



THE ROLE OF ENTREPRENEURIAL EDUCATION IN FIELD OF INDUSTRIAL ENGINEERING

Mihai Boca

¹“Gheorghe Asachi” Technical University of Iasi-Romania, Department of Machine Manufacturing Technology
Bld. D. Mangeron No 59A, 700050, Iasi Romania

Corresponding author: Mihai Boca, mihai.boca@academic.tuiasi.ro

Abstract: All of us we are agreeing the idea according with that the entrepreneurship activity represent the engine of the economic sector. Through innovative activities developed in different sectors of the economy, as well as the investments into an idea, there will be registered significant increases in the quality of services and also into the obtained products or goods. Therefore, the activity of entrepreneurs and the entrepreneurship represent the optimal solution for a good and strength economy of Romania. More than that, the future graduated students from the technical domain and not only these, are welcome to be trained to develop smart ideas in this area. The purpose of this study is to analyse and reflect, based on a SWOT analysis, the actual state of perspectives that young graduated students have at their disposal to become good entrepreneurs. Also, in this study is presented a short review of the current situation of entrepreneurship at Romania. Beside this, some answers to a short questionnaire concerning the trend of the students from the industrial engineering domain are exposed, in order to express the actual opinion of them related to the entrepreneurial developing direction. This study represents a small step in order to define the main objectives and organizing activities to be sustained for the universities in order to prepare the future entrepreneurs among from graduated students.

Key words: entrepreneurial education, entrepreneurial abilities and skills, entrepreneurship activity, entrepreneurial perspectives, SWAT diagram

1. INTRODUCTION

It is well known that the entrepreneur's activities, booth with studing the perspectives of entrepreneurship have a vital role in our days [1]. In the universities from all over the world, the interest for entrepreneurship and for transmitting the knowledges about this domain has increased [7]. Even if the entrepreneurial education is necessary to get a job or to start a new business, the graduated students will use the knowledges accumulated during their studies. This fact also is stimulated by continues growth of the economical activities which requests innovative potential from the graduated students [8].

The entrepreneurial eduction needs to promote in the ranks of the graduated student's skills, abilities and competeneces needed to sutain, develop and implement an innovation through an idea. Beside this, the entrepreneurial knowledges will motivate and prepare the graduated student for understanding the ways to inovate into a domain. In this context, many research studies revealed that a part of this training requested for employes be in concordance with the study of entrepreneurship learned by students during their faculty studies [4].

Until now, different approaches were made in order to describe and characterize ways to teach the basics of entrepreneurship to the students. Thus, into a recent study [3] is mentioning the acute necessity to implement and develop entrepreneurial studies in higher eduction institutions. This fact represents the cause of a small number of graduated students from Malaysia and other contries, to obtain and secure their jobs. In this way are encouraged the young graduated students to become entrepreneurs and create their jobs. Thus, the training programs developed allways fits the challenges and demanding of all contries.

The tendencies from today of the graduated students are to be employee in management positions with salaries as high as possible, instead of creating their position as entrepreneurs. Beside this, they still afraid about their knowledges in this domain and by the potential risks assumed. From this reason, they encounter a social issue consist into applying their ideas into the present environment and growing this until the ideaas are implemented. Also, their issues are in correlation with choisen of a carrer [9]. This because the academic planning of study is focusing only at the studied matiers in orders to assure the path of the students in compliance with the plan of

studies. In other countries as China for instance, due to the socio-political context, an entrepreneurial education program for future entrepreneurs was established in 2012 by a procedure named, "Basic Requirements of Teaching Entrepreneurship Education in Higher Education Institutions" [11]. This model and other legislative methods were studied and tested in order to highlight the main contributions given to the entrepreneurial activity [10]. The results obtained are visible, but quite hardly be implemented.

All these considerations are leading to expose the reasons which have such causes and not without a deepening by the notions related to entrepreneurship, during the faculty activity of the students.

2. GENERAL CONSIDERATIONS ABOUT ENTREPRENEURSHIP IN ROMANIA

Generally speaking, the entrepreneurial activities from Romania and from the other country in Europe have the purpose to stimulate the increasing of the economic activities at the national level. Beside this, the entrepreneurship is the main contributor for developing the actual society in which all the ideas become applicable due to the high level of technique and technology. If we consider that the entrepreneurship represents the engine for developing the society, at one with developing of an entrepreneurial environment, for certainly the competition between different sectors of the economy will increase. In this way, all of us we will benefit by services and goods at a high level.

When we talk about the future of Romania in business and about the investments into ideas, we should trust in the entrepreneurial perspectives generated by our country. Even if Romania does not excel in certain areas, a good environment for the entrepreneurial activities could be created in order to trainee and obtain good entrepreneurs with some mandatory skills for this profession as: ambition, perseverance and integrity.

In order to obtain future results on the entrepreneurship in Romania, some studies have established protocols for development of the entrepreneurial activities [5]. These preparations start from the school level and continue with the high school.

However, as it is known, at present in Romania is not established a national development strategy in the field of entrepreneurial education [5]. This means that a number of training elements of such training cannot be included in the study curricula. Even if there have existed such initiatives, only in recent years have appeared considerable progresses, but still only partially applied in the education of student graduates. Thus, through various research projects, it was encouraged and stimulated the establishment of companies and training by qualifications of future engineers [5]. In such conditions, this present study comes with an analysis of the situation of entrepreneurship in Romania, seen through the eyes of graduate students in engineering. Thus, for a better appreciation this study proposes through a SWOT analysis to highlight the factors which has a significant influence on the entrepreneurship activity.

3. SWOT ANALYSES OF THE DEVELOPMENT AND APPLICATION OF THE ENTREPRENEURSHIP IN ROMANIA

Due to the economical and social environment existing in Romania, even if the entrepreneurship is can be possible applied here, in Romania its implementation encounters some possible gaps and impediments. These issues are justified in some places, depending by the context. Thus, in the following rows will be presented some perspectives, based and structured in the form of a SWOT analysis. All the opinions and point of views will be presented from the perspective of a future engineer, a graduated one.

Strengths:

1. The enthusiasm of the young students and the multitude of ideas

Romania, beside the industrial domain, has a lot of domains which need to be improved with innovative ideas furnished by fresh graduated. With the enthusiasm and the power of work of them it could be developed, by through well-developed plans and strategies, profitable activities of implementing the new ideas into the technology. Thus, the business environment is overlapped by the speed of developing and resources which cause the slow implementation of ideas in industry.

2. The existence of networking between people

Despite the interests manifested by each people who attend to an organization, the collaboration between different sectors from industry gives the opportunity to find resources and support in many organizational sectors. This aspect includes the possibility to establish a connection, based on contracts, between different sectors of activity, especially between engineers.

3. Communication facilities

Due to a highest level of student which known foreign languages, English language for instance, and the existence of the communication infrastructure based on the internet connection, the graduated students manifest

a highest interest to work beside the borders of the country. The communication is easier to be established by using the computer, networking and of existing logistical support. Thus, now it is possible to them to participate to different projects developed in partnership with foreign companies, by exchanging computer-generated information and online discussions.

Weaknesses:

A highly interest in the issue of entrepreneurial application is represented by the weaknesses which makes difficult the entire process of developing the business ideas and their putting in practice. There are some major weaknesses which can be detached from the basic activity of the entrepreneurship as follow:

1. The lack of political stability

It is well known the existence of the political context where some gaps appear in the functioning of the legislative state. More precisely, on the hand, in the conditions of some conflicts between the political parties, some legislative rules for assuring good ways and solutions for developing the entrepreneurial activities are not elaborated. On the other side, the lack of political stability will affect, on long term, the decision and the vision of future perspectives. Also, the decisions taken by future graduated students. Every minister comes with his plan of invigoration, so that the government measures to have the desired result. In fact, not all the government measures provided for developing the entrepreneurship environment will have the planned results.

Other difficulties encountered by the entrepreneurs could be considered through the selling prices of good, or for purchasing some raw materials, especially in the case of the metallic ones used in engineering. Any kind of raw material transformation will be made using resources. These resources are oriented to the electrical energy and gases. From this reason, the prices for the obtained goods will have included the amount of prices for these resources. Another risk factor, or probably the first one, is represented by the inflation rate, correlate with the exchange rate. An inconvenient who counterbalances with the deficit obtained through the expenditures made on raw materials and energy resources [1].

2. Taxes and administrative barriers

Between the main issues which have a high impact under the entrepreneurial activity developed for individual persons, it also counts the taxes and administrative procedures. On long term, all the gaps met in the development of entrepreneurial activity could produce obstacles that are difficult to overcome, especially for an entrepreneur at the beginning of his road. The challenge consists into walk, step by step and meets the requirements imposed by the system for regulating the steps to be followed. Usually, this time must be allocated to the product improvement and also dedicated to the business development [6].

3. Funding resources

In most all situations, the funding resources represent a turning point for a young entrepreneur which is also an engineer. For that is very hard to make translations between the idea and the raw material and at last, to the product. The amount of money needed for starting a business in engineering request, beside preparations, machine-tools for transforming the raw material into an object or a good. In this context, it is assumed that it is necessary to access loan funds. The lack of this access into the Romanian administration system could restrict the launch of many entrepreneurship projects. Some graduated students prefer to invest some personal resources or personal loans, in order to perform such actions. However, the European funds which are available through governmental programs or bank credits, to future entrepreneurs, could save the situation. However, the risk of non-financing exists and must be taken into account.

4. Educational system

Partially, the educational system has a significant contribution to the formation of thinking and to entrepreneurial spirit among the graduated students.

The educational system does not apply with the students some unwritten rules as: ways to make and build a team, ways to benefit by the occurred opportunities and so on. An exhortation such as: „we have to encourage the competition and to stimulate innovation”, could be consider as a good advice, but not applicable to a strong team headed by a leader and not by a manager or a director. Also, the graduated students live with the feeling that are they not well prepared to develop and sustain an idea, not even to put it into practice. Of course, most of the skills are developed during the educational period consist into practice made at all the matiers and by study, benefiting from learning using modern teaching methods.

In all those cases there is presented and sustained the necessity for developing a relationship between the educational systems, represented by the students and the industrial environment. A possible solution could be represented by finding an easiest way to transmit the information and training on the business site. As it is in our case, the future engineers have the possibility to apply for a stage of practice, in the second and third year of study, in one of the companies which the faculty has collaborations.

5. Influences of existing companies

Every company has his field of developing in which is difficult to enter. Most of great companies offer good

salaries and good conditions of work to their employees. With such comfort conditions, every idea of personal developing as entrepreneur becomes a lost cause. This fact for short term in conditions of quick win, on long term by a good strategy developed with involvement and support.

Opportunities:

1. A sum of opportunities to implement an idea

At this section, Romania comes with an impressionist environment for practicing the new idea. All the time could be provided to an idea expected to be applied and developed. The European programs offer to the graduated students and not only to them, some financial facilities in order to access European funds for develop businesses. This finds allows acquisitions such as processing and measurement equipment's.

2. Competitive prices for utilities and labor

In comparison with other countries, Romania has low prices for utilities and for the workforce. This fact brings our country in front of other manufacturers from all over the word and lead to an open market opportunity. Thus, Romania is a country with a wide potential concerning the prices and the workforce well prepared. In this context our graduated student endowed with proper training in order to could manage entrepreneurial activities.

Threats:

1. Lack of trust in people and on the environment

One of the threats which what can characterize the decision to put an idea into practice is given by the lack of trust of the graduated students. This disadvantage comes one side from the socio-political context which existing in Romania and on the other side, by the human characters met in their activities.

2. Lack of workforce

Beside the enthusiastic behaviour of the graduated student, Romania it also faces with a decrease in number of people able to work, because most of them decide to leave the country in the hope of a better life. Based on this aspect, is becoming difficult to organize a working group and lay the groundwork for targets.

Thus, the main aspects about the entrepreneur and entrepreneurship activity presented in the study, is summarized in the figure 1.

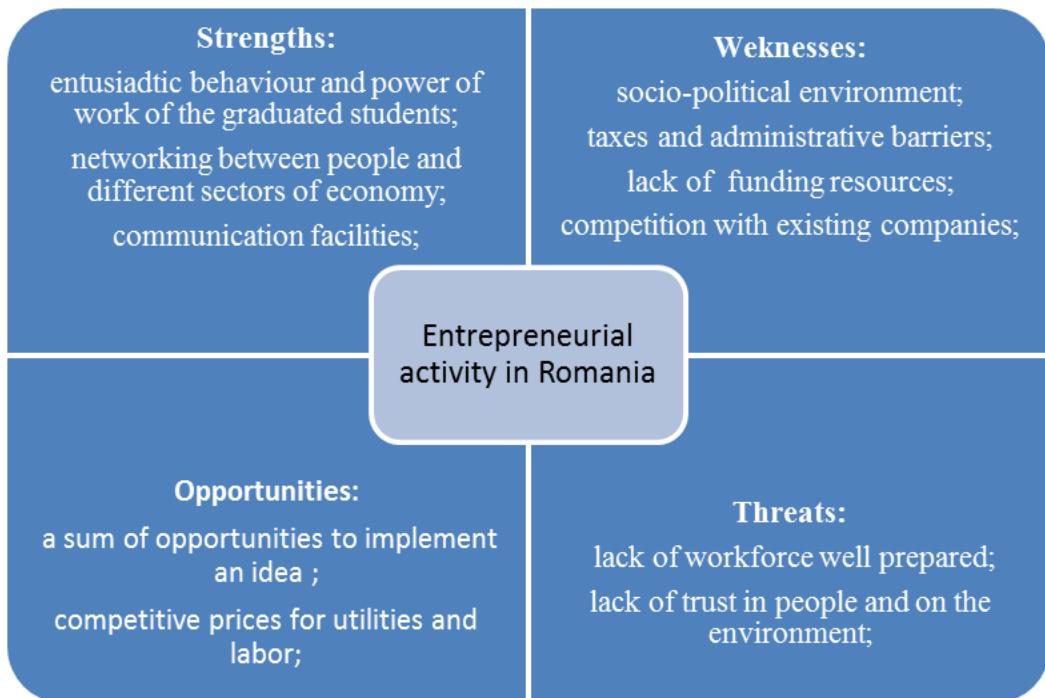


Fig 1. Brief presenting: SWOT analysis

According to the figure 1, the number of the weaknesses and threats factors tends to have significant influence on the entrepreneurial activities, fact that could generate a low success rate for future graduates as entrepreneurs. Even if the perspective seems to not offer many resources for entrepreneurship, there are known cases who were succeeded. More than that, there is a case in which a young entrepreneurial came from France to develop a business in Romania [2]. He believed in Romania and trusted in multilingual culture and in adaptability of the people from here.

4. THE METHODOLOGY USED FOR ESTABLISH THE ENTREPRENEURIAL PERSPECTIVES FOR THE GRADUATED STUDENTS WHICH COMES FROM THE INDUSTRIAL ENGINEERING DOMAIN

In order to determine perspectives of developing for the graduate's students, several oriented on subject studies were completed. The aim of each test was to establish the opinion of each student according to a possible entrepreneurial carrier followed. The data collected concerning the opinions of the students were analyzed by using some statistical tools. The study was attended by a number of 40 undergraduate students and another 25 master's students, each of them with training in the field of industrial engineering. Each survey test was focused on main skills which should characterize an entrepreneurial behavior and character. Thus, first questionnaire was about the impact of the studied matiers on their experience as young entrepreneurs.

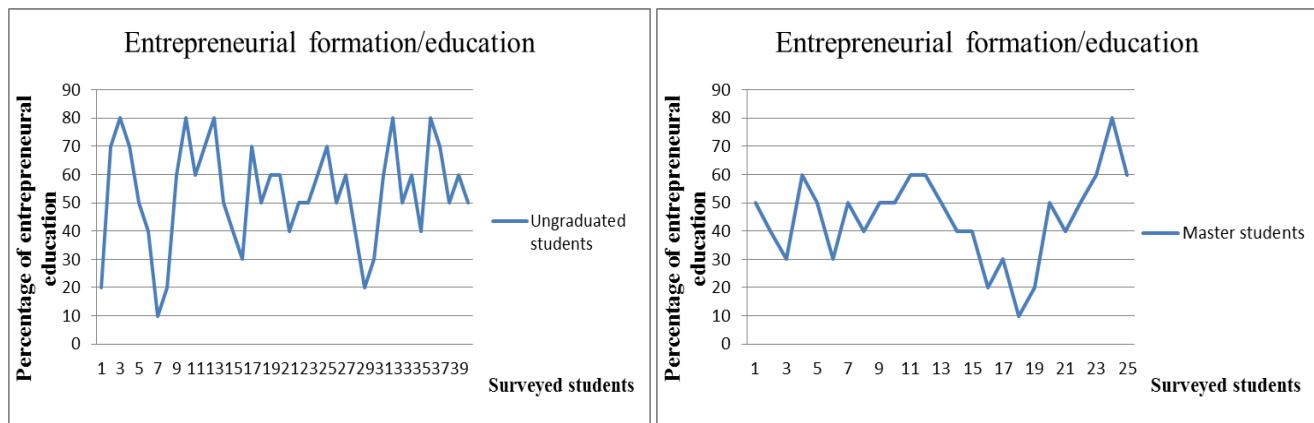


Fig 2. Student's answers concerning the impact of the main disciplines studied during classes on the engineering preparation

All students answered to the questions in the questionnaires received.

According to the figure 1, it can be observed that a significant part of the ungraduated students considers the entrepreneurial education as being efficient in proportion of 60 percentages. In comparison with them, the master students have a lower degree of confidence about the educational entrepreneurial efficiency.

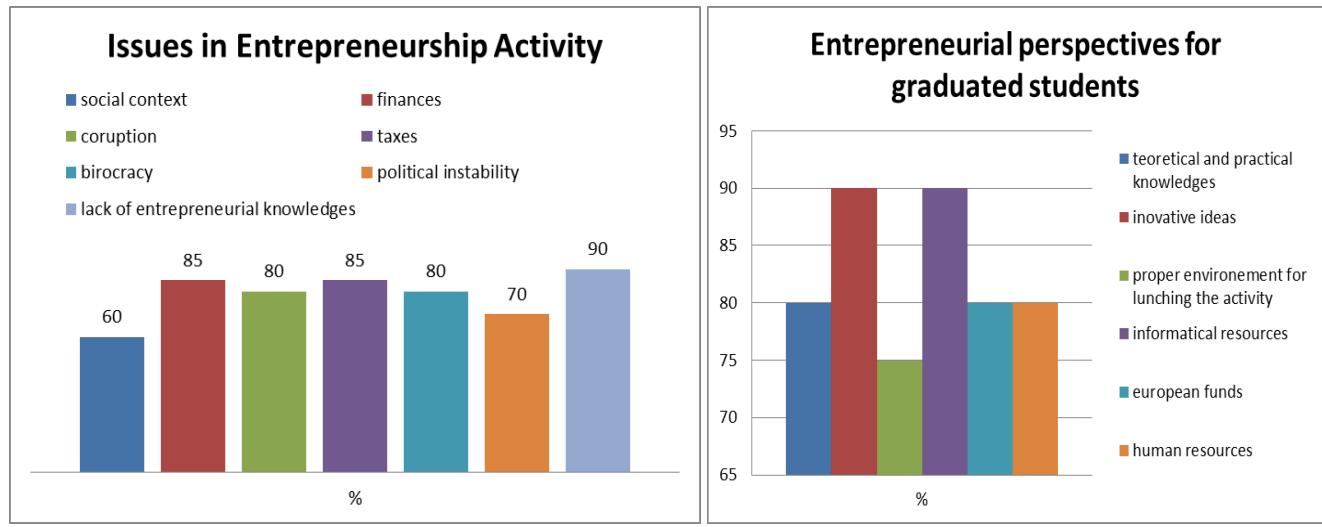


Fig 2. Answers of the students about possible issues encountered during of an entrepreneurship activity development and some perspectives for graduated students

The second questionnaire tried to focus on the main issues and application an innovative idea, in figure 2 (a). On the other hand, in the evolution presented in figure 2 (b) it is studied the impact of some key factors which competes in implementing an innovative idea.

competes in implementing an innovative idea. Those two images from the figure 2 present that some factors as finances, taxes and lack of knowledges about entrepreneurship. These factors have a strong impact under carrying out of entrepreneurial activities. Those

disadvantages are not only encouraging the entrepreneurship, but they block the development and implementation of new ideas, which generates over time a series of adverse economic implications.

5. CONCLUSIONS

This study focuses on several aspects of the entrepreneurial activity in order to establish which factors could influence the establishment of a business and which of them sustain the development of an innovative idea. After a short presentation of the actual state of entrepreneurship bases, it was necessary to analize all the factors that have a significant influence on the perspective to develop a business in Romania, aspect that has been described. Starting from the actual context, of socio-political and economical aspects, a SWOT analysis was made. Based on this analysis, a series of ideas could be set regarding the future prospects that future entrepreneurs from the field of industrial engineering may have. Also, those perspectives were analysed through a study developed among undergraduate students, as well as a few from master's studies. Thus, it was possible to create an idea regarding the reality inspired by them regarding the entrepreneurship. It has been observed that the basic ideas of entrepreneurship are not sufficiently debated in the entrepreneurship education and this type of education is not studied enough. Thus, through the attached questionnaires, the students' opinion on the elements related to entrepreneurship was also emphasized, which should be emphasized more.

REFERENCES

1. Available from: https://www.utilben.ro/article/top-piedici-si-oportunitati-pentru-dezvoltarea-antreprenoriatului-in-romania?gclid=Cj0KCQiAtJeNBhCVARIsANJUJ2HGhghGQpfI1BzRxX2DwMPNyTETiHX1b94MKydn40TQoMlu49ek0aAjxHEALw_wcB, Accessed: 12.09.2021
2. Available from: <https://www.eu-startups.com/2020/10/romania-is-a-country-that-truly-shines-interview-with-business-angel-and-serial-entrepreneur-gregoire-vigroux/>, Accessed: 10.09.2021
3. Badariah H. D., et al., (2016), *The Effectiveness of the Entrepreneurship Education Program in Upgrading Entrepreneurial Skills among Public University Students*, Procedia - Social and Behavioral Sciences 224 pp.117 – 123, <https://doi.org/10.1016/j.sbspro.2016.05.413>
4. Bosman L. et al. (2021), *Using adaptive comparative judgment to promote the entrepreneurial mindset and visual literacy in the engineering technology classroom*, Using adaptive comparative judgment to promote the entrepreneurial mindset and visual literacy in the engineering technology classroom, *Entrepreneurship Education* 4, pp. 251–271, <https://doi.org/10.1007/s41959-021-00055-7>
5. Eurydice Report, *Entrepreneurial education at School in Europe*, Executive Agency for Education, Audiovisual and Culture, Bruxelles, ISBN 978-92-9492-441-4, EC-02-16-104-RO-N, (<http://ec.europa.eu/eurydice>), <https://doi.org/10.2797/015724>
6. Gautam M. K. and Singh S. K., (2015), *Entrepreneurship Education: Concept, Characteristics and Implications for Teacher Education*, SPIJE, ISSN 2231 – 2323 (Print), 2231 – 2404 (Online), Vol. 5, (No. 1), pp. 21-35
7. García J. C. S. et al., *Entrepreneurship Education: State of the Art*, Propósitos y Representaciones , Vol. 5, (Nr 2): pp. 401 – 473, <http://dx.doi.org/10.20511/pyr2017.v5n2.190>
8. Mukta M., (2015), *Entrepreneurship Education: A Students' Perspective*, Int. J. of E-Entrepreneurship and Innovation, 5(1), pp. 1-14, <https://doi.org/10.4018/978-1-5225-3153-1.ch029>
9. Ria T. A. and Korflesch H. F. O., (2021), *Entrepreneurship education in Indonesian higher education: mapping literature from the Country's perspective*, *Entrepreneurship Education* 4, Vol.0123456789, pp. 291–333, <https://doi.org/10.1007/s41959-021-00053-9>
10. Xingjian Wei et al. (2019), How Does the Entrepreneurship Education Influence the Students' Innovation? Testing on the Multiple Mediation Model, Hypothesis and theory article front. psychol., <https://doi.org/10.3389/fpsyg.2019.01557>
11. Yu C. and Mei W., (2021), *Students' perception on the effectiveness of entrepreneurship education programs in China*, *Entrepreneurship Education* 4, pp. 233–250, <https://doi.org/10.1007/s41959-021-00059-3>