018), "The relationship of individual creativity with entrepreneurial intention via individual entrepreneurial orientation (IEO)", *International Journal of Innovative Business Strategies*, Vol. 9, pp. 41-54, available at: https://business.utm.my/ijibs/attachments/article/96/IJIBS_09_01_04.pdf.
- Reis, D.A., Fleury, A.L. and Carvalho, M.M. (2021), "Consolidating core entrepreneurial competences: toward a meta-competence framework", *International Journal of Entrepreneurial Behavior and Research*, Vol. 27 No. 1, pp. 179-204, doi: [10.1108/IJEBr-02-2020-0079](https://doi.org/10.1108/IJEBr-02-2020-0079).
- Sahoo, S. and Panda, R.K. (2019), "Exploring entrepreneurial orientation and intentions among technical university students: role of contextual antecedents", *Education + Training*, Vol. 61 No. 6, pp. 718-736, doi: [10.1108/ET-11-2018-0247](https://doi.org/10.1108/ET-11-2018-0247).
- Saiden, T. (2017), "Towards an entrepreneurship and stem education primary school curriculum in Zimbabwe: a case study of bumburwi of Gweru district", *Advances in Social Sciences Research Journal*, Vol. 4 No. 18, pp. 148-159.
- Santos, G., Marques, C.S. and Ferreira, J.J. (2020), "Passion and perseverance as two new dimensions of an Individual Entrepreneurial Orientation scale", *Journal of Business Research*, Vol. 112, pp. 190-199, doi: [10.1016/j.jbusres.2020.03.016](https://doi.org/10.1016/j.jbusres.2020.03.016).
- Schoof, U. (2006), *Stimulating Youth Entrepreneurship: Barriers and Incentives to Enterprise Start-Ups by Young People*, International Labour Office, Geneva.
- Sitaridis, I. and Kitsios, F. (2019), "Entrepreneurship as a career option for information technology students: critical barriers and the role of motivation", *J Knowl Econ*, Vol. 10 No. 3, pp. 1133-1167.

- Souitaris, V., Zerbini, S. and Al-Laham, A. (2007), "Do entrepreneurship programs raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources", *Journal of Business Venturing*, Vol. 22 No. 4, pp. 566-591, doi: [10.1016/j.jbusvent.2006.05.002](https://doi.org/10.1016/j.jbusvent.2006.05.002).
- Stam, E. and van de Ven, A. (2021), "Entrepreneurial ecosystem elements", *Small Bus Econ*, Vol. 56, pp. 809-832, doi: [10.1007/s11187-019-00270-6](https://doi.org/10.1007/s11187-019-00270-6).
- Statistics Poland (2021), available at: <https://stat.gov.pl/en/> (accessed 24 May 2021).
- Taatila, V.P. (2010), "Learning entrepreneurship in higher education", *Education + Training*, Vol. 52 No. 1, pp. 48-61, doi: [10.1108/00400911011017672](https://doi.org/10.1108/00400911011017672).
- Taatila, V. and Down, S. (2012), "Measuring entrepreneurial orientation of university students", *Education + Training*, Vol. 54 Nos 8/9, pp. 744-760, doi: [10.1108/00400911211274864](https://doi.org/10.1108/00400911211274864).
- Toth, I., Heinänen, S. and Puumalainen, K. (2021), "Passionate and engaged? Passion for inventing and work engagement in different knowledge work contexts", *International Journal of Entrepreneurial Behavior and Research*, Vol. 27 No. 9, pp. 1-25, doi: [10.1108/IJEBR-09-2020-0632](https://doi.org/10.1108/IJEBR-09-2020-0632).
- Turker, D. and Selcuk, S.S. (2009), "Which factors affect entrepreneurial intention of university students?", *Journal of European Industrial Training*, Vol. 33 No. 2, pp. 142-159, doi: [10.1108/03090590910939049](https://doi.org/10.1108/03090590910939049).
- Wasilczuk, J. (2004), "Investigating growth factors in polish firms: empirical evidence from 1996 and 2002", in Dowling, M.J., Jürgen, S. and Knyphausen-Aufsess, D.Z. (Eds), *Advances in Interdisciplinary European Entrepreneurship Research*, Münster: Lit, Piscataway, NJ.

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