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THE ROLE OF ENTREPRENEURIAL EDUCATION IN CARRYING OUT ENTREPRENEURIAL INITIATIVES. EVIDENCE FROM ROMANIAN TECHNICAL UNIVERSITIES

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Abstract: *Entrepreneurs play a crucial role in driving the economic growth of a nation, and research on entrepreneurial education and students' entrepreneurial initiatives has gained momentum in the past years. However, few of these studies have considered the specificities of the curriculum associated with the study programs they pursue. The research evaluates the impact of entrepreneurial education within technical universities on students' entrepreneurial intentions in terms of business start-ups. The empirical research was conducted in five development regions in Romania, where five of the most important technical universities operate. The obtained results reveal that, although there is no statistically significant link between entrepreneurial education and the growth rate of new business registrations, there is solid evidence regarding the interdependence between the proportion of disciplines contributing to the formation of entrepreneurial skills and the selected dependent variables. This evidence confirms the contribution of young entrepreneurial engineers to the consolidation of the local/regional economic environment.*
Key words: *entrepreneurial education, technical universities, entrepreneurial intentions, entrepreneurship, start-ups.*

1. INTRODUCTION

Entrepreneurs play a critical and influential role in driving the economic growth of a nation because entrepreneurs improve the existing economic system by introducing new products or services, creating new organizations, and changing raw materials [1]. Numerous studies emphasize the fact that there is a link between economic development and entrepreneurship [2-6], and policymakers also consider that increased levels of entrepreneurship can be reached through education [7], especially through entrepreneurial education. It is also clear that there is a need for a solid European entrepreneurial community since the contributions made by Small and Medium Enterprises (SMEs) in terms of employment possibilities and growth are essential for the European Union's sustained economic development, as they represent 99% of all businesses in the European Union [8].

This is why building and developing a robust educational system that effectively motivates and inspires the upcoming generation to support and pursue their entrepreneurial aspirations is imperative.

Researchers have begun to focus their attention and study the importance of general education and entrepreneurial education as a tool for fostering and promoting entrepreneurship [9-13]. Their studies offer compelling evidence of a consistent and positive correlation between entrepreneurial education and the intention to engage in entrepreneurial activities [14-19], as they are more likely to identify business opportunities, venture into new ventures, and effectively manage their enterprises. Furthermore, the positive correlation extends to overall entrepreneurial performance, with educated entrepreneurs demonstrating greater business success, innovation, profitability, and long-term sustainability [20,21].

Formal education programs, specialized courses, training seminars, and extracurricular learning opportunities are a few elements of entrepreneurial education in a university's ecosystem.

Entrepreneurial education also provides a powerful means of advocating and stimulating entrepreneurship, equipping individuals with the knowledge, skills, and mindset necessary to embark on entrepreneurial ventures. The cited scholars have explored this relationship extensively, and their findings demonstrate the positive impact of entrepreneurial education.

Researchers examining the effectiveness of university-based entrepreneurial education programs have discovered that these programs have a favorable effect on students' abilities, competencies, and general entrepreneurial attitudes [22-24].

The cumulative findings strongly emphasize the significance of integrating entrepreneurial education into academic curricula, vocational training programs, and lifelong learning initiatives. By nurturing and promoting entrepreneurship through education, societies can foster a culture of innovation, creativity, and economic growth. Furthermore, policymakers, educators, and stakeholders are encouraged to collaborate in developing comprehensive and effective entrepreneurial education frameworks that address the evolving needs of aspiring entrepreneurs and equip them with the necessary competencies to thrive in today's dynamic business environment.

2. ENTREPRENEURIAL EDUCATION IN TECHNICAL UNIVERSITIES

Universities ought to be “at the heart of their local community, and so they may be considered to have a duty to contribute to that community by supporting business activity” [25]. Given that creativity and innovation are crucial for socio-economic development and universities serve as hubs for invention through their research programs, this support can take many forms.

Empirical studies have linked entrepreneurship education, attitudes, and entrepreneurial behavior [26]. Specifically, entrepreneurship education has been found to foster positive attitudes towards entrepreneurship. These favorable attitudes, in turn, positively influence entrepreneurial intent, which is considered a strong predictor of actual entrepreneurial behavior, such as starting a business. Therefore, given that attitudes can be shaped and influenced, educators and practitioners have the opportunity to impact and cultivate entrepreneurial attitudes among individuals [27].

At the same time, [28] contend that the role of universities, particularly technical universities, extends beyond producing technology transfer (i.e., patents, spin-offs, and start-ups) and that it also includes larger roles like providing leadership and support for developing entrepreneurial thinking, actions, institutions, and capital.

By analyzing primary data collected from a sample of 1470 students, of which 50.3% were students in the field of exact sciences and engineering, Adeel et al. (2023) [2] examined the specific individual characteristics of students interpreted through the lens of their prior knowledge acquired during their study programs, motivation, and entrepreneurial intention, as well as their entrepreneurial vigilance and opportunity recognition abilities. Highlighting the fact that more than half of the surveyed students (69.4%) did not receive entrepreneurial education during their studies (education reflected through the structure of the curriculum), the authors demonstrated a weak but statistically significant relationship between students' entrepreneurial motivations and their ability to recognize business opportunities. Furthermore, the authors provided evidence of a direct connection between the ability to identify entrepreneurial opportunities and students' entrepreneurial intentions. Specifically, it was shown that for students in higher education, the main driver of their intention to start a new business depends on their ability to identify business opportunities. The authors concluded that students who benefit from entrepreneurial education have an advantage as they can leverage their prior knowledge to identify new business opportunities and establish new businesses.

Meng et al. (2023) [29] evaluated how entrepreneurship education impacts entrepreneurship policy, the desire to engage in entrepreneurial activities, and entrepreneurial behavior. Although the analyzed sample was mixed (with only 12.2% represented by engineering graduate students), the authors demonstrated a reciprocal relationship among

the three mentioned variables (students' desire to engage in entrepreneurship partially mediating the relationship between entrepreneurship policy and entrepreneurial behavior).

The research [30] analyzed primary data collected through questionnaires in two stages. In the first stage, the authors evaluated the relationship between the quality of entrepreneurship education and entrepreneurial orientation. They assessed the students' entrepreneurial self-efficacy and intentions in the second stage. The average age of the respondents was approximately 22.32 years (with 65.1% being undergraduate students), and engineering students accounted for 39.7% of the total sample population. Analyses conducted on this population provided evidence for three significant interdependencies for the present study: entrepreneurial intention is dependent on the quality of entrepreneurship education; the quality of entrepreneurship education (coupled with the concern for entrepreneurial self-efficacy) is dependent on entrepreneurial orientation (which is reinforced within academic programs); supporting students in entrepreneurial orientation strengthens the positive relationship between the quality of entrepreneurship education and entrepreneurial self-efficacy. The conclusion is that there are mediating and moderating mechanisms between the quality of entrepreneurship education and entrepreneurial intentions, which can be controlled at the level of higher education service providers.

The research [31] analyzed the determinants of entrepreneurial intentions among students, focusing on learning motivation and personal innovativeness. The processing of primary data collected from 330 students from various fields such as science, technology, and management indicated that these two determinants have an indirect (but significant) effect on entrepreneurial intentions, with technological self-efficacy being the main moderator of these relationships. From a practical perspective, the authors highlighted two essential aspects: personal innovativeness should be integrated into entrepreneurship education programs as it positively influences entrepreneurial mindset and potential, and fostering entrepreneurial intentions among students is a responsibility of universities, as they can and should design a learning environment that facilitates the creation of new ventures.

Based on a literature review that includes engineering and management journals, the study [32] reinforce the findings of the previously mentioned authors, emphasizing that in the knowledge society, universities play a significant role in regional development and economic growth as they have the means to increase students' entrepreneurial awareness and stimulate and directly exploit their innovations. Concerned with identifying the mechanisms adopted by universities to support and promote student entrepreneurship, the authors found both commonalities and divergences in the research. The commonalities include the fact that the research is grounded in four essential theories: the theory of planned behavior, the entrepreneurial event model, the effectuation theory, and the institutional theory. However, regarding the divergences, the authors explained the lack of convergence in the results in terms of the research methodologies adopted (empirical approaches being predominant compared to narrative ones), the data collection methods (predominantly analyzing primary data), and the scientific traditions in the research on student entrepreneurship. The authors concluded that entrepreneurship education, the entrepreneurial atmosphere, the structure of study programs (reflected in the course structure of the curriculum), and support processes are the most important determinants of students' entrepreneurial intentions. Therefore, the practical realization of entrepreneurial intentions depends on entrepreneurship education and the university ecosystem.

However, according to a European Commission assessment, European education and training systems continue to fail to produce the necessary skills for employability and need to effectively collaborate with businesses or employers to make the learning process more realistic for the workplace [33]. A study conducted in 31 European states has shown that over half of European students need access to entrepreneurship education. More precisely, 11 million students need the opportunity to

participate in a curricular or extracurricular activity that would stimulate their entrepreneurial spirit [34]. The need for entrepreneurship studies is even more pronounced in some Member States from Central and Eastern Europe that joined the EU in and after 2004 within nonbusiness institutions and disciplines [35].

The Executive Unit for the Financing of Higher Education, Research, Development, and Innovation [36] researched the country's limited development of entrepreneurship education. It was discovered that rather than being a collective and planned effort by higher education institutions (HEIs) or the national government, the focus on entrepreneurship was driven mainly by individuals. However, multiple Romanian universities have lately actively participated in various programs designed to support the entrepreneurial ecosystem. Programs aimed at improving HEI administration and changing their mindset towards incorporating entrepreneurship into the overall university strategies are included in these initiatives. In terms of the promotion of entrepreneurial culture and self-employment at the university level, various actions have been taken, such as the inclusion of specific subjects on venture creation across multiple study programs and the development of specific actions to encourage enterprise creation, such as business idea competitions, business incubators, encouragement and support for start-ups, etc.

3. RESEARCH METHODOLOGY

The research is based on rigorous empirical analysis using secondary data from 2018-2022, collected for the five most important technical university centers in Romania - Bucharest, Cluj, Timișoara, and Iași. For three key reasons, the study focuses on technical universities in Romania. First, the research [37] notes a strong link between a nation's technical capability and its level of economic development. Second, recent literature has underlined the value of entrepreneurship education for engineers, as noted by a group of authors [38] and also, an other group of researchers [24]. Finally, the Romanian Ministry of Education (2020) reports that the average number of engineering students enrolled in bachelor programs from 2014 to 2018 was 80,188, representing 19.68% of the total student population in Romania [39].

The first stage of the research was conducted on five major Romanian technical universities (the universities included in the study had over 50% of their programs in engineering) according to the Romanian Ministry of Education List of Public HEIs, namely:

- University POLITEHNICA of Bucharest (UPB),
- Technical University of Civil Engineering of Bucharest (UTCB),
- Technical University of Cluj Napoca (TUCN),
- Technical University "Gheorghe Asachi" Iasi (TUIASI),
- Polytechnic University of Timisoara (UPT).

This stage aimed to explore the way technical universities in Romania contribute to the formation and development of entrepreneurial skills among engineers using the research conducted by [40], which analyzed the *teaching and learning* dimension of the entrepreneurial universities, as defined by NIRAS (2008) and examined the programs, courses, curricula, and extra-curricular activities designed to enhance entrepreneurial competences [41].

Based on the content analysis of the curricula, the mentioned authors identified the proportion of disciplines that contribute to developing entrepreneurial skills in the total number of disciplines in the curriculum [40]. The analysis included 50 faculties from the five universities presented in Table 1, and the inclusion criteria was the fact that faculties curricula had a minimum of 50% engineering classes.

For this study, the following independent variables were considered:

a) The proportion of disciplines contributing to the formation of students' entrepreneurial competencies in the total number of disciplines in the curriculum (from bachelor's programs) (ENTb):

*% ENTb = (total entrepreneurship classes/total number of classes) * 100* (1)

Table 1

Share of entrepreneurship classes in the total number of classes

Universities	Total entrepreneurship classes/total no. classes (average %)	
	Bachelor	Master
University POLITEHNICA of Bucharest (UPB) – 15 faculties	8.19	9.61
Technical University of Civil Engineering of Bucharest (UTCB) – 5 faculties	2.90	3.47
Regional average	5.54	6.54
Technical University of Cluj Napoca (TUCN) – 11 faculties	8.09	10.87
Technical University "Gheorghe Asachi" Iasi (TUIASI) – 11 faculties	5.08	7.18
Polytechnic University of Timisoara (UPT) – 8 faculties	9.70	7.75

Note: Data was collected from January 2020 to May 2020, and only publicly available programs were considered for each degree program. Since the duration of studies in the technical field is 4 years, the data collected were considered representative for 2018-2022.
Source: Processing according to [40]

Table 2

Analyzed Population: 5 universities, 5 regions, 25 counties

University	Region	Counties assigned
UPB	Bucharest-Ilfov	(2): Bucharest, Ilfov
UTCB	South Muntenia	(7): Argeș, Prahova, Dâmbovița, Ialomița, Călărași, Giurgiu, Teleorman
TUCN	Northwest	(6): Satu Mare, Maramureș, Bihor, Sălaj, Cluj, Bistrița Năsăud
TUIASI	Northeast	(6): Iași, Botoșani, Suceava, Neamț, Bacău, Vaslui
UPT	West	(4): Arad, Timișoara, Hunedoara, Caraș Severin

Source: Own processing

b) The proportion of disciplines contributing to the formation of students' entrepreneurial competencies in the total number of disciplines in the curriculum (from master's programs) (ENTm):

*% ENTm = (total entrepreneurship (ENT) classes/total number of classes) * 100* (2)

These proportions were first determined for each faculty within the selected universities, and then the average values were calculated at the university level.

The second step of the research was to define the regions where the selected universities operate. The five technical university centers (UPB, UTCB, TUCN, TUIASI, and UPT) are in 5 development regions. Therefore, five regions were selected out of the total 8 development regions in Romania, corresponding to the degree of polarization in technical education: Bucharest-Ilfov Region, South Muntenia Region, Northwest Region, Northeast Region, and West Region. Bucharest-Ilfov is the most developed region compared to other regions in Romania. According to statistics at the European Union level (as mentioned by the European Committee of the Regions documents in 2022), the other regions are categorized as less developed regions as they have a lower per capita GDP than the EU average (Table 2) [42].

The third step of the research was to identify the dynamics of entrepreneurial activities at the county level within the selected regions. Based on data provided by the National Trade Register Office, information regarding the number of new business registrations was collected for each year and each county, corresponding to the analyzed period (2018-2022), as well as the age distribution of associates/shareholders for all registered businesses in each county. The following indicators were determined based on the collected data:

- The new business growth rate at the county level (*NBgr*): 2018 was considered the base year for this research. The growth rate of new business registrations was determined for 2019, 2020, 2021, and 2022 (each year and each county). This indicator considered both business registrations as legal entities (with a predominance of limited liability companies - SRL) and registrations as sole proprietors (with a predominance of authorized individuals - PFA and sole traders - II).
- The share of new businesses in the total number of registered businesses at the county

level (*NO*): This indicator was determined by considering two sets of data provided by the National Trade Register Office: the number of new business registrations and the total number of registered businesses. This indicator reflects the intensity of entrepreneurial activities in relation to the existing business environment.

- The share of active shareholders aged up to 29 years (*S29*): Data on the age of shareholders/partners are provided for all registered businesses. These business founders are grouped into five age groups: up to 29 years, between 30 and 39 years, between 40 and 49 years, between 50 and 59 years, and over 60 years. From these groups, only the first age group was selected (as it focused on the practical realization of students' entrepreneurial intentions both during and after their studies).

The proposed hypotheses to be tested were formulated as follows:

H1: The formation of entrepreneurial competencies among students in technical higher education from bachelor's and master's programs (reflected by the proportion of courses contributing to these competencies) directly correlates with the intensity of entrepreneurial activities (reflected by the growth rate of newly registered businesses).

H2: The proportion of courses contributing to the formation and development of entrepreneurial competencies (in technical higher education, from bachelor's and master's programs) influences the practical realization of entrepreneurial intentions (reflected by the proportion of new businesses in the total number of registered businesses, as well as the number of shareholders/partners aged up to 29 years who are involved in businesses).

Correlation and regression analyses were performed using SPSS software to test these hypotheses. The regression equations that highlight the interdependencies between the selected dependent and independent variables were defined as follows:

$$NBgr_{it} = ENTb_{it}\beta 1 \pm ENTm_{it}\beta 2 \pm u_{it} \quad (3)$$

$$NO_{it} = ENTb_{it}\beta 1 \pm ENTm_{it}\beta 2 \pm u_{it} \quad (4)$$

$$S29_{it} = ENTb_{it}\beta 1 \pm ENTm_{it}\beta 2 \pm u_{it} \quad (5)$$

where *NBgr* is the new business growth rate, *S29* is shareholders aged up to 29 years, *NO* is the share of new business in old business, *ENT* represents the share of entrepreneurial classes in the total number of classes in the curriculum (bachelor and master); *it* reflects population and period, β is coefficient of regression and u_{it} is the free term.

4. RESULTS AND DISCUSSIONS

The empirical research aimed to evaluate the interdependencies between entrepreneurship education provided to students from bachelor's and master's programs in the technical field and the intensity of entrepreneurial activities in the regions where the five most important technical universities operate. Preparatory analyses were conducted to test the validity of the proposed models. Descriptive statistics for the variables used in the econometric analysis are presented in Table 3.

For the analyzed period, *NBgr* (determined in relation to the values of the year 2018) was 5%. This indicator's minimum and maximum values show moderate variation at the level of the 25 analyzed counties. The highest value for *NBgr* corresponds to Ilfov County in 2021. The minimum value recorded for this indicator is not below 1, indicating that the number of newly registered businesses has increased compared to the registrations in 2018 over the four-year analysis period. The analysis of skewness and kurtosis parameters indicated that values below the sample mean are predominant.

Table 3

Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
NBgr	125	1.00	1.12	1.05	0.03	-0.60	-0.37
NO	125	6.20	29.50	14.31	3.52	1.15	3.15
S29	125	6.36	12.89	9.33	1.21	0.39	0.68
ENTb	125	5.08	9.70	6.71	1.74	0.64	-1.24
ENTm	125	6.54	10.87	7.93	1.71	1.03	-0.69

Source: Own processing

Regarding *NO*, the descriptive statistics indicated an average value of 14.31%. The maximum value for this indicator (29.50%) was recorded in Dâmbovița County (in 2018), while the minimum value was recorded in the adjacent county of Prahova (6.2%). The standard deviation, skewness, and kurtosis parameters indicate that data homogeneity at the sample level is relatively low, with values above the sample mean being predominant. The positive aspect to note from this analysis is that, at the regional level, there is a growing interest among entrepreneurs in registering new businesses.

Out of the total number of shareholders/ partners (founders of registered businesses in each year and county), 9.33% are aged below 29. Giurgiu County has the highest proportion of young entrepreneurs (12.89%), while Bucharest has the lowest (6.36%).

The analysis of the independent variables indicated differences at both the bachelor's and master's program levels. Within the total number of disciplines in the curriculum of the five selected universities, 6.71% are dedicated to entrepreneurship education (*ENTb*), with the potential to contribute to forming and consolidating entrepreneurial initiatives among bachelor's students. The university center providing students with access to the highest number of integrated entrepreneurship education disciplines is in Timișoara (serving the West Region). On the other end of the spectrum (with values halfway between those recorded for the West Region), is the Northeast Region served by the university center in Iași (where the proportion of disciplines dedicated to entrepreneurship education is only 5.08% of the total number of disciplines in the curriculum).

According to the analyzed data, the proportion of disciplines contributing to entrepreneurial competencies (*ENTm*) increases in the case of master's programs (with an average of 7.93%). The university located in the Northwest Region (TUCN) holds a more favorable position, providing students with access to more courses dedicated to entrepreneurship education (10.87%). On the other hand, UTCB, a center of attraction for students from the South Muntenia Region, has the lowest proportion of disciplines dedicated to entrepreneurial education in the master's programs (only 6.54% of the total number of disciplines in the curriculum).

Several important conclusions can be drawn based on the integrative results of the descriptive statistics. The entrepreneurial education of students significantly differs among the analyzed university centers, both at the bachelor's and master's program levels. Within the analyzed regions, robust evidence supports the fact that entrepreneurial initiatives are put into practice (as indicated by the dynamics of *NBgr*), and young individuals are involved in creating and developing new businesses (*NO*).

The correlation analysis of the collected data showed a low association between the analyzed variables (Table 4). Therefore, the low risk of multicollinearity provided favorable evidence for further analysis.

As preliminary steps to the regression analysis, the significance of the relationship between variables was tested. Assuming that the regression analysis results will be statistically significant, the data in Table 5 indicate that 1.1% (respectively, 5.2% and 11.7%) of the variation in the selected dependent variables (*NBgr, NO*, and *S29*) can be explained by the variation in the proportion of disciplines dedicated to entrepreneurship education among engineering students in the five analyzed universities.

Table 4

Pearson correlation.

	NBgr	NO	S29	ENTb	ENTm
NBgr	1	-0.205*	-0.045	-0.109	-0.055
NO	-0.205*	1	0.476	0.026	0.198*
S29	-0.045	0.476	1	-0.085	0.216*
ENTb	-0.109	0.026	-0.085	1	0.596
ENTm	-0.055	0.198*	0.216*	0.596	1

Source: Own processing.
Note: *) Correlation is significant at the 0.05 level.

Table 5

The significance of the relationship between variables

Equations	Multiple R	R Square	Adjusted R Square	Standard Error
(3) NBgr	0.110	0.012	-0.004	0.029
(4) NO	0.228	0.052	0.037	3.459
(5) S29	0.343	0.117	0.103	1.144

Source: Own processing. Note: Significance level 95%

An additional analysis supplemented the analysis of the sample-level data to test the significance of the three proposed statistical models. The results of the ANOVA test, presented in Table 6, reveal that only in models (4) and (5) the F coefficients have a probability associated with them that is smaller than 0.05, rejecting the null hypothesis and indicating that only these prediction models are statistically significant.

Based on the results of the ANOVA test, the regression analysis was conducted only for models (4) and (5), which were considered statistically significant. The results are presented in Table 7.

Table 6

ANOVA test

ANOVA	Sum of Squares	df	Mean Square	F	Sig.
$NBgr_{it} = ENTb_{it}\beta 1 \pm ENTm_{it}\beta 2 \pm u_{it}$					(3)
Regression.	0.001	2	0.001	0.75	0.48
Residual	0.10	122	0.001		
Total	0.11	124			
$NO_{it} = ENTb_{it}\beta 1 \pm ENTm_{it}\beta 2 \pm u_{it}$					(4)
Regression	80.22	2	40.11	3.35	0.04
Residual	1459.70	122	11.97		
Total	1539.92	124			
$S29_{it} = ENTb_{it}\beta 1 \pm ENTm_{it}\beta 2 \pm u_{it}$					(5)
Regression	21.24	2	10.62	8.12	0.00
Residual	159.59	122	1.31		
Total	180.83	124			

Source: Own processing

Table 7

Coefficients of regression equations

Equations / Variables		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
(4) NO	(Constant)	11.63	1.53		7.,60	0.00		
	ENTb	-0.29	0.22	-0.14	-1.29	0.20	0.65	1.56
	ENTm	0.58	0.23	0.28	2.57	0.01	0.65	1.56
(5) S29	(Constant)	8.56	0.51		16.92	0.00		
	ENTb	-0.23	0.07	-0.33	-3.13	0.02	0.64	1.55
	ENTm	0.29	0.08	0.41	3.90	0.00	0.64	1.55

Source: Own processing. Note: Regression is significant at the 95% level.

Based on the results of the regression analysis, the following conclusions can be drawn:

1. No statistically significant relationships were found between the selected dependent variable *NBgr* and *ENT*. Hypothesis H1 is rejected.
2. Statistically significant relationships were identified between the dependent variables *NO* and *S29*, on one hand, and *ENT*, on the other hand. Hypothesis H2 is confirmed, and the results can be interpreted as follows:

- A 1% increase in *ENTm* leads to a 0.58% increase in the NO indicator.
- A 1% increase in *ENTb* has a negative impact on *S29*. This negative influence can be explained by the fact that students in technical bachelor's programs are more oriented towards pursuing professional activities based on individual employment contracts, preferring to work as employees rather than as employers. This result is supported by previous studies emphasizing that although many students desire to be self-employed, very few are willing to start their own businesses right after graduation [43].
- A 1% increase in *ENTm* results in a 0.29% increase in *S29*. This result confirms that master's graduates are more inclined to get involved in businesses (as shareholders/ partners) during or after their studies due to their entrepreneurship education.

Considering that similar analyses have not been found in the consulted literature, the results of this study can serve as benchmarks for future research. The validity of the study results is confirmed by additional tests conducted. For both regression equations, the tolerance level is below 0.7, and the test for collinearity (VIF - Variation Inflation Factor) shows values below 10.

5. CONCLUSIONS

The study's main objective was to evaluate the contribution of entrepreneurship-focused education (provided by technical higher education institutions) to students' entrepreneurial intentions and the practical

realization of these entrepreneurial initiatives. Specifically, the aim was to analyze the interdependencies between the curriculum structure of bachelor's and master's programs in the technical field and the dynamics of entrepreneurial activities in the regions where the educational institutions are located. Regarding the curriculum structure, the focus was on the proportion of disciplines contributing to entrepreneurial competencies (calculated in relation to the total number of disciplines in the curriculum).

Studies show that individuals who receive entrepreneurship education demonstrate a higher inclination and intention to pursue entrepreneurial endeavors, leading to increased identification of business opportunities, venture creation, and effective management of enterprises–and technical universities play a pivotal role in supporting business activity and fostering entrepreneurship because by shaping entrepreneurial attitudes and providing opportunities for venture creation, they can contribute not only to technology transfer but also to the development of entrepreneurial thinking, institutions, and capital.

Conclusions regarding the empirical research can be formulated based on the two independent variables analyzed. For undergraduate programs, the proportion of disciplines contributing to the development of entrepreneurial competencies (*ENTb*) was not found to have a significant and favorable influence on the local and regional business environment. On the other hand, for master's programs, the proportion of disciplines contributing to entrepreneurial competencies (*ENTm*) has a statistically significant favorable influence, contributing to both the increase in the proportion of new businesses in the total registered businesses (*NO*) and the increase in the proportion of active shareholders aged up to 29 (S29).

These results support the hypothesis that the curriculum's emphasis on entrepreneurship-related courses fosters entrepreneurial intentions and practical implementation among students.

Overall, this study contributes to understanding the relationship between entrepreneurship education and entrepreneurial activities, in the context of technical higher education. The results can be a foundation for future research and informed educational and policy initiatives to promote entrepreneurship and economic growth.

The conducted study is useful for education providers (technical universities that offer educational activities for developing student entrepreneurial initiatives) and policymakers (concerned with intensifying entrepreneurial activities at the national economic level).

To enhance the effectiveness of entrepreneurship education, technical universities should consider two strategies:

A. Adapting the undergraduate curriculum (by modifying the structure or increasing the proportion of disciplines contributing to entrepreneurial competencies) to stimulate an entrepreneurial mindset among engineering students, encouraging them to pursue entrepreneurial opportunities rather than solely seeking employment. as the universities have limited autonomy in developing undergraduate curricula, they can supplement entrepreneurship education through optional or extracurricular courses.
B. Promoting entrepreneurial initiatives among students and graduates of master's programs, encouraging these initiatives to materialize in practice (by increasing the number of students/graduates who become shareholders/partners in a business). universities have more autonomy in developing master's program curricula, allowing decision-makers to consider modifying the structure by increasing the proportion of disciplines contributing to students' entrepreneurial competencies.

The study's results are also valuable for informing policies that support entrepreneurial initiatives as a crucial factor for economic growth. These public policies should be formulated to:

a) Motivate students and graduates in technical fields to contribute to local/regional economic development by stimulating the establishment of new businesses and

b) Provide financial support for implementing their entrepreneurial initiatives.

Notably, this study was limited to a pilot sample and focused on only five of the eight development regions in Romania (selected based on their proximity to major technical universities). In future research, we intend to expand the analysis to cover all regions of the country, as students in technical fields often migrate to the university centers that offer them the best educational opportunities, regardless of the physical distances involved.

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Rolul educației antreprenoriale în concretizarea inițiativelor antreprenoriale. Dovezi pentru universități tehnice române

Antreprenorii joacă un rol crucial în stimularea creșterii economice a unei națiuni, iar cercetările privind educația antreprenorială și inițiativele antreprenoriale ale studenților au câștigat avânt în ultimii ani. Cu toate acestea, puține dintre aceste studii au luat în considerare specificul curriculum-ului asociat cu programele de studii pe care le urmează. Cercetarea se concentrează pe evaluarea impactului educației antreprenoriale din cadrul universităților tehnice asupra intențiilor antreprenoriale ale studenților, concretizate în înființarea de noi afaceri. Cercetarea empirică a cuprins cinci regiuni de dezvoltare din România, unde își desfășoară activitatea cinci dintre cele mai importante universități tehnice. Rezultatele obținute relevă că, deși nu există o legătură semnificativă statistic între educația antreprenorială și rata de creștere a înregistrărilor de noi afaceri, există dovezi solide privind interdependența dintre proporția disciplinelor care contribuie la formarea competențelor antreprenoriale și variabilele dependente selectate. Aceste dovezi confirmă contribuția tinerilor ingineri antreprenori la consolidarea mediului economic local/regional.

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