










“Entrepreneurial competencies and intentions among students of technical universities”

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ENTREPRENEURIAL COMPETENCIES AND INTENTIONS AMONG STUDENTS OF TECHNICAL UNIVERSITIES

Abstract

The study investigates the entrepreneurial competencies and intentions of students. Their formation is a requirement of modern times. The question arises whether students of modern technical universities get entrepreneurial competencies and whether they transform these competencies into their entrepreneurial intentions. More than 3.6 thousand students from six technical universities from Poland, Ukraine, Latvia, Bulgaria, and Lithuania were surveyed. Methods of summarizing and grouping data, analysis of the structure of the population and distributions of its elements, evaluation of relationships were used to analyze the results of the survey. It was found that studying at technical universities is not an obstacle to the existence of entrepreneurial intentions among students. The respondents positively assessed their ability to recognize market opportunities for new business (the sum of the shares of positive answers exceeded the sum of the shares of negative answers by 12.4%). A positive generalized assessment was determined when assessing the ability to persuade others to invest in their business, while negative – their ability to write a formal business plan. It is proved that students who highly value their entrepreneurial abilities are much more likely to show the intention to start their own business ($p < 0.001$). Students' focus on starting their own business is partly explained by the fact that they connect employment in corporations with a low guarantee of job retention. High positive integrated assessments received the following advantages of own entrepreneurship: prestige (0.302), chance to be realized (0.362), and the ability to create jobs (0.597).

Keywords

entrepreneurial intentions, entrepreneurial competencies, starting a business, comparative analysis, technical university, student

JEL Classification

A22, I25, O57

INTRODUCTION

In the modern world, the competencies needed to start and run own business are increasingly valued. The rapid socio-economic transformations taking place in society bring to the forefront people who are willing to make quick decisions and take risks in an unforeseen environment. Under such conditions, universities become generators and disseminators of new knowledge, which result in their commercialization; archivers, supporters, interpreters of intellectual traditions and texts (McCowan, 2016); producers of social values; drivers of economic innovations, which form and develop intellectual potential; activators of higher competitiveness of social systems, their sustainable development is questioned. Young people see many examples of the lack of a tight chain of "education → status → income". Especially when it comes to training specialists in technical sciences.

The modern institutional landscape and the environment of higher education are not always aimed only at providing qualitative education to student youth for their successful preparation for future work

in the specialty, but also at the formation of harmoniously developed, personally mature, socially active individuals capable of increasing social efficiency and personal income. Discussions about practical skills, the need to introduce dual education, the ability to self-employment, the organization of their work on a flexible schedule, the implementation of entrepreneurial potential in practice, which was formed during the student years, come to the fore.

Higher educational institutions must respond to these demands of society. In the context of global changes in the forms of financial support of higher educational institutions, a trajectory has emerged that has brought them closer to the business model. Higher educational institutions became participants in the competition and are forced to actively implement managerial innovations. The socio-ethical approach to management, according to which higher educational institutions focus on corporate values, gave way to the marketing management, which is focused on the needs of students as one of the key stakeholders. The public demand for the formation of entrepreneurial potential has posed to the management of higher educational institutions the question of the formation of entrepreneurial competencies of teachers, scientists, and students. Of particular relevance is the issue of entrepreneurial competencies of students from technical universities, who are expected to be able to implement increasingly popular innovations. It is important to compare the assessment results of their entrepreneurial competencies by students of different countries, specialties, and gender, in particular on the impact of assessment of their entrepreneurial competencies by students on their intention to start their business.

1. LITERATURE REVIEW AND HYPOTHESES

According to the results of the latest OECD Education at a Glance study (OECD, 2020), the average income of the population with educational and educational-scientific levels of master and doctor is 89% and 69% higher than the income of people with secondary education. Bachelors earn 43% and 36% more, respectively, than those who have completed secondary education. For people who have studied for a short cycle of higher education, the same figures are 19% and 20%, respectively (Figure 1).

Similar trends are observed in terms of economic activity in the labor market. On average across OECD countries, the employment rate is 61% for 25-34 year-olds without upper secondary education, 78% for those with upper secondary or post-secondary non-tertiary education as their highest attainment, and 85% for those with tertiary education (OECD, 2020). People with the lowest educational qualifications are more likely to hold positions that are more likely to be automated, which increases the risk of losing their job. The situation with the spread of the COVID-19 undoubtedly exacerbates the problems in the labor market, and people with lower education may be the most vulnerable. Under such circumstanc-

es, the value of higher education remains, but the requirements for universities as places where innovations can be created and implemented as well as commercialized are growing.

Empirical research on the example of educational institutions related to the level of university staff satisfaction with their work is widely conducted. Kolot and Silchenko (2018) studied the experience, problems, and prospects of the university electronic educational space formation. Kakabadse et al. (2007) investigated private financing for the provision of capital assets for schools. Stukalo and Simakhova (2020) estimated the impact of the COVID-19 on higher education. Franco et al. (2011) evaluated the teaching effectiveness at universities. The range of empirical studies of higher education is expanding. However, the accelerated dynamics of the modern world, on the one hand, further expands the range of the research problems that need a scientific solution, and on the other hand – requires deepening of the past research results. In this study, the focus is put on the problem of the students' entrepreneurial competencies.

Prokopenko et al. (2020) pointed out that a competency-based approach assumes that the goals facing the educational system are not determined within the system itself, but is dictated by the labor market. The system of higher educational in-

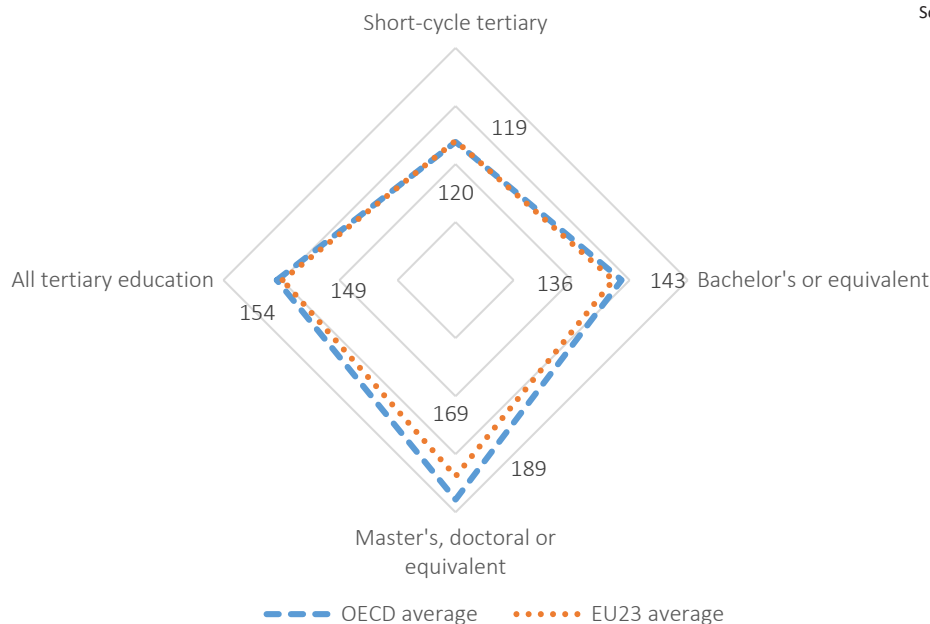


Figure 1. The predominance of the income of the population with higher education over the income of the population with general secondary education in the OECD, %

stitutions graduates' competencies should be determined not only by the labor market now or in the past, but also by the ability to influence this market through self-employment or jobs creation.

Comparative studies of students' entrepreneurial intentions in different countries and the factors influencing these intentions show mixed results. However, the evaluation of personal qualities, the image of entrepreneurship, and the main factors that affect students' entrepreneurial intention vary across cultures (Baubonienė et al., 2018).

Gelaidan and Abdullateef (2017), Henley et al. (2017), Hussain and Norashidah (2015), Padilla-Angulo (2019), and Torres et al. (2017) studied entrepreneurial intentions of business students. At the same time, there is no consensus in the scientific literature in studies that revealed the level of students' entrepreneurial potential at technical universities of different countries and assessed its impact on the intention to start own business. In particular, Vodă and Florea (2019) did not show significant differences in the assessment of opportunities to be entrepreneurs and intentions to be entrepreneurs between students of economic and technical specialties. At the same time, Chen et al. (2015) showed that entrepreneurship education does not improve the entrepreneurial intentions of

technical university students.

A review of the literature and differences in results in different countries resulted in this study. This study aimed to identify the extent to which students assess their entrepreneurial abilities and entrepreneurial intentions. Hypothetical assumptions are:

- H1: Students tend to positively assess the totality of their capabilities to identify market potential, write a business plan, and persuade others to invest in their business.*
- H2: Students who appreciate each of analyzed opportunities (market potential recognition, business plan writing, persuading others to invest in their business) are more likely to show an intention to start own business.*

2. DATA AND METHODOLOGY

Materials of the SEAS research project were used. This project involved representatives of five countries: Poland, Ukraine, Latvia, Bulgaria, and Lithuania. The survey was conducted by SEAS project participants at their universities. The survey results were presented in the form of MS Excel

tables and were summarized centrally. This survey covered 3,631 students at six universities: Gdansk University of Technology (GUT – 1,029 students); Lviv Polytechnic National University (LPNU – 746 students); Riga Technical University (RTU – 372 students); Sofia University (140 students); Technical University of Sofia (65 students); and Vilnius Gediminas Technical University (VGUT – 1,279 students). In the study, the survey data from two universities from Bulgaria were combined into one group (SU).

This paper describes the results of processing those questionnaire questions that were not analyzed by other participants of the SEAS research project. A fragment of the questionnaire with these questions is given in Appendix A.

To analyze the results of the survey, the methods of analysis and visualization of the share of the j -th element (d_j) in total, as well as methods of data summarizing and grouping, were used. For the respondents' answers characteristics distributions, the quadratic coefficient of variation (v), Pearson asymmetry coefficient (A_s), and medium centered score (RS_0) were used. To assess the relationship between the respondents' alternative answers to individual questions of the questionnaire, the method of analysis of the four-cell conjugation table was employed. Thus, the following indicators were determined: Pearson Chi-Square (χ^2) – to prove the presence of relation at a certain level of materiality ($< p$); odds ratio (OR), relative risk (RR), their limits of change – to justify with a probability of 95% the content of the factor feature influence on the effective; normalized Pearson's coefficient (C_{ij}) – to identify the strength of the factor feature influence on the effective.

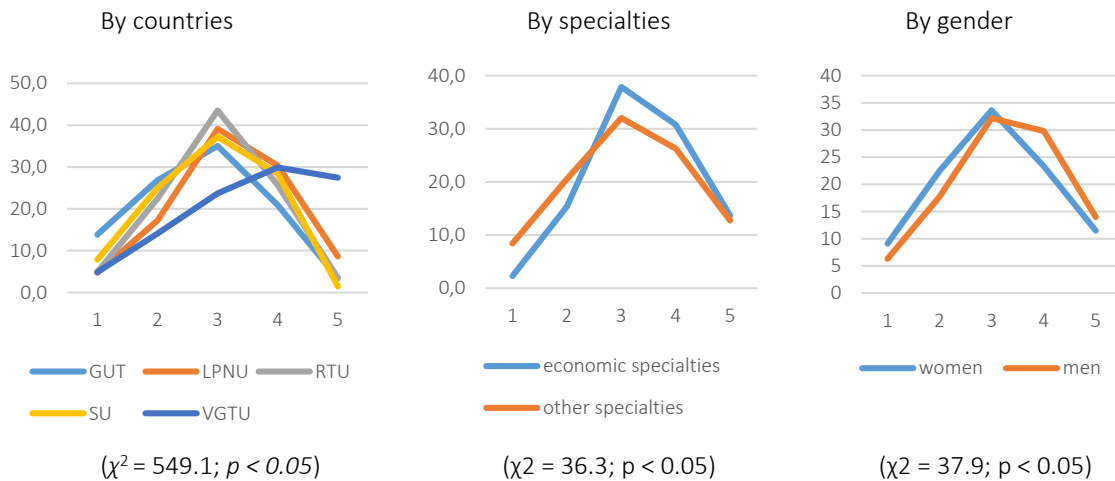
3. RESULTS

International institutions and governmental organizations attribute the entrepreneurial competence of their applicants to the system of higher education. Following Meoli et al. (2020), the study of students' entrepreneurial intentions is gaining popularity. It is logical to assume that entrepreneurial intentions depend on the extent to which students recognize the market niche for new busi-

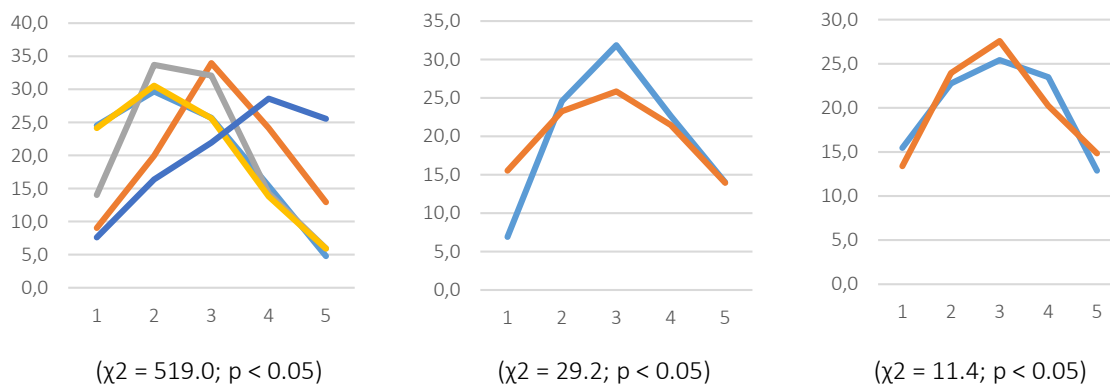
ness. Therefore, the questionnaire included the question "Rate your level of confidence: I can identify market opportunities for a new business." It was possible to assess the level of confidence on all analyzed questions on a five-point scale:

- 1) completely not confident;
- 2) not confident;
- 3) somewhat confident;
- 4) confident;
- 5) completely confident.

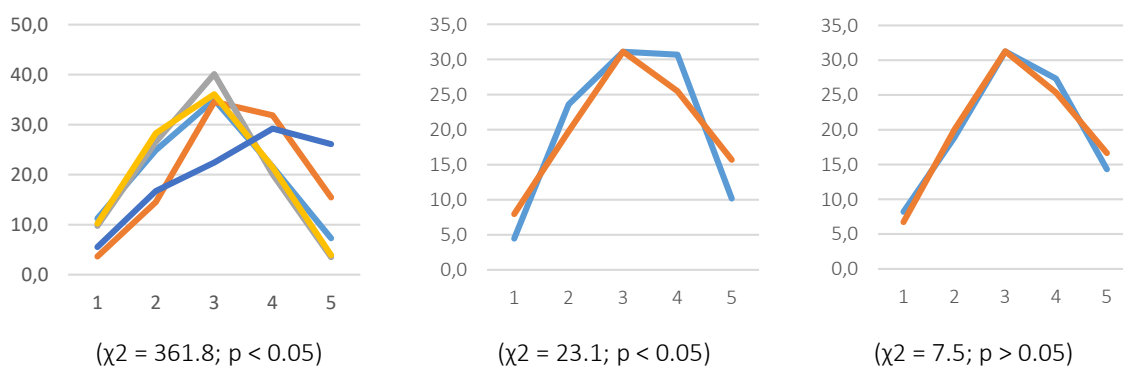
Analysis of the answers to this question revealed that their distribution was characterized by a slight right-hand asymmetry ($A_s = 0.159$): modal value (3) occurred in 32.9% of cases and was inferior to the average value (3.177); the sum of the shares of the choice of answers "4" and "5" (d_{4+5}) by 12.4 percentage points exceeded the sum of the shares of the choice of answers "2" and "1" (d_{1+2}). This indicates a positive assessment by students of their ability to recognize market opportunities for new business. The peculiarity of the results in terms of countries was that the representatives of Lithuania most often chose the answer "4" and the value of the average score (3.6) was the highest. Also, according to the results of the responses processing from Lithuania, the highest negative value of A_s was obtained (-0.334); the largest predominance of d_{4+5} over d_{1+2} (38.4 percentage points), as well as the maximum value of RS_0 (0.610). In other countries, the answer "3" is the most often, and the sign RS_0 varies: negative at GUT (-0.256) and SU (-0.098) and positive at LPNU (0.210) and RTU (0.005). The same signs of the value A_s were obtained in terms of economic and non-economic specialties (0.390 and 0.126), male and female (0.240 and 0.057). The value of RS_0 for non-economic specialties is 0.237 less than for economic ones; for female by 0.218 less than for male. The smallest variation of estimates was found among representatives of economic specialties. Thus, students positively assessed the ability to recognize market opportunities for new business, while in terms of individual characteristics, the degree of confidence varies. In terms of countries, the most confident in their capabilities were representatives of VGUT, in terms of specialties – representatives of the economic specialties, in terms of gender – men (Figure 2a).



A) identify market opportunities for a new business



B) write a formal business plan



C) convince others to invest in the business

Figure 2. Distribution of respondents' answers about self-confidence, %

The analysis of the answers to the question “Assess your level of confidence in the position: I can write a formal business plan” revealed that their distribution was close to symmetric ($A_s = -0.020$), and the generalized score was negative and close to zero ($RS_0 = -0.025$). The value of v in general

(42.2%) exceeded the critical level, ranging from 36.4% for representatives of economic specialties to 46.9% for representatives of Poland. This indicates the heterogeneity of the set of estimates. The modal value and the sign RS_0 varied in the context of countries (for VGUT – “4”, for LPNU – “3”; for

GUT, RTU, and SU – “2”) and the sign RS_0 (for VGUT and LPNU – “+”; for GUT, RTU, and SU – “-”). Opposite signs RS_0 were obtained in terms of representatives of economic and non-economic specialties and (0.123 and -0.050), while the same for male and female (-0.007 and -0.035).

Summarizing the data of the analysis, it was estimated that the generalized assessment of the respondents' ability to write a formal business plan, although close to neutral, but is negative. The lowest evaluation results were found among the representatives of Poland, Latvia, and Bulgaria ($RS_{0(GUT)} = -0.538$; $RS_{0(SU)} = -0.532$; $RS_{0(RTU)} = -0.356$). In terms of countries, the most confident in their capabilities were representatives of VGUT, in terms of specialties – representatives of the economic specialties, in terms of gender – men (Figure 2b). In terms of the possibility of a business plan writing, $H1$ cannot be verified.

The analysis of the answers to the questionnaire revealed that the modal value (3) occurred in 31.1% of cases and was lower than the average value (3,208), $A_s = 0.181$; the structure of the set of estimates was heterogeneous ($v = 35.8\%$); the generalized score was positive ($RS_0 = 0.208$). The modal value for VGUT was “4”, for others – “3”. Negative values of A_s were obtained for VGUT (-0.387), SU (-0.242), RTU (-0.193), representatives of economic and non-economic specialties, and (-0.082 and -0.159) male and female (-0.147 and -0.141). Positive values of RS_0 were obtained for VGUT and LPNU (0.536 and 0.410), representatives of economic and non-economic specialties (0.185 and 0.212), male and female (0.251 and 0.207). The generalized data of the analysis show that the respondents generally positively assessed their ability to persuade others to invest in their business. Representatives of Lithuania and Ukraine had the highest evaluation results. In terms of specialties – non-economic representatives. There were no statistically significant differences in the distribution of responses by gender (Figure 2c).

The current study shows differences in the level of recognition of business opportunities and their use (Kuckertz et al., 2017). Given the high level of assessment of students' ability to start a business, the level of their readiness to start a business was additionally analyzed.

Analysis of the results of the responses to the statement “I will make every effort to start and run own business”, which provided a five-point scale (from “1” – definitely not to “5” – definitely yes), found that the modal value (3) yielded to the average value (3.246); $A_s = 0.202$; the generalized estimate ($RS_0 = 0.246$) is positive; the value of d_{4+5} at 14.7 percentage points exceeded the value of d_{1+2} . The peculiarity of the results in terms of countries was that the representatives of Lithuania most often chose the answer “5”, while in other countries – the answer “3”. According to the results of processing the responses from Lithuania, the highest left asymmetry was detected ($A_s = -1.701$); the largest size of the predominance of d_{4+5} over d_{1+2} (43.6 percentage points). The results of the analysis show the respondents' tendency to focus on creating and running own business. Representatives of Lithuania ($RS_{0(VGUT)} = 0.690$) were the most prone to such a focus. Representatives of Poland ($RS_{0(GUT)} = -0.224$) and Bulgaria ($RS_{0(SU)} = -0.265$) showed low negative ratings. The value of RS_0 prevailed by 0.305 in economic specialties, by 0.188 – in men.

Data of Table 1, obtained based on the respondents' answers distributions analysis, presented in the form of a four-cell conjugation table, allow to state the presence of statistically significant differences in the intention to create and run own business in terms of each of the three factors. The degree of influence for each of the factors was identified as relatively strong. It means that students who value each of their opportunities (identify market opportunities for a new business, write a business plan, convince others to invest in my business) are several times more likely to aim to start own business. Thus, $H2$ is confirmed.

In addition to the evaluative ability to start own business, students' decisions to become entrepreneurs are also influenced by the attractiveness of working for themselves compared to working at a corporation. Accordingly, questions were asked concerning the comparative characterization of employment efficiency at corporations and family businesses. Respondents gave grades on a five-point scale: 1 – I strongly disagree; 2 – I do not agree; 3 – I somewhat agree; 4 – I agree; 5 – I definitely agree (Table 2).

In the distribution of answers on the set of respondents for all three statements, positive assess-



Table 1. Influence of factors on the intention to create and run own business

Factors	OR (OR _{L95%} – OR _{U95%})	RR (RR _{L95%} – RR _{U95%})	χ^2 ; (p)	C _H
Ability to recognize market opportunities for new business	5.105 (4.417 – 5.899)	2.403 (2.222 – 2.598)	518.4 (< 0.001)	0.503
Ability to write a business plan	4.190 (3.624 – 4.844)	2.126 (1.974 – 2.288)	394.7 (< 0.001)	0.445
Ability to persuade others to invest in their business	4.665 (4.045 – 5.380)	2.327 (2.149 – 2.519)	472.1 (< 0.001)	0.482

Table 2. Distribution of respondents' answers on the comparative characteristics of corporations and family businesses

Signs of grouping		Work is more attractive			Job insecurity is higher			The opportunities to develop competencies are greater		
		RS ₀	d ₄₊₅ – d ₁₊₂	χ^2	RS ₀	d ₄₊₅ – d ₁₊₂	χ^2	RS ₀	d ₄₊₅ – d ₁₊₂	χ^2
Countries	GUT	-0.199	-11.5	551.3 ^a	0.338	25.5	191.6 ^a	0.272	22.8	365.3 ^a
	LPNU	0.203	14.8		0.256	20.2		0.516	37.5	
	RTU	0.192	17.1		0.176	12.7		0.455	35.8	
	SU	0.478	28.8		-0.049	-4.9		0.785	48,3	
	VGUT	0.788	51.7		0.561	35.4		0.914	59,3	
Specialties	non-economic	0.228	14.9	117.6 ^a	0.362	24.7	21.4 ^a	0.583	40,4	16.2 ^a
	economic	0.703	53.1		0.363	25.7		0.677	48,0	
Gender	female	0.300	19.0	11.1 ^a	0.321	22.6	8.2 ^b	0.603	41,8	2.6 ^b
	male	0.233	16.5		0.393	26.5		0.593	41,4	
In general		0.302	20.9	x	0.362	24.9	x	0.597	41.5	x

Note: a means $p < 0.05$; b means $p > 0.05$.

ments were received. Representatives of Lithuania were the most inclined to agree with each of the allegations. Representatives of Poland showed a low level of disagreement about the prestige of the work, and about the guarantee of job security in Bulgaria. Based on gender, there were no differences between respondents with fewer guarantees for job retention and higher opportunities for competence development.

In continuation of this topic, a separate group of questions was formulated to assess aspects of the attractiveness of running own business (Figure 3). Distributions of answers on the set of respondents on certain aspects are characterized by high left-handed asymmetry: self-realization ($A_s = -0.719$); prestige ($A_s = -0.961$); job creation ($A_s = -0.946$). When assessing the aspect of self-realization, the modal value in terms of countries, specialties, articles did not vary and was equal to the maximum assessment. The difference $d_{4+5} - d_{1+2}$ exceeded 75 percentage points. Accordingly, the average centered score as a whole for the set of respondents took a high positive value ($RS_0 = 1.406$), including for each of the grouping characteristics. In terms of countries, this figure varies from 1.256

(SU) to 1.411 (GUT) in terms of genders – from 1.347 (men) to 1.479 (women). No statistically significant differences were found in the context of specialties. The set of estimates turned out to be homogeneous: according to grouping characteristics, v did not exceed the critical value, ranging from 15.9% to 20.0%.

Other aspects of the attractiveness of doing business have received similar assessments. Despite the fact that when assessing the aspect of prestige, the modal value of the distribution of GUT and RTU representatives' responses, and when assessing the aspect of job creation – representatives of GUT, RTU, and SU did not reach the maximum score, the average centered score on the set of respondents takes a high positive value: prestige ($RS_0 = 0.975$); job creation ($RS_0 = 1.005$). For each of the grouping features, RS_0 also takes only positive values. In terms of countries, this indicator varies from 0.579 (GUT) to 1.234 (LPNU) when assessing prestige, and from 0.439 (SU) to 1.381 (VGUT) when assessing job creation. Slightly higher prestige and job creation were appreciated by representatives of economic specialties than non-economic ones; women than men.

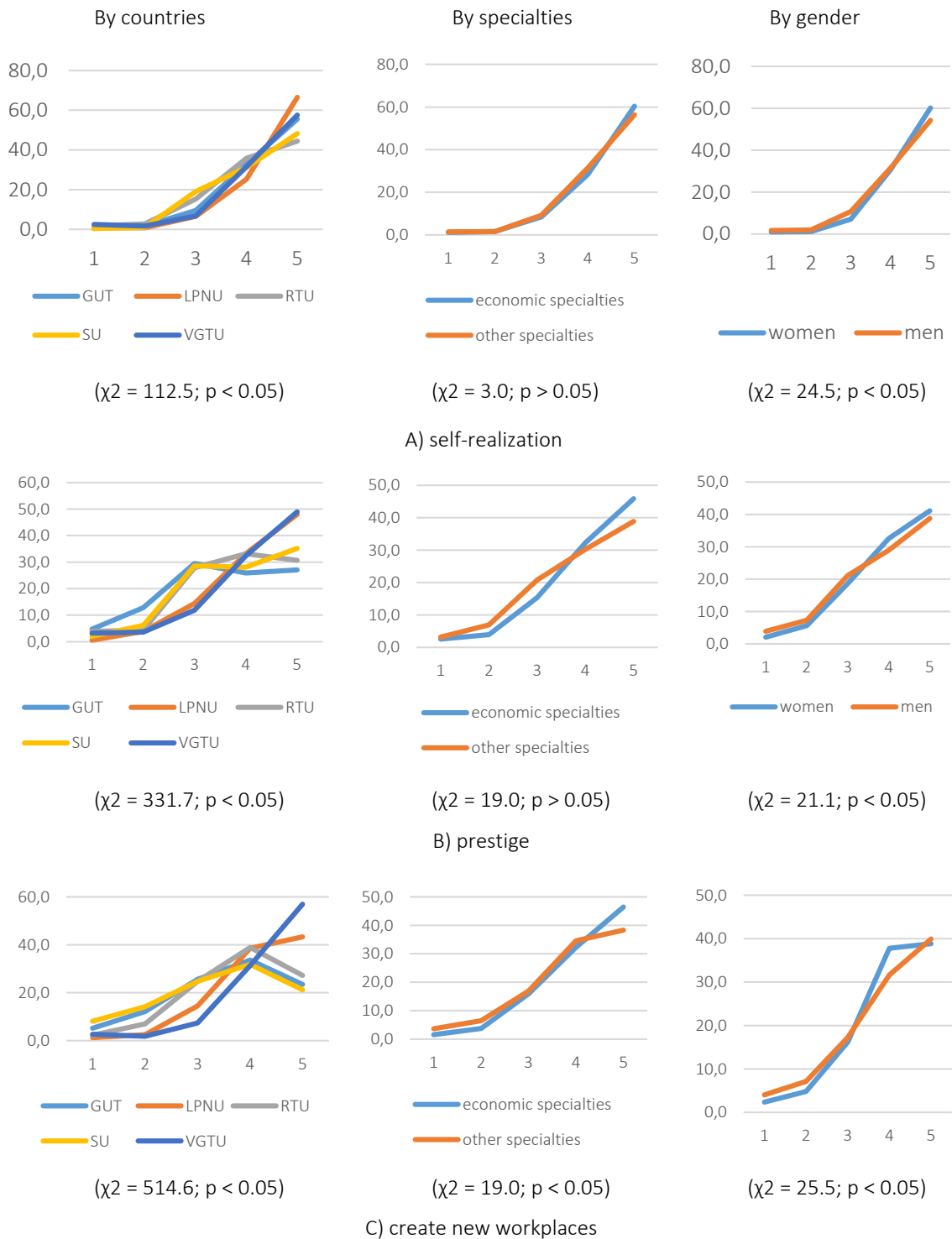


Figure 3. Distribution of respondents' answers as to whether certain aspects of doing business are attractive, %

4. DISCUSSION

In the modern world, the value of higher educational institutions' services is questionable. Knowledge quickly becomes obsolete, and ac-

quired skills lose their value. In the field of engineering and technology, there is a need to acquire skills to quickly generate and commercialize innovations. Students of technical universities are aware of this and are ready to take the risk of in-

novations implementation, demonstrate their intention to become entrepreneurs. Students, as well as young people in general, tend to appreciate highly their abilities. This thesis is partially confirmed by the results of the study. The opportunity to identify a market niche for new business has received a positive but low assessment. Somewhat higher positively students assessed the ability to persuade others to invest in their business, while close to neutral, but a negative assessment was done by students, evaluating the possibility of writing a formal business plan.

Ferreira et al. (2017) surveyed Brazilian students and showed that students who do not have entrepreneurial experience but want to become entrepreneurs are significantly concerned with the business plan. Even in countries where special programs for the development of entrepreneurial culture among students are implemented, only half of the students are confident in their ability to prepare a business plan on their own (Bakheet, 2018). Malinda (2019) showed that additional business planning classes increase students' entrepreneurial intentions. Accordingly, it can be assumed that conducting additional business planning classes would have a positive effect on students' motivation to start own business. If students of economic specialties and men rated their ability to identify a market niche and write a business plan a little higher, the same can be concluded about persuading others to invest in their business.

Study at technical universities is not an obstacle to the entrepreneurial intentions of students, because according to the results, the statement "I will make every effort to create and run own business" was positively assessed. Such results correlate with the results of the survey in classical universities. In particular, studies have shown (Wang et al., 2019) that students' sense of opportunity identification efficacy firmly

stimulates their entrepreneurial intention. However, according to the results, students of economic specialties at technical universities are more likely to show entrepreneurial intentions than non-economic ones; male students – slightly more often than female students. Higher entrepreneurial intentions of men in comparison with women are recorded by Vodă and Florea (2019), and Ward et al. (2019).

The study proved that students who value their entrepreneurial competencies are more likely to show the intention to start their own business. The results support Miroshnyk and Prokopiieva (2020) – the desire to start a business is influenced primarily by the general conditions of small and medium-sized businesses in each country. There are natural differences in the tendency of students to start their businesses in different countries. In this context, further differences in the business environment in Lithuania compared to other countries presented in the study need to be further studied, as Lithuanian students rated their skills and intentions to start own business the highest. Higher attractiveness (prestige, influence on job creation) by representatives of economic specialties can be explained by the fact that these individuals have chosen economic specialties when entering a higher educational institution, respectively, they a priori evaluate higher the prestige and importance of economic and entrepreneurial activity.

The limited list of questions in the questionnaire did not allow analyzing the influence of other important factors. In particular, how the financial condition of students is affected by the financial condition of their families (Gujrati et al., 2019) or how the management policy of the educational institution regarding the selection of teachers and the offer of academic disciplines (Bell, 2019) affects the entrepreneurial intentions.

CONCLUSION

Students, acquiring entrepreneurial competencies during their studies, show different intentions to start a business. The analysis of such intentions served the purpose of this paper.

During the processing of empirical materials obtained by surveying the students of technical universities from five countries, it was found that the integrated assessment of the ability to write a formal business plan is close to neutral, but negative. The latter requires special competencies and may indicate the need for certain management decisions by heads of educational units. Students who value each of their opportunities (recognize market opportunities for new business, write a business plan, persuade

others to invest in their business) are much more likely to show an intention to start own business. They are impressed by the prestige of running their company, the chance for self-realization in business, and the opportunity to provide work for others. To the TOP-5 restraining factors for the implementation of entrepreneurial competencies in practice, students included: lack of capital, risk of failure, insufficient experience and knowledge, income instability, complex procedures, and legal norms. Recognizing employment in corporations, compared to a family business, more effective in terms of prestige and opportunities for competence development, students negatively assess such employment in terms of job preservation.

The obtained results can be useful for scientists and practitioners who deal with the problems of forming the entrepreneurial potential of students. Thus, decisions can be made at the university level that will promote the development of entrepreneurial competencies of students. Methodological approaches, selected factors, obtained integrated assessments may be of interest to other researchers.

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REFERENCES

- Arntz, M., Gregory, T., & Zierahn, U. (2016). *The risk of automation for jobs in OECD countries: A comparative analysis* (Working Papers No. 189). Paris. <https://dx.doi.org/10.1787/5jlz9h56dvq7-en>
- Bakanauskienė, I., Bakanauskienė, R., & Krikštolaitis, R. (2010). Empirical research of job satisfaction on case of university employee groups. *Management Theory and Studies for Rural Business and Infrastructure Development*, 22, 12-24. Retrieved from <http://mts.asu.lt/mtsrbid/article/view/402>
- Bakheet, A. H. (2018). Student perceptions on business opportunities and barriers for business start-up in Oman. *International Journal of Entrepreneurship*, 22(1), 1-8. Retrieved from <https://www.abacademies.org/articles/student-perceptions-on-business-opportunities-and-barriers-for-business-startup-in-oman-7082.html>
- Baubonienė, Ž., Hahn, K. H., Puksas, A., & Malinauskienė, E. (2018). Factors influencing student entrepreneurship intentions: the case of Lithuanian and South Korean universities. *Entrepreneurship and Sustainability Issues*, 6(2), 854-871. [http://doi.org/10.9770/jesi.2018.6.2\(26\)](http://doi.org/10.9770/jesi.2018.6.2(26))
- Bell, R. (2019). Predicting entrepreneurial intention across the university. *Education + Training*, 61(7/8), 815-831. <https://doi.org/10.1108/ET-05-2018-0117>
- Chen, S.-C., Hsiao, H.-C., Chang, J.-C., Chou, C.-M., Chen, C.-P., & Shen, C.-H. (2015). Can the entrepreneurship course improve the entrepreneurial intentions of students? *International Entrepreneurship and Management Journal*, 11(3), 557-569. <https://doi.org/10.1007/s11365-013-0293-0>
- Ferreira, A. da S. M., Loiola, E., & Gondim S. M. G. (2017). Motivations, business planning, and risk management: entrepreneurship among university students. *RAI Revista de Administração e Inova-*

- ção, 14(2), 140-150. <https://doi.org/10.1016/j.rai.2017.03.003>
8. Franco, M., Di Virgilio, F., & D'Angelo, N. (2011). Qualitative Performance and Diversity Management in University Teaching Evaluation. *SSRN Electronic Journal*. <https://dx.doi.org/10.2139/ssrn.1927853>
 9. Gelaidan, H. M., & Abdullateef, A. O. (2017). Entrepreneurial intentions of business students in Malaysia: The role of self-confidence, educational and relation support. *Journal of Small Business and Enterprise Development*, 24(1), 54-67. <https://doi.org/10.1108/JS-BED-06-2016-0078>
 10. Gujrati, R., Tyagi, V., & Lawan, A. (2019). Family Financial Status and Students' Entrepreneurial Intention: The Mediatory Role of Entrepreneurship Education (2019). *Journal of Management*, 6(3), 21-28. Retrieved from <https://ssrn.com/abstract=3525299>
 11. Henley, A., Contreras, F., Espinosa, J. C. & Barbosa, D. (2017). Entrepreneurial intentions of Colombian business students: Planned behavior, leadership skills and social capital. *International Journal of Entrepreneurial Behavior & Research*, 23(6), 1017-1032. <https://doi.org/10.1108/IJEBR-01-2017-0031>.
 12. Hussain, A., & Norashidah, D. (2015). Impact of entrepreneurial education on entrepreneurial intentions of Pakistani students. *Journal of Entrepreneurship and Business Innovation*, 2(1), 43-53. <http://dx.doi.org/10.5296/jebi.v2i1.7534>
 13. Kakabadse, K., Kakabadse, A., & Summers, N. (2007). Effectiveness of private finance initiatives (PFI): study of private financing for the provision of capital assets for schools. *Public Administration and Development*, 27(1), 49-61. <https://doi.org/10.1002/pad.433>
 14. Kolot, A. M., & Silchenko, M. V (2018). Formuvannia elektronnoho osvithnoho prostoru universytetu – dosvid, problemy, perspektyvy [Formation of electronic educational space of the university – experience, problems, prospects]. *Digital Economy: Proceedings of the national scientific and methodological conference*, 189-194. (In Ukrainian). Retrieved from <https://ir.kneu.edu.ua/443/handle/2010/25966>
 15. Kuckertz, A., Kollmann, T., Krell, P., & Stöckmann, C. (2017). Understanding, differentiating, and measuring opportunity recognition, and opportunity exploitation. *International Journal of Entrepreneurial Behavior & Research*, 23(1), 78-97. <https://doi.org/10.1108/IJEBR-12-2015-0290>
 16. Malinda, M. (2019). Learning Methods of Business Plan subject to Increase Entrepreneurial Skill, Entrepreneurial Intention and Entrepreneurial Spirit of Students. *International Journal of Information and Education Technology*, 9(11), 810-814. <https://doi.org/10.18178/ijiet.2019.9.11.1309>
 17. McCowan, T. (2016). Universities and the post-2015 development agenda: an analytical framework. *Higher Education*, 72, 505-523. <https://doi.org/10.1007/s10734-016-0035-7>
 18. Meoli, A., Fini, R. Sobrero, M., & Wiklund, J. (2020). How entrepreneurial intentions influence entrepreneurial career choices: The moderating influence of social context. *Journal of Business Venturing*, 35(3), 105982. <https://doi.org/10.1016/j.jbusvent.2019.105982>
 19. Miroshnyk, R., & Prokopieva, U. (2020). Development of small and medium-sizes businesses in Ukraine: problems and possibilities. *Journal of Lviv Polytechnic National University, Series of Economics and Management Issues*, 4(1), 63-71. (In Ukrainian). <https://doi.org/10.23939/semi2020.01.063>
 20. OECD. (2020). *Education at a Glance: OECD Indicators*. <https://doi.org/10.1787/69096873-en>
 21. Padilla-Angulo, L. (2019) Student associations and entrepreneurial intentions. *Studies in Higher Education*, 44(1), 45-58. <https://doi.org/10.1080/03075079.2017.1336215>
 22. Podolchak, N. Y., Prokopysheyn-Rashkevych, L. M., & Karkovska, V. Y. (2019). The influence of coaching on the development of manager's leadership skills. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, 4, 107-113. <http://dx.doi.org/10.29202/nvngu/2019-4/22>
 23. Prokopenko, O., Osadchenko, I., Braslavskaya, O., Malyshevska, I., Pichkur, M., & Tyshchenko, V. (2020). Competence approach in future specialist skills development. *International Journal of Management*, 11(4), 645-656. Retrieved from https://dspace.udpu.edu.ua/bitstream/123456789/12916/1/Prokopenko%2C%20Osadchenko%2C%20Braslavskaya..._COMPETENCE%20APPROACH%20IN%20FUTURE%20SPECIALIST%20SKILLS%20DEVELOPMENT.pdf
 24. Stukalo, N., & Simakhova, A. (2020). COVID-19 Impact on Ukrainian Higher Education. *Universal Journal of Educational Research*, 8(8), 3673-3678. <https://doi.org/10.13189/ujer.2020.080846>
 25. Torres, F. C., Méndez, J. C. E., Barreto, K. S., Chavarria, A. P., Machuca, K. J., & Guerrero, J. A. O. (2017). Exploring entrepreneurial intentions in Latin American university students. *International Journal of Psychological Research*, 10(2), 46-59. <http://dx.doi.org/10.21500/20112084.2794>
 26. Vodă, A. I., & Florea, N. (2019). Impact of personality traits and entrepreneurship education on entrepreneurial intentions of business and engineering students. *Sustainability*, 11(4), 1192. <https://doi.org/10.3390/su11041192>
 27. Ward, A., Hernández-Sánchez, B. R., & Sánchez-García, J. C. (2019). Entrepreneurial potential and gender effects: the role of personality traits in university students' entrepreneurial intentions. *Frontiers in Psychology*, 10, 2700. <https://doi.org/10.3389/fpsyg.2019.02700>
 28. Wang, W., Tang, Y., Liu, Y., Zheng, T., Liu, J., & Liu, H. (2019). Can sense of opportunity identification efficacy play a mediating role? Relationship between network embeddedness and social entrepreneurial intention of university students. *Frontiers in Psychology*, 10, 1342. <https://doi.org/10.3389/fpsyg.2019.01342>

APPENDIX A

Table A1. A fragment of the survey questionnaire within SEAS – Survey on Entrepreneurial Attitudes of Students

Students' card number/ID number

1. Sex:	<input type="checkbox"/> female(1)	<input type="checkbox"/> male(2)			
2. Nationality:					
3. For each task, rate your level of confidence on a scale (1 = "not confident"; 5 = "completely confident")					
1. I can identify market opportunities for a new business.	1	2	3	4	5
2. I can write a formal business plan.	1	2	3	4	5
3. I can convince others to invest in my business.	1	2	3	4	5
4. Rate your level of agreement on a scale (1 - I strongly disagree; 2 - I do not agree; 3 - I somewhat agree; 4 - I agree; 5 - I definitely agree): In corporations, compared to family businesses					
1. Work is more attractive	1	2	3	4	5
2. Job insecurity is higher	1	2	3	4	5
3. The opportunities to develop competences are greater	1	2	3	4	5
5. Assess whether each of the following aspects of running a business would be <u>attractive</u> for you					
<input type="checkbox"/> self-realization (1)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> prestige (2)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> create new work places, contribute to economic development (3)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
6. Assess whether you would be afraid of each of the following aspects of starting your own business					
<input type="checkbox"/> lack of capital (1)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> the risk of failure (2)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> high competition (3)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> lack of experience and knowledge (4)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> lack of free time (5)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> underdeveloped idea for business (6)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> income insecurity (7)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> complicated procedures and regulations (8)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> lack of state support (9)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> lack of support from family and friends (10)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
<input type="checkbox"/> too high costs of running a business (11)	<input type="checkbox"/> no(1)	<input type="checkbox"/> rather not(2)	<input type="checkbox"/> neither yes nor no(3)	<input type="checkbox"/> rather yes(4)	<input type="checkbox"/> yes(5)
7. Rate on a scale how well statements below describe you (1 – definitely not; 2 – rather not; 3 – neither yes nor no; 4 -rather yes; 5 - definitely yes):					
I will make every effort to start and run own business	1	2	3	4	5