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What are the Critical Premises for the Entrepreneurial Development of University Students?

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Abstract

The article aims to propose an approach to the development of the entrepreneurial spirit of university students based on a prediction model. The intention is to analyse the environment for the development of the entrepreneurial spirit of university students.

The basis for the prediction model is the results of the international quantitative survey 'Global University Entrepreneurial Spirit Students' Survey' (GUESSS) carried out over a 2 to 3-year period, specifically the study in 2016, 2018 and 2021.

Data Mining Software for working with big data was used, specifically IBM SPSS Modeler 18.3 and IBM SPSS Statistics 28 (Decision Tree, Neuron Network).

The novelty is in explaining the learning process through different types of education, from the bachelor's degree towards the highest step of education, from the Triple Helix approach. The study is not oriented just on the economics faculties but includes all the types of study programmes at universities from a long-term perspective.

Analyses of students' views, thoughts and opinions contribute to the fact that the authors can define the essential factors of the so-called entrepreneurial spirit. The survey seeks ideas that deal with, for example, business plans, growth and performance of new businesses, succession in the family business and factors that influence the decision to start a business in 52 countries (267,000 respondents).

The clarified model can evaluate the perception of entrepreneurship in terms of intentions and attitudes. This unique approach brings a new quality to students' entrepreneurship's educational and training process.

Keywords: entrepreneurial student's spirit, entrepreneurship intention, career motivation, prediction model, data mining methods.

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1. Introduction

The role of student's attitudes towards entrepreneurship intensifies. In contrast, the part of family background influence decreases in creating career plans (plans immediately after graduation and five years later); therefore, universities are becoming essential to the business ecosystem and can significantly impact student career plans (Gubik, 2021). Understanding students' opinions, especially critical motivations, can increase their interest in entrepreneurial activities. This indicates that changing the traditional curriculum is necessary to make entrepreneurial careers more attractive. Therefore, there is a need to develop new solutions that allow students to deepen their knowledge through experience and enable them to try different roles. Students must learn during their studies to identify and solve problems, calibrate risks, work in teams and communicate (Dodgson, Gann, 2020). The authors of this article analysed how university students who want to run a business after graduation think about the possible risks and how they prepare for their future entrepreneurship and predict which students have a solid motivation to become entrepreneurs soon.

This paper explains the development of the predictive model of entrepreneurial spirit, within which the most critical identified predictors for determining whether the students will incline more towards the career path of an employee or an entrepreneur. The model maps university students' perception of intention and attitude towards entrepreneurship and risk. Based on the identified predictors from the literature review, a draft approach to developing the entrepreneurial spirit of university students was prepared.

The article brings innovations to identifying students' interest in entrepreneurship and entrepreneurship. This knowledge allows universities to set their educational programs on time and catch those interested in these activities. Such an approach by universities will also contribute to the innovative activities of the entire university environment.

The following part of the article reviews the literature from different perspectives (entrepreneurship environment, intention and attitude to entrepreneurship, and influence of university education on entrepreneurship). Other parts of the article describe the data and the model's development, including the discussion and conclusion.

2. Literature Review

The literature review focuses on the business environment and the issue of risks in the broader context. The authors also considered the main aspects influencing business choice over employment, intention and surroundings. They found inspiration in the Triple Helix Model (Etzkowitz, 1993 and Carayannis et al., 2022), which refers to a set of interactions between the academic community (university), the private sector and the government to promote the economic and social development of society. Within this approach, the article's authors defined three pillars influencing the model of entrepreneurship education at universities. The government sets business rules, which affects the 'entrepreneurship environment' factor. The private sector is about the 'intention and attitude to entrepreneurship', and the academic environment shapes students interested in entrepreneurship within 'university education'. The authors used the Prisma method for the systematic literature review. They used the Web of Science database with the keywords Entrepreneurship, Triple Helix and Support, searching just articles (n = 67) with the impact of the entrepreneurship environment, the intention of students, and the influence of the university.

2.1. Entrepreneurship environment

The current business environment is characterised by considerable turbulence and uncertainty, so it is necessary to anticipate certain obstacles and risks during start-up activities, whether the problems are related to the business environment or decision-making (Rotariu, Feder, 2008; Linton, 2019). Therefore, research from authors Lumpkin and Dess (1996) shows that it is complicated to start a business without these prerequisites.

The article's authors are members of a community in Czechia that aims to arouse the interest of university students in entrepreneurship. Thanks to these activities, students can gain valuable experience that they will later apply professionally. These activities include organising competitions to support start-ups' creation, financing, and sharing their positive and negative experiences.

The proposed model aims to identify active students at the university interested in entrepreneurship as soon as possible and offer them suitable educational courses. The authors presented the first idea and the draft of the prediction model at the 29th Interdisciplinary Information

Management Talks 2021 conference (Rydvalova et al., 2021). Based on the discussion at this conference, they subsequently finalised it and updated it with newly obtained data.

2.2. Intention and attitude to entrepreneurship

Another important aspect of interest in entrepreneurship is personality characteristics: being independent, active and being a leader (Belz, 2000; Hargie et al., 2004 and Nöllke, 2015). Another factor related to interest in entrepreneurship is the student's family environment (Breivik et al., 2020). This aspect is also explained in detail in a study by Lopez and Alvarez (2019). The authors found the same evidence in Gubik's (2021) and Zhao et al.'s (2005 research). These authors also mention the courage to take existential, physical, and economic risks.

Authors of many studies focused on entrepreneurial intentions and their features as gender, age, parents, self-efficacy, risk and environmental characteristics. Many gender studies discussed men's strong predisposition (Zhao et al., 2005; de Bruin et al., 2007; Gupta et al., 2009). Another feature is age. Young people are more energetic, dynamic, and enthusiastic (Alvarez Herranz et al., 2011). The next feature – parents – is that entrepreneurial parents motivate young people to engage in activities (Antlová et al., 2017). The last feature (self-efficacy) means that people strongly believe they can start and run their businesses (Rakib et al., 2020).

2.3. The influence of university education on entrepreneurship

Universities introduce new curricula (Prameswari et al., 2020), promote creativity (Gabrielson et al., 2020) and provide adequate knowledge (Shirokova et al., 2016). The analyses from Landstrom et al. (2022) prove this topic is a novelty and challenging current knowledge. During the study, the students can try to develop some business projects to learn how to prepare for future companies. In this university environment, start-ups can begin (Antlová et al., 2017).

According to Sieger et al. (2016), universities often do not contact all the students to discuss the possibility of improving their entrepreneurship skills. Still, they focus on students keen to enhance their entrepreneurship skills or those with the entrepreneurship field of study. So, the longitudinal study of the article authors brings up how to identify the focus groups of students. Here, we can mention, for example, the article by Leith and Harrison (1999). They point to a three-stage model of the evolution of entrepreneurship education (hereafter also EE), published in 1994. They divided the development of EE into three stages/approaches. The first approach characterised business education as a subset of general management education. The second approach distinguishes entrepreneurship education in small businesses from the managerial executive in large companies. They subsequently defined the third stage in developing education in the context of the needs learning organisation. Leitch and Harrison (1999) later discuss the historical development of the management and business education approach, which was essential in the 1950s, in six main areas: accounting, economics, finance, management, marketing, and production. The research of Leitch and Harrison (1999) states that it is crucial to apply this method in the context of who is learning, what is being taught, how it is being taught, and where and when it is being taught. At the end of their research, they state that entrepreneurial learning is not necessarily understood as unique but within a broader framework that enables a comprehensive reconceptualisation of management education.

Landström et al. (2022) confirm in their research that entrepreneurship education (EE) is a young and growing research field. Maike Liu et al. (2022) state that universities can support student entrepreneurship in many ways. Schrör (2006) states that a university education is not a necessary condition for starting a business, but it can be one of the crucial factors for business success. In his results, Schrör demonstrates that the evaluation of invention by entrepreneurs correlates with the level of education. Also, Vesper and McMullan point out that entrepreneurship courses help graduates make better entrepreneurial decisions by working in the start-up process (Vesper, McMullan 1997). As stated by Lüthje and Franke (2002), most surveys show that entrepreneurship education encourages graduates to start their businesses. The question is how to implement such EE in practice and ensure the development of students' entrepreneurial spirit at the university. The authors are seeking an answer to this question and defined three research questions (RQ) to fulfil the article's aim.

RQ1: Definition of essential predictors for specifying business perception regarding intention and attitude, based on clarifying respondents' approach to risk (GUESSS data 2016, 2018, 2021). Additional criteria for entrepreneurial self-efficacy are field/industry, gender and nationality.

The output is a predictive model of entrepreneurial spirit.

RQ2: Confrontation of the relationship between entrepreneurial self-efficacy and participation in professional courses and education for entrepreneurship during university studies (GUESSS data 2016, 2018, 2021). In this second part of the research, the identified significant predictors are evaluated concerning whether the student actively participates in courses/business education. This relationship can be called 'the effect of entrepreneurial education'. The assumption is that the students' entrepreneurship competence will improve with the completed courses.

RQ3: Proposal of an approach to education for entrepreneurial activities concerning the identified main predictors of the prediction model in the context of entrepreneurship education score. The output is an educational proposal to support the entrepreneurial spirit at universities. The theoretical framework in a study comprises a critical and organised analysis of the literature relevant to the topic, providing a theoretical contextualisation and defining the key concepts. It must comprehensively contain theories, models and previous research, identifying gaps, contradictions and consensuses in the literature that are important for the focus of the work being developed.

3. Methodology

The input data for the prediction model comes from the international GUESSS survey (Global University Entrepreneurial Spirit Students' Survey), details of which can be found at http://guesssurvey.org. This project has three main objectives: 1) to systematically monitor students' entrepreneurial intentions and activities; 2) to identify factors influencing the creation of new businesses and entrepreneurial careers in general; and 3) to analyse and evaluate university activities in the field of student entrepreneurship education (see Sieger et al., 2021). The study's authors use a large data sample from the international GUESSS survey from the last three waves of the survey (in 2016, 2018 and 2021). They participated in the global study in 2015 and subsequently participated in the survey in 2016 when a total of 122,509 respondents responded. In 2018, the number of respondents increased to 208,000, and in 2021, more than 267,000 students worldwide participated in the survey. Participation in this international study is voluntary, but the survey methodology has remained unchanged since 2003. This suggests that while individual measurements may be imprecise in the short term, they maintain a consistent level of imprecision over the long term, allowing trends to be identified.

In addition to the literature review, this study used a software solution for big data analysis. Specifically, the authors worked with IBM SPSS Modeler 18.3 and IBM SPSS Statistics 28.

Decision tree algorithms were mainly used to create prediction models. The development of the model was divided into three steps. The following text explains the process of creating a conceptual research model; see the diagram in Figure 1.

In the first part of the research, a dataset is created for the period 2016 to 2021 with the definition of the critical characteristics of the respondents, their choice of future career path and comments on business opportunities. In the second part, the choice of a career path and students' expression of entrepreneurial skills and attitudes to risk are confronted. A training set is prepared to create a prediction model. Subsequently, a prediction model using decision trees from the GUESSS survey data (2016, 2018 and 2021) determines significant predictors based on this.

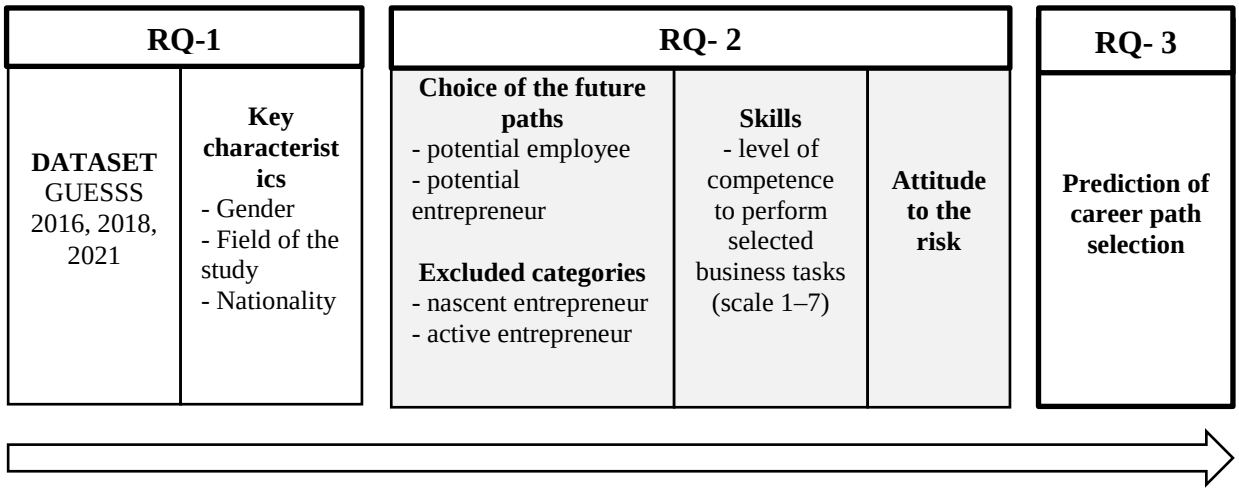

Fig. 1. Research conceptual model (Rydvalova et al., 2021)

The target variable of the prediction model is the student's career choice as an entrepreneur. It is defined by the evaluation of the answers to the questions of whether the student wants to be an entrepreneur or an employee:

– An employee immediately after graduation or five years after graduation,

– Entrepreneur (founder working in his firm, successor in a family business, successor in another company),

– Another variant/they don't know yet – this group was not included in the prediction model.

It means two variables were defined: 'I want to be ... immediately after graduation' and 'I want to be in five years after graduation'. Variables take on values: entrepreneur or employee or others. The so-called entrepreneurial spirit, i.e. entrepreneur or employee, was subsequently defined from these variables. In the first step, 'potential entrepreneurs' are defined as students considering starting a business immediately or five years after graduation. In the second step, the 'potential employee' group is dealt with when the student wants to be an employee immediately or five years after graduation.

Entrepreneurial spirit

In a questionnaire survey, the authors investigated students' career preferences. As highlighted in the literature review, risk and responsibility – especially the potential for failure – are closely linked to entrepreneurship. It is, therefore, reasonable to assume that students who plan to start a business perceive risk as an integral part of their journey and are willing to accept it. In contrast, students who want to become employees (i.e. potential employees) tend to be more risk-averse and less uncertainty-averse (Rydvalova et al., 2021).

Respondents interested in entrepreneurship were asked additional questions regarding their entrepreneurial views, potential plans after university, and those already starting a business (labelled 'NASCENT'). They answered queries assessing the respondents' relationship to entrepreneurship. In subsequent waves of the GUESSS survey (2018 and 2021), the same questions focus only on students who are not starting a business (i.e. only potential employees and potential entrepreneurs). For this reason, the GUESSS 2016 data set on students labelled 'NASCENT entrepreneurs' was cleaned.

To develop a predictive model, the authors analysed students' career expectations immediately after graduation and five years later. In addition, students who were classified as NASCENT (those attempting to start a business) and ACTIVE (those already running a company) in the GUESSS survey were excluded from the dataset. The GUESSS survey also includes questions on different perspectives on entrepreneurship, building on previous research on college students' attitudes toward entrepreneurship (see Liñán, Chen, 2009). This research applies Ajzen's theory of planned behaviour to design an Entrepreneurial Intention Questionnaire (EIQ), which highlights how cultural values influence individuals' perceptions of entrepreneurship (Rydvalova et al., 2021). This approach shows how cultural values change how people perceive entrepreneurship. As the article's introduction mentions, another factor is the ability to face risk when assessing entrepreneurial self-efficacy (Zhao et al., 2005).

Students who are not yet entrepreneurs answered questions about their ability to perform various tasks related to business activities. Seven answers were on a Likert scale (1 = very low competence, 7 = very high competence). Suppose we compare the answers of students interested in becoming an employee with those of students who want to start a business; students interested in starting a business rate their competencies and skills much higher. The results of the survey from the last three questionnaire waves (in 2016, 2018 and 2021) are presented in Table 1. We can also notice here that high ratings prevail and do not change in individual questionnaire waves.

4. Results and Discussion

As a follow-up to the findings, it was possible to fulfil research questions, i.e. to predict the entrepreneurial spirit among university students.

The proposed model also considers additional characteristics of respondents, including gender, field of study, and nationality. Following this, a training set was prepared to develop the prediction model. Finally, a test set was utilised to evaluate the model's accuracy. During the prediction process, the values of the predictor variables were known, but the target variable, which the model aimed to determine, remained unknown.

Table 1. Answers to self-assessment

	Identifying new business opportunities [%]			Creating new products and services [%]			Managing innovation within business [%]			Being a leader and communicator [%]			Building up a professional network [%]			Commercialising new ideas or developing [%]			Successfully managing a business [%]		
Year	2016	2018	2021	2016	2018	2021	2016	2018	2021	2016	2018	2021	2016	2018	2021	2016	2018	2021	2016	2018	2021
1	6,26	7,23	6,73	6,62	7,79	7,07	6,69	8,2	7,29	3,57	4,63	4,29	5,15	6,78	6,29	5,98	7,62	7,2	6,94	8,24	7,53
2	9,92	10,51	9,39	10,44	10,85	9,87	8,62	9,25	8,68	4,99	5,83	5,31	7,26	8,45	7,78	8,19	9,18	8,7	8,02	8,57	7,97
3	15,47	15,78	14,45	15,94	16,07	14,86	13,33	13,41	12,44	9,18	9,75	8,84	12,8	13,27	12,32	13,01	13,37	12,75	11,4	11,49	10,72
4	21,92	21,74	21,21	22,33	21,58	21,17	20,39	19,6	19,29	16,14	15,74	15,25	21,39	20,32	20	20,54	19,68	19,36	19,86	19,08	19,53
5	24,48	23,41	23,87	23,47	22,23	22,91	23,5	22,11	22,76	22,65	21,14	21,25	24,37	22,4	22,48	23,65	21,7	21,99	21,59	20,29	20,8
6	15,18	13,73	14,98	14,33	13,65	14,79	18,29	17,09	17,88	24,73	22,79	23,3	18,76	17,42	18,21	18,65	17,12	17,43	19,33	17,78	18,29
7	6,78	7,61	9,35	6,87	7,84	9,34	9,18	10,33	11,66	18,75	20,12	21,75	10,27	11,37	12,92	9,99	11,33	12,57	12,86	14,55	15,17
Total 1-3	31,65	33,52	30,57	33	34,71	31,8	28,64	30,86	28,41	17,74	20,21	18,44	25,21	28,5	26,39	27,18	30,17	28,65	26,36	28,3	26,22
Total 5-7	46,44	44,75	48,21	44,67	43,72	47,03	50,97	49,53	52,3	66,13	64,05	66,31	53,4	51,19	53,61	52,29	50,15	51,99	53,78	52,62	54,25

This model is designed to estimate whether a student will be interested in entrepreneurship or want to be employed after graduating from school based on the student's answers to the questions from the questionnaire survey. The model identifies a student interested in entrepreneurship considering starting his own business within five years after graduating. The article's authors used the learning principle and prepared several models using the criteria found (nationality, field of study, gender, statement defining entrepreneurial competence). The authors divided the obtained data into two sets (training and testing) – Table 2 lists four IBM SPSS Modeler algorithms. The following text provides an example of a model: "A student fills out a questionnaire and answers, among other things, questions regarding nationality, gender, field of study, and his assessment of his competencies and skills regarding entrepreneurship. From these values, whether this student is interested in entrepreneurship after graduating can be estimated. Table 3 lists these developed models. The authors mainly used decision trees (binary and general) for prediction. The properties of general decision trees are the possibility of having several branches, then more straightforward interpretations, usually fewer levels and algorithms: CHAID, C5.0. The properties of binary decision trees are two components leading from a node: faster calculation, naturally more levels, and algorithms, such as C&RT and QUEST. The advantage of trees is that they can evaluate the quality of decision-making (Witten, Eibe, 2017).

Table 2. Results of prediction of students entrepreneurial spirit from years in 2016, 2018, and 2021

Decision Tree	**The success of the model with trainee (%)**			**The success of the model in testing (%)**			**Predictor importance**		
Year	2016	2018	2021	2016	2018	2021	2016	2018	2021
Neuron network	67,94	66,87	67,36	67,56	66,47	67,15	Nationality	Nationality	Nationality
C5.0	72,74	71,12	68,62	66,94	65,94	68,48	Nationality	Searching for new business opportunities	Successfully managed the business
C&RT	64,63	65,35	65,32	64,36	65,06	65,74	Successfully managed the business	Searching for new business opportunities	Searching for new business opportunities
CHAID	68,3	66,73	66,26	67,44	65,5	66,47	Nationality	Searching for new business opportunities	Successfully managed the business

Commentary on Table 2: Searching new business opportunities (responses according to the level of agreement, it means 1 = very low competence; 7 = very high competence) = Predictor A; Successfully managing a business (1 = very low competence, 7 = very high competence) = Predictor B.

The secondary output of the model is the determination of the significance of the predictors. Of these, in addition to 'nationality', two other essential predictors were identified – characteristics for identifying entrepreneurial spirit ('Searching of new business opportunities' and 'Successfully managing the business').

The next step was to find the connection between entrepreneurial self-efficacy and the active involvement of students in entrepreneurship education. Based on this, an assessment of the impact of entrepreneurship education was carried out.

The influence of education on the entrepreneurial spirit

As mentioned above in the methodology, research question goal 2 is the confrontation of the relationship between entrepreneurial self-efficacy and participation in professional courses/learning for entrepreneurship during university studies. Data on the involvement in entrepreneurship education courses are also part of the international GUESSS research. Thus, it is possible to connect the answers of the sample of respondents in the prediction model with their participation in entrepreneurship education for the same period (GUESSS data 2016, 2018, 2021).

The problem is that the answers to these two areas cannot be easily compared. In assessing skills defining ENTREPRENEURIAL SPIRIT (predictors A, B), the degree of agreement can be answered (from 1 to 7). Questions focused on ENTREPRENEURSHIP EDUCATION could answer YES/NO, or they did not have to answer. It was necessary to find a space where these areas meet. The following was done: for each value of the degree of agreement (in the range of 1 to 7) for both predictors A and B (in each year separately), count the number of respondents who answered YES to the individual education questions.

The results of the sum of participation in the courses were subsequently expressed as a proportion of the answered questions. The evaluation of the influence of entrepreneurship education was thus carried out based on analysis using graphs for each year separately for individual expressions of self-evaluation skills with a degree of agreement on a Likert scale from 1 to 7 (see skills listed in Table 1), and this compared to a group of questions focused on entrepreneurship education with the possibility of choosing multiple options.

The survey was conducted only for the most essential predictors of the Entrepreneurial spirit model:

– Predictor A: Identifying new business opportunities (responses according to the level of agreement, which means 1 = very low competence; 7 = very high competence).

– Predictor B: Successfully managing a business (1 = very low competence, 7 = very high competence).

Self-evaluation in question Entrepreneurship Education (answers 0 = NO; 1 = YES), multiple answers possible):

1. I have not attended a course on entrepreneurship so far (code EE1).
2. I have attended at least one entrepreneurship course as an elective (code EE2).
3. I have attended at least one entrepreneurship course as a compulsory part of my studies (code EE3).
4. I am studying in a specific program on entrepreneurship (code EE4).
5. I chose to study at this university mainly because of its strong entrepreneurial reputation (code EE5).

The article's authors assumed that students with higher competencies in predictors A and B, i.e. with a higher level of agreement (5, 6, 7), are also more interested in entrepreneurship education. This is also explained in Table 3. In all three waves of the questionnaire survey, predictors A and B have a higher level of agreement, as students who decided to study at the university due to its good reputation in entrepreneurship.

Table 3. Competence evaluation (scale 5 – 7 – predictor A a B)

	Percentage agreement with competencies concerning type of Entrepreneurship Education (EE)				
Predictor (assessed competence) in year:	EE1 [%]	EE2 [%]	EE3 [%]	EE4 [%]	EE5 [%]
A-2016	39,61	57,86	53,65	60,19	73,83
A-2018	37,18	57,24	54,32	62,40	71,44
A-2021	39,80	61,95	58,49	68,91	77,56
B-2016	46,81	64,68	62,16	68,69	78,84
B-2018	45,45	64,37	61,98	69,61	77,51
B-2021	46,73	65,72	62,50	72,37	80,89
A-average through the years 2016-2021	38,86	59,02	55,49	63,84	74,28
B-average through the years 2016-2021	46,33	64,92	62,21	70,22	79,08

Table 3 shows the assessment of the degree of agreement with predictor A – Identifying new business opportunities (answers using the degree of understanding, i.e. 1=very low competence; 7 = very high competence) in 2021, always by students who are not yet entrepreneurs. At the same time, interest in business education is here – EE (percentage share of agreement with participation in a given type of education among all those who expressed their opinion).

The variant of entrepreneurship education EE1: If the student did not attend the course on entrepreneurship, his level of agreement with predictor A also decreases. As we can see, only 39.86 % of students who did not participate in the business course in total (i.e., evaluation of the given competence on a scale of 5 to 7) had a higher level of agreement with predictor A.

The variant of entrepreneurship education EE2: Completing at least one entrepreneurial course as an optional subject simultaneously with a higher degree of agreement with predictor A was indicated by a total of 61.9 % (i.e. evaluation of the given competence on a scale of 5 to 7). Here is an interesting comparison with the compulsory course variant. If the student takes only one course, an optional subject is more suitable than a compulsory one. The variant of entrepreneurship education EE3: Completing at least one entrepreneurial course as a mandatory part of the study at the same time with a higher degree of agreement with predictor A was indicated by a total of 58.5 % (i.e. evaluation of the given competence on a scale of 5 to 7).

The variant of entrepreneurship education EE4: It is evident that a higher degree of agreement with predictor A (i.e. value 5, 6, 7) is further associated with the student's answer that they are studying a specific programme on entrepreneurship, a total of 68.9 % of respondents (i.e. evaluation of the given competence on a scale of 5 to 7).

The variant of entrepreneurship education EE5: In total, 77.6 % of students who rated their competence in the field of 'Identifying new business opportunities' with a higher degree of agreement (i.e. rating the given competence on a scale of 5 to 7) state that they chose their university precisely because that it has a 'strong entrepreneurial reputation'.

As mentioned above, the degree of agreement with the given competence marked as predictor A increases with the conceptual approach to EE. Interestingly, we see a slight decrease in agreement with competence concerning the subject's optionality (EE2) or obligation (EE3) in this area of education. Keeping a particular interest in EE within study programmes that are not directly focused on EE can be recommended. This pattern of behaviour can be observed in all three periods, 2016, 2018, and 2021, for both predictors A and B (see Table 3), even during the pandemic period.

The limitation of the survey is that the questionnaire is voluntary and is not primarily focused in any particular way. However, the methodological procedure is always the same, which has been the case since 2003. Based on this, it was concluded that in the short term, all measurements are imprecise, but in a long time, they are still equally vague, and in the case of extensive data, it is

possible to proceed to define a trend. The authors expect new data from a future survey in 2025 and would like to continue developing more precise models with other predictors, such as the main field of study.

5 Conclusion

Based on the research results, diversifying education supporting entrepreneurship is necessary. To the prediction model of entrepreneurial spirit (see Table 3), the most critical factors for stimulating interest in entrepreneurship among university students are nationality, the ability to identify new business opportunities, and successfully managing a company. The authors expect to improve the educational process and develop a new approach to entrepreneurial education soon.

The nationality factor is a determinant linked to the institutional environment that affects business activities in a given country. The institutional environment plays a significant role in motivating entrepreneurship and creating barriers or restrictions when setting legislative requirements, regulations and conditions. The influence of the institutional dimension (regulatory, normative and cultural-cognitive) on the probability that a person will become an entrepreneur was discussed, for example, by Urbano and Alvarez (2014). In connection with the above, introducing entrepreneurship education at universities across study programmes can be recommended (see the simplified model, Figure 2). Model presents the concept of connecting the external environment from the point of view of the Triple Helix Model and the design of the educational concept based on the identified predictors of entrepreneurial spirit. Testing the entrepreneurial spirit has a massive benefit in preparing modern entrepreneurship courses and individual coaching students keen to have a business after graduation.

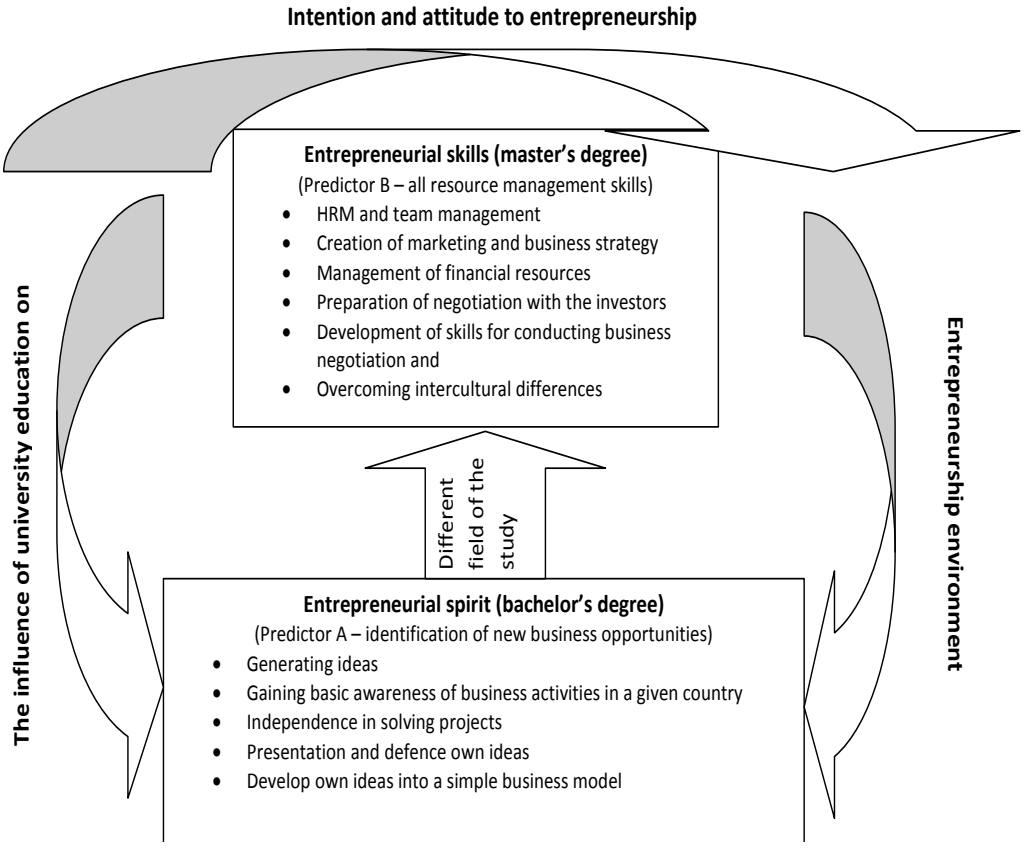

Fig. 2. A simplified model of university education for the development of the entrepreneurial spirit

In the bachelor's degree, the authors recommend focusing on the issue of generating ideas and gaining essential awareness of business activities in a given country. The ability to independently approach project solutions, present and defend your ideas, develop your idea into a simple business model, and prepare for business negotiations. As part of the subsequent degree of university studies, in connection with the definition of the meaning of the given start-up project, it is essential to practise managing all resources. In human resources management (HRM),

emphasis should be put on team management, the importance of individual roles in the team, and creating a marketing and business strategy. Also, it is necessary to be able to manage financial resources, including preparation for negotiations with an investor, developing skills the students need to lead business negotiations and overcoming intercultural differences. For doctoral students, training focused on creating academic spin-off companies can be considered.

Universities contribute to the entrepreneurial spirit, encourage creativity and provide relevant expertise in their study courses (Baubonienė, 2018). For example, in Austria, the concept of an entrepreneurial university was directly introduced (Sperrer et al., 2016). It is also essential to realise that the government's responsibility for tax policy and the overall business climate is vital for entrepreneurship development. Another significant factor is innovation. This also fits into the concept of the Triple Helix System, which was introduced in the nineties by the author Etzkowitz (1993). The results of the authors of the article and their proposed prediction model correspond to this concept.

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