



**MINISTRY OF NATIONAL EDUCATION
UNIVERSITY OF PETROȘANI
DOCTORAL SCHOOL
DOCTORAL DOMAIN: ENGINEERING AND MANAGEMENT**

Ec. ANCA (FURDUI) AMALIA IULIANA

**DOCTORAL THESIS
SUMMARY**

**ASPECTS OF INNOVATION MANAGEMENT FROM THE PERSPECTIVE OF
TECHNOLOGICAL ENTREPRENEURSHIP**

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**PETROȘANI
2021**

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*Motto: "Innovation-a-change that creates a new dimension of performance".
(Peter Drucker)*

Keywords: management, innovation, innovative management, entrepreneur, entrepreneurship, entrepreneurial ecosystem, entrepreneurial system, entrepreneurial intent, technological entrepreneurship.

1. CONCEPTS, DEFINITIONS, THE MOTIVATION OF THE THESIS, THE FOLLOWING OBJECTIVES

Introduction

This study addresses a topic of great interest and topicality given that it aims to analyse entrepreneurship in VET (Vocational Education Training training-professional and technical education) in Romania and technological entrepreneurship, as long as technological entrepreneurship will represent the future and focuses on increasing innovation.

An important feature of the contemporary era is the development of scientific and economic interface disciplines, an essential feature of the knowledge society that seeks to respond to the increasing complexity of economic and social realities, which requires interactive and innovative approaches.

Over the past decades entrepreneurship has become an important economic and social topic as well as a well-known research topic in the world. Entrepreneurship is important because it increases economic efficiency, creates new jobs, brings innovations to the market. Sessions of the empirical research studied have shown that entrepreneurship can be learned and education can stimulate the intention of young people to become entrepreneurs This has led to a continuous increase in the number of entrepreneurship programs. However, the impact that entrepreneurship education has on the intention to become an entrepreneur has remained largely unexplored.

The study of youth entrepreneurship contributes to a better understanding of the process of creating employment opportunities for young people. Against the background of the need to boost youth employment, entrepreneurship is an important alternative for "negotiating" the transition from school to work. However, not many aspects of young people's entrepreneurial attitudes, young people's entrepreneurial motivations, incentives and barriers are known.

The importance of the chosen research theme is considerably amplified by the latest trends at European level in the field of entrepreneurship. The situation of entrepreneurship in Europe and Romania is explained by encouraging the entrepreneurial and implicit thinking of entrepreneurship itself, and the recommendation 2006/962/EC on key competences for lifelong learning defines the meaning of the initiative and entrepreneurship as the ability to turn ideas into action through creativity, innovation and risk-taking.

The actuality of the chosen theme addresses a number of pre-university issues concerning entrepreneurship and technological entrepreneurship in vocational and technical education in Romania, and the topic addressed are leading concerns at national and European level. The theme of the doctoral thesis corresponds to the societal and industrial interest and

current technical-applicative requirements. The inspired choice of the subject demonstrates creativity, synthesis capacity and critical thinking skills on the problem of the field.

The need for research. The field of technological entrepreneurship is at an early stage on the areas: economics, entrepreneurship and management. However, we are at a time when we can harness previous research to create a clearer definition of entrepreneurship in technology. The distinctive characteristics of technological entrepreneurship describe its connection with economic, entrepreneurship and management. The formal definition of entrepreneurship in technology should prove valuable in order to add how entrepreneurship works in a company that invests in projects and is interdependent with the progress of science and technology.

- In line with the Council of the EU (Conclusions of the Council of the EU and representatives of the governments) Member States proposed promoting a creative, innovative and entrepreneurial perspective among students, learners, students, teachers and researchers, which supports the progressive development of a broader entrepreneurial culture through vocational education and training, as well as a more dynamic European labour market and a skilled workforce.

- According to the official document Recommendation of the European Parliament and of the European Council (December, 2006) the development of entrepreneurship is an educational ideal and entrepreneurial skills have become key European skills.

- Recommendation 2006/962/EC on key competences for lifelong learning defines the meaning of the initiative and entrepreneurship as the ability to turn ideas into action through creativity, innovation and risk-taking, as well as the ability to plan and manage projects. Entrepreneurial competence is one of eight key competences established at European level and includes (ISE, key European competences).

- The situation of entrepreneurship in Europe and Romania is explained through the prism of cultural values that encourage the entrepreneurial way of thinking and implicitly entrepreneurship itself, as presented in European Commission documents such as: Green paper Entrepreneurship in Europe, Key Competences for lifelong Learning. European reference Framework, Eurobarometer Survey on Entrepreneurship, Flash Eurobarometer Survey 354. Entrepreneurship in the EU and beyond, Entrepreneurship 2020 Action Plan etc.

- Entrepreneurship is a contemporary form of involving individuals in the life of the community. Development of the entrepreneurial skills of young people has a positive effect on their social status, in the sense of gaining financial independence and social recognition. In addition, the effects are also felt at local and national level, through economic growth and implicitly increasing the standard of living.

- Innovation and entrepreneurship are in an interdependent relationship, innovation can be considered a resource available to any entrepreneur, providing him with valuable tools for integration into the competitive business environment, for adaptation and, of course, for growth and development in a competitive business environment. Entrepreneurship highlights innovation, as demonstrated by the policies of the European Union support the importance and appropriateness of scientific research devoted to the topic addressed.

The overall objective of the research is to develop a coherent methodological approach,

accompanied by the foundation and application of pragmatic tools for analysing entrepreneurship in the VET education system in Romania and extended to the entire education system in Romania.

In order to achieve this objective, a coherent set of specific research objectives was detailed, namely:

- Determination of the factors that determine the entrepreneurial intentions and innovation of young people in the VET education system in Romania.
- Identification of the entrepreneurial ecosystem in VET education (professional and technical education) in Romania.
- Promote a modern approach to the concept of technological entrepreneurship linked to entrepreneurial skills and connected with today's social needs.
- Research and improvement of entrepreneurial skills in the Romanian pre-university education system as well as technological entrepreneurship.
- Conduct an analysis on entrepreneurial education in terms of status, skills, content and values in order to advance proposals for improving entrepreneurial skills in Romanian pre-university education.
- Determine young people's motivation to start a business between the ages of 16-20.
- Facilitating the transition from school to the active life of students through the use of methods of entrepreneurship and technological entrepreneurship.

Motivation of the thesis

Entrepreneurship involves change and is one of the reasons why it should be encouraged and supported. What is different is not always better, but what is better is always different (Kuratko, 2005). The entrepreneurial spirit promoted by the European Union is a key factor for competitiveness and underlines how important the implementation and development of a true entrepreneurial culture is at Member State level. These changes are not only passively expected, but are stimulated by specific public policy measures and regulations. The European Union has adopted a new strategy for economic growth (Europe, 2020) which aims to redefine the economy in a sustainable, smart and integration-friendly economy.

The role played by entrepreneurs in the new context of globalisation is constantly increasing. It influences to some extent the direction where a particular society is heading at a given time (they have a socio-political role), in a context where (with a few exceptions) today's governments no longer decide directly and unilaterally on investments in their countries. It is the business people who promote this, although constrained by financial parameters, they must, to believe in the investments they promote. The decision is ultimately intuitive and especially psychological and thus "the future of any country is ultimately in the hands of businessmen who make investment decisions and depends to a large extent on their psychology" (Akerlof, G., Kranton, R, 2005).

A distinct defining feature of mature developed economies is the vital role of entrepreneurship as a central factor of economic growth. Motivated entrepreneurs are ready to take risks, set up new companies that will be job-generating in the course of their business. In particular, however, technological progress continues to generate new businesses and lead to

the development of existing businesses, being a decisive factor in adapting to new market opportunities, acquiring new knowledge and increasing productivity.

Technology entrepreneurship is at the heart of several important debates, including those around the launch and development of firms, regional economic development selecting suitable stakeholders to take ideas in markets and educate managers, engineers and scientists. Unless a generally accepted definition of technological entrepreneurship is established, technological entrepreneurship is an investment in a project that assembles and distributes specialised and active individuals to create and capture value for the firm.

Entrepreneurship technology is a vehicle that facilitates prosperity in individuals, firms, regions and nations. The study of technological entrepreneurship therefore serves an important function beyond the satisfaction of intellectual curiosity. Previous definitions in the literature do not explore and do not identify the end result of technological entrepreneurship, since the humanity of technological entrepreneurship is on early stage on the following areas: economy, entrepreneurship and management. In present times time we can harness previous work to create a clear definition of work in the field of technology. The distinctive characteristics of technological entrepreneurship write its links with economic, entrepreneurial and management domains. The formal definition of entrepreneurship in technology should prove valuable to add on how entrepreneurship works in a company that invests in projects and is interdependent with the progress of science and technology.

This doctoral thesis "Aspects of innovation management from the perspective of technological entrepreneurship" aims to analyse entrepreneurship in VET (Vocational Education Training) in Romania and technological entrepreneurship. Technological entrepreneurship will represent the future and it focuses on increasing innovation.

In order to achieve the above objectives, we analysed the national education system in Romania, in the European Union, as well as documents in the field of entrepreneurship and technological entrepreneurship. A closer look on entrepreneurship from the angle of entrepreneurs allows us to capture the capacity for creative action, building businesses, selecting the right people to work, as well as the appropriate acquisition and allocation of resources and taking personal risks.

The interdependence between scientific and technological changes, as well as the selection and development of new, active products and their attributes, differentiates technological entrepreneurship from other types of entrepreneurship. Technological entrepreneurship has more to do with collaborative production based on a common vision of future changes in technology, and a process-based approach to entrepreneurship which is popular in literature involving the identification of environmental opportunities (Glinka and Gudkova, 2011).

2. STRUCTURE AND SENTENCE OF THE THESIS

Structure of the thesis

The thesis addresses a topical issue with future development prospects; it addresses a number of problems in the high school field on entrepreneurship and technological entrepreneurship in vocational and technical education in Romania (VET-Vocational

Education Training). As a way of structuring, the work contains an introductory part, 7 chapters and 7 annexes, summarizing an extension of 211 pages, each chapter having a presenthas adequate graphics and logic, with 55 tables and 86 figures, as well as a list of 253 bibliographic references cited in the body of the work.

Synthesis of doctoral thesis

The work is developed in 2 parts, the first part comprises the literature and the second part comprises the empirical scolding part, having a number of 7 chapters and also includes a vast recent and relevant bibliography.

In Capitol I, entitled **Getting started on innovation management**, we addressed concepts on innovation management, the need for innovation in both Europe and Romania and innovation in the field of technological entrepreneurship which is almost non-existent in Romania.

Chapter II is entitled **The Entrepreneurial Ecosystem** is dedicated to the conditions and factors that influence entrepreneurship. The term entrepreneurial ecosystem encompasses the social and economic environment affecting entrepreneurial activity. In order to stimulate entrepreneurial activity in a country it is necessary to facilitate an ecosystem conducive to entrepreneurship.

In Chapter III, which is entitled **Basic Concepts on Technological Entrepreneurship**, we have analysed technological entrepreneurship which has become an increasingly important global phenomenon and is perceived for growth, differentiation and competitive advantage at regional and national level of a company. Technological entrepreneurship is mainly aimed at leading leaders and top teams, management of small and large firms that use technology to create and capture value for stakeholders. We also looked at the key elements of technological entrepreneurship that are represented by: education systems, clusters, technology parks and techno-entrepreneurship.

Chapter IV is entitled **Analysis of Entrepreneurship in Vocational and Technical Education in Romania**. The Council of the EU (Conclusions of the Council of the EU and representatives of the Governments of the Member States on the development of education in a fully functional knowledge triangle) proposed promoting a creative, innovative and entrepreneurial perspective among students, teachers and researchers, which would support the progressive development of a broader entrepreneurial culture through vocational education and training, as well as a more dynamic European labour market.

The second part of the thesis comprises Empirical Research and is structured in three chapters as follows:

Chapter V is entitled **Research on Entrepreneurship using national and international databases**. In this chapter we draw on the values of the EU countries where some conclusions can be reflected, pragmatically on the directions needed for action at European level, on entrepreneurship and support for entrepreneurship. The last few years have marked the emergence of a number of indicators for comparing entrepreneurship in different countries, offering perspectives with varying degrees of completeness on the phenomenon investigated, as follows: Entrepreneurs International-OECD (Organisation for Economic Cooperation and Development) World Bank through the World Bank's group of indicators and databases, GEM

(Global Entrepreneurship Monitor); REDI (Regional Entrepreneurship and Development Index) which is an index composed and developed on request by the European Commission and developed by four research institutions for the evaluation and development of entrepreneurship by region in EU Member States; GEDI (Global Entrepreneurship and Development Index) and Flash Eurobarometer 354 Entrepreneurship in the EU. We have also tried to clarify some of the basic principles of entrepreneurship in education in this chapter, focusing on the following questions: what it is, why it is relevant to society, when it is applied or not, and how it applies in practice.

Chapter VI is entitled **Research on the development of entrepreneurship in vocational and technical education in Romania**. In recent decades after the manifestation of economic crises, the importance of entrepreneurship for affirming economic growth and development at global level has been a topic that has captured the interest of researchers and practitioners, due to the multidimensional aspects of the phenomenon, with micro-economic and macro-economic implications. The European Union's entrepreneurship policy constantly highlights the need to create the most appropriate micro-environments and macro-environments to support the development of small and medium-sized companies and entrepreneurship. The development of entrepreneurship is an educational ideal and entrepreneurial skills have become key European skills according to the official document Recommendation of the European Parliament and of the Council (December, 2006). Internationally, entrepreneurship is a key element for job creation and the economic growth of a country. Supporting entrepreneurship has come to be a key priority and a solution to relaunch the economy. From this research it follows that young people certainly have concerns to develop businesses, have a motivation to start their own projects and a good perspective on entrepreneurial enterprises that are an effective tool for increasing incomes and the last, Chapter VII is called the **Final Conclusion, Personal Contributions and Research Perspectives**. The process of creating technological entrepreneurship is largely conditional on the expertise of trainers and their ability to identify, study and simulate for students contexts, case studies, materials, tools, learning activities adapted to the economic and social context in which we find ourselves.

The bibliography also includes the author's works, quoted ISI, B+ or published at prestigious international or national conferences.

In Romania at the level of technological high schools and not only entrepreneurship should be promoted and supported as an alternative to a professional career. An ecosystem on entrepreneurship education at secondary, secondary and university levels can also be integrated and a national strategy can be developed with other European countries as successful models. The practice and activity of a student in the practice firm should be considered professional experience for the practitioner/student. During the exercise firm, during two school years, a student will hold two positions as a result of the rotation on posts at the end of the first year of activity. This gives the student the opportunity to learn and obtain more skills and, why not, to identify which career or specialization best suits him or her in his or her socio-professional profile.

In conclusion it can be observed that the first part of the thesis was dedicated to the literature, because through a thorough knowledge something reliable can be achieved, and the

second part of the thesis was dedicated to the analysis and empirical research of entrepreneurship.

3. VALORIFICATION OF THE RESULTS OF RESEARCH

The results of the research undertaken were carried out by supporting and publishing works, in the proceedings of conferences/symposiums or INDEXed Journals ISI or BDI, of which the following can be listed:

1. Elena-Izabela POPA, **Amalia Furdui**, Eduard-Victor Edelhauser, 2019, *Considerations on Management for Technological Entrepreneurship*, **MATEC Web of Conferences**, 290, 07011, (2019), 9th International Conference on Manufacturing Science and Education – MSE 2019 „Trends in New Industrial Revolution”, June 5-7, 2019, Sibiu, Romania, <https://www.matec-conferences.org/articles/mateconf/pdf/2019/39/mateconfmse201907011.pdf>. Accession Number: WOS:000569367700088, ISSN:2261-236X, IDS Number:BP9HB.

2. Elena-Izabela POPA, **Amalia Furdui**, Eduard-Victor Edelhauser, 2019, *Organizational Culture an Important Vector for the Performance of a Company*, **MATEC Web of Conferences**, 290, 07010 (2019) , 9th International Conference on Manufacturing Science and Education – MSE 2019 „Trends in New Industrial Revolution” June 5-7, 2019, Sibiu, Romania,<https://www.matec-conferences.org/articles/mateconf/pdf/2019/39/mateconfmse201907010.pdf>. Accession Number: WOS:000569367700087, ISSN:2261-236X, IDS Number:BP9HB.

3. **Amalia Furdui**, Eduard Edelhauser, Elena-Izabela POPA, *Innovation Management Correlated with the Models of Development of Technological Entrepreneurship*, QUALITY-ACCESS TO SUCCESS, Volume:20, Pages:513-518, Supplement:1, Published: JAN 2019, Accession Number:WOS:000459686300090, ISSN: 1582-2559, IDS Number:HM7UX.

4. Eugenia JORNEA, Eduard Edelhauser, **Amalia Furdui**, *Aspects Concerning the Quality of Management Projects Designed for Restructuring the Economy*, QUALITY-ACCESS TO SUCCESS, Volume:20, Pages:531-536, Supplement:1, Published:JAN 2019, Accession Number:WOS:000459686300093, ISSN:1582-2559, IDS Number:HM7UX.

5. Lupu-Dima Lucian, Eduard Edelhauser, Emilia Corina Corbu, **Amalia Furdui**, *Innovative Method of Increasing the Quality of Management in Administration Using the Principles of Sharing Economy*, QUALITY-ACCESS TO SUCCESS Volume: 20 Supplement: 1Pages:507-512, Published:JAN 2019, Accession Number: WOS :00045 968 6300089, ISSN:1582-2559, IDS Number:HM7UX.

Works published in BDI indexed journals

1. **Amalia Furdui**, *Analysis of the Entrepreneurial Ecosystem from Romania*, Annals of the University of Petroșani, Economics, 19 (1), 2019, 107-114, <https://www.upet.ro/annals/economics/pdf/2019/p1/Furdui.pdf>

OTHER PUBLISHED WORKS

1. **Amalia Furdui**, Eduard-Victor Edelhauser, Elena-Izabela Popa, *The Impact of Information Technology on Entrepreneurship*, The 19th International Conference on Informatics in Economy (IE 2020) Education, Research & Business Technologies, Online Conference Bucharest, Romania May 21st, 2020, <http://www.conferenceie.ase.ro/wp-content/uploads/2020/05/Program-IE-2020.pdf>.

2. **Amalia Furdui**, *E-learning platform for the concept of practice firms for methodological-scientific work for the award of the didactic degree I*, "Lucian Blaga" University, Faculty of Socio-Human Sciences, Department for the training of teaching staff, Sibiu, 2017.

3. **Amalia Furdui**, *ICT Tools Used in Exercise Firm, Auxiliary Curricular Class XI*, Emma Books Publishing House, Sebes, 2020, ISBN 978-606-8845-62-3.

4. **Amalia Furdui**, *Analysis of the Romanian Entrepreneurial Ecosystem* work published at the international symposium "Performance through Partnerships", organized by the Economic College "Virgil Madgearu", Edition III, Ploiești, 2020, ISBN 978-606-7852-86-0.

5. **Amalia Furdui** coordinator specialized magazine "Virtual today, real tomorrow through exercise firms!", Year IV, No.4, Alba Iulia, 2020, ISSN 2559-5229, ISSN-L 2559-5229 <https://iuliaamalia.wixsite.com/azivirtualmainereal>.

6. **Amalia Furdui**, *Innovation Management in relation to Technological Entrepreneurship*, published at the National Symposium "Convergences and Provates in the Field of Economics", organized by the University 1 December 1918, Alba Iulia, Nr.6/2019, ISSN 2360-073X, ISSN-L 2360-073X.

7. **Amalia Furdui**, *Development of entrepreneurship through the exercise firm*, communication session for teachers "Build Up Your Future", Lugoj, October 19, 2018, ISBN 978-973-0-28589-5.

8. **Amalia Furdui**, *Entrepreneurship Technology: Overview, Definitions and Distinctive Aspects*, published at the National Symposium "Convergences and Provărs in Economic Sciences", organized by The University 1 December 1918, Alba Iulia, Nr.5/2018, ISSN 2360-073X, ISSN-L 2360-073X.

9. **Amalia Furdui**, *International Symposium Management of School Institution in European Context/ Management of the School Institution in the European Context*-Paralia Katerini, Greece, 27.04-01.05-2018.

10. **Amalia Furdui**, *Educational Management in Romanian Education Related to European Education*, published at the National Student Symposium, "Geoecology", Edition XVI, 10-12 May 2018.

11. **Amalia Furdui**, *Concept exercise firm in didactic, social and entrepreneurial context*, work published at the National Symposium "Soft Bazaar", EDITION IX 2017, CCD Buzau Publishing House, ISSN 2360-4271.

12. **Amalia Furdui**, *Theoretical and practical approaches in the instructional-educational process through the practice firm*, published at the Communication

Session "Challenge exercise firm for teachers and students", organized by the Nicoale Titulescu Economic College, Baia Mare, 11th edition, 2017, ISBN 978-973-0-25942-1.

4. PERSONAL CONTRIBUTIONS. FUTURE RESEARCH DIRECTIONS

Entrepreneurship is important for innovation, job creation and economic growth. It can also strengthen social inclusion and address societal challenges through policies of entrepreneurship, social entrepreneurship and technological entrepreneurship.

Innovation and entrepreneurship are in an interdependent relationship, innovation can be considered a resource available to any entrepreneur, providing him with valuable tools for integration into the competitive business environment, for adaptation and, of course, for growth and development in a competitive business environment. Entrepreneurship showcases innovation, as demonstrated by European Union policies and sometimes timidly taken over by entrepreneurial policies in Romania. This study highlights that the new generations of Romanian entrepreneurs who value unlimited access to information will change Romania's status as a "modest innovator", as mentioned in the European Innovation Scoreboard. Economic growth is strongly correlated with the abundance of small, entrepreneurial firms, this relationship shows technological progress, stimulates product cycles where growth is faster in the previous stages and the importance of entrepreneurship.

Instead, the evidence suggests that spatial differences in the fixed costs of entrepreneurship in the offer of entrepreneurs best explain the formation of clusters. Group learning experiences within the exercise firm are marked by the stimulation of critical thinking and the self-confidence that students gain during the implementation of this experimental learning strategy. It also contributes to the establishment of a relaxed working relationship between the educator and the educated, even though at first the students found it harder to organize, they got used to working in this way, some of them showing creativity. Creativity is an essential prerequisite for innovation, which is so necessary for Romanian entrepreneurial organisations to become competitive on the European market.

Vocational and technical education (VET) in Romania tries to train young graduates with entrepreneurial skills, skills and attitudes by training and practicing them in a modern, flexible and connected learning framework to the demands of the global business environment. From this perspective, an entrepreneurial innovation is being attempted, i.e. a transfer of technological entrepreneurship that is structured and most importantly sustainable.

Thus, we argue that the teacher who uses the practice firm as a teaching method and the teaching strategy experimental learning manages to help students become united, to be motivated and to understand what they are working on and to create their own firm in the future. The exercise firm ends up being a team, and the diplomas that the students received from participating in entrepreneurial competitions and fairs of exercise firms in different locations, prove that this method is effective in developing the entrepreneurial capacity of the students, being also a key objective of the European Commission. Young people who have worked in an exercise firm during their pre-university programmes can easily use various tools that can transform innovation into a structured activity with sustainable and tangible results. In order to achieve this goal, academia, the consulting industry and the business sector must cooperate and

become more actively involved in the further entrepreneurial learning of young people and their integration into activities within the "simulated enterprises" of university education.

The study found that students were determined to work successfully in the exercise firm and in entrepreneurial activities and worked with pleasure. The very good results did not delay to appear, and the training within the practice firm proved to be one of an interdisciplinary manner, oriented towards an experimental strategy (action and problems), centered on the students and inspired by the practice.

Upon completion of the research we can point out that teaching by the "exercisefirm" method is a particular challenge: the transition from the role of presenter to that of collaborator in a team. Operationalization of theoretical knowledge constitutes elements of work within the practice firm for the specialist teacher. In conceptualising entrepreneurship, the teacher must close the significant gap that can arise between simulation and reality, more than ever, the reality of the 21st century moves the activities of entrepreneurship to the technological and digital sphere. Thus, elements of the technological and digital ecosystem must be intuited, studied and interconnected with the elements of the entrepreneurial ecosystem. Young entrepreneurs need to be prepared to better understand and adapt quickly to the individual and social behaviour of consumers, and the vast majority of activities in exercise firms simulate economic activities that take place in a virtual environment. In these circumstances, the coordinating teacher of such an exercise firm can no longer provide quality training if he has only technical competences in the economic field. His training must today also cover the technological and digital skills needed to operate within an efficient entrepreneurial ecosystem.

The use of this research will be achieved by continuing to use this method and developing it in activities involving the operation of the exercise firm, taking it over by another class after the sample class completes the high school, and working with other exercise firms to create a competitive framework at the school level, as well as collaboration, by making local, national and international transactions between these firms through the platforms www.roct.ro and <https://www.penworldwide.org/>. This method and procedure should also be introduced to all pre-university specialisations in Romania, not only to specialisations in VET education services.

A young person can become an entrepreneur, regardless of the type or profile or specialization followed in high school studies, and Romanian education should give equal opportunities to all graduates and stimulate their entrepreneurial spirit. Entrepreneurial education should be introduced to all high school specialisations in school curricula. The programmes include digital skills that need to be linked and adapted to boost the level of innovation and technological entrepreneurship, and the future Romanian entrepreneur can reflect on the uniqueness of newly created products and services tailored to certain segments of consumers.

The process of creating technological entrepreneurship is largely conditional on the expertise of the trainers and their ability to identify, study and stimulate students in different contexts, case studies, tools, learning activities adapted to the economic and social context in which we are located.

In Romania at the level of technological high schools and not only entrepreneurship should be promoted and supported as an alternative to a professional career. An ecosystem on entrepreneurship education at secondary, secondary and university levels can also be integrated and a national strategy can be developed with other European countries as successful models. The practice and activity of a student in the practice firm should be considered professional experience for the student, and in the course of the activity in the practice firm, during the two school years, a student will hold two posts as a result of the rotation on posts at the end of the first year of activity. This gives the student the opportunity to learn and obtain more skills and to identify which career or specialization best suits his or her socio-professional profile.

Romanian pre-university education in recent years tends to develop and capitalize on the integration of experimental learning strategies (exercise firm), thus stimulating their idea of launching a commercial or social project. There are also situations where some students do not want to be actively involved in the work of exercise firms because they argue that they do not want to own their own business. In this case, the teacher must shape the mentality of young people regarding entrepreneurship education: it is not only those who will launch their own business who have to work in an exercise firm. Entrepreneurial education forms and stimulates the entrepreneurial spirit required of any employee in a firm or institution, which depends very much, after all, on the efficient functioning of an institution or the development of the business.

In addition to the specific activities of entrepreneurship, the student will develop through this method of learning within the practice firm different skills for the future job: communication, teamwork and the use of software specific to a company, and access to the European labour market is easier and easier.

In line with the identified trends and challenges a greater focus should involve a change in the workplace learning offer specific to key technical skills and entrepreneurial skills so as to facilitate the transition in the labour market. Learning and career development should also be improved by achieving learning paths with good integration and coordination between general education, as well as between formal, non-formal and informal training, as well as for lifelong learning.

On the basis of these conclusions, it was recommended that school authorities and relevant stakeholders engage in mass communication in the dissemination of information that favours perceived adequacy and perceived effectiveness, in addition to improving the quality of entrepreneurial training facilities in schools.

Although progress has been made in the training of teachers in the entrepreneurial field, the inclusion of the "exercise firm" method in the curricula of technical high schools, the organisation of entrepreneurial competitions for pupils, etc., in vocational schools entrepreneurial education is not carried out to a satisfactory standard.

It is important to highlight and promote a wider acceptance of entrepreneurial competence, one that can be applied in various contexts: education and training, work, personal life in general. The Danish Entrepreneurship Foundation said that "entrepreneurship is when you act on opportunities and ideas and turn them into value to others. The value created can be financial, cultural or social and, consequently, entrepreneurial education refers to content, methods and activities that support the creation of knowledge, skills and experiences that make

it possible for students to initiate and participate in value creation processes" (Moberg et al., 2012, Lackéus, M., 2015).

Entrepreneurship can be an important element in terms of the autonomy, personal development and well-being of young people and is considered one of the available and promising solutions to combat youth unemployment. This is why Europe should invest in entrepreneurship education and training, in creating an environment where entrepreneurs can best optimise their potential and develop, as well as develop entrepreneurial models.

As necessary directions of action at the level of Romanian education to support entrepreneurship education are necessary the following:

- providing funding for the establishment and operation of exercise firms from all specialisations, and this funding can be provided either from the State budget or from economic operators. Modern facilities (computers, printers, internet), modularly arranged spaces (classrooms) (to highlight key departments in a real firm), various consumer goods and materials (paper, stationery, shelves, etc.) are required with which, indeed, the activity of an exercise firm is efficient and achieves its intended purpose;

- involvement in the work of exercise firms of experts from various fields of activity for a continuous correlation of entrepreneurship education with local, national, European economic reality;

- continuous training of teachers for the completion and development of skills in the economic, digital and technological fields;

- counselling and guidance of students working in exercise firms;

- ensuring fair funding for the establishment and operation of cost-per-pupil exercise firms, including provision of facilities and settlement of costs of organisation or participation in both national and international competitions (exercise firms' fairs, entrepreneurial workshops, etc.).

Today, more and more national programmes financed by European funds or from the state budget encourage small or young entrepreneurs to start a new business. We believe that the financing of exercise firms would considerably reduce the risks of implementing programmes that finance the launch of new businesses and would obviously and sustainably contribute to the training of young people for employment.

Studies and research in the literature and the empirical research part contribute to the achievement of the objectives of this doctoral thesis: facilitating the transition from school to the active life of VET students through entrepreneurship, innovation and technological entrepreneurship.

Schools are the main learning environments for students, and teachers and school leadership are the key factors that define this learning environment. Incorporating entrepreneurship into a school's culture and values helps to encourage the development of entrepreneurial skills and creative individuals.

An entrepreneurial school can adopt school-wide approaches to promote entrepreneurship and involve students in different ways in promoting entrepreneurship, for example by encouraging participation in competitions, extracurricular and extracurricular

activities. More flexibility in educational establishments helps to implement innovative activities and elements in the curriculum that can also be supported and funded.

In terms of entrepreneurial culture it gives students a career in entrepreneurship (technology, innovation) and can give them the boost to self-fulfillment, this belief will likely translate into a significant intention to engage in an entrepreneurial activity after graduation.

Research limits

The most important limits of this doctoral research, I mention:

- in research we used a statistical measurement tools: SPSS and Microsoft Excel;
- in the research we used only forms from GoogleForms to disseminate questionnaires on entrepreneurship;
- I did not ask for email addresses or phone numbers on the first questionnaire, and I could not measure whether respondents who answered that they wanted to start a business in the future were also able to do so;
- did not take into account the reluctance of the participants to complete the questionnaires.

Ethics of research

The theoretical research part complies with the guidelines of the drafting of a doctoral thesis, prepared by the University of Petroşani. The theoretical part of this thesis also contains information from the literature as well as personal analyses, and for the synthesis of the literature the sources used and cited have been entered in the bibliography.

The statistical analysis tool used to interpret questionnaires was SPSS under free license and from the Microsoft Office package we used the Microsoft Excel app.

We applied the ethics of empirical research research as follows:

- all the data of the interviewees remained secret;
- in the online questionnaire, we did not publish the names, first names and identification data of the participants; all participants' personal data are protected and confidential;
- maintaining the objectivity of the researcher;
- participants' data was not provided to anyone.

Even though we have come a long way since we started this study in 2017, I must say that the studies carried out in this thesis have answered some questions, but other questions have arisen that will be answered in the future. By continuing to follow respondents, we will be able to assess how they are doing in their professional lives, how many of them have become entrepreneurs, how many of them will work innovation and technological entrepreneurship, how well they do these activities. This will give us information about what type of entrepreneurial education should be offered to students and at what level of education should take place.

In light of the distortion that usually occurs in entrepreneurial education, since students can choose according to their interests, it will still be necessary to carry out additional studies based on technology. The increased use of the technological tools offered in teaching also offers interesting research opportunities and methodologies and there are many ways of teaching. For entrepreneurship in an online format is an area that we need to study and

implement in the future, both with its positive and negative effects. When digitised courses, it will be easier to produce large amounts of data and answer more questions about the process and how it affects learning, which requires continuous data collection. This form of continuous data collection could also take place in and out of the classroom, the researchers before used a notepad and passenger (e.g. Csikszentmihalyi and Lason,1984) can now be done using mobile phone applications. This would allow the identification of interesting dimensions in teaching processes and how they relate to motivation and learning, the opportunity to provide formative assessments based on student-teacher (see LoopMe as an example) could also be used. In order to achieve a more widespread use of assessment tools, it is important that the results are accessible, easy to understand and usable for users.

For the future as a development perspective, an app can be developed that gives teachers and users the opportunity to assess how their teaching initiative affects students and entrepreneurial intentions, student attitudes and effectiveness, as well as how to measure education-related variables such as school engagement, relationship with colleagues and teachers, and motivation for entrepreneurial education. In this application, data will be automatically analyzed and therefore will not require statistical expertise to understand the results. With this crowdsourcing data we need to create studies to evaluate entrepreneurship education and technological entrepreneurship, we will be able to find answers to many of the questions that have so far remained hidden from researchers and that have been limited by their research design and questions that they might focus on.

The limits that I have detailed above and the subject of this thesis have increased my interest in studying and researching the subject further, so I will consider other future perspectives to investigate:

- developing an innovative service that includes technological entrepreneurship;
- starting a process to track the development of participants after completing a course, entrepreneurship module or other entrepreneurial activities;
- developing a new method or technique that can apply to technological entrepreneurship for vocational and technical education in Romania;
- developing empirical research strictly on the innovation process;
- developing a tool to measure the skills that an employee has improved in the courses or modules in which he has participated and applied them in the workplace;
- in the teaching-learning-assessment process, more emphasis should be placed on the development of key competences, in particular innovation, entrepreneurial and digital skills;
- extension of the practice firm/simulated by order of the Minister and to the other qualifications in VET education and to introduce in the school curricula the obligation of this method to all specialisations;
- the establishment of an operating and anticipating instrument for the skills required on the labour market, as well as the adaptation to school curricula to technological developments and technological entrepreneurship;
- identifying several emerging challenges for technological entrepreneurship as a point of reflection and a potential future implementation engine in VET education.