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Unpacking the drivers of university students' entrepreneurial intentions: Individual mindset and contextual influences in EU and EU-candidate countries

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Abstract

This study explores the entrepreneurial intentions of university students from different educational, economic, and social backgrounds by comparing four European Union (EU) countries (Italy, Austria, Sweden, Greece) to an EU-candidate country (Bosnia and Herzegovina). Data were collected through surveys on a convenience sample of 301 students. The hierarchical regression and formal statistical hypothesis testing assess and compare the role of individual factors and contextual activating factors. In doing so, the paper adopts and adapts the EPIC tool, making it suitable for cross-country comparison. The results indicate a lack of significance of the risk-taking dimension, and a striking similarity in the influence of resources as a contextual activating factor, despite the differences of the investigated countries. In addition, the results indicate the individual mindset dimensions that significantly contribute to the entrepreneurial intentions of EU students (innovation-oriented, persistence, and peculiarity), and the different predictors for students from Bosnia and Herzegovina (innovation-oriented and action-oriented). The paper contributes to the stream of research on entrepreneurial intentions in higher education by assessing the individual and contextual factors within a fine-grained cross-cultural comparison. Insights for institutions and policymakers to enhance support and resources for aspiring entrepreneurs can ultimately be derived.

Keywords

student entrepreneurship, entrepreneurial mindset, entrepreneurial intention, university entrepreneurship, regional differences

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Introduction

Entrepreneurship is widely recognized as a key driver of economic growth and social change, and a variety of educational programs have been developed to foster entrepreneurial activities among university students, underlining their crucial role[1,2]. However, both individual factors and mindset[3] and contextual factors[4,5] strongly shape individual intentions to engage in entrepreneurial activities. Despite extensive research in the field,[6,7] few studies adequately integrate both individual and contextual factors in the application of intention-based models, comparing distinct socio-economic and cultural contexts. Significant gaps also remain in the analysis of Central and Eastern European (CEE) countries and those

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aspiring to join the European Union,[8] as much of the empirical research focuses predominantly on Western Europe. This limited attention restricts a comprehensive understanding of how contextual specificities influence entrepreneurial intentions of university students[9] in different national contexts[2,8], especially in the case of transitional economies, where it is essential to assess the impact of the broader institutional environment.[9,10]

In an attempt to fill in these gaps, this study seeks to identify key predictors of entrepreneurial intentions of university students in a convenience sample of EU countries (Italy, Austria, Sweden, and Greece) compared to Bosnia and Herzegovina, an EU-candidate country. The study then examines the impact of different individual factors of the entrepreneurial mindset on the entrepreneurial intention, along with contextual activating factors that may indeed significantly influence the entrepreneurial intention of young people[11,12] and their job pursuit[13]. The study specifically assesses differences in contextual activating factors by exploring the role of institutional resources, support and national context.[14,15]

For the purpose of this study, the focus is on Bosnia and Herzegovina (BIH) as a transitional economy that exhibits cultural and institutional characteristics that differ from those of the selected EU members. For example, while EU countries—particularly in Western and Northern Europe—tend to display higher levels of individualism, BIH is marked by stronger collectivist orientations, where group goals are valued over individual autonomy. BIH also emphasizes relational and quality-of-life aspects to a greater extent, compared to EU societies that are generally more driven by achievement and success as markers of status. To account for these differences, a modified entrepreneurial mindset assessment tool based on the EPIC, developed by HEInnovate and integrated with validated scales, has been tested and modified to fully capture the unique nuances of the targeted countries.

The study highlights two key outcomes that challenge long-held beliefs in entrepreneurial literature. First, with regard to the influence of EM dimensions on EI, risk acceptance does not emerge as a significant predictor of entrepreneurial intention in either the EU or EU candidate countries. This calls into question the assumption that risk-taking is a core and universal component of the entrepreneurial mindset. Secondly, in terms of contextual activating factors, resources significantly affect entrepreneurial intentions in both BIH and EU students, and there are no statistically significant differences in this effect between the two groups. In addition, the results reveal the specific dimensions of the entrepreneurial mindset that characterise students from the EU and BIH, as well as the role of contextual activating factors. While innovation-oriented entrepreneurial mindset significantly predicts entrepreneurial intention in both EU and EU-candidate country contexts, the remaining significant predictors differ across contexts. In EU countries, peculiarity and persistence emerge as significant predictors, whereas in the EU-candidate country, action-oriented entrepreneurial mindset and age play a significant role.

Based on these key findings, the study presents a threefold contribution. From a theoretical perspective, it makes a valuable addition to the literature on entrepreneurship. First, results may reflect broader changes in how younger, university-educated individuals perceive and approach entrepreneurial risk. Second, students' perceptions of the resources available in their local environment, shaped by subjective interpretations, local norms and institutional signals, appear to influence entrepreneurial intentions more than objective measures. In addition, by including university students from selected EU countries (Italy, Austria, Sweden, and Greece) and Bosnia and Herzegovina, an EU-candidate country, the study expands the geographical scope of the debate by exploring a relatively under-investigated geographical area and specific factors that influence entrepreneurial intentions. Finally, from a methodological perspective, the study validates an assessment tool for entrepreneurial intentions and mindset in order to address contextual differences among EU and CEE countries. While entrepreneurial intention is usually measured using standardised scales that assume cross-cultural equivalence; conversely, this study complements previous calls emphasising the need to validate such tools across countries[12,13]. Unlike prior research, this approach captures national and institutional specificities and their role within intention-based models.[14,15]

In terms of implications, the findings provide a framework for educational policy development, as the differentiated predictive power of specific mindset dimensions across socio-economic settings offers a basis for targeted interventions.[3]The paper is structured as follows: the next section outlines the theoretical framework, the third section presents the methodology, the fourth section presents and discusses the results, and the final concluding section discusses the research's contributions and limitations, as well as future research directions.

Literature framework

Entrepreneurial intention: The role of individual and contextual factors

The assessment of entrepreneurial intention (EI) has become increasingly important since the use of intention-based models helps to better understand what factors lead to the entrepreneurial activity.[15,16] Starting from the 1990s, it has

emerged as a well-established area of research,[17] but it is only in the last decade that studies of intention as an antecedent of entrepreneurial behavior have flourished.[12,15] Several theoretical models have consistently demonstrated that behaviors are preceded and influenced by intentions, with stronger intentions exerting a greater impact on the direction and enactment of individual actions. However, traditional models like Ajzen's TPB[14] focus on attitudes, norms, and perceived behavioral control; conversely, by extending the TPB, other dimensions such as self-efficacy, identity and more nuanced components related to personal intrinsic motivations have been identified as key determinants of EI.[9,15] Since individual intention is considered to account for one-third of the actual behavior of being an entrepreneur, much emphasis has been - and still needs to be - placed on more broader factors that could impact entrepreneurial activity[4,9] and in assessing EI.[17,18] The dimensions identified within the TPB itself are indeed the aggregation of numerous background factors,[14,16] which can be ultimately classified into individual (e.g., attitudes and personality traits, motivations) and contextual (e.g., socio-economic context, access to information and resources). Whether background factors or TPB's direct measures are employed depends on the objectives; the former are more appropriate for comparison and assessment than prediction of behaviour.[14,16] To understand EI, it is necessary to consider both individual attitudes, since EI is rooted in deep cognitive structures,[19] and the factors that can further shape it. These factors include differences in socio-economic and national contexts,[4,20] as well as institutional support.[9,21] Complementary predictors are therefore worth considering.[12,17]

An entrepreneurial mindset (EM) is defined as the set of personal skills and assets that sustain the intention to become an entrepreneur,[3,22] a way of thinking, or the ability to capture entrepreneurial opportunities.[23,24] Its dimensions indeed encapsulate those elements of an individual's background that shape EI and behavior. Socio-demographic and psychographic characteristics define the individual EM. For example, previous research has focused on autonomy, competitive aggressiveness, innovativeness, and proactiveness,[25] or on the personal attitude and inclination to start a new business and the perceived behavioral control.[26] In addition, mindsets are conceived as subject to experience and education,[24] therefore they can be influenced by learning experiences. The role of university educational programs in influencing students' EM remains a major debate,[10] and so does voluntary participation in entrepreneurship education programs.[12,27] Specifically, creative and innovative thinking, problem-solving techniques, and autonomy of thought and judgment,[27] self-efficacy and role models[9] have been explored with respect to EM of students in higher education.

Conversely, contextual background factors are identified as a function of cultural, national, and institutional variables.[3,15,23] As Welter (2011)[28] pointed out, "there is growing recognition in entrepreneurship research that economic behavior can be better understood within its historical, temporal, institutional, spatial, and social context" (p. 165), evidencing a growing interest in contextual factors. The complexity, dynamism, or uncertainty of the context in which entrepreneurs would operate can then be considered as activating factors for EI.[3] Furthermore, these factors can vary considerably from one country to another, which could result in differences in the extent to which they influence EI. While previous studies have predominantly examined entrepreneurial intention at the national level, the nuanced role of contextual variables has largely been overlooked. In addition, much of the existing empirical research on EI has focused on developed regions. In contrast, our study explores the contextual activating factors in greater detail, highlighting the impact of activating elements within institutional resources and support. The comparative analysis proposed will then add a fine-grained, cross-cultural perspective to the existing empirical research on EI.

The role of institutional resources and support

It is widely recognized that institutional resources and support can either boost or limit the opportunity to start a new business,[12,29,30] similarly to policies at the regional level.[31] Previous research has shown that institutional resources and support influence individuals in the early stages of the entrepreneurial process,[32] and that university culture and policies play a central role in influencing university personnel and students' EI.[32,33] However, those factors need to be further explored[12,17], as individual perceptions of these elements may deeply influence whether or not to start a new business.[17] Overall, universities can create a nurturing environment for the entrepreneurial attitudes of faculty members and students,[10,32] for example through positive recognition and encouragement of individual entrepreneurial activities. A key role is also played by the strong presence of structures that support entrepreneurship, such as a technology transfer office,[32] both at central and departmental levels, together with the availability of specific financial resources and non-financial rewards.[34] In addition, the support generated within the university context is not only direct but also indirect, conveyed through an entrepreneurial culture that normalizes failure and fosters personal attitudes and self-efficacy.[35] This support operates through "sub-dimensions"[29], such as management imprinting, training programs, and related services. Moreover, it must be said that teaching staff can play a central role in shaping the EM of university students.[27] The university environment for students in higher education can deeply encourage entrepreneurial action, positively influencing EI.[10]

Universities are then embedded in a regional context, with their own specificities, and characterised by spread and efficacy of infrastructure, such as communication networks, easy access to financial resources, and the presence of

incubators. All these elements can enhance EI and facilitate the actual establishment of a new business. The presence of incubators or acceleration programs provides aspiring entrepreneurs with facilities, but also crucial networks and skills needed to start their entrepreneurial ventures,[12] while an institutional context richer in infrastructure and resources, including financial resources, is more conducive to entrepreneurship.[33] However, these elements may have a different weight and role depending on the national context under investigation. Despite being based on previous empirical studies, we can assume a positive impact on EI. This paper explores their impacts within a cross-country study to tackle any differences. EU countries may access venture capital and financial networks easily as funding programs are more widely spread; conversely, EU-candidate countries may have limited access to private funding for new ventures, while funding programs have started including CEE. These differences in institutional resources and support, based on the national context, can influence EI and the ease with which university students initiate entrepreneurial processes.

The national context and EI

Regulatory, normative, and cultural-cognitive elements[5,20] directly and indirectly influence the perceptions that individuals may have about the desirability and feasibility of becoming an entrepreneur.[13,34] Moreover, social norms influence the combined impact of students' attitudes and mindset,[3] and the perceived behavioral control and barriers towards EI.[15,27] Overall, cultural values and practices have also shown to deeply affect EI.[4,36] However, these culture-related factors, deeply anchored in a national context, require more investigation within intention-based models, such as TPB.[15,17] Past studies have indeed shown that, while common antecedents to students' EI exist, their magnitude varies across cultural contexts.[37–39] The national context is the expression of specific values, historical particularism, and heritage that may present the entrepreneurial activity as more (or less) desirable.[35,36] For example, business failure is perceived quite differently in the U.S., where it is accepted as a learning experience, while in Europe it is highly stigmatized.[37] National culture plays a role in translating entrepreneurial intentions into specific actions, and some cultures are seen as more compatible with individual entrepreneurial involvement than others.[4,36] Aspiring entrepreneurs are less likely to take action in countries where resources are concentrated among a select few groups of individuals, where inequality is prevalent, or where uncertainty is avoided in favor of more structured actions.[4]

Overall, studies on CEE countries or countries aspiring to join the EU lack focus.[8] The diversity within CEE countries in terms of economic development, EU membership status, and cultural influences is often overlooked. Indeed, comparative studies are rare and the lack of such granular insights limits the possibility to design specific interventions. The present study then compares selected EU countries (Austria and Sweden as central-northern EU countries, and Greece and Italy as southern EU countries) to Bosnia and Herzegovina as an EU-candidate country. Italy has been a member of the EU since 1958, Greece since 1981, while Austria and Sweden joined the EU in 1995. Based on the recommendation of the European Commission, the European Council decided to open accession negotiations with Bosnia and Herzegovina in March 2024. As far as cultural differences across EU countries are concerned (e.g., Refs. 8 and 38), historical and cultural backgrounds bring a legacy that influences social norms and, consequently, individual choices. As culture refers to shared "collective programming of the mind" that differentiates one national group from another,[40] it encapsulates values that are handed down through generations within a society, and which influence motivations, attitudes, and behavioral patterns. For example, individuals in Western European countries, which are more individualistic, view themselves as autonomous and independent from social groups, while in Eastern European countries individuals show greater collectivism, valuing group goals more than personal ones.[39] The individualism-collectivism orientation, considered as a proxy of the national social norms, is assessed as having an influence on individual behavior and, ultimately, on the individual EI especially in contexts where collectivism is predominant.[41] Hofstede's cultural dimensions also provide a useful framework for understanding cultural differences between countries[42] (Table 1).

Table 1. Hofstede's cultural dimensions.

Country	Power distance	Individualism	Motivation towards achievement and success	Uncertainty avoidance	Long term orientation	Indulgence
Austria	11	77	79	70	47	63
Greece	60	59	57	100	51	50
Italy	50	53	70	75	39	30
Sweden	31	87	5	29	52	78
Bosnia and Herzegovina	90	40	48	87	36	44

As can be seen from Table 1, there are differences between BIH and EU countries according to Hofstede's cultural dimensions scores. These differences are particularly pronounced in terms of power distance, individualism, and motivation towards achievement and success. Power distance indicates the extent to which unequal power distribution is accepted; high values reflect strong hierarchies, while low values emphasise equality. Individualism reflects whether members of society prioritise themselves and their immediate family or the collective. 'Motivation towards achievement and success' reflects a society's drive for competition and achievement versus valuing quality of life. Among the other dimensions, uncertainty avoidance shows substantial variation across societies, reflecting differing comfort levels with ambiguity. Long-Term Orientation contrasts societies that are focused on the past with those that are focused on the future, while Indulgence measures the degree to which people control their desires versus seeking enjoyment.[42]

As for broad economic characteristics, the selected countries present remarkable differences in economic and innovation indicators[1,43–47]. The GDP per capita in 2023 in Italy, Greece, Austria and Sweden was € 30320, € 18470, € 41350, and € 48880, respectively, while GDP per capita in Bosnia and Herzegovina was € 6781 in 2022. The average annual net wage in 2023 in Italy, Greece, Austria, and Sweden was € 23616.55, € 18248.62, € 32611.43, and € 28589.02, respectively. The average annual net wage in Bosnia and Herzegovina was € 7750 in 2023. Unemployment rates by age from 20 to 64 years in 2023 were 7.6% in Italy, 11% in Greece, 4.8% in Austria, 6.5% in Sweden, and 13% in Bosnia and Herzegovina. According to the European Innovation Scoreboard for 2024,[1] which shows the state of innovation performance in Europe, Sweden is classified as an innovation leader and ranks as the 3rd best country out of 39 countries, with the innovation index equal to 132.9% of the EU average. Finally, EU countries tend to have strong innovation ecosystems, while EU-candidate countries may experience weak systemic support for entrepreneurial and innovation activities. Austria is classified as a strong innovator, ranking 8th out of 39 countries with an innovation index equal to 116.3% of the EU average. Italy and Greece are classified as moderate innovators and rank as 20th and 24th countries with innovation index equal to 89.6% and 77.5%, respectively. Bosnia and Herzegovina is classified as an emerging innovator, and ranks 37th with an innovation index equal to 33.1% of the EU average. Progress in ESI innovation performance is crucial for advancing cutting-edge technologies and promoting a dynamic environment for both start-ups and established businesses.[1]

Methodology

Conceptual model

Figure 1 presents the conceptual model of this study. Overall, the indirect dimensions based on[14,16] have been used to capture personality traits, and intrinsic motivation, the perceived desirability, and the institutional support for starting an

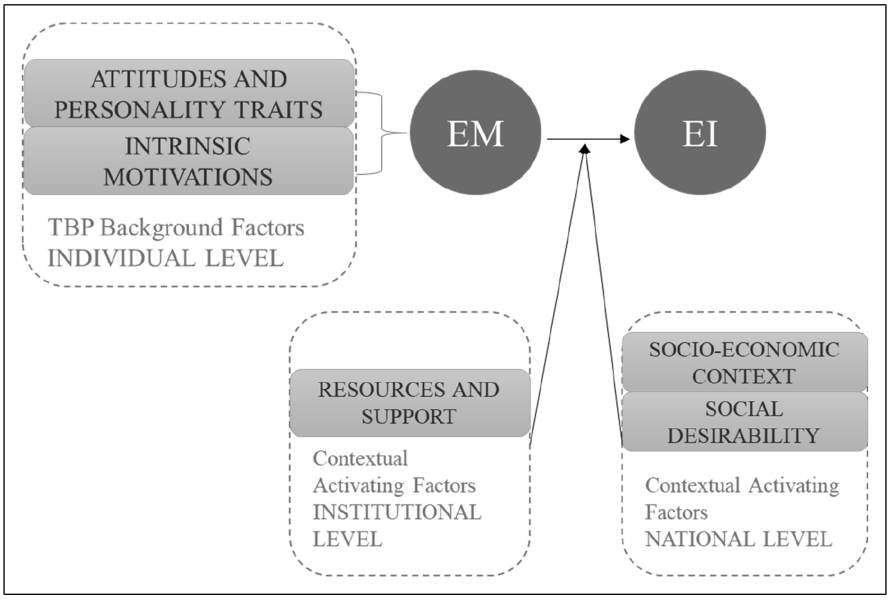

Figure 1. Conceptual model.

entrepreneurial activity in a given national context. The purpose is indeed not to predict any actual behavior, but to explore the intention to become an entrepreneur among university students in different national and institutional contexts.

For the sake of this study, we considered the following dimensions as individual mindset and background factors, and contextual activating factors. Individual factors are captured by dimensions of the entrepreneurial mindset. Innovation-oriented, peculiarity, innopreneurship, need to achieve, and persistence specifically reflect attitudes and personal valuations towards entrepreneurial intention. Confidence, experience, and action-oriented reflect the belief in own ability to perform entrepreneurial tasks and intrinsic motivation. These elements somehow reflect the individual, subjective judgment of the desirability of the behavior, based on background factors that may lead within the TBP to the attitude toward the behavior dimension.

As for contextual activating factors, we rely on two levels, the institutional and the national level. The resources dimension represents the burden or lever of institutional support and economic national context. The risk-acceptance dimension captures the influence shaped by social desirability and social dimensions in the national context. These elements cannot be fully linked to the social pressure as defined in TBP,[14,16] as the subjective norm dimension specifically refers to peers who are important to the individual—family, friends, colleagues. Instead, these elements inform on the background factors that in TBP define the perception of ease or difficulty in performing a specific behavior. However, they are here defined as activating factors pertaining to a broader context within which the individual built his/her own willingness to be an entrepreneur.

Questionnaire development

Various tools (e.g., Refs. 24, 25 and 36) have been developed over time to investigate EI or EM. The EPIC (Entrepreneurial Potential and Innovation Competences) instrument, developed by HEInnovate, an initiative of the European Commission's DG Education and Culture in partnership with the OECD, was used as the starting point for measuring entrepreneurial mindset dimensions. Exploratory factor analysis was applied to the EPIC items, and factor loadings were used to guide item selection and grouping, resulting in five EPIC-derived dimensions suitable for cross-context application. In addition, four entrepreneurial mindset dimensions were added to the modified EPIC instrument based on the framework proposed by Davis et al.[22]. A resources dimension was also introduced to capture perceived availability of institutional and contextual support for entrepreneurial activity, as suggested during the initial testing phase. The final instrument therefore integrates nine entrepreneurial mindset dimensions, a resources construct, and entrepreneurial intention items measured using validated scales.

Questionnaire development and data collection relied on specific project partner universities, which may shape how far the findings generalise. Data were collected through project partner institutions: University of Modena and Reggio Emilia (Italy), FH Joanneum University of Applied Sciences (Austria), Harokopio University of Athens (Greece), Mid Sweden University (Sweden), and the University of Sarajevo (Bosnia and Herzegovina). All these universities are public and present formal technology transfer offices or activities to support entrepreneurship, despite being immersed in entrepreneurial ecosystems with varying levels of maturity. The University of Modena and Reggio Emilia is one of the best universities in Italy and it is ranked among the top 10 large sized Italian universities. It features a mature technology transfer office, as most Italian universities, within a well-consolidated entrepreneurial ecosystem. FH Joanneum University of Applied Sciences is one of the Austria's largest and best applied sciences institutions; it aligns with national average in terms of entrepreneurship support systems and operates within a well-consolidated entrepreneurial ecosystem. Harokopio University of Athens is ranked second in Greece, it has more limited formal structures in support of entrepreneurship in line with the national average. Mid Sweden University is one of the ten largest universities in Sweden, it reflects the high baseline of Swedish entrepreneurial ecosystems. University of Sarajevo is the highest-ranked and the largest university in Bosnia and Herzegovina, it is nationally leading in supporting entrepreneurship, but embedded in an emerging ecosystem.

At the initial stage, students completed the EPIC questionnaire, to assess if all the dimensions they would consider as influential in shaping their EI were clearly emphasized. This approach invites their input on whether the identified factors align with their perceptions and experiences, fostering a deeper understanding of the topic. To meet the suggestions received, a new tool has been developed based on HEInnovate Entrepreneurial Potential and Innovation Competences (EPIC). Among the tools developed to assess EM, Davis et al.[22] stands out as one of the most comprehensive and extensive, as it encompasses a larger set of individual characteristics.[3] This includes self-confidence, risk-acceptance, action-oriented behavior, need to achieve and persistence, along with creativity and innovation related to entrepreneurial activity, all elements that could ultimately sustain EI. A modified questionnaire was obtained after applying factor analysis. It featured 5 dimensions and 12 items based on factor loading values; precisely, four new dimensions with ten items (based on Davis' tool[22]) were added to create a more comprehensive assessment tool. The final tool presents nine dimensions with 23 items related to EM. Adapted scales developed by Krueger et al.[15] and Sowmya et al.[40] were used to measure EI. Based on a

literature review (see Ref. 3, p. 27) and comments received during the testing phase, a resources dimension was also added to the questionnaire to enhance comprehensiveness. The questionnaire also included specific questions on age, gender, and study program, our control variables, along with the resources dimension. The final questionnaire consisted of a total of 11 dimensions and 33 items, as shown in Table 2.

After the instrument was adapted, its psychometric properties were systematically assessed. Internal consistency reliability was evaluated using Cronbach's alpha, item-to-total correlations, and inter-item correlations. Confirmatory factor analysis (CFA) was conducted to verify that items loaded on their intended constructs. To ensure that the adapted instrument performs equally well across groups, multi-group confirmatory factor analysis (CFA) was used to test measurement invariance at the configural, metric, and scalar levels. Discriminant validity was assessed using the heterotrait–monotrait (HTMT) ratio, while convergent validity was evaluated using Average Variance Extracted (AVE) and standardized factor loadings.

Table 2. Assessment tool.

Dimensions	Item and source for each
EM	
Peculiarity (PEC)	PEC1: I often get unique ideas (EPIC)
	PEC2: I can identify different combinations of resources more easily than many others (adapted from EPIC)
	PEC3: I can spot and forecast trends more quickly than others (adapted from EPIC)
Innopreneurship (INPR)	INPR1: Inventing new solutions to problems is an important part of who I am (EPIC)
	INPR2: I am motivated to make existing products/services better (EPIC)
	INPR3: I tend to find new or different solutions to known problems (adapted from EPIC)
Confidence (CONF)	CONF1: I believe in the quality of my own ideas from the very start (EPIC)
	CONF2: I trust my own judgement (adapted from EPIC)
	CONF3: I usually act based on my own judgement (adapted from EPIC)
Innovation-oriented (INNO)	INNO1: I like to create my own ideas (adapted from EPIC)
	INNO2: I like to define my own tasks (adapted from EPIC)
Experience (EXP)	EXP1: It is easy for me to apply my past experience in novel contexts (adapted from EPIC)
	EXP2: I am able to relate new and unaccustomed challenges to my past experience (adapted from EPIC)
Risk acceptance (RISK)	RISK1: I tend to implement my plan although conditions are uncertain
	RISK2: I am willing to take a certain amount of risk to achieve goals (adapted from)[20]
	RISK3: I tend to act boldly in situations in which high risk is involved[23]
Action-oriented (ACT)	ACT1: I do things without being told to do so
	ACT2: I take the responsibility for making things happen
	ACT3: I am often the one who takes initiatives
Need to achieve (ACH)	ACH1: I want to do everything to the best of my ability (adapted from)[20]
	ACH2: I want to continuously improve my performance
Persistence (PERS)	PERS1: I do not give up easily (adapted from)[20]
	PERS2: I am committed to finish what I begin doing
Entrepreneurial intention (EI)	EI1: Starting my own business is an attractive idea to me (adapted from)[13]
	EI2: Starting my own business is desirable for me (adapted from)[13]
	EI3: Starting my own business is feasible for me (adapted from)[13]
	EI4: If I start a business in the near future, it will most likely succeed (adapted from)[13]
	EI5: It is likely that I start a new business from my own idea (adapted from)[39]
Resources (RES)	RES1: Regulations at national/regional levels do support the development of new entrepreneurial initiatives
	RES2: The infrastructure (like IT, connectivity, transportation, communication, etc.) at national/regional levels do support the development of new entrepreneurial initiatives
	RES3: The access to financial resources and the presence of investors (i.e., business angels and venture capital funds) do support the development of new entrepreneurial initiatives
	RES4: Regional/local presence of incubators and technological parks do support the development of new entrepreneurial initiatives
	RES5: My university does support new entrepreneurial initiatives

Internal consistency reliability

Internal consistency[48–50] is estimated by Cronbach's alpha, corrected item-to-total correlations, and inter-item correlation. Cronbach's alpha depicts how all items in a scale measure the same dimension. From Table 3 it can be seen that all EM dimensions are above 0.7, except for INNO and EXP with values 0.66 and 0.60, respectively, while Cronbach's alpha for Risk is 0.69. These values are also acceptable by considering that Cronbach's alpha value is influenced by the number of items.[51] Shorter scales with fewer items and lower Cronbach's alpha values actually show greater inter-item correlations.[52] A generally accepted rule is that Cronbach's alpha of 0.6-0.7 indicates an acceptable reliability level.[53] Calculated Cronbach's alpha values then show overall internal consistency reliability for EM dimensions. Cronbach's alpha value for the dependent variable EI is 0.84, and for the control variable RES is 0.84, showing good internal consistency.

Corrected item-to-total correlations range from 0.424 to 0.698, and all values exceed the recommended value of 0.4, indicating the reliability of high internal consistency[54,55] and that the items are appropriately related to the overall construct of interest and contribute meaningfully to scale reliability. Calculated coefficients of correlation range from 0.354 to 0.698 and are all within the acceptable range of 0.15 and 0.85.[56,57]

Confirmatory factor analysis

Table 4 depicts the standardized factor loadings from a confirmatory factor analysis (*CFA*). All items show statistically significant loadings on their respective latent variables indicating strong relationships between each observed item and its underlying construct. Most standardized estimates are above 0.70,[58] indicating convergent validity and suggesting that the items are strong indicators of their latent factors. Additionally, the standard errors of the estimates are consistently small, suggesting precise estimation of the factor loadings and further supporting convergent validity of the measurement model.

Measurement invariance

To assess whether the adapted instrument performs equally well across groups, a multi-group confirmatory factor analysis (*CFA*) was conducted to test measurement invariance at the configural, metric, and scalar levels. The acceptable model fit was determined by a comparative fit index (CFI) ≥ 0.900 with a root mean square error of approximation ($RMSEA$) $= <$ 0.080,[59–61] while acceptable measurement invariance between sequential models was determined by $\Delta CFI \geq -0.010$. and $\Delta RMSEA \leq 0.015$.[62,63] The configural invariance model showed acceptable fit ($\chi^2 = 920.58$, $df = 610$. $CFI = 0.915$, $RMSEA = 0.058$), supporting the assumption that the factor structure is consistent across groups. The metric invariance model, which constrained factor loadings to be equal across groups, also demonstrated acceptable fit ($\chi^2 = 951.34$, $df =$ 628, $CFI = 0.912$, $RMSEA = 0.058$) with only slight changes compared to the configural model (ΔCFI = -0.003, $\Delta RMSEA = 0.000$). The scalar invariance model, which the additionally constrained item intercepts, showed acceptable fit ($^2 = 988.08$, $df = 646$, $CFI = 0.907$, $RMSEA = 0.059$), with small changes from the metric model (ΔCFI = -0.005, $\Delta RMSEA = 0.001$). The results provide support that the adapted instrument performs equally well across two groups. However, the interpretation of these results should consider the potential influence of differences in how meaning is ascribed to these constructs by different groups, as stated by Bornstein (1995).[64]

Table 3. Cronbach's alpha values.

Dimension	Item	Cronbach's α	Dimension	Item	Cronbach's α
PEC	PEC1	0.74	RISK	RISK1	0.69
	PEC2			RISK2	
	PEC3			RISK3	
INPR	INPR1	0.78	ACT	ACT1	0.70
	INPR2			ACT2	
	INPR3			ACT3	
CONF	CONF1	0.76	ACH	ACH1	0.79
	CONF2			ACH2	
	CONF3				
INNO	INNO1	0.66	PERS	PERS1	0.82
	INNO2			PERS2	
EXP	EXP1	0.60			
	EXP2				

Table 4. Factor loadings.

Dimension	Item	Std. estimate	Std. error	*z*-value	*p*-value	95% confidence interval	
						Lower	Upper
ACH	ACH1	0.834	0.030	27.410	0.000	0.774	0.893
	ACH2	0.859	0.025	33.743	0.000	0.810	0.909
ACT	ACT1	0.658	0.039	16.893	0.000	0.582	0.735
	ACT2	0.762	0.036	20.942	0.000	0.691	0.833
	ACT3	0.708	0.035	20.124	0.000	0.639	0.777
CONF	CONF1	0.774	0.033	23.569	0.000	0.710	0.839
	CONF2	0.817	0.030	27.155	0.000	0.758	0.876
	CONF3	0.689	0.034	20.525	0.000	0.623	0.755
EI	EI1	0.868	0.023	37.049	0.000	0.822	0.914
	EI2	0.792	0.027	29.669	0.000	0.739	0.844
	EI3	0.732	0.030	24.414	0.000	0.673	0.790
	EI4	0.763	0.030	25.417	0.000	0.704	0.821
	EI5	0.846	0.023	37.378	0.000	0.801	0.890
EXP	EXP1	0.676	0.034	20.136	0.000	0.610	0.742
	EXP2	0.707	0.030	23.920	0.000	0.649	0.765
INNO	INNO1	0.788	0.033	24.123	0.000	0.724	0.852
	INNO2	0.685	0.035	19.300	0.000	0.615	0.755
INPR	INPR1	0.786	0.028	27.643	0.000	0.730	0.842
	INPR2	0.719	0.032	22.255	0.000	0.656	0.783
	INPR3	0.738	0.030	24.685	0.000	0.679	0.796
PEC	PEC1	0.785	0.032	24.798	0.000	0.723	0.847
	PEC2	0.799	0.031	26.128	0.000	0.739	0.859
	PEC3	0.632	0.042	15.095	0.000	0.551	0.714
PERS	PERS1	0.917	0.031	29.948	0.000	0.857	0.977
	PERS2	0.837	0.033	25.411	0.000	0.772	0.901
RES	RES1	0.784	0.028	28.115	0.000	0.729	0.839
	RES2	0.815	0.025	32.539	0.000	0.766	0.864
	RES3	0.791	0.027	29.728	0.000	0.739	0.843
	RES4	0.811	0.025	32.848	0.000	0.763	0.860
	RES5	0.531	0.048	11.051	0.000	0.437	0.625
RISK	RISK1	0.586	0.038	15.361	0.000	0.511	0.661
	RISK2	0.765	0.031	24.908	0.000	0.705	0.825
	RISK3	0.707	0.032	22.163	0.000	0.644	0.769

Heterotrait-monotrait ratio (HTMT)

The HTMT ratio values in Table 5 are all below the conservative threshold of 0.85, with only one pair (INNO–EXP = 0.883) slightly exceeding this cut-off. As recommended by Henseler et al.[65], values below 0.90 are generally acceptable, indicating that the constructs demonstrate adequate discriminant validity. These results suggest that each entrepreneurial mindset dimension and the entrepreneurial intention construct are empirically distinct, supporting the validity of the measurement model.

Average Variance Extracted (AVE)

Based on the Average Variance Extracted (AVE) values in Table 6, most constructs exceed the recommended threshold of 0.50 by Fornell & Larcker,[66] indicating that they explain more than half of the variance of their indicators, which supports convergent validity. While EXP (0.479) and RISK (0.476) are slightly below the threshold, their proximity to 0.51 suggests only minor concern, especially since Cronbach's alpha, corrected item-to-total correlations, calculated coefficients of correlation range, and confirmatory factor analysis (CFA) loadings are satisfactory. Together, these results demonstrate that the measurement model has acceptable convergent validity across the entrepreneurial mindset dimensions and the entrepreneurial intention construct.

Table 5. Heterotrait-monotrait ratio.

PEC	INPR	CONF	INNO	EXP	RISK	ACT	ACH	PERS	EI	RES
1.000										
0.851	1.000									
0.515	0.571	1.000								
0.658	0.741	0.768	1.000							
0.745	0.821	0.678	0.883	1.000						
0.654	0.726	0.685	0.694	0.768	1.000					
0.529	0.619	0.591	0.711	0.622	0.753	1.000				
0.390	0.573	0.574	0.699	0.686	0.595	0.749	1.000			
0.268	0.411	0.482	0.528	0.499	0.518	0.520	0.762	1.000		
0.498	0.540	0.566	0.696	0.511	0.535	0.456	0.410	0.411	1.000	
0.252	0.321	0.253	0.384	0.416	0.403	0.249	0.209	0.199	0.371	1.000

Data collection and hierarchical regression analysis

Data collection involved sending the questionnaire link and QR code to students from the partner universities, inviting them to complete the survey. The response scale ranges from 1 to 7, with equal distances between all numbers. Students were asked to respond according to their level of agreement or disagreement with the statements in the questionnaire, where 1 stands for 'I completely disagree' and 7 stands for 'I completely agree'. The labelling choice is based on Harpe[67], considering ratings with five or more categories as continuous data, while Evans[68] claims that, without labels, many users treat such ratings as interval data. Filling out the questionnaire was completely anonymous, and participation was entirely voluntary. The questionnaire was completed by 301 students.

Table 7 presents demographic and academic characteristics of respondents from EU member countries (Italy, Sweden, Austria, and Greece), compared to Bosnia and Herzegovina (BIH). According to Table 2, 63.46% of students from the EU were male, compared to 53.79% from BIH. In the EU, 36.54% of students were female, while 46.21% were female in BIH. The average age of EU students was 25.42 years, while the average age of students from BIH was 22.83 years. Regarding academic enrolment, 43.59% of EU students were in a bachelor's study program, 50% were in a master's study program, and 6.41% were PhD students. In BIH, 40% of students were enrolled in a bachelor's study program, 56.55% in a master's study program, and 3.45% were PhD students.

We employed hierarchical regression analysis and a stepwise approach to effectively isolate the effects of control variables, and to assess the unique contributions of each EM dimension in explaining EI, in terms of additional variance. The regression models developed for this research are presented in Equation (1).

$$\widehat{y}_j = b_0 + \sum_{i=1}^{k} b_i x_{ij} \tag{1}$$

Table 6. Average variance extracted.

Latent	AVE
PEC	0.551
INPR	0.560
CONF	0.581
INNO	0.545
EXP	0.479
RISK	0.476
ACT	0.515
ACH	0.717
PERS	0.770
EI	0.642
RES	0.569

Table 7. Demographic and academic characteristics of students.

	Total	Male	Female	Average age	Bachelor students	Master students	PhD students
EU	156	99	57	25.42	68	78	10
BIH	145	78	67	22.83	58	82	5
Total	301	177	124	24.12	126	160	15

where:

k – number of independent variables

$\widehat{y_j}$ – predicted value of dependent variable ($j = 1, \ldots, n$)

n – number of samples

b_0 – intercept

b_i – regression coefficients ($i = 1, \ldots, k$)

A Harman single-factor test was performed on all control and independent variables to test for common method variance. Seven factors were identified, accounting for 60.6% of the variance, with no evidence of common method bias.

Hypothesis test of differences in the regression coefficients

In order to evaluate the significant differences between two independent samples of EU and BIH students, we conducted a formal hypothesis test. For each pair of regression coefficients corresponding to the same independent variables, derived for EU and BIH students, the null hypothesis (H_0) and the research hypothesis (H_1) are defined as follows:

$$H_0 : b_{iEU} - b_{iBIH} \leq 0 \tag{2}$$

$$H_1 : b_{iEU} - b_{iBIH} > 0 \tag{3}$$

The numerator of the test statistic of the hypothesis test is the estimated difference between the two coefficients of two different groups of students, while the denominator is the estimated standard error of this difference, providing a measure of the variability or uncertainty associated with the estimate of the difference. Test statistics are calculated using equation (4) [48,69,70]:

$$z_{STAT} = \frac{b_{iEU} - b_{iBIH}}{\sqrt{(SEb_{i\ EU})^2 + (SEb_{iBIH})^2}} \tag{4}$$

where:

SEb_i – standard error of the i^{th} regression coefficient ($i = 1, 2, \ldots, k$)

The decision whether to reject the null hypothesis or not is made by comparing the test statistics (z_{STAT}) and the critical value (z_{CRIT}). If the null hypothesis is not rejected, statistical evidence does not suffice to conclude that the research hypothesis is true. If the decision is to reject the null hypothesis, there is sufficient statistical evidence that the research hypothesis is true. The level of significance used in this research is $\alpha = 0.05$.

Results

Four hierarchical regression models were developed to analyse the impact of control variables and independent variables on EI of university students from BIH and EU, as shown in Table 8.

Based on the results obtained and reported in Table 8 and sample sizes given in Table 3, the probability of type II error β was calculated to get achieved power ($1 - \beta$ error probability). The calculation was done using G*Power[48] as depicted in Table 9.

From calculated post hoc power values, it can be concluded that for BIH students there were 99.91% and 100% chances of correctly rejecting a false null hypothesis for the baseline and final models, respectively, while for EU students there were 99.75% and 99.99% chances of correctly rejecting a false null hypothesis for the baseline and final models, respectively. Calculated high power values, which are 80% or 90% greater than common values[70], prove that the sample sizes used in this research were large enough.

Table 8. Multiple hierarchical regression models for BIH and EU.

	BIH				EU			
	M1	95% CI	M2	95% CI	M1	95% CI	M2	95% CI
Dependent variable (EI)								
Constant	1.36		0.162		2.576		-1.255	
Control variables								
RES	0.357	(0.203; 0.512)	0.203	(0.060; 0.347)	0.437	(0.257; 0.618)	0.235	(0.077; 0.393)
AGE	0.099	(0.040; 0.158)	0.055	(0.002; 0.109)				
Independent variables								
PEC							0.331	(0.142; 0.520)
INNO			0.354	(0.202; 0.516)			0.399	(0.220; 0.578)
ACT			0.189	(0.039; 0.339)				
PERS							0.19	(0.013; 0.366)
$R^2(\%)$	17.31		37.35		12.91		40.84	
Adjusted $R^2(\%)$	16.14		35.56		12.35		39.27	
R^2 change (%)			20.04				27.93	
$F-$ value	14.858		20.867		22.835		26.057	

Note. Variables for each model are significant at the level of significance $\alpha = 0.05$ and 95% confidence intervals for the regression coefficients.

The power of the addition of EM variables to the regression equation with other control variables was calculated as well, as shown in Table 10.

Table 10 shows that the power of these tests is very high. For BIH students there was a 99.99% chance of correctly rejecting a false null hypothesis, while this chance for EU students was 100%.

Although the sample sizes between the two groups were slightly uneven ($n_{EU} = 156$, $n_{BIH} = 145$), post hoc power analysis confirmed that both sample sizes were large enough for the conducted regression analyses, with power values exceeding 99% for all models, thus indicating a very low probability of Type II error and supporting the robustness of estimates within each group. Furthermore, measurement invariance testing (configural, metric, and scalar) demonstrated that the adapted instrument functions equivalently across groups, thereby supporting the robustness of comparisons across groups.

All baseline models were statistically significant and able to predict EI. After applying backward regression with control variables, the final baseline Model 1 for BIH retained RES and age as significant predictors. Conversely, RES remained the only significant predictor in the final baseline Model 1 for EU.

Independent variables were then added to the baseline models. Applying backward regression to achieve the final models with statistically significant variables, Model 2 for BIH retained resources and age as significant control variables, innovation-oriented and action-oriented as significant EM dimensions, explaining 37.35% of the variance in EI. Similarly, Model 2 for EU included resources as a significant control variable, peculiarity, innovation-oriented and persistence as significant EM dimensions, accounting for 40.84% of the variance in EI. The significant EM dimensions in these final models explained an additional 20.04% of the variance in EI for BIH students, and 27.93% of the variance in EI for EU students.

The final step in the analysis was to perform formal hypothesis tests of differences in the regression coefficients between both final baseline models 1 for BIH and for EU, as shown in Table 11, and between final models 2 for BIH and for EU, as shown in Table 12. For each hypothesis test, the null hypothesis (H_0) and the research (alternative) hypothesis (H_1) were

Table 9. Post hoc power analysis.

Model	Variables	R^2	n	α	Effect size f^2	Power ($1-\beta$ error probability)
BIH students						
M1	RES, AGE	0.1731	145	0.05	0.2093	0.9991
M2	RES, AGE, INNO, ACT	0.3735			0.5962	1.0000
EU students						
M1	RES	0.1291	156	0.05	1.0000	0.9975
M2	RES, PEC, INNO, PERS	0.4084			0.6903	0.9999

Table 10. Post hoc power analysis – increase of R^2.

Model	Variables	R^2	n	α	Variance explained by special effect	Residual variance	Effect size f^2	Power ($1-\beta$ error probability)
BIH students								
M1	RES, AGE	0.1731	145	0.05	0.2004	0.6265	0.3199	0.9999
M2	RES, AGE, INNO, ACT	0.3735						
EU students								
M1	RES	0.1291	156	0.05	0.2793	0.5916	0.4721	1.0000
M2	RES, PEC, INNO, PERS	0.4084						

defined to compare regression coefficients between EU and BIH groups. The decision to reject or not reject H_0 was based on the comparison between the calculated and the critical z values. If H_0 was rejected, it was concluded that there was sufficient statistical evidence to support the statement in research hypothesis H_1. If H_0 was not rejected, it was concluded that there was insufficient statistical evidence to support the statement in research hypothesis H_1.

The only common variable in the final baseline models for both EU and BIH students was RES. The null (H_0) and the research hypothesis (H_1) are:

$$H_0 : b_{RESEU} - b_{RESBIH} \leq 0 \tag{5}$$

$$H_1 : b_{RESEU} - b_{RESBIH} > 0 \tag{6}$$

Using equation (4), calculated test statistics were $z_{STAT} = 0.664$. The critical value for this test was $z_{CRIT} = 1.645$. Since $z_{STAT} < z_{CRIT}$ the decision is not to reject the null hypothesis $H_0 : b_{RESEU} - b_{RESBIH} \leq 0$. Statistical evidence does not suffice to conclude that b_{RESEU} is higher than b_{RESBIH}.

In the final models 2, two variables were common to both EU and BIH, namely resources and innovation-oriented, as shown in Table 12. The null (H_0) and the research hypothesis (H_1) for resources are:

$$H_0 : b_{RESEU} - b_{RESBIH} \leq 0 \tag{7}$$

$$H_1 : b_{RESEU} - b_{RESBIH} > 0 \tag{8}$$

Using equation (4), the calculated test statistics were $z_{STAT} = 0.377$. The critical value for this test was $z_{CRIT} = 1.645$. Since $z_{STAT} < z_{CRIT}$ the decision is not to reject the null hypothesis $H_0 : b_{RESEU} - b_{RESBIH} \leq 0$. The statistical evidence does not suffice to conclude that b_{RESEU} is higher than b_{RESBIH}.

The second common variable to both final models 2 was INNO as shown in Table 12.

The null (H_0) and the research hypothesis (H_1) for innovation-oriented are:

$$H_0 : b_{INNOEU} - b_{INNOBIH} \leq 0 \tag{9}$$

$$H_1 : b_{INNOEU} - b_{INNOBIH} > 0 \tag{10}$$

Using equation (4), the calculated test statistics were $z_{STAT} = 0.297$. The critical value for this test was $z_{CRIT} = 1.645$. Since $z_{STAT} < z_{CRIT}$ the decision is not to reject the null hypothesis $H_0 : b_{INNOEU} - b_{INNOBIH} \leq 0$. The statistical evidence does not suffice to conclude that the regression coefficient b_{INNOEU} is higher than $b_{INNOBIH}$.

Table 11. Hypothesis test of the difference in regression coefficients of the final baseline models.

	EU		BIH		z_{STAT}	Decision
	b_i	SE	b_i	SE		
RES	0.437	0.0915	0.357	0.078	0.664	Do not reject H_0
AGE			0.099	0.030		

Table 12. Hypothesis test of the difference of regression coefficients of the final models.

	EU		BIH		z_{STAT}	Decision
	b_i	SE	b_i	SE		
PEC	0.331	0.096				
INNO	0.399	0.091	0.354	0.077	0.377	Do not reject H_0
PERS	0.190	0.089				
ACT			0.189	0.076		
RES	0.235	0.080	0.203	0.072	0.297	Do not reject H_0
AGE			0.055	0.027		

Discussion

The study explores differential activating factors[17] and provides a comparative lens through which to examine the individual and contextual influences on the EI of university students. In doing so, it validates an assessment tool that addresses differences across countries, specifically comparing selected EU countries (University of Modena and Reggio Emilia from Italy, FH Joanneum University of Applied Sciences from Austria, Harokopio University of Athens from Greece, and Mid Sweden University from Sweden) with one EU candidate country (University of Sarajevo from Bosnia and Herzegovina). The modified assessment tool has been developed to account for differences in EM dimensions—namely peculiarity, innopreneurship, confidence, innovation-oriented, experience, risk acceptance, action-oriented, need to achieve, and persistence—on university students' EI, over and above control variables such as gender, age, educational level across countries.

With regard to the influence of EM dimensions on EI, some were found to be significant for both the BIH and EU student groups, while others did not demonstrate a consistent pattern. The innovation-oriented dimension has been shown to emerge as a common predictor, in accordance with the findings of previous studies, thus reinforcing its relevance in fostering EI.[3,15,17] Conversely, specific EM dimensions emerge as being significantly relevant in one group, thereby challenging the assumption that a universal mindset universally drives EI.[5,17,22] Action-oriented and age are significant predictors for BIH students, whereas peculiarity and persistence are significant predictors for EU students. This is in line with previous studies, which highlight that the drivers of students' EI have specificities and constraints that vary across cultural and national contexts.[26,36] Based on the Hofstede's cultural dimensions scores, where BIH and EU countries have differences in scores in Power Distance, Individualism, and Motivation Towards Achievement and Success, it is shown as expected that some EM dimensions are the same for both BIH and EU countries, while some EM dimensions are not. Overall, cultural contextual factors shape behavioral pathways.[3,36] The divergence in significant EM dimensions between BIH and EU students aligns with Hofstede's cultural dimension scores, indicating that local cultural values may shape which entrepreneurial mindset dimensions become significant. This supports the idea that entrepreneurial intention among university students must account for culturally specific contexts.

It is particularly noteworthy that risk acceptance does not emerge as a significant predictor in either group, despite the prevailing belief that risk tolerance is an essential trait of entrepreneurs[22]. This challenges the basis of entrepreneurial studies, which emphasise risk-taking as a core trait, and suggests the greater value of other EM dimensions, such as persistence or action-oriented. The foundational view of risk-taking in entrepreneurship traces back to Ref. 71 and is closely linked to the certainty effect described in prospect theory[72]. This effect implies that individuals tend to avoid risk when facing potential gains, but may accept higher levels of risk when decisions are framed in terms of potential losses. Despite its prominence in entrepreneurship theory, only a limited number of empirical studies have examined risk-taking as a trait of the EM among university students or adult learners.[3] The lack of a significant relationship between students' responses to risk-related items and entrepreneurial intentions suggests that risk-related decision-making may be shaped by cognitive biases that operate in more nuanced ways than is generally assumed. Similar results emerge in the empirical study by Van Trang et al.[35], which questions the widely held assumption that portrays risk-taking as a defining entrepreneurial characteristic.[15,17]

The non-significance of the risk acceptance dimension may also reflect broader changes in how younger, university-educated individuals perceive and approach entrepreneurial risk. Rather than exhibiting traditional risk-taking behaviors, students may interpret entrepreneurial choice differently to established models, possibly due to generational shifts and educational environments. These results are consistent with Knight's distinction between measurable risk and unmeasurable uncertainty[71], as early-stage entrepreneurial intention among students is more likely to involve the latter. In line

Table 13. Resource dimension: Items scores and t-test.

	RES1	RES2	RES3	RES4	RES5
EU	4.27	4.53	4.37	4.49	5.41
BIH	4.50	4.33	4.21	4.32	4.82
p-value	0.167	0.233	0.353	0.297	0.001
95% CI	(-0.567; 0.098)	(-0.126; 0.515)	(-0.169; 0.472)	(-0.150; 0.489)	(0.254; 0.925)

Note. t-tests performed for the differences for two population means for each item of resource dimension RES1 to RES5 for EU and BIH at the level of significance α=0.05.

with prospect theory[72], students may evaluate entrepreneurship based on their subjective perception of potential gains and losses rather than through objective risk assessments. This helps to explain why dimensions of the EM other than risk acceptance emerge as stronger. The non-significance of risk acceptance observed also suggests that future empirical research may reconceptualize risk-related constructs.

With regard to the influence of contextual activating factors on EI, resources significantly predict EI in both EU and BIH students. Interestingly, the impact does not differ statistically between these groups. This contradicts prior research which suggested that financial and institutional resources were the main constraints for aspiring entrepreneurs in countries with weaker institutional support.[9,31] These results demonstrate that innovation-orientation and resources act as universal drivers of EI among university students. Table 13 shows the average scores for all five items RES1-RES5 of the resources dimension. Additionally, there were no significant differences in the means for EU and BIH students for items RES1 to RES4. However, there was a significant difference in the means for EU and BIH students for the item RES5, related to university support. The composite mean for RES is 4.61 for EU students with a standard deviation of 1.16; for BIH students, the composite mean for RES for is 4.44, with a standard deviation of 1.06. As shown, the scalar invariance for the instrument was achieved, supporting comparisons of the means. The sensitivity analysis is robust to excluding RES5 item. The composite means of RES, excluding item RES5, are 4.41 and 4.34 for EU and BIH students respectively, with standard deviation values of 1.25 and 1.12 respectively. T-tests performed for the differences in the two population means of RES, both with and without RES5, show that there are no significant differences with *p*-values of 0.073 respectively at the level of significance α=0.05. Overall, these results do not suggest that access to resources is equal across contexts. Rather, they reflect how students may underestimate or overestimate the availability of resources in their own local context.

Ultimately, perceptions of resource availability are deeply rooted in local contexts and are shaped by subjective interpretations[17,33] rather than by objective measures. The availability of resources is not sufficient to stimulate EI; what matters is how individuals perceive those resources within their social and institutional context[33]. There is indeed a massive difference in GDP per capita between EU countries, with a minimum value of € 18470 in Greece and a maximum value of € 41351 in Sweden, and BIH that has a GDP per capita value of € 6781; yet the RES scores for the EU and BIH are almost the same. This suggests that students in resource-constrained environments may develop expectations about institutional and national support that are specific to their context[33], which could lead to similar perceptions despite objective disparities. From an opportunity structure perspective, resources function as activating factors only insofar as they are cognitively accessible, interpretable, and institutionally legitimate to individuals[33]. In addition, in the early stages of EI, perceptions act as an interpretative filter that mediates the impact of objective resources on possible entrepreneurial action: subjective evaluation therefore becomes a more important element than the objective measurement of that resource[17,33]. These patterns may also reflect the normalization of expectations among students from countries with different levels of resource availability and economic development, which may be also linked to institutional trust[33]. As a result, perceived support and resources may exert a stronger influence on EI than objective measures and actual availability.

Conclusion

Through a comparison between selected EU countries and one EU candidate country, the present study offers novel insights into the EM dimensions that influence EI for university students, and how such influences vary across different socio-economic and institutional contexts. The main contribution is threefold.

First, at a theoretical level, the study contributes to the entrepreneurial literature by challenging established assumptions regarding the drivers of EI. Specifically, the results challenge the prevailing assumption that objective measures of resources and innovation-orientation EM dimension are the primary driver of entrepreneurial initiatives, demonstrating instead that mindset-related variables - shaped by national and institutional activating factors - are more decisive. It shows that EI is shaped by the interplay between perceived resource availability and the particular EM dimensions relevant for

students in each country. This emphasises the importance of contextually embedded perceptions[33] and cognitive EM dimensions in the decision-making of prospective entrepreneurs, especially in the early stages of their careers. In addition, the study also calls into question the centrality of risk-taking as a core and universal entrepreneurial trait. The non-significance of the risk acceptance dimension led the room to a new interpretation of this dimension, as university students' evaluation of entrepreneurial choices may be different to established models, for example due to generational shifts and educational environments. Second, the study contributes to comparative research on EI by providing empirical evidence from a relatively under-investigated geographical area, by including BIH as an EU candidate country. The study reveals how specific dimensions of the EM vary according to socio-economic development, educational systems, and historical-cultural contexts. It addresses a significant gap in entrepreneurship research, which has been predominantly concentrated in Western Europe. Third, at a methodological level, the study validates an assessment tool for EI and EM in order to address contextual differences. EI is indeed typically measured through standardized scales that assume cross-cultural equivalence[12,13]; conversely, this study validates a culturally sensitive measurement approach, by employing a modified version of the EPIC tool developed by HEInnovate, integrated with validated scales.

This study offers implications for policymakers and universities in the design of targeted, evidence-based educational policies aligned with national and institutional contexts. By identifying which EM dimensions most strongly predict students' EI in different socio-economic settings, guidance for more effective educational design and resource allocation is provided, addressing ongoing concerns about the actual impact of university-level entrepreneurship initiatives[2,9,10]. Importantly, the results suggest that entrepreneurship education should prioritize the development of specific mindset dimensions over the mere provision of resources, fostering support mechanisms that are context-sensitive and actionable[31,33]. From a policy perspective, these results further imply that merely increasing resources may not translate into higher perceived support unless the visibility and communication of available support mechanisms are substantially improved.

In the EU context, where persistence and peculiarity emerge as key predictors of EI, entrepreneurship education could emphasise semester-long, iterative projects incorporating multiple feedback cycles, deliberate practice in originality assessment, and evaluation frameworks that reward resilience across iterations. In contrast, in the BIH context, where an action-oriented mindset and age play a more prominent role, educational interventions may benefit from shorter, intensive formats focused on rapid prototyping, immediate stakeholder engagement, and community- or SME-based challenges. Across both contexts, fostering innovation remains essential, encouraging creative problem-solving and the development of novel solutions while supporting the effective use of available resources to translate entrepreneurial ideas into practice. Entrepreneurship education should then retain innovation-oriented modules that scaffold ideation, problem framing, and early solution testing, and integrate them as credit-bearing components to encourage participation. Embedding such initiatives within supranational or exchange-based programmes could enhance students' exposure to diverse institutional settings and support the development of international entrepreneurial competencies, while refining students' subjective evaluation of the contextual activating factors.

The contribution is not without limitations, which provide avenues for future research. First, countries were selected based on a convenience sample. Therefore, the results should be interpreted taking into account the constraints imposed by the convenience sampling approach. For example, the universities in our sample exhibit differences in the presence and development of entrepreneurial support programs: broader sampling within the same countries could estimate effects of the overall entrepreneurial ecosystem. Future studies could also employ stratified sampling techniques to corroborate these findings and further explore contextual differences across countries. Second, the here considered activating factors could be explored as mediating or moderating variables, formal hypothesis testing can then be built to assess actual behavior. While intentions are indeed recognized as important antecedents of action[15], the intention-action gap could also be addressed. Longitudinal monitoring of the same group of participants could investigate intention-action discrepancies across various cultural and economic contexts. Third, while measurement invariance was assessed, non-significant group differences may still reflect differences in how constructs are interpreted across groups rather than true equivalence. This highlights the need for future research to further investigate measurement equivalence across diverse groups.

Future research could also build upon the most salient findings of this study. Future research could more systematically investigate how distinct EM dimensions inform or interact with the main dimensions of the TPB across different national contexts, thereby clarifying the mechanisms through which broader orientations translate into individual intention-related antecedents. In addition, experimental studies could manipulate both objective and subjective measures of resources to examine whether students' entrepreneurial intentions respond more strongly to perceived resource availability than to actual resource indicators. The risk-taking dimension also warrants focused attention in future research, given the above-mentioned considerations on generational shifts, educational influences, and measurement limitations. Rather than focusing exclusively on general risk acceptance, future studies could examine alternative constructs, such as tolerance for uncertainty or ambiguity, sensitivity to potential losses, or protective orientations toward downside risk. Risk-related

constructs may also require different operationalisation when applied to student populations. Respondents may indeed interpret risk-related issues in heterogeneous ways, for example as uncertainty rather than calculable risk, and risk-taking may manifest in forms not fully captured by the measures employed in this study. Qualitative follow-up research could help clarify how students interpret and frame risk in different entrepreneurial contexts, while future studies may also test specific learning models and educational programs, drawing on social cognitive career theories.

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The data supporting the findings of this study are not publicly available. Requests for data access may be directed to the first author.

References

1. European Commission. Directorate General for Research and Innovation. *European Innovation Scoreboard 2024*. LU:Publications Office, 2024. https://data.europa.eu/doi/10.2777/779689
2. Bae TJ, Qian S, Miao C, et al. The Relationship between Entrepreneurship Education and Entrepreneurial Intentions: A Meta–Analytic Review. *Entrepreneurship Theory and Practice* 2014; 38: 217–254.
3. Daspit JJ, Fox CJ and Findley SK. Entrepreneurial mindset: An integrated definition, a review of current insights, and directions for future research. *Journal of Small Business Management* 2023; 61: 12–44.
4. Bogatyreva K, Edelman LF, Manolova TS, et al. When do entrepreneurial intentions lead to actions? The role of national culture. *Journal of Business Research* 2019; 96: 309–321.
5. Pérez-Campdesuñer R, García-Vidal G, Sánchez-Rodríguez A, et al. Influence of the socio-economic environment on the entrepreneurs behavior. Cases of cuba and ecuador. *International Journal of Engineering Business Management* 2021; 13: 1847979021994519.
6. Cardella GM, Barba-Sánchez V, Meseguer-Martinez Á, et al. Analyzing university students' entrepreneurial intentions under the influence of the COVID-19 pandemic. *International Entrepreneurship and Management Journal* 2024; 20: 2567–2590.
7. Atienza-Barba M, del Brío-González J, Mitre-Aranda M, et al. Gender differences in the impact of ecological awareness on entrepreneurial intent. *International Entrepreneurship and Management Journal* 2025; 21: 1–19.
8. Nowiński W, Haddoud MY, Lančarič D, et al. The impact of entrepreneurship education, entrepreneurial self-efficacy and gender on entrepreneurial intentions of university students in the Visegrad countries. *Studies in Higher Education* 2019; 44: 361–379.
9. Nguyen TT and Phan HTT. Entrepreneurship environments and entrepreneurial intention- the role of self-efficacy and role model. *International Journal of Engineering Business Management* 2024; 16: 18479790241275925.
10. Hahn D, Brumana M and Minola T. Is it all about creating new firms? A broader look at the impact of the Entrepreneurial University on youth employment. *Studies in Higher Education* 2022; 47: 1036–1045.
11. Carpenter A and Wilson R. A systematic review looking at the effect of entrepreneurship education on higher education student. *The International Journal of Management Education* 2022; 20: 100541.
12. Fayolle A and Liñán F. The future of research on entrepreneurial intentions. *Journal of Business Research* 2014; 67: 663–666.
13. Nguyen NT, Viet Dung M, Rowley C, et al. Generation Z job seekers' expectations and their job pursuit intention: Evidence from transition and emerging economy. *International Journal of Engineering Business Management* 2022; 14: 1–13.

14. Ajzen I. *Attitudes, personality and behaviour*. McGraw-hill education, 2005.
15. Krueger NF, Reilly MD and Carsrud AL. Competing models of entrepreneurial intentions. *Journal of Business Venturing* 2000; 15: 411–432.
16. Ajzen I. The theory of planned behavior. *Organizational behavior and human decision processes* 1991; 50(2): 179–211.
17. Schlaegel C and Koenig M. Determinants of entrepreneurial intent: A meta–analytic test and integration of competing models. *Entrepreneurship Theory and Practice* 2014; 38: 291–332.
18. Krueger NF and Carsrud AL. Entrepreneurial intentions: Applying the theory of planned behaviour. *Entrepreneurship & Regional Development* 1993; 5: 315–330.
19. Krueger NF Jr. What lies beneath? The experiential essence of entrepreneurial thinking. *Entrepreneurship theory and practice* 2007; 31: 123–138.
20. Della Piana B, Bayraktar S and Jimenez A. Entrepreneurial Mindsets Across Cultures. In: Botti A and Parente R (eds) *Humane Entrepreneurship and Innovation*. Emerald Publishing Limited, 2024, pp. 175–191.
21. Walsh GS, Cunningham JA, Mordue T, et al. What business schools do to support academic entrepreneurship: a systematic literature review and future research agenda. *Studies in Higher Education* 2021; 46: 988–999.
22. Davis MH, Hall JA and Mayer PS. Developing a new measure of entrepreneurial mindset: Reliability, validity, and implications for practitioners. *Consulting Psychology Journal: Practice and Research* 2016; 68: 21–48.
23. Kuratko DF, Fisher G and Audretsch DB. Unraveling the entrepreneurial mindset. *Small Bus Econ* 2021; 57: 1681–1691.
24. Mathisen J-E and Arnulf JK. Entrepreneurial mindsets: Theoretical foundations and empirical properties of a mindset scale. *International Journal of Management and Business* 2014; 5: 81–97.
25. Bolton DL and Lane MD. Individual entrepreneurial orientation: development of a measurement instrument. *Education + Training* 2012; 54: 219–233.
26. Liñán F and Fayolle A. A systematic literature review on entrepreneurial intentions: citation, thematic analyses, and research agenda. *Int Entrep Manag J* 2015; 11: 907–933.
27. Lyu J, Shepherd D and Lee K. The impact of entrepreneurship pedagogy on nascent student entrepreneurship: an entrepreneurial process perspective. *Studies in Higher Education* 2024; 49: 62–83.
28. Welter F. Contextualizing Entrepreneurship-Conceptual Challenges and Ways Forward. *Entrepreneurship Theory and Practice* 2011; 35: 165–184.
29. Song Y and Lu G. The impact of university entrepreneurship support on college students' entrepreneurial intention: A cognitive-affective perspective. *The International Journal of Management Education* 2024; 22: 101087.
30. Souitaris V, Zerbinati S and Al-Laham A. Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. *Journal of Business Venturing* 2007; 22: 566–591.
31. Kibler E. Formation of entrepreneurial intentions in a regional context. *Entrepreneurship & Regional Development* 2013; 25: 293–323.
32. O'Shea RP, Allen TJ, Chevalier A, et al. Entrepreneurial orientation, technology transfer and spinoff performance of U.S. universities. *Research Policy* 2005; 34: 994–1009.
33. Welter F and Smallbone D. Institutional perspectives on entrepreneurial behavior in challenging environments. *Journal of small business management* 2011; 49: 107–125.
34. Athreye S, Sengupta A and Odetunde OJ. Academic entrepreneurial engagement with weak institutional support: roles of motivation, intention and perceptions. *Studies in Higher Education* 2023; 48: 683–694.
35. Van Trang T, Do QH and Luong MH. Entrepreneurial human capital, role models, and fear of failure and start-up perception of feasibility among adults in Vietnam. *International Journal of Engineering Business Management* 2019; 11: 1847979019873269.
36. Liñán F and Chen Y. Development and Cross–Cultural Application of a Specific Instrument to Measure Entrepreneurial Intentions. *Entrepreneurship Theory and Practice* 2009; 33: 593–617.
37. Solesvik M, Westhead P and Matlay H. Cultural factors and entrepreneurial intention: The role of entrepreneurship education. *Education + Training* 2014; 56: 680–696.
38. Tekic A and Tsyrenova E. Drivers and constraints of students' entrepreneurial intentions across cultural contexts: A neo-configurational perspective. *The International Journal of Management Education* 2024; 22: 100996.
39. Sowmya VD, Majumdar S and Gallant M. Relevance of education for potential entrepreneurs: an international investigation. *Journal of Small Business and Enterprise Development* 2010; 17: 626–640.
40. Hofstede G. *Culture's consequences: comparing values, behaviors, institutions, and organizations across nations*. 2nd ed. Sage, 2013.
41. Siu W and Lo ES. Cultural Contingency in the Cognitive Model of Entrepreneurial Intention. *Entrepreneurship Theory and Practice* 2013; 37: 147–173.
42. The Culture Factor Group. Hofstede insights - Country comparison tool. https://www.hofstede-insights.com (2025, accessed 14 August 2025).

43. Agency for statistics of Bosnia and Herzegovina. Annual indicators. https://bhas.gov.ba/?lang=en (2024, accessed 15 December 2024).
44. Eurostat. Annual net earnings of a full-time single worker without children earning an average wage. https://ec.europa.eu/eurostat/databrowser/view/earn_nt_netft/default/table?lang=en (2024, accessed 15 December 2024).
45. Eurostat. Real GDP per capita. https://ec.europa.eu/eurostat/databrowser/view/tipsna40/default/table?lang=en (2024, accessed 15 December 2024).
46. Eurostat. Unemployment rate by age. https://ec.europa.eu/eurostat/databrowser/view/tepsr_wc170/default/table?lang=en (2024, accessed 15 December 2024).
47. Eurostat. Gross domestic product (GDP) and main components (output, expenditure and income). https://ec.europa.eu/eurostat/databrowser/view/NAMQ_10_GDP__custom_7680558/bookmark/table?lang=en&bookmarkId=a4ce6a9d-7ef1-48f1-a5bf-e23a717fcf75&c=1696497560747 (2024, accessed 15 December 2024).
48. Keith TZ. *Multiple regression and beyond*. Pearson Education, 2006.
49. Clark LA and Watson D. Constructing validity: Basic issues in objective scale development. *Psychological Assessment* 1995; 7: 309–319.
50. Larsson F, Engström Å, Strömbäck U, et al. Development and psychometric evaluation of the Feeling Safe During Surgery Scale. *Nursing Open* 2021; 8: 2452–2460.
51. Cortina JM. What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology* 1993; 78: 98–104.
52. Di Iorio CK. *Measurement in health behavior: methods for research and education*. 1st ed. Jossey-Bass, 2005.
53. Ursachi G, Horodnic IA and Zait A. How Reliable are Measurement Scales? External Factors with Indirect Influence on Reliability Estimators. *Procedia Economics and Finance* 2015; 20: 679–686.
54. Vaske JJ, Beaman J and Sponarski CC. Rethinking Internal Consistency in Cronbach's Alpha. *Leisure Sciences* 2017; 39: 163–173.
55. Gliem JA and Gliem RR. Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. In: *Midwest Research-to-Practice Conference in Adult, Continuing, and Community education*. The Ohio State University, 2003, pp. 82–88.
56. Padmanabhanunni A, Pretorius TB and Isaacs SA. Validation of the vaccination attitudes examination scale in a South African context in relation to the COVID-19 vaccine: quantifying dimensionality with bifactor indices. *BMC Public Health* 2023; 23: 1872.
57. Paulsen J and BrckaLorenz A. Internal consistency. *FSSE Psychometric Portfolio*. https://scholarworks.iu.edu/iuswrrest/api/core/bitstreams/0d3be3c8-a5f1-49e7-b5af-4c0a671cd061/content (2017).
58. Hair JF (ed) *Multivariate data analysis*. 7th ed. Pearson Prentice Hall, 2010.
59. McDonald RP and Ho M-HR. Principles and practice in reporting structural equation analyses. *Psychological Methods* 2002; 7: 64–82.
60. Fournier L, Bőthe B, Demetrovics Z, et al. Evaluating the factor structure and measurement invariance of the 20-item short version of the UPPS-P Impulsive Behavior Scale across multiple countries, languages, and gender identities. *Assessment* 2025; 32: 635–653.
61. Merino-Soto C, Dominguez-Lara S, Rodriguez LM, et al. Cross-cultural measurement invariance of the BFI-15p in university students from Argentina, Spain, and Peru. *Acta Psychologica* 2025; 256: 104993.
62. Chen FF. Sensitivity of Goodness of Fit Indexes to Lack of Measurement Invariance. *Structural Equation Modeling: A Multidisciplinary Journal* 2007; 14: 464–504.
63. Cheung GW and Rensvold RB. Evaluating Goodness-of-Fit Indexes for Testing Measurement Invariance. *Structural Equation Modeling: A Multidisciplinary Journal* 2002; 9: 233–255.
64. Bornstein MH. Form and function: Implications for studies of culture and human development. *Culture & Psychology* 1995; 1: 123–137.
65. Henseler J, Ringle CM and Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *J of the Acad Mark Sci* 2015; 43: 115–135.
66. Fornell C and Larcker DF. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research* 1981; 18: 39.
67. Harpe SE. How to analyze Likert and other rating scale data. *Currents in Pharmacy Teaching and Learning* 2015; 7: 836–850.
68. Evans JR and Basu A. *Statistics, data analysis, and decision modeling*. 5th ed., Pearson, 2013.
69. Clogg CC, Petkova E and Haritou A. Statistical Methods for Comparing Regression Coefficients Between Models. *American Journal of Sociology* 1995; 100: 1261–1293.
70. Paternoster R, Brame R, Mazerolle P, et al. Using the correct statistical test for the equality of regression coefficients. *Criminology* 1998; 36: 859–866.
71. Knight FH. *Risk, uncertainty and profit*. Hart, Schaffner and Marx, 1921.
72. Kahneman D and Tversky A. Prospect Theory: An Analysis of Decision under Risk. *Econometrica* 1979; 47: 26.

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