

The continuous entrepreneurial education and training of economist engineers through the design and accreditation of a master's program



Liliana Doina Măgdoiu, Ioan Constantin Rada *

Engineering and Management Department, Faculty of Electrical Engineering and Information Technology, University of Oradea, Oradea, Romania

ARTICLE INFO

Article history:

Received 1 March 2018

Received in revised form

6 May 2018

Accepted 10 May 2018

Keywords:

Entrepreneurial education and training

Economist engineers

Master's degree program

Quality of professional competences

ABSTRACT

The reasons underlying this research are those that have led to the need for continuous entrepreneurial education and training of economist engineers, by designing and accrediting a Master's degree program, in order to continually increase the quality of the professional and transversal skills of economist engineers, so as their education and training becomes adequate for the requirements of the changing labor market, in the present and future conditions of Romania's economic situation. The research method that responds best to this approach is the case study. It answers the questions "how" and "why", in the situation where the complexity of entrepreneurship on the labor market is unpredictable in the current state of Romania's economic structure. The case study architecture allows us to determine: the questions of the case; the hypothesis; the analysis units; the preliminary theories about the continuous entrepreneurial education and training of economist engineers; the types of entrepreneurship for which the economist engineers have to learn and develop continuously, in order to achieve an increase in their qualitative professional skills; the matrix of knowledge from different disciplines in the curriculum of the Master's degree program; entrepreneurship simulation programs in the Laboratory of Entrepreneurial Education and Training. Last but not least, it gives the opportunity to collect data, analyze it and draw conclusions about the continuing education and training of economist engineers. Practically it aims at the innovation of the economist engineer profession. This paper relies on and continues our previous research on the initial training of economist engineers, in the field of engineering and management studies.

© 2018 The Authors. Published by IASE. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

The modernization of the Romanian higher education qualification system is in fact related to the innovation of the former economic system, by eliminating some qualifications, which became inappropriate with the removal of certain economic structures, especially in industry; it is also related to the continuous education and training of human resources, with the clear goal of ensuring a qualitative growth of professional and transversal competencies, in the present case, of increasing the quality of the professional and transversal skills of economist engineers through the development of entrepreneurial activities. In our view, innovation requires, among other elements, a Master's degree

program that might be consistent with the recommendations of the European Commission and the Bologna process imperatives, in line with the demands and developments of the labor market. The mechanisms of such an educational program, as well as the continuing entrepreneurial training and education of economist engineers, are associated to the activity of university professors and economist engineers – students participating to the Master's degree program, together with the representatives of the economic and social environment, constituting consortia of the university-enterprise type. This mechanism must operate in accordance with the structure of the Master's degree study fields.

The Consortium of Engineering and Management, in accordance with the structure of the undergraduate university study fields, has the role of validating or amending the descriptions of the qualifications included in the field of „engineering and management studies. The profession (qualification) of economist engineer in the electrical, electronic and energetic field was

* Corresponding Author.

Email Address: ic_rada@yahoo.com (I. C. Rada)

<https://doi.org/10.21833/ijaas.2018.07.012>

2313-626X/© 2018 The Authors. Published by IASE.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

described by experts, as part of some projects. Entrepreneurial education and training continues through a Master's degree program, perceived as an innovative form, aimed at the qualitative improvement of the economist engineer qualification.

The chance of Romania's national economy to survive and return to a normal situation is perceived by us to be related to the continuous entrepreneurial education and training, which can be achieved through a National Qualifications Framework in Higher Education (CNCIS), which is in fact the academic value that can ensure the success and fructification of the chance referred to above.

The return to a normal situation of the national economy, from a state of subsistence, through the development of entrepreneurial activities in all forms of entrepreneurship and in its entire complexity, would ensure a normal development of the branch of industry which could absorb the highly qualified workforce and would ensure a growth in the living standards of the population.

The ever-changing national labor market needs not only a precise description of the professions (highly qualified occupations), but also the requirements of the international labor market. The use of CNCIS is measured by the fact that it is an integral part of the National Qualifications Framework and has no utility outside it; however, it is also measured by a form of continuous entrepreneurial education and training of the holders of these highly qualified professions.

The National Register of Qualifications in Higher Education (RNCIS, 2018) is an informatics application organized in the form of a national database that includes all the qualifications awarded by higher education institutions in Romania, being also a working tool for universities, students, candidates, social partners.

The foundation of the curricula on competences and learning outcomes, at both Bachelor and Master's level, is the premise of a qualification framework designed as a basic tool in the development of the EHEA Higher Education Area and was assumed by the Ministers of Education in the signatory states of the Bologna Process. The Qualifications frameworks are important tools for achieving comparability and transparency within the EHEA, facilitating the mobility of those who learn both within higher education systems and between them (MEPB, 2005). The Qualification frameworks also play a key role in the development of EHEA. A qualification framework encompasses all qualifications in a higher education system - or from an entire education system if that framework is developed for that purpose. It shows what a person who learns eventually comes to know, understand, and is able to do on the basis of a given qualification, showing the results of learning for a specific qualification, and how different qualifications, in education or higher education systems, will allow learners to move between qualifications (MEPB, 2007), or The development of national qualifications

frameworks is an important step towards the implementation of lifelong learning. These are intended to be implemented and prepared for self-certification, according to the general framework for qualifications, for the European Higher Education Area, by 2012. This will require sustained coordination at the level of the European Higher Education Area and the European Qualifications Framework for Lifelong Learning (MEPB, 2009). This research is part of the priority research fields: socio-economic and humanistic research; Research Directorate - Quality of Education; Research theme - Initial and continuing training of human resources from the perspective of education and stimulation of their creative potential.

Previously to this piece of research, we have completed the following reports on the issue referred to above, relevant in terms of grounding the problem approached; the following papers were published in professional journals and presented at international conferences: Managers and Economist Engineers between the Sociology of the Elites and the Social Economy of Vulnerable Groups (Rada et al., 2017); The Antifragile of Decisions Adopted by Managers and Economist Engineers Working in the Sector of Vulnerable Groups' Social Economy (Doina and Constantin, 2016); Forms of Communication and Strategies adopted by Managers and Economist Engineers in the "BLACK SWAN" Situation of Social Economy (Doina and Constantin, 2016); Managers and Economist Engineers between Social Economy Development and Obtaining Profit (Măgdoiu and Rada, 2014); Managers and Economist Engineers between the Social Responsibility of Oil Corporations and the Development of Social Economy (Măgdoiu et al., 2014); The Initial and Ongoing Training of Economist Engineers as Human Resources of the Labor Market (Măgdoiu and Rada, 2013); Managers and Economist Engineers in the Development of the Social Economy (Măgdoiu and Rada, 2013), Using banking information security management to ensure the system (Rada and Rada, 2018a;b), The Engineering of the Prudential Supervision Structure - Essential Factor of Financial-Banking Stability in the European Context of Romania (Rada and Rada, 2018a;b), The Necessity of Developing the Economic Engineering Specialization in the Current Context of Romania's Economic Structure (Măgdoiu and Rada, 2018), this last paper being currently under evaluation and awaiting publication at IJAAS Journal.

The labor market in present-day Romanian economy is undergoing a process of constant change, and entrepreneurship can be a fundamental organizational form that allows the functioning of the new managerial-economic mechanisms and in which the continuous entrepreneurial education and training of the economist engineers has become a necessity. Their multidisciplinary training enables them to acquire professional and transversal skills in accordance with the requirements of the labor market. Economist engineers in general, but especially those with skills as entrepreneurs in the electric, electronic and energetic domain, may have

access to very diverse occupations in almost all the departments of an enterprise, from research and development, design, production, marketing, along with occupations in secondary education.

2. The research method

The case study strategy (Yin, 2005) was preferred and chosen from among the many research methods available, given the fact that, since there is little control over the events observed, attention was focused on the general phenomenon of continuous education and training for entrepreneurship, and on the particular case of economist engineers and of the constant need for innovation - the development of a Master's degree program as a form of education and continuous entrepreneurial training of economics engineers, in order to increase the professional and transversal skills, as specialists in this field, who can initiate and develop entrepreneurial (business, social, political, research, non-entrepreneurial or intra-entrepreneurial) activities, vital in a subsistence economy that seeks to recover and enter the normal course of development, but also to be able to access occupations in the ever-changing and increasingly complex domestic and international labor market. Innovation in this engineering domain aims at preparing engineers to meet the challenges of an economy without a stable economic system. By promoting, organizing and conducting university studies in the field of fundamental engineering sciences, engineering and management, under the terms of law, engineers become economist engineers capable of coping with current challenges in the economy. This method (the case study) responds to initial questions of the "how" and "why" type and has both advantages and disadvantages. Through the application of this method we managed to deal with the contextual conditions of innovation through continuous entrepreneurial training in economic engineering, in order to prepare specialists for the purpose of employment in the ever-changing labor market. Because the phenomenon and the context are not always differentiable in real life, data collection and analysis strategies have been used.

2.1. Study questions

The first component of critical importance for the research design and the case study strategy is represented by the study questions. These being of the "how" and "why" type, are more likely to require an explanation, and may involve the use of case studies, histories and experiments as favorite strategies. The case-study allows us to find out how and why innovation is needed and achieved through the continuous entrepreneurial education and training of economist engineers, through a Master's degree program, in the situation when there is no possibility to rely on previous archived data, reviews or surveys. Since these types of questions provide an important clue as to the most relevant strategy to use, they have been set as study questions:

1. How and why is the continuous entrepreneurial education and training of economist engineers necessary in the current state of the Romanian economy?
2. How is the continuous entrepreneurial education and training of economist engineers achieved?
3. Why is the Master's Degree Program necessary in order to support the continuous entrepreneurial education and training of economist engineers?

2.2. The hypothesis

The second component of the case study design, the study hypothesis, draws attention to the issue of the need for continuous entrepreneurial education and training of economist engineers, in order to increase the quality of their professional and transversal competences through a Master's degree program, so as to enable them to cope with the increasingly sophisticated challenges of the labor market. The research started with the question How and why is the continuous entrepreneurial education and training of economist engineers necessary in the current state of the Romanian economy? Therefore, the questions "how" and "why" capture the essence of what must be learned and determine the choice of the case study as an appropriate strategy. This type of question does not indicate what should be studied, leaving the researcher the formulation of the hypothesis whereby she/he will advance in the right direction. Thinking is directed at the need to continuously innovate the aspect of the entrepreneurial education and training of economist engineers, so as to enable them to cope with the complexities and the requirements of the ever-changing labor market.

In addition to the fact that the hypothesis reflects an important tertiary aspect (that is the necessity to innovate the continuous education and training of economist engineers), it also indicates where to look for relevant evidence (to determine to what extent the professional and transversal competences of economist engineers through the master's degree program increase qualitatively) and what is the result of innovation in the continuous entrepreneurial education and training. The established hypothesis is as follows:

If there is a need for continuous entrepreneurial education and training of economist engineers, so as to increase the quality of their professional and transversal skills, in the current state of the Romanian economy, in order to solve the challenges of the ever changing labor market, this education and entrepreneurial training should be innovated by the design and accreditation of the Master's degree program in Engineering and Management studies, specialization: Entrepreneurial education and training of economist engineers.

2.3. The analysis units

The analysis units are related to the fundamental problem of defining the case and constitute the third

component of the research design. This case does not refer to individuals or to groups of individuals where an individual represents the case being studied and at the same time the primary analysis unit, but refers to a phenomenon that regards the need for the continuous entrepreneurial education and training of economist engineers, in the current state of the Romanian economy, in order to solve the challenges of the constantly changing labor market; it also refers to a university that provides entrepreneurial Master's programs, not so well defined as an individual. This is a case study on decisions, programs, implementation processes, and the enhancement of professional skills. Such aspects, along with the entrepreneurial education and training, are not very easy to define in terms of the beginning and end points of the case. The study on such a theme may reveal: a) variations in the definition of decisions, programs, implementation processes, or entrepreneurship education and training, and b) their components that existed before their formal nomination (Yin, 2005). Therefore, in this study the delimitation conditions a) and b) are taken into account in the definition of the analytical conditions.

The establishment of the analysis unit and therefore of the case is connected to the way in which the initial study questions were formulated, namely: it was intended to approach, as a study analysis unit, the continuous entrepreneurial education and training of economist engineers at the present stage of Romania's economy, by innovating the Master's programs, the result of this innovation being the qualitative increase of the professional and transversal competences of the economist engineers, and implicitly of their entrepreneurial capacities, following the undergraduate studies in the field, in order to solve the challenges of the ever changing labor market. The selection of the analysis unit was made after the primary research inquiries had been accurately stated.

The establishment of the analytical unit was not considered to be definitive, with the possibility, as with other aspects of design, to be reconsidered as a result of discoveries made during the subsequent processes of the study.

2.3.1. The primary analysis unit

The primary unit of analysis is the achievement of the continuous entrepreneurial education and training of economist engineers.

2.3.2. The contextual analysis unit (the existence of the case)

The contextual analysis unit is the very existence of the case, namely: the necessity to innovate education and continuous entrepreneurial training of economist engineers in the current state of Romania's economy.

2.3.3. The embedded analysis unit

The embedded unit includes the Master's Degree Program, which represents the support for the continuous entrepreneurial education and training of economist engineers.

2.3.4. Linking data to hypotheses

The fourth component of the case study design anticipates the data analysis stage and is usually little discussed in case studies, but research design should help build solid bases for this stage of the investigation. There are no clear explanations on how to link data to hypotheses, although this can be done in several ways. The approach chosen is a promising one as regards case studies, i.e. pattern matching, described by Campbell (1975). This technique involves the use of some pattern matching logic (Yin, 2005), which compares an established pattern with empirical bases with an anticipated prediction (or with more alternative predictions), according to Trochim (1989). In this case, if the pattern established on empirical bases (i.e., the necessity to innovate the continuous entrepreneurial education and training of economist engineers in the current state of Romania's economy), coincides with the anticipated pattern, predicted by authors, (i.e., the achievement of the continuous entrepreneurial education and training of the economist engineers), in order to solve the challenges of the ever-changing labor market, the results can contribute to the qualitative increase of the professional and transversal skills of the economist engineers, demanded on the ever-changing labor market. In this case the patterns are related to the dependent and the independent variables defined above, namely the predicted pattern with respect to the independent variable is defined before the data collection stage, and the information obtained in this case can be related to the theoretically determined hypothesis.

2.3.5. Criteria for data interpretation

The fifth component of the case study design allows the interpretation, through comparison, of at least two alternatives. Alternatives depend on researchers' understanding of the conditions under which new discoveries, related to the continuous entrepreneurial education and training of economist engineers, may be useful in achieving innovation in entrepreneurial education and training for economist engineers through Master's studies, in order to eventually enable them solve the challenges of the changing labor market. It is made clear that people often believe that research serves only to itself, not satisfying any practical need (Yin, 2005).

The pattern matching technique is also valid when it comes to an explanatory study, the patterns being related to the independent variables, in this case: the necessity to innovate the continuous entrepreneurial education and training of economist

engineers through master degree studies in order to acquire the qualitative increase of their professional and transversal competencies, in the context of the current state of the Romanian economy; the patterns are also related to the dependent variables, in our case: the achievement of the entrepreneurial education and training of economist engineers in the current state of the Romanian economy. This technique may be equally useful if the study were descriptive, as long as the anticipated (predicted) pattern of certain variables is defined before the data collection stage, in this case: the achievement of continuous entrepreneurial education and training of economist engineers, at the present stage of the Romanian economy, in order to solve the changing challenges of the labor market.

Being the last component of research design, the criteria anticipate the data analysis stage. The data obtained through the chosen strategies and techniques are a constant challenge to make a quality analysis, which has led researchers to pay particular attention to all the evidence. Evidence was presented objectively and an appropriate interest in the exploitation of alternative interpretations was manifested (Yin, 2005). For the interpretation of the findings, the combined criteria were used, though generally employing the logical models in which the logical model deliberately stipulates a complex chain of events over time. These are included in repeated cause-effect-cause-effect patterns (Yin, 2005). That is, the dependent variable from an initial stage the achievement of the continuous entrepreneurial education and training of the economist engineers in the current state of the Romanian economy becomes an independent variable at a later stage innovation of the education and entrepreneurial training of economist engineers through master's degree studies for acquiring the qualitative increase of the professional and transversal competences of economist engineers, at the present stage of the Romanian economy in order enable them to face the complex challenges of the ever-changing labor market. The logical model implies matching empirically observed events with the need for continuous entrepreneurial education and training of economist engineers and with the theoretically predicted elements of delivering entrepreneurial education and training so as to acquire the qualitative growth of the professional and transversal skills of economist engineers in order to enable them to cope with the complex challenges of the constantly changing job market, in the current stage of Romania's economy.

2.4. Preliminary theories

After analyzing the five components of the design, a preliminary theory, related to the topic of the study, should be developed. Applying this practice to the theory before collecting the data (evidence) makes the difference between the case study as a research method and the other research methods. Some methods, such as ethnographies and grounded

theory, intentionally avoid the statement of theoretical hypotheses at the beginning of the investigation (Yin, 2005). This situation can induce mistakes, and make the approaches be taken for a case study. It may be thought that the so-called identification with the case study allows for the immediate approach to the data-collection stage and the reaching of field contacts very quickly. The serious error consists in creating relevant field contacts without the understanding or theory of the object being studied.

This time, the development of theory as part of the design stage is essential for the purpose of the investigation and proposes a theory about the achievement of entrepreneurial education and training of economist engineers in the current state of the Romanian economy. It shows why the mere replacement of the professional and transversal competences of the economist engineers, acquired during the period of undergraduate studies, is not enough to contribute to the innovation and increase of the entrepreneurial skills, in the current state of the structure of the Romanian economy. The mere elimination of the initial competencies provided by university studies does not solve the increasingly complex and the ever changing demands of the labor market.

The first theorization is that of the primary analysis unit, which includes: the achievement of the continuous entrepreneurial education and training of economist engineers in the current state of the Romanian economy. Continuous entrepreneurial education and training of economist engineers, for the stated purpose of acquiring the qualitative increase of their professional and transversal competences, comes as an immediate response to the problem identified in the labor market that economist engineers are insufficiently educated and trained as entrepreneurs for the fields of development of entrepreneurship, therefore inefficiently trained from the perspective of education and creative potential. The purpose of this research is to create at least the theoretical support for the achievement of the continuous entrepreneurial education and training of economist engineers through the initiation and accreditation of a Master's degree program in entrepreneurship. This goal has a number of objectives, such as: the creation of an Entrepreneurial Education and Training Laboratory, as a material basis for the design and accreditation of the Master's program in Entrepreneurship; the elaboration of a coherent educational plan with entrepreneurial subjects for the continuous education and training of economist engineers - master students in the Master's degree program; organizing training and retraining courses for university graduates, in order to enable them to practice and simulate entrepreneurial activities; organizing the reception of dissemination and, at the same time, disseminating results on a large scale through national and international communication and publication of various studies and research on the topic of the entrepreneurial activity; ensuring the

participation of the university staff, students, master students in technical and scientific manifestations, specific to the continuous education and training (round tables, workshops, national / international symposiums, national / international fairs); ensuring connection to national and international research networks on the continuing training of human resources; elaboration of visits at enterprises / good practice programs for university and economics engineers - master students participating in continuous entrepreneurial education and training; the setting, by the persons benefiting from the programs referred to above, of entrepreneurial forms for their own activity (social, political, research, non-entrepreneurial, intra-entrepreneurial entrepreneurship) and simulating such enterprises within the Laboratory for entrepreneurial education and training.

The entrepreneurial career planning of economist engineers is part of their continuous entrepreneurial education and training as master's students at the Master's degree program: Entrepreneurship Education and Training. Such activities represent means whereby economist engineers have the opportunity to shape their career in entrepreneurship, set goals for their own career, and initiate actions to achieve these goals. Planning here does not mean achieving a plan for life but is a continuous process of adjusting entrepreneurial career goals to personal characteristics and continuous educational and occupational provision to become creators of jobs, rather than job seekers. Planning involves several stages: understanding of one's own capacities, including the one related to education, training, and self-education; exploring the profession of entrepreneur in accordance with the interests and skills of each economist engineer, as well as the personality traits that characterize them; making decisions in relation to the profession of entrepreneur, followed by the attendance of education and training courses within the LABORATORY FOR ENTREPRENEURIAL EDUCATION AND TRAINING; initiating and developing their own entrepreneurship.

The activity of professional counseling and career orientation of the entrepreneur will take place in the LABORATORY FOR ENTREPRENEURIAL EDUCATION AND TRAINING, under the supervision and guidance of the university professors who activate within the Faculties of education and psychology and of the successful entrepreneurs from the business environment or NGOs. The activity falls under the responsibility of a member of the Master's Degree Implementation Team, who will have the authority and responsibility at the same time to organize, plan, motivate, control and evaluate this activity. The purpose of this activity is to motivate and ensure economist engineers' access to quality education through their education and training as entrepreneurs; increase the quality of professional skills; motivate and ensure the access of economist engineers to quality education by establishing a mutual support relationship between the tutor and

participants to the Master's degree program, by informing the Master's students about the organization of the faculties, by methodologically supporting the Master's students, by offering the Master students' the opportunity to become familiar with the university structure and the organizational culture in order to fulfill their role and interact with the other faculty members; the formation of entrepreneurial competences by analyzing the group work, teamwork; identifying and understanding the individual entrepreneurial characteristics by introducing economist engineers in their specific activity and organization of the study; the use of resources provided for entrepreneurial education and training; the repair of available information and the selection of documents through the exploration of methodological paths to develop entrepreneurial skills and knowledge by encouraging Master's students to develop their own learning style; contributing to moral development, motivation, and demonstration of professional ethics; creating an attitude that would promote the creative and innovative thinking to master students.

The activity of education and training for a career as entrepreneurs represents an educational intervention aimed at developing the skills and abilities that economist engineers might need for the management of their own entrepreneurial career; this aim is achieved by developing a learning program with the following themes: How to start a business, from the idea of existing opportunities, to the idea of initiating business and generating the business plan? What do you need to know about entrepreneurship? Sources of financing; Business development management; about vulnerable social groups; About Social Entrepreneurship, Social Affairs, Social Entrepreneurship and Social Cooperatives. All these activities are primarily aimed at students at the master's degree program and refer to the specific decisions that determine action.

The mission of the continuous entrepreneurial education and training of economist engineers is the one stated in their initial, undergraduate training, namely: increasing the degree of improvement, the evaluation and the certification of the quality of the managerial activity and, in this regard, the improvement of the managerial education in all of its forms. It also promotes economic engineering education as an interdisciplinary form of managerial education and promotes the profession (occupation) of economist engineer (AMIER, 2018), with the objectives of Establishing a set of relationships between the economic environment, universities and research institutions with managerial concerns so as to facilitate a professional dialogue in the field of management, with mutual benefits. Organizing activities such as: training, consulting, documentation, technology transfer, auditing, postgraduate courses etc., leading to the formation and development of the managerial culture, the improvement of the managerial act, in order to increase the competitiveness of the enterprises; promoting excellence in managerial activity and in

the preparation of specialists in economic engineering. Initiating and developing links with other professional organizations in the country and abroad, which have similar or converging activities and objectives (AMIER, 2018).

Increasing the quality of economist engineers' skills is the aim of the Masters' specialization, which focuses on the entrepreneurial education and training of engineers in the field of engineering and management, as well as on the expected qualification level of those graduating the Master's degree program. It can be noticed that the new status of the person graduating from technical academic studies should be directed towards multidisciplinary training (Singer and Sarivan, 2006).

The following theorization is done for the contextual analysis unit, which refers to the very existence of the case, namely: the necessity to innovate the continuous entrepreneurial education and training of economist engineers in the current state of the Romanian economy. Taking into consideration the fact that, apart from the Romanian legal provisions on university studies, starting with 2005, the substantiation of study programs on competences and learning outcomes, as a premise of a qualification framework, designed as a basic tool in the development of the European Area of Education Higher Education (EHEA) has become an obligation assumed by the Ministers of Education in the signatory states of the Bologna Process; therefore, the Master's Degree Program in Contemporary Economies, where the labor market is constantly changing, should insist on the need for qualifications that can be met by hybridizing some segments of science.

With the validation, by the Consortium of Engineering and Management, of the Bachelor's degree in Economic Engineering in the Electrical, Electronic and Energetic field, the activity of this specialization has started having in view the professional competences and transversal skills that the economist engineer must acquire until graduation, as well as the possible occupations graduates might have access to on completion of their studies. At the same time, the Department of Engineering and Management, of the Faculty of Electrical Engineering Information Technology, analyzed the necessity for the continuous entrepreneurial education and training of economist engineers, which may be achieved through a master's degree program that would ensure a qualitative increase in participants' entrepreneurial skills. The members of the Department of Engineering and Management analyzed the subjects from the curriculum of the Master's degree program in the Entrepreneurial Education and Training of engineers, their sequence over time and the logic of teaching the disciplines over time, the contents and themes of courses and seminars, laboratory activities, etc.

The need for the continuous entrepreneurial education and training of economist engineers stems precisely from the general problem of human

resources, from the point of view of education and the existing creative potential. When looking at the case of the economist engineers, some of the causes associated to the above-mentioned need for entrepreneurial education and training refer to: the unavailability of a Laboratory for entrepreneurial education and training; the absence of cohesive curricula for master's programs aiming at the continuous formation of professionals; the inadequate training of teachers, who must be able to present entrepreneurial activities in all their complexity; the difficulty of ensuring dissemination of results on a large scale, through the communication and publication, at the national level, of various studies and research on the entrepreneurial activity; non-participation of university and Master's students at technical and scientific manifestations in engineering and management (round tables, workshops, national/international symposiums, national / international fairs, impossibility to connect to national and international research networks on the continuous training of economist engineers, lack of programs that would allow university staff and Master's students to visit enterprises and understand the good practices that have been adopted by the business environment.

The last conceptualization refers to the Master's Degree Program, which represents the support for the continuous education and training of economist engineers. It refers to the opportunity, offered to economist engineers, to achieve a qualitative growth of their professional and transversal skills, by the Master's degree program in the specialization: Continuous Entrepreneurial Education and Training of Economist Engineers.

In this respect, the Master's Degree Program: The Continuous Entrepreneurial Education and Training of Economist Engineers is in line with the desideratum for the achievement of the Common European Space for Higher Education. The achievements in the field of the initial and the continuous training of human resources are hampered by a series of problems, in particular the ones regarding the effectiveness of the first cycle (undergraduate studies) and the difficulties faced by students and teachers while adapting and restructuring the curriculum to new structures.

The design and the accreditation of the Master's Degree Program: Entrepreneurial education and training will contribute to the development of knowledge in engineering and management in general and in the field of entrepreneurial activity in particular, representing a connection between the initial (undergraduate) training of economist engineers and their continuous education and training (the master's degree), from the perspective of quality in education, their creative potential, and labor market requirements.

The novelty and originality of the Master's Degree Program: Entrepreneurial Education and Training of Economist Engineers consist in the creation of the framework for the continuous training of engineers,

linked to European criteria and standards for professional and academic training. The Program Implementation Mechanism is the Laboratory for Entrepreneurial Education and Training, generated by the latest technologies of development.

The complexity of the proposed Master's Degree Program: Entrepreneurship Education and Training is directly proportional to the dimension of quality assurance in higher education, which can guarantee a starting point in the dialogue between universities, governments, the business environment and European entities, with the view of achieving the European Higher Education Area (EHEA)

The configuration of the curriculum for the Master's Degree Program: Entrepreneurial education and training of engineers will be done on the basis of the use of the Laboratory for Entrepreneurial Education and Training. Consideration is given to the formulation and verification of hypotheses for the configuration of the Master's degree program into the two types: the research master and the professional master, using the laboratory for the entrepreneurial education and training of engineers. Conceptual models and theories will be elaborated, on the types of entrepreneurship: business, social, political, research, non-entrepreneurial, intra-entrepreneurial.

3. The gathering of evidence (data)

The sources from which the evidence was collected are: documents, archives, interviews, sites, direct observation, participatory observation. In each case, methodological procedures have been observed. In the data collection activity, the principles of priority were respected: a) multiple sources of evidence (two or more sources converging towards the same findings), b) a database (it is the sample of the evidence gathered, not the final report and c) a logical succession of evidence (explicit links between the data collected, the questions raised and the conclusions reached) (Yin, 2005). All sources were considered useful, for this reason many articles, research methodology books for this study were examined.

In this case, interviews represented one of the most important sources of information. They were generated, among others, while fulfilling our professional responsibilities in connection with the management of the bachelor's degree program. The results, as well as the measures adopted, were recorded in the evaluation and monitoring documents, in reports submitted to the management of the Faculty and/or the University and the conclusions of these interviews represent documents that have become confidential and are the property of the University. For this reason, they will not be published (mentioned) in this study.

- The problem identified in the education and training of economist engineers was the inefficiency of economist engineers' training from the perspective of education and of the creative

potential with causes and effects as the ones included in Table 1.

- The need for the continuous entrepreneurial education and training of economist engineers, through the Master's Degree Program, at European level, in accordance with the desideratum of the achievement of the European Common Space for Higher Education, has become a must. Thus, the following aspects have become crucial: targeting the achievements of this research towards the reconfiguration of the academy-without-frontiers tradition; focusing on the type of learning appropriate to the knowledge society.
- The continuous training of human resources, as presented in the European Project Report, Trends IV is difficult due to a series of issues related, in particular, to the efficiency of the first cycle (undergraduate) of learning and the difficulties faced by students and academics alike, due to the restructuring and adaptation of the curriculum to the new, emerging structures. Many people believe that the statute of the first cycle is questionable, especially since it is too short to ensure a proper qualification and training of students, so as they might be able to answer the demands of the labor market. Reform disrupts students, and to a certain extent, the study program as well. Academics need to renew their courses, the way they work and their evaluation system, so they have to make additional training efforts.
- The Master's Degree Program: Entrepreneurial Education and Training, aimed at developing entrepreneurial knowledge, focusing on economic and social cohesion policies, provides a link between the initial education of economist engineers and their subsequent entrepreneurial training, from the perspective of the quality in education and the creative potential demanded by the ever-changing labor market.
- It is necessary to generate novelty and originality in the creation of a continuous entrepreneurial training framework for economist engineers through the Master's Degree Program: continuous entrepreneurial education and training, linked to the European criteria and standards for professional and academic training.
- The need for the Implementation Mechanism of the Master's Degree Program: continuous entrepreneurial education and training of economist engineers, which is based on activities conducted in the Laboratory for the entrepreneurial education and training of economist engineers, has become obvious.

4. Data analysis

The data analysis is part of the case study research strategy and consists of examining, clarifying, tabling and testing the data. In other words, the quantitative and qualitative reorganization of data in order to approach the initial assumptions of a study (Yin, 2005). During

this stage, a series of difficulties have been encountered since the strategies and techniques that had to be used were not found in clearly defined bibliography. However, there have been three strategies that rely on theoretical assumptions and might be used in order to establish a framework based on alternative explanations, and develop case descriptions, based on these strategies. Five techniques, specific to case study analysis, can be used: pattern matching, constructing explanations, analyzing time series, logical models and comparative synthesis (Yin, 2005). The challenge in this case is that of achieving a quality analysis, which implies a great deal of attention for all the evidence, not just for the data presented here, in Chapter 3. At the same time, it involves gathering the evidence objectively and with an appropriate interest in exploring alternative interpretations.

This study differs from a broader approach, such as a doctoral dissertation, and therefore it cannot include here all the evidence and evaluations performed. In the analysis of this case, examinations were limited to evidence from analysis units that were established on the basis of the research hypothesis and which can demonstrate that continuous entrepreneurial education and training of economist engineers, by means of a Master's degree program: entrepreneurial education and training of engineers, aimed at ensuring the increase of quality in participants' professional and transversal skills. The complexity of the proposed solutions is directly proportional to the dimension that regards the assurance of quality in higher education, which can be considered as a starting point in the dialogue between universities, governments and European bodies for the achievement of the European Higher Education Area. Table 2 presents the objectives and achievements proposed by the Master's Degree Program: Entrepreneurial Education and Training:

- Configuration of the curricula for the Master's program: entrepreneurial education and training, using the engineer's education and training laboratory. Configuration activities are included as follows:
 1. Formulation and verification of hypotheses regarding the alternatives of configuring the master's program in the two types: the research master and the professional master, using the Laboratory for the entrepreneurial training and education of engineers;
 2. Elaboration of conceptual models and theories regarding the two types of master's programs: research and professional;
 3. Studies and analyses concerning the two types of master's programs that would allow graduates both to increase the quality of professional skills for entering the labor market as entrepreneurs and to continue their studies within a PhD program, while the set of disciplines included in the Master's program should ensure the flexibility of future choices;

4. Designing an experimental master's program, aimed at training entrepreneurial skills at a more sophisticated level than the specialization; concepts with a higher degree than those of the specialization, which would better fulfill the successful performance in the field of entrepreneurship, lead to a more precise approach to solving problems and to finding solutions applicable to both entrepreneurship and research, corresponding to Level 7 of the European Qualifications Framework;
5. Configuration of the competences required by the Master's program, with the help of the laboratory for the entrepreneurship training and education of engineers, based on operational categories: business Entrepreneurship; social entrepreneurship; political entrepreneurship; entrepreneurship in research; entrepreneurship and entrepreneurship in the professional field;
6. Configuring the Master's program curriculum based on curriculum development principles from the perspectives of graduate skills development, taking into account the distribution of curricular areas (Communication, Entrepreneurship, Value Management) and using the Laboratory for the entrepreneurial education and training of engineers;
7. Experimenting the implementation of the Education Plan in the Laboratory for the entrepreneurial education and training of engineers;
8. Participation in technical and scientific events in the field of entrepreneurship (roundtables, workshops, national / international symposiums, national / international fairs);
9. Participation in training and retraining courses;
10. Organizing training and retraining courses;
11. Connecting to national and international research networks;
12. Work visits / exchanges of best practices.

5. Conclusion

Given the current stage of the economic structure in Romania, it is crucial to have available human resources prepared to take entrepreneurial risks, who have the professional competences needed in the field, in order to be able to solve the complex and ever changing problems of the labor market.

The continuous entrepreneurship education and training of economist engineers, aimed at the qualitative increase of their professional skills and the creation of entrepreneurial capabilities belonging to the field of Engineering and Management Studies, in the field of Fundamental Engineering Sciences, is also a crucial point for progress at the current stage of Romania's economic development. The Laboratory for entrepreneurial education and training represents the material

support for the development of a Master's program, aimed at the continuous entrepreneurial education

and training of economist engineers.

Table 1: Causes and effects of inefficiency in relation to the entrepreneurial education and training of economist engineers

CAUSES	EFFECTS
<ul style="list-style-type: none"> •The unavailability of a Laboratory for Entrepreneurial Education and Training •Lack of coherent programs for the continuous training of economist engineers •Insufficient training of teachers/academics in order to efficiently present entrepreneurial activities •The difficulty of receiving broad dissemination of ideas included in various studies and research on entrepreneurial activity, published in national or international publications •Non-participation of the academics, students, master students at technical-scientific manifestations specific to the continuous training of economist engineers (round tables, workshops, national / international symposiums, national / international fairs •The impossibility of connecting to the national and international research networks on the continuous training of economist engineers •Lack of programs, for the university staff, master students, which would aim at work visits / good practices. 	<ul style="list-style-type: none"> •The continuous training of economist engineers cannot take place •The continuous training of economist engineers in the absence of coherent programs (master's programs) is inefficient •As part of their continuous training, economist engineers do not benefit from practical training on entrepreneurial activities •Economist engineers do not receive continuous training which might come in the form of having access to the results of studies, research, development and innovation, as information disseminated by means of national and/or international journals; •The academics, the master students, are not sufficiently informed on the new discoveries in the field since they do not take part to the technical-scientific manifestations in the field of entrepreneurship •Economist engineers are not continuously trained from the perspective of entrepreneurial education through research and stimulation of their creative potential •The academics, the master students are not connected to the practical reality of entrepreneurship and fail to fully integrate into the labor market.

Table 2: Objectives and achievements of the master's degree program: Entrepreneurial education and training

OBJECTIVES	ACHIEVEMENTS
<ul style="list-style-type: none"> •Setting the Laboratory for continuous entrepreneurial education and training; •The organization, accreditation and improvement of coherent Master's degree programs, aimed at the continuous training of economist engineers; •Organization of training and retraining courses for academics in order to make them able to present entrepreneurial activities; •Organizing the reception of dissemination, while disseminating results on a large scale, through communication and publication, in national or international journals, of various studies and research on the entrepreneurial activity; •Ensuring the participation of academics, students, master students in technical and scientific manifestations specific to the continuous training of economist engineers (round tables, workshops, national / international symposiums, national / international fairs; •Ensuring connection to national and international research networks on the continuous training of economist engineers; •Elaboration programs for visits and understanding good practices in the case of academics and Master's students. 	<ul style="list-style-type: none"> •The continuous training of economist engineers will take place in the Laboratory for the entrepreneurial education and training of engineers; •Increasing the efficiency of continuous training of economist engineers, based on coherent (master) programs; •During their continuous training, economist engineers will benefit from practical training on entrepreneurial activity; •Economist engineers will benefit from continuous training by receiving large-scale dissemination, using national and international communication and publication of the different outcomes of studies, research, development and innovation; •Academics and master students will be informed about new research outcomes, presented at the technical-scientific manifestations in the field of entrepreneurship; •Economist engineers will be continuously formed from the perspective of entrepreneurial education through research and the stimulation of their creative potential; •The academics, the master students will be connected to the practical reality of entrepreneurship and will be able to fully integrate into the labor market.

References

- AMIER (2018). Professional, scientific, non-governmental, independent, juridical, non-profit organization constituted on the principle of the free consent of its members, indefinitely. Association of Managers and Economists of Romania, Bucharest, Romania. Available online at: <http://www.amier.org>
- Campbell DT (1975). Degrees of freedom and the case study. *Comparative Political Studies*, 8(2): 178-193.
- Doina ML and Constantin RI (2016). The antifragile of decisions adopted by managers and engineers economists working in the sector of vulnerable groups' social economy. *International Journal of Modern Communication Technologies and Research (IJMCTR)*, 4(3): 1-4.
- Magdoiu LD and Rada IC (2013). The initial and ongoing training of engineer economists as human resources for the labor market. *Journal of Electrical and Electronics Engineering*, 6(1): 73-76.
- Măgdoiu LD and Rada IC (2014). Managers and engineer economists between social economy development and obtaining profit. In the 4th Review of Management and Economic Engineering International Management Conference "The Management Between Profit and Social Responsibility", Tehnical University of Cluj-Napoca, Romania: 88-94.
- Măgdoiu LD and Rada IC (2018). The necessity of developing the economic engineering specialization in the current context of romania's economic structure. *International Journal of Advanced and Applied Sciences*, 5(5): 48-60.
- Măgdoiu LD, Rada IC, and Maghiar NF (2014). Managers and engineer economists between social responsibility of oil corporations and the development of the social economy. *Annals of the Oradea University, Oradea, Romania*: 240-243.
- MEPB (2005). Comunicatul Bergen. *Ministrii Educației din Procesul Bologna, București, României*. Available online at: <https://www.edu.ro>
- MEPB (2007). Comunicatul Londra. *Ministrii Educației din Procesul Bologna, București, Romania*. Available online at: <https://www.edu.ro>
- MEPB (2009). Comunicatul Leuven. *Ministrii Educației din Procesul Bologna, București, Romania*. Available online at: <https://www.edu.ro>
- Rada IC and Rada IC (2018a). Using banking information security management to ensure system stability and investors' well being. *International Journal of Advanced and Applied Sciences*, 5(1): 49-60.
- Rada IC and Rada IC (2018b). The engineering of the prudential supervision structure - essential factor of financial-banking stability in the European context of Romania. *International Journal of Advanced and Applied Sciences*, 5(4): 14-23.

- Rada IC, Măgdoiu LD, and Rada IC (2017). Contributions of professional associations in Romania to prevent poverty and social exclusion by developing social businesses. *International Journal of Business and Finance Management Research*, 5: 61-83.
- RNCIS (2018). Centrul național de acreditare; standarde ocupaționale. Registrul Național al Calificărilor din învățământul Superior (RNCIS). Available online at: www.rncis.ro
- Singer M and Sarivan L (2006). *Quo vadis, Academia? Repere pentru o reformă de profunzime în învățământul superior*. Sigma, București, Romania.
- Trochim WM (1989). Outcome pattern matching and program theory. *Evaluation and Program Planning*, 12(4): 355-366.
- Yin RK (2005). *Case study research and applications: Design and methods*. Sage Publications, Thousand Oaks, California, USA.