



*Centre for Studies in European Integration*  
***Working Papers Series***

**Issue 8, March 2018**



**Centre for Studies in European Integration  
Working Papers Series**

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# Centre for Studies in European Integration

## Working Papers Series

Issue 8/ March 2018

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# Study on Best Practices in EU Entrepreneurship Education

Alina SUSLENCO<sup>1</sup>, Nelli AMARFII-RAILEAN<sup>2</sup>,  
Svetlana MELNIC<sup>3</sup>

## Abstract

*This study presents the analysis of the best practices in European Union on entrepreneurship education. The purpose of the research is to analyze the situation created at the national level in Romania and France regarding the development of entrepreneurial culture. The authors identified the measures used for developing the entrepreneurial environment at the local level, researching the legislation regarding the support of entrepreneurial environment development and the entrepreneurial culture, identifying the opportunities of the educational institutions regarding the entrepreneurial education.*

*The objects of the research are two European universities: Alexandru Ioan Cuza University of Iasi, Romania, and the University of Strasbourg, France. The following research methods were used in the research: documentation, analysis, synthesis, comparative analysis, induction, deduction, abduction, observation.*

*The study was realized within the project: „Reinforce entrepreneurial and digital skills of students and teachers to enhance the modernization of higher education in MOLDOVA”, no. 585353-EPP- 1-2017- 1-RO- EPPKA2-CBHE- JP. Conclusions were formulated in order to highlight the importance of international practices, applied by well-known higher education institutions with regard to the development of entrepreneurial education.*

*Key words:* entrepreneurial culture, innovative education, entrepreneurial environment, innovative teaching methods.

*JEL classification:* O30, O 32

## 1. Introduction

The purpose of this study is to analyse the situation created at the national level in Romania and France regarding the development of entrepreneurial culture. The authors identified the measures used in Romanian and France Universities for the development of entrepreneurial culture, researched the methodology of developing the entrepreneurial environment at the local level.

Research focuses on identifying the opportunities of the educational institutions regarding the development of entrepreneurial culture; establishing the ways of enhancing the university education in the development of entrepreneurial environment; identifying the necessary partnerships to be established in order to develop the entrepreneurial culture at local

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level; researching the legislation regarding the support of entrepreneurial environment development and the entrepreneurial culture; outlining the proposals in order to boost the development of innovative culture at local and national levels.

The study was realized within the project: „Reinforce entrepreneurial and digital skills of students and teachers to enhance the modernization of higher education in MOLDOVA”, no. 585353-EPP- 1-2017- 1-RO- EPPKA2-CBHE- JP.

## **2. The methodology for content research**

In order to achieve the research objectives, we consider it appropriate to carefully select the research methodology that will help us achieve our pre-established goals. In this context, we must emphasize the fact that we will use as research methods the following: documentation, analysis, synthesis, comparative analysis, induction, deduction, abduction, observation. In order to achieve the objectives and through the selected research methods we will focus on the documentation regarding the development of entrepreneurial culture within the universities of the analysed states. The objects of research are two European Universities: Alexandru Ioan Cuza University of Iasi and The University of Strasbourg. We plan to study the ways of developing the entrepreneurial culture and the entrepreneurship education through projects involving students and teachers in order to study the entrepreneurial culture and the entrepreneurship education. In fact, the subjects of the research will be the students and professors of Alexandru Ioan Cuza University of Iasi, who will be interviewed on the practices of stimulating the entrepreneurial education within the university. These practices are to be analysed and proposals are outlined for their development and implementation within the Universities of Moldova. As research hypotheses, we can presume the following:

H1: entrepreneurial culture positively influences performance at the national level;

H2: entrepreneurship education is a pillar of national economic sustainability;

H3: the main measure of development of the entrepreneurial environment within Alexandru Ioan Cuza University is the creation of partnerships;

H4: one of the practices that can be implemented in Moldova is creating partnerships with the business environment.

In this context, we must mention that these hypotheses will be validated during the research and the opportunity to reach them will be investigated. Finally, conclusions and recommendations will be highlighted on the opportunities for development and stimulation of entrepreneurial education.

## **3. The international**

Investigating the international context of research in the field of entrepreneurship education, entrepreneurial culture, opportunities for the development of the entrepreneurial environment, we have to mention that many measures are being implemented at international level to stimulate the development of entrepreneurial education among pupils, students and teachers. Researching the provisions of the European Union, we can highlight the fact that “the spirit of initiative and entrepreneurship” is among the eight key competences of lifelong learning defined by the European Union. It refers to the ability of people to identify and capitalize on opportunities, to put ideas into practice, to plan and manage projects in order to achieve goals. The following materials give you more insight into this key-competence and how teachers can cultivate it to their students. If we are to review the most successful projects and proposals applied internationally, we could mention as an example Entre Comp: The

framework of entrepreneurial competence, which defines entrepreneurship as “a transversal competence that is found in all spheres of life: from facilitating the personal development, to active participation in society, (re) insertion into the labour market as an employee or self-employed, and up to starting a (cultural, social or commercial) initiative. Entre Comp was designed as an 18-month research period involving experts from across Europe, which allowed taking into account the diversity of perspectives and contexts from different countries. The domain is made up of three areas of competence and 15 competencies, which are:

1. *Ideas and opportunities* – opportunities for support, creativity, vision, ethical and sustainable vision.
2. *Resources* – motivation and perseverance, mobilization of resources, social and economic environment, other mobilizations.
3. *Actions* - learning from other experiences, working with others, copying under uncertainty, risk, planning and management, implementing initiatives (The Education Code of the Republic of Moldova, 2016).

Another successful experience in developing the entrepreneurial education is that of the USA, where projects are applied in order to stimulate young people's initiatives, to bring the business environment closer to academia and professional environment. As examples of projects implemented in the USA, we could mention: The USA International Virtual Business Fair, The Global Business Challenge, Virtual Enterprise International Trade Fair. In Europe, through the “Entrepreneurship 2020” Action Plan and the Communication, and through the “Rethinking of Education”, the European Commission has highlighted the need to integrate the entrepreneurship learning in all sectors of education, including informal learning. Both documents invite Member States to give all young people practical entrepreneurship experience before completing compulsory education, highlighting the importance of learning through practice in the education and training process. Education is a competence of the Member States, but the actions, at European level, can support Member States in adapting and improving the recruitment, education and teacher development methods. The Dublin College of Arts and Design offers a range of teacher training programs. At university level, students can take an examination to obtain a double specialization, either in fine arts and education, or in design and education (Entrepreneurial education: the guide for trainers, 2018).

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If we are to look at other examples of successful entrepreneurship development, then it should be noted that the Group T Leuven Education College has about 1,000 students and 85 teachers. The principle statement of the College is as follows: “Teaching the essence by experimenting with existence.” Its purpose is to develop the person as a whole, and the emphasis is on the:

- *Learning*: developing students’ capacities around the four UNESCO educational pillars: to learn to be, to learn to know, to learn to do, to learn to cohabit.

- *Engineering*: teachers are allowed to create powerful learning environments, proving creativity and inventiveness throughout this process.

- *Entrepreneurial initiative*: problem solving through leadership, innovative spirit and courage (Entrepreneurial education: the guide for trainers, 2018).

Another example is St Mary’s University College offering university courses in the field of teacher education and liberal arts, as well as, a range of postgraduate programs in the field of teacher training. The policy adopted by St Mary’s University College in the field of entrepreneurship education is explicitly based on its academic, professional and civic mission and values. All students are given the opportunity to develop and test entrepreneurial ideas through an intensive and interactive program of workshops, seminars and courses (Entrepreneurial education: the guide for trainers, 2018).

Another successful example would be the fact that eight European governments agreed in 2008 to set up the South East Europe Entrepreneurial Learning Centre (SEECCEL), the host country being the Republic of Croatia. The objective of SEECCEL is to share indicators to promote more developed learning economies. This specific project is a transnational model for teacher training, with clearly defined learning outcomes for pupils and teachers. The project benefited from financial support from the European Commission and the Croatian government.

At international level, there are successful examples demonstrating the effectiveness of student involvement in training and reinstruction of teachers to form an entrepreneurial culture within universities. Such an example would be Swansea Metropolitan University, which has adopted a number of innovative ways to prepare future teachers for classroom reality and to support them in developing entrepreneurial skills. For example, the university involves former students and graduates in the development of current measures and programs (Entrepreneurial education: the guide for trainers, 2018).

The University College of Sogn og Fjordane has about 3,000 students and 300 employees. Entrepreneurship education is mandatory for all future teachers - from primary, secondary and vocational education - and forms an integral part of curriculum in the field of training. All students are offered a training program lasting at least two days in the field of entrepreneurship and the REAL program, which follows the model of learning based on practical experience (Entrepreneurial education: the guide for trainers, 2018).

#### **4. European and national context**

If we are to analyse the European and national context of developing the entrepreneurial education, we should mention that at European level there are a series of laws and norms that support and stimulate the development of entrepreneurship in Europe. Even through the “Entrepreneurship Action Plan 2020” on the relaunching of entrepreneurship in Europe (European entrepreneurship is considered an essential vector of economic growth and job creation: it creates Commission Communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 09.01.2013,

Brussels), new enterprises and jobs, opens new markets and stimulates new skills and competencies (Marinescu, A., 2018).

In this context, it should be noted that according to statistical data in Europe, over 23% of the population claim to have participated in at least one entrepreneurship course, (Entrepreneurship study. Entrepreneurial education). Research at this level highlights that entrepreneurial education should not be confused with business-related economic studies because the objectives of entrepreneurial education are: promoting the creativity, innovation, and the practical and independent/collective business activities Communication from the European Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. The 2020 Entrepreneurship Action Plan, 2018, p.62). Stimulating the entrepreneurship among young people brings many benefits - both economic and social: reducing unemployment, promoting social inclusion, stimulating innovation, increasing self-confidence, moral satisfaction, etc.

If we are to make reference at a national level, then in the Republic of Moldova the entrepreneurial environment is in the process of developing, stimulating and attracting young people in the amplification of this process. In this context, it should be noted that according to the Code of Education of the Republic of Moldova, according to Article 6 of the present Code “The educational ideal of the school in the Republic of Moldova consists in the formation of an initiative spirit, capable of self-development, possessing not only a knowledge system and skills necessary for employment on the labour market, but also independence of opinion and action, being open to intercultural dialogue in the context of the assumed national and universal values” (The Education Code of the Republic of Moldova, 2016). We also need to mention that according to Article 11 of the Education Code of the Republic of Moldova, education in Moldova aims at forming the following key competences:

- a) Communication competences in Romanian;
- b) Communication competences in mother tongue;
- c) Communication competences in foreign languages;
- d) Competences in mathematics, science and technology;
- e) Digital competences;
- f) Competence of learning to learn;
- g) Social and civic competences;
- h) Entrepreneurial competence and spirit of initiative;
- i) Competence of cultural expression and awareness of cultural values (The Education Code of the Republic of Moldova, 2016).

In this context, it is noticed that among the competences formed among the pupils, the students in Moldovan education can also form entrepreneurial competences and these actions are supported by the legislative framework.

In Moldova projects to support the development of entrepreneurial education are launched, such as: CEDA, Entrepreneur Tower, Yep Moldova, LED.

CEDA is a non-governmental organization registered at the Ministry of Justice of the Republic of Moldova as a Public Association. CEDA is a member-based organization. The aims of the Association are: training and capitalizing on professional competences, individual initiative and entrepreneurship spirit, along with promoting entrepreneurship and the entrepreneurship spirit through education, business initiation and development.

Another project that is implemented in the Republic of Moldova is the Youth Entrepreneurship Horizons Project in Moldova. Starting with June 2015, the Institute for Rural Initiatives with the support of the Angello Development Foundation launched a new initiative “The Young Entrepreneur”. The aim of this project is to empower high school and

gymnasium students to be more prepared for life from the perspective of economic initiative, to better understand the basic principles of entrepreneurship, efficient management of time and resources. The project is being carried out in 4 localities of the country (Zirnesti, Cahul, Mingir, Hincesti and Gribova, Drochia) where the Institute for Rural Initiatives runs programs using the existing model of the School of Democracy. The training course will take place after the completion of the basic sessions and will consist of 2 modules: theory and practice. Throughout the entire academic year, the courses will be facilitated by various experts and facilitators in the field (Entrepreneurial education projects in Moldova, 2018).

Another project launched by CEDA in Moldova was “Reconceptualising Professional Orientation and Career Guidance II”. This project aims to support young people in the Republic of Moldova in their career decisions so that these decisions are based on the needs of the labour market and as a result the employment rate and labour productivity in the economy will increase. The project budget is estimated at around 900,000 Euros and will be implemented by 2021 (CEDA Entrepreneurial education projects, 2018).

The LED project is a project that promotes young people’s economic empowerment by developing entrepreneurial revenue-generating skills. The main activities are: national assistance in the implementation of the new Curriculum for the “The Basics of Entrepreneurship” discipline. Following the piloting in 15 schools, the project will support the Ministry of Education, Culture and Research in implementing this curriculum at national level. Based on a study of identifying the training needs, a series of trainings are to be carried out for vocational school and college teachers. Establishment of 3 Methodological Centres for “The Basics of Entrepreneurship” (North, Centre and South) for teachers holding this course. Together with the resource centres, the project will organize annual forums on entrepreneurship education in order to have a systematic contact with the teachers. Supporting young people in developing and implementing business plans: Business Plans Competitions, additional courses in start-up entrepreneurship, providing start-up grants, organizing production and mentoring practices. Assisting 3 professional schools in initiating their own entrepreneurial activities, this will serve as a model for students, and will contribute to their professional education (LED Projects, 2018).

## **5. Relevant initiatives**

The most relevant initiatives are presented in the projects that have been pointed out and we consider it useful to adapt them to the economic context of the Republic of Moldova in order to develop a unique methodology at country level and to develop the entrepreneurial education in Moldova. Previous initiatives, taken from the international, European and national experience, need to be considered as optimal and timely urgent initiatives needed to boost the business environment, the youth culture and teachers. For these reasons, it should be noted that implementing projects to develop creativity, innovation, innovative culture, innovative business environment will contribute as core initiatives in focusing on the development of entrepreneurial education and will lead to the formation and bringing up a prosperous nation.

## **6. Policies documents**

Among the documents and policies supporting the development of entrepreneurial education in Moldova is the Education Code; at level of Europe is the “Entrepreneurship Action Plan 2020”, the “Global Education” Initiative, the Europe 2020 Strategy, on the

relaunching of entrepreneurship in Europe. In other world countries there are such laws that support the development of entrepreneurial education. The “Global Education” Initiative, through discussions at the European Round Table on Entrepreneurship Education, seeks to consolidate its existing global knowledge and good practices in entrepreneurship education around three areas that cover the learning process of an individual, namely:

1. Youth (with emphasis on disadvantaged young people)
2. Higher education (focused on a strong growth of entrepreneurship spirit) and
3. Social Inclusion (with emphasis on marginalized communities). This was the first opportunity in which entrepreneurial education was taken into account in such a comprehensive manner (Entrepreneurial education and its role, 2018).

The new Europe 2020 Strategy focuses on skills and education, implementing it particularly by looking at qualitative results and quantitative measures.

## **7. Recommendations in the entrepreneurship and digital competences**

In the field of entrepreneurship development in Moldova, concrete steps must be taken to stimulate the development of entrepreneurial education among young people, pupils, and students as well as among teachers. Therefore, in order to develop a society with a sustainable, prosperous economy, we must invest in the development of entrepreneurial culture and entrepreneurship education both at the macroeconomic level and at the microeconomic level. For these reasons, it is necessary to achieve the following objectives:

- elaboration of the methodology for development and boosting the improvement of entrepreneurial education;
- developing the necessary competences among young people and teachers, in order to implant the necessity of forming entrepreneurial culture;
- correlating the theoretical and practical aspects in order to improve the obtained effects;
- identifying the main partnerships in order to cultivate the entrepreneurial spirit.

## **8. Process flows and diagrams for learning and teaching processes**

Entrepreneurial culture plays an important role as a stimulus for the entrepreneurial activity in a country. From this point of view, Romania currently has a high social capital and the entrepreneurship along with the entrepreneurs is appreciated in the society. We have to bear in mind that statistical data indicate that 23% of Romanians claim to have participated in at least one entrepreneurship course. If we were to interpret this data, it should be noted that this figure is not an encouraging one because if we want to have a developed country, with a growing economy, we must focus on the development of entrepreneurial education, project work, generation of new ideas. Therefore, the need to develop innovative ideas through the support of entrepreneurial education is a necessity of the 21st century.

In order to research the entrepreneurial education within Alexandru Ioan Cuza University of Iasi, Romania, we considered useful to primarily look at all faculties where entrepreneurship is taught. Consequently, from Alexandru Ioan Cuza University documentation, we can mention that the course of entrepreneurship is taught both at the Faculty of Economics and Business Administration and at the Faculty of Law. We have to also point out that this course is found in the study programs both at the Bachelor and Master levels. It is worth revealing the fact that there is even a specialization at UIAC at the Master

cycle, which is entitled Entrepreneurship, where students are taught to start businesses, to acquire necessary skills and competences and to form an entrepreneurial thinking.

In order to develop the entrepreneurial education within UAIC, the Centre for Continuing and Entrepreneurship Training was created, which meets the requirements of the labour market, focusing mainly on the economic field and the information technology. This Centre wishes to be a bridge between high schools, universities and the private business sector, hence providing an informational and permanent training stream, always up to date with increasingly dynamic requirements. The IT courses and certifications offered are of international level (Microsoft, ECDL), certifying the standard of knowledge, skills and professional level of the beneficiaries. The existence of this centre helps preponderantly the students and those who wish to be trained in the IT field as well as in the entrepreneurship field in order to ensure the insertion of the young people into the labour market. Through the acquired competences, this centre helps the young people to become more creative, to understand true values of an entrepreneur. It promotes the need to cultivate an entrepreneurial culture among students and not only.

In addition to this centre, which helps young people in professional competence formation, the UAIC also has a Centre for Personal Development and Professional Training. For these reasons, this centre helps UAIC staff and students in developing themselves, learning the necessary competences fitting the labour market, combining personal and professional life. Moreover, the Centre organizes its activities in the form of seminars, trainings, at the end of which diplomas and certificates are issued.

Accordingly, based on UAIC documentation in the field of entrepreneurship education, we should mention that within this institution there are also implemented projects and activities for supporting the entrepreneur's development, such as: Business Plan Competition, Entrepreneurship Week, etc.

In this context, we should mention that UAIC develops and implements entrepreneurship support projects such as the Business Plan Competition organized within the UAIC where Alexandru Ioan Cuza University teaches individuals how to start their own business. The top 10 business plans are granted funds up to 100,000 lei. Thus, students in the 2nd or 3rd year of Bachelor study, as well as Master and Doctorate students, UAIC graduates for up to three years, can take part in this competition in which they must send their CV, a motivation letter, a copy of the identity card, and a study certificate to [cipo@uaic.ro](mailto:cipo@uaic.ro) in order to form the first training group (UAIC Entrepreneurial projects, 2018).

The courses are organized in the framework of a European Structural Funds project developed by CIPO Professional Information Centre, Career Guidance and Placement in partnership with AVENSA, a business and management consulting company for the private, public and NGO sector (UAIC Entrepreneurial projects, 2018).

Another project contributing to the cultivation of digital competences among teachers, students was the project where UAIC took part in February 18-21, 2018, in Brussels, at the First Academy Seminar "Kick Off Seminar. Prepare - Inspire - Produce – Mingle", organized in the context of the Digital Cities Challenge Journey, where Iasi was selected to participate in this city digitization project. There were 92 cities from Europe, from which eight cities were selected to be involved in the project. The main purpose of the meeting was to establish the next year's work plan, to identify the digitized elements of the selected cities and to find ways to attract the companies from Iasi to be involved in the project. This project will involve both teaching staff and students in order to help companies from the business community to collaborate with the university to facilitate the formation of necessary competences of young people in the field of IT and Entrepreneurship.

The second object of research is the University of Strasbourg, France. This university was founded in the 16th century by Johannes Sturm, a protestant scholar. Sturm created a Protestant Gymnasium in 1538 with the mandate of disseminating knowledge, one of the core values of Humanism. Through the years, the Gymnasium progressively developed into an Academy and a University before it finally became the Royal University in 1631. Today, the University of Strasbourg counts 42000 students, offers initial and further education in a wide range of academic fields and is an international player in scientific research. The Faculty of Economics and Management is one of the largest French academic institutions for teaching and research in that field. It provides high-quality education in the following areas of study: economic analysis, innovation economy, econometrics, management of companies, production, management, logistics, quality, international management, finance.

French baccalaureate can be professional, general or technical. With a technical or vocational baccalaureate diploma, two years of practical studies in various fields related to industry, commerce and services can be accessed. After studying the two years, a BTS (Patent of Technicien Supérieur) diploma is awarded - a higher technical patent or a university degree in technology called DUT (Diplôme Universitaire de Technologie).

The integration of graduates into the labour market depends on the chosen field and on the university's ability to help students undertake internships. Most of the higher education units are theoretical, but at Masters level there is a choice between Master Professionnel and Master Recherché. The professional master allows a better knowledge practice, therefore more chances to be hired after completing it. The research is designed for future candidates for doctoral studies. Some masters even propose alternate studies, which mean the student will work with a company or organization during the year.

In a resume, the internships that a student gets along their studies matter as much as the Master or Grande Ecole diploma. In most French schools' students learn the reflex of working intensively, being self-taught and autonomous.

### **8.1. Learning outcomes**

The learning results achieved by the students and teachers who are involved into projects are embodied in necessary abilities, skills and competencies which are, afterwards, used at work or in business. For these reasons, it should be noted that once the UAIC students, teachers follow some training courses, trainings, seminars, master and Bachelor studies in the entrepreneurial field, they can form great skills needed for an easier insertion into the labor market, to become specialists or future entrepreneurs.

Among the competences that are formed by students during the entrepreneurship lectures, business start-ups, business start-ups in tourism, we can list the following:

#### **1. Professional competences:**

- a. collecting, processing and analysing business data needed for business administration;
- b. explaining and interpreting the relationship of economic influence exerted by the external environment on the enterprise;
- c. critically-constructive evaluation of the explanation and/or solving of a problem regarding the relationship of economic influence exerted by the external environment on the enterprise;
- d. assistance to manage the business of the enterprise / organization;
- e. critically-constructive evaluation of the explanation and/or solving of a problem affecting the operations of the enterprise;

## 2. Transversal competences:

- a. the application of rigorous and efficient working rules, the manifestation of responsible attitudes towards the scientific and didactic field, for optimal and creative valorisation of their own potential in specific situations, observing the principles and norms of professional ethics;
- b. identifying opportunities for continuous training and efficient use of learning resources and techniques for their own development.

Dual education is quite popular in France. Dual students receive a salary from the first working day, both during the practice and during the theoretical studies at the university. Small businesses are also a good option because many of them have international experience and are often global leaders in their field of activity.

Dual students acquire not only theoretical knowledge but also practical experience during their studies at university. During the study process, double students have the opportunity to gain experience in several departments of the company. Because of this, by the end of their studies they know exactly which department is most interested and where they want to work after graduation. This is a huge advantage over non-dual students, who often cannot decide on the future specialization.

Companies that have invested financial and time resources in training students in dual-curriculum programs are interested that graduates remain in work after graduation.

## 8.2. Optimized methodologies for digital learning design

Among the teaching methods used in the UAIC to teach the Entrepreneurship course, several methods are used:

- Interactive exposure;
- Discussions on the basis of examples provided by the teacher;
- Analysing and debating some case studies;
- Debates on the presented projects.

Furthermore, during this UAIC course, students are working on developing business start-ups and studying entrepreneurial models/ templates. Thus, students have the opportunity to acquire the professional and transversal skills they need in order to be creative, to become future entrepreneurs and to build their own career. Projects are elaborated using digital technologies, thus students have also the chance to form these skills. They operate with data, calculus that they do in excel, the text that is collected in word, the presentation made in ppt. In addition to elaborating the logos of simulated enterprises, students show the enterprise sketch to their group-mates, they also operate with specific computer programs from which they have the possibility to acquire the necessary skills to become future managers, entrepreneurs.

## 8.3. Pedagogical strategies for blending and Learner-cantered approach

The teaching strategies used by didactic staff are focused on:

- capitalizing on business opportunities and ideas;
- learning to select the best ideas;
- studying to transform the best ideas into viable business ones.

The teaching strategies used by UAIC teachers are different. By definition, the concept of didactic strategy is regarded as an integrative way of approaching and acting all procedural resources (forms, methods, and technical means) and the didactic principles of their use in the

process of conveying the contents in order to develop / form the general and discipline-specific competences.

The discipline of Entrepreneurship has a pronounced applicative character and implies the emphasis of the action dimension in forming the student personality. The curriculum of this discipline is student-centered and adopts a practical approach of “learning by action”. It introduces a number of learning methods and techniques that stimulate the students’ active involvement in the educational process and their responsibility for their own training. The applied methodology changes the emphasis during the training process from the teacher to the student.

The teacher becomes an organizer, facilitator and coordinator of the learning experience relevant to students, thus realizing the direct link between what is learned and why is learned. Under these conditions, the authentic subject of the training will be the student and, consequently, the teaching strategy will be designed in this respect.

In the long and short-term didactic design, the teacher will be guided by the Curriculum, both by the section of competences as well as that of recommended content. Structuring by units of learning, specific competences and modular outcomes associated with them will be performed at the discretion of the teacher, who has the obligation to train all the specific competencies of the curriculum to the students by the end of the learning period. According to the teaching requirements, teachers will plan hours of synthesis and evaluation, as well as practical activities depending on the conditions existing in the respective educational institution and the available materials.

The new design model is centered on the unit of learning - an open and flexible, thematic unit of teaching structure that takes place over a certain period of time and aims at the formation of specific competences, modular outcomes and finalizes by an assessment. In this case, the didactic process focuses on the formation of disciplinary specific competences.

For this reason, the didactic activity must start from capitalizing on opportunities; transforming an idea into practice; the courage to face problems and the ability to solve them; accepting the implications of your own choices; perceiving the self-employed activities as a valuable professional choice; responsible management of resources and money; understanding how organizations work in society.

Experience-based education is essential to promoting entrepreneurship and entrepreneurial skills. Particularly good results are obtained within the UAIC, because they are working in small groups, using interactive techniques such as: Mosaic, STAD - the small group learning method, TGT - Team Cognitive Methods, Computerized Simulations and Business Gaming, Cognitive Map or Conceptual Maps, Matrices, Cognitive Chains, Fishbone Maps, Case-Effect Diagram, Spider Clip, Brainstorming, Thinking Hats, Round Table, Interview Group, Case Study, Critical Incident, Phillips 6/6, Technique 6/3/5, Creative Controversy, Fishbowl (Aquarium Technique), Four Corners, Frisco Method, Sinectica, Delphi Method, Individual and Group Portfolio, Student Exercise, Visiting Businesses and Internships, and others, which will contribute to the training of competences specific to the Entrepreneurship discipline within the UAIC.

Practical exercises at this UAIC discipline include setting up and managing companies that students simulate are widespread in professional schools from the Eastern Europe area.

Also, students go to partners with whom UAIC has partnership and visit the production process, service provision within these enterprises and thus acquire practical skills. The best students (3 in each group) are selected to conduct an internship within these businesses.

Another opportunity offered by UAIC to its students, in order to develop their entrepreneurial education, is the partnership with the business environment. Thus, the curriculum at this course is designed according to the requirements of the business environment, i.e. the competencies that are formed by students during the course are adapted to the needs of the business environment. Among UAIC partner enterprises there are: Northeast Regional Development Agency, Romtelecom, business companies from Iasi, Chamber of Commerce in Iasi, Audit Companies.

Alternating studies (dual education) are a training system in which theoretical training periods offered in specialized institutions alternate with periods of work or application at the workplace. Work-related training is carried out under specific employment contracts for a particular audience with a specific objective. There are currently two of them: the apprenticeship contract (initial training) and the professionalization contract (alternative training).

#### **8.4. Inputs and outputs for educational process**

Students following the Entrepreneurship course at UAIC are being formed the necessary skills to operate with the key theoretical concepts of business management as well as digital critical thinking skills that are extremely necessary for future entrepreneurs. For these reasons, through innovative ideas and through the created atmosphere, the teaching methods centered on the student, specific, professional, transversal competences will be created that will help them manage a business, and will increase their insertion into the labour market.

The results of the learning process from this course are based on the practical skills already being developed for the UAIC students and on the following:

- Entrepreneurial competences and spirit of initiative;
- Digital competences;
- Critical thinking competences;
- Social and civic competences;
- Awareness competences of entrepreneurial values.

Finally, after completing this course, the students have the opportunity to launch their own business, submit their business plans to the business plan competition, to get an easier access to the labour market. Therefore, through interactive teaching methods used by teachers, students are able to manage a business, launch business ideas and become future entrepreneurs. Due to practical skills of business visits, after analysing case studies, as a result of collaborating with the business community, students go to practice within the network of addressees and increasingly apply their skills and make new ones in practice.

On average, over 70% of dual program graduates remain in the company where they have received dual training. According to Deloitte consulting firm statistics in 2015, 7% of double-degree students not only stayed in the company but were promoted to positions.

At present, the Republic of Moldova does not have higher education institutions that are oriented towards the development of practical skills in the economic specialties, which graduate students will use in the future jobs.

In order to better align with labour market requirements, strategies for developing practical skills in higher education institutions must ensure the development of both technical skills and core competencies for employment.

In this context, it is essential to ensure a better link between the institution and employers and to promote their involvement in the design of workplace learning programs.

## Conclusions

After conducting the analysis, together with the review of effective teaching and learning practices in several colleges and universities abroad, we can highlight that many useful international practices are applied in order to develop the entrepreneurial education. From our research we can point out that in Europe, the USA, even internationally, entrepreneurial practices are always diversified and improved in order to create and develop an entrepreneurial culture. For these reasons, the Republic of Moldova would like to apply the most optimal methodologies in educational institutions, universities, colleges and vocational schools so that pupils, students and teachers can benefit from these opportunities.

On the basis of the researches carried out, we have to point out those Moldovan universities, in order to develop entrepreneurial culture and entrepreneurial education, could apply the following measures with the intention of increasing their effectiveness:

- creating partnerships with the business sector – universities in Moldova, while developing, approving their curricula, should consult with the business environment. With the application of this measure, universities will teach competent students who will be easily inserted into the labour market. Thus, the enterprises will gain skilled and competent specialists who will be able to cope with the requirements.

- sending the best students to perform the internship in the selected businesses – learning from the practice of UAIC students, we could propose that the best students in the universities of Moldova should be selected and sent to perform the internship in the selected enterprises. Therefore, the partners will receive qualified, competent interns and students will have the opportunity to get a future job within these enterprises after the completion of the studies.

- organizing the competition “The best business plans” we should mention that students who study the discipline of “entrepreneurship”, “business planning” can participate in this competition. Thus, students will be given the opportunity to support their business idea and gain experience.

- creation of the entrepreneurship centre among students – the creation of this centre can help attract into business management practices, generate business ideas, find solutions to the problems that arise, and thus provide a practical basis, a student centre where they can learn new visions in this field and can participate in trainings, seminars.

- creation of creative centres “Entrepreneurial culture among students” – by participating in these creative centres, students will have the opportunity to apply their learned skills in practice and thus demonstrate the opportunity to become successful entrepreneurs. As a result, students will be able to be grouped into centres, as management, marketing, finance, and deal with certain specific operations and activities.

- creating the cooperation with university graduates – the Association of Universities Graduates should be created where graduates will be able to cooperate productively with the university and contribute to improving the performance of the institution. As a consequence, graduates could be invited to master-classes, that is to say, at practical lectures of practical business management. Thus, students, who are already employed, could teach current students certain practical, valuable career growth skills.

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# Requirements for the Disclosure of Financial Information for Smes in Accordance With European and National Legislation

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## Abstract

*This article focuses on the issues of presentation and disclosure the information in financial statements for small enterprises in the EU and requirements for financial statements of such enterprises in Moldova in connection with the drafting of a new law on accounting.*

*Keywords: presentation and disclosure the information in financial statements for SMEs, Directive 2013/34/EU.*

## 1. Introduction

The main normative document that regulates the disclosure of information in the financial situation in the European Union is Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 "On the annual financial statements, consolidated financial statements and related reports", which amending the Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC.

European Commission adopted communication entitled "Smart regulation in the European Union", which goal is to elaborate and apply the regulation of the highest quality respecting the principles of subsidiarity and proportionality and ensuring that the administrative onus is proportionate to the benefits it brings. The Directive 2013/34/EU takes into consideration the provisions of Commission's communication.

It is also necessary to emphasize, that one of the most important communication of European Commission in the sphere of SME is "Think Small First – Small Business Act for Europe". This document recognizes the central role of SMEs in the European economy and suggests an improvement the approach to entrepreneurship and to fix the "think small first" principle in policy-making from regulation to public service.

Small and medium enterprises constitute over 90% of EU enterprises and form the backbone of the economy within the Community. That's why, the European Council intends measures to increase economic growth and jobs, results to citizens and businesses.

Unification of national provisions of the presentation and content of annual financial situation and management reports is of special importance for the protection of shareholders and investors. Coordination in presentation and disclosure of financial information for SME's enterprises is necessary because some undertakings operate in more than one Member State of European Union.

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The European Directive 2013/34/EU provides unified requirements for the presentation and disclosure of information in financial statements for all SMEs in all countries members of the European Union. Despite this Member States can set the requirements in notes that are additional to the mandatory notes. In addition, Member States may limit additional disclosures of financial information if this is required by their national tax laws for tax purposes.

Member States have the possibility to stipulate additional requirements for the disclosure of Information presented in financial statements for large businesses that exceed the minimum requirements established in this Directive. Directive 2013/34/EU allows Member States to apply additional requirements to small businesses, it is possible to partially or fully use their requirements, which are less than the provisions of the Directive. The Directive establishes that Member States may use exceptions in relation to small enterprises for exemption from disclosure of information

Criteria that classify enterprises as small, medium- sized and large, are the most objective, and represent such indicators as: balance sheet total, net turnover and the average number of employees during the financial year. In the event that a Member State applies one or more specific provisions for microenterprises, these provisions should also be linked and determined using the balance sheet total, net turnover and average number of employees during the financial year. If the gradation of the categories and requirements for medium and large enterprises in the national legislation of member countries are the same, then Member States should not define separate such categories in their national legislation.

Micro-enterprises have limited resources to meet all regulatory requirements. If member countries no specific rules for micro-businesses, the rules that apply to them are the rules established for small businesses. These rules establish micro-enterprises for additional administrative burden, which do not correspond to their dimensions and, therefore, become more onerous, compared to other small undertakings. Therefore, Member States should exempt microenterprises from wide disclosures of financial statements that could lead to unnecessary administrative burdens on them. However, micro-enterprises in accordance with national legislation should keep records and reflect business transactions.

Investment funds and financial holdings cannot use the benefits of disclosure financial information as micro-enterprises, while Member States must take into account the specific conditions and needs of their markets when deciding how to implement a separate regime for micro-enterprises in the context the provisions of Directive 2013/34/EU.

For micro-enterprises publication of financial statements can be cumbersome. However, in fulfilling the requirements of the Directive, Member States should not exempt microenterprises from of requirement of publication, in condition that information presented in balance sheet is provided in accordance with national legislation.

In this situation, the requirement established in Directive 2013/34/EU, on the publication of financial statements which are disclosed in accordance with Directive 2009/101 / EC of the European Parliament and of the Council of 16 September 2009 on coordination of safeguards, which are necessary for the protection of the interests of owners and third parties, are required by member States to ensure the equivalence of these guarantees, should not apply. To guarantee the comparability and equivalence of information and recognition the disclosure must include the going concern, the prudence, and the accrual bases. Set-offs between asset and liability items and income and expense items should not be allowed and components of assets and liabilities should be valued separately. However, in specific cases, Member States should be allowed to permit enterprise to perform set-offs between asset and

liability and income and expense. Financial information must be presented relying on the economic reality or commercial substance of the underlying transaction or arrangement, but in a number of cases Member States should be allowed to exempt enterprises from applying such principles.

In the disclosure and consolidation financial statements, the primary role should be played by materiality for recognition, measurement, presentation information in the financial situation. In the event that the information is not material then it must be aggregated in the financial situation. A separate element of the financial statements may be immaterial, but immaterial items of a similar nature might be considered material when taken as a whole. Member States should be allowed to impose restrictions in the sphere of application the principle of materiality which is concerning to presentation and disclosure of information in the financial situation. The principle of materiality should not affect any national obligation to keep complete records showing business transactions and financial position.

The recognition of the elements of financial statements should be measured on the basis of the principle of initial value (purchase price or production cost) to ensure the reliability of information contained in financial situation. For presentation of more relevant information Member States should be allowed to permit undertakings to apply the revaluation method for fixed assets in order for a more complete disclosure of information for users.

It is necessary to limit a number of tips of the balance sheet to allow users of financial statements for better comparing the financial position of enterprises within the Union. Member States should require one set of balance sheets and offer a choice of several allowed formats, as published in Official Journal of the European Union at 29 June 2013. However, member States should be able to allow or to require enterprises to change the layout and to submit a balance sheet that distinguishes current and long-term elements such as assets and liabilities.

There are two layouts of profit and loss account which disclose information in accordance with the nature and the function of expenses. Member States should require the use of one layout for the profit and loss account and should be allowed to offer a choice from amongst permitted layouts. Member States are allowed to establish requirements for their enterprises to fill and to present a statement of performance instead of a profit and loss account prepared in accordance with one of the permitted layouts. Exceptions in terms of simplification of the required layouts for balance sheet and for the profit and loss account, can be made for small and medium-sized undertakings. If it is necessary for the electronic filing of financial statements, Member States could be allowed to restrict layouts of the balance sheet and profit and loss account.

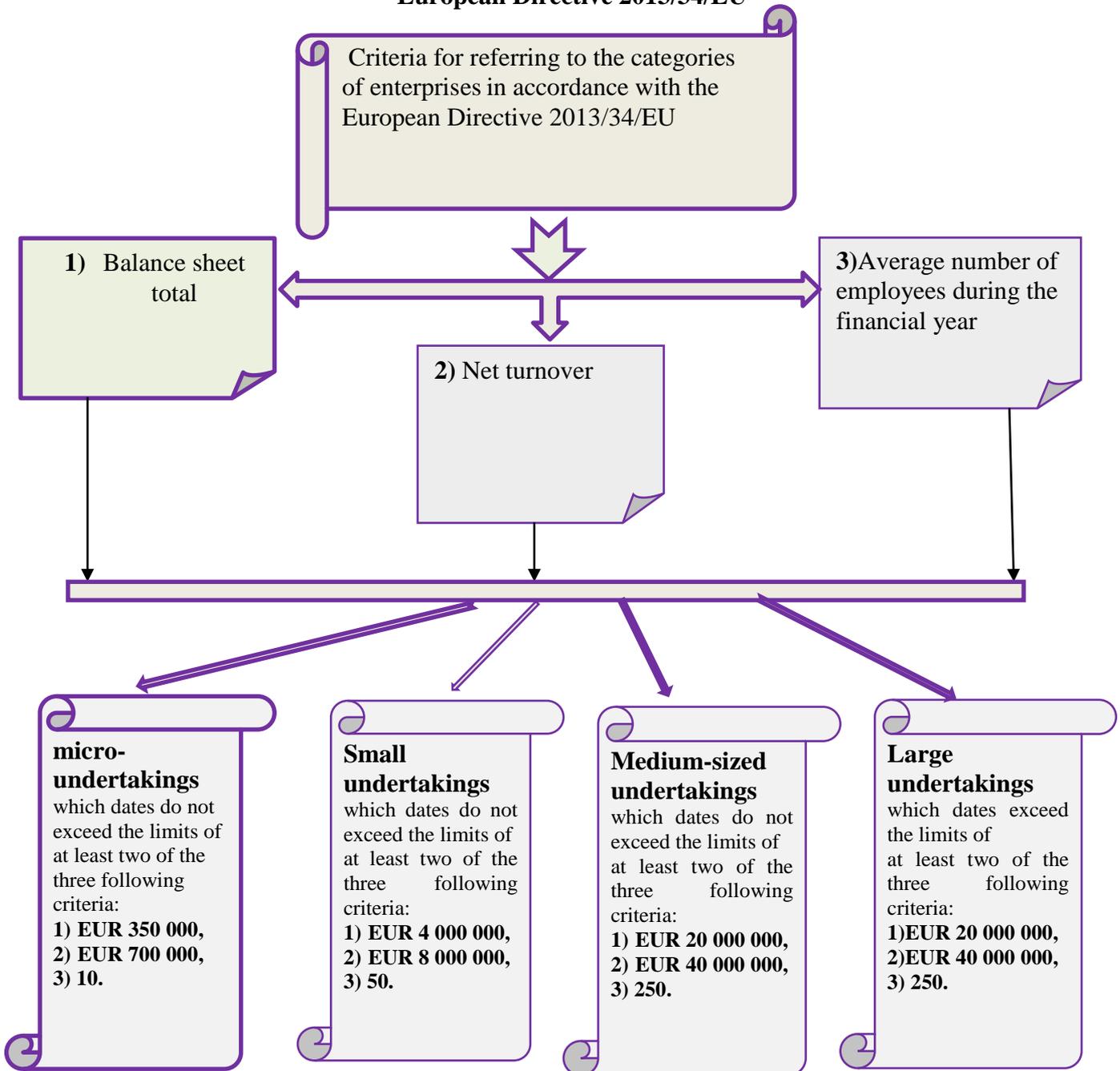
Member States should be able to exempt small companies from the obligation of compiling the management reporting, provided that such commitments include, in the notes to the financial statements, information on the acquisition of own shares referred to in Article 24 of Directive 2012/30 / EU Of the European Parliament and of the Council of 25 October 2012 on the coordination of safeguards which, in order to protect the interests of members and others, are required by Member States with the meaning of the second paragraph of Article 54 of the Treaty on the Functioning of the European Union, in the formation of public limited liability companies and the maintenance and change of their capital, with a view to making such safeguards equivalent.

It can be expensive to compose consolidated financial statements in addition to the annual financial statements of the parent and subsidiary undertakings, because users of small enterprises' financial statements do not have sophisticated information needs and that's why

small groups should be exempt from the obligation to prepare consolidated financial statements.

The Directive 2013/34/EU establishes the criteria for referring to the categories of enterprises that are presented in Figure 1.

**Figure 1. Criteria for referring to the categories of enterprises in accordance with the European Directive 2013/34/EU**



*Source:* elaborated by the authors on the materials of the Directive 2013/34/EU.

The international economic situation in different member countries can lead to the fact that the criteria for referring to different categories of enterprises can vary greatly, in which case countries are allowed to extend the thresholds of criteria for small undertakings in the direction of increasing and to exceed the thresholds constitute in the Directive 2013/34/EU, however the thresholds shall not exceed EUR 6 000 000 for the balance sheet total and EUR 12 000 000 for the net turnover.

Member States may solicit small enterprises to prepare, disclose and publish information in the financial situation which extend far beyond the demands of the Directive

2013/34/EU. Such additional disclosure shall provide that any such information is gathered under a single filing system and the disclosure requirement is contained in the national tax legislation for the strict purposes of tax collection. And such additional information should be placed in the relevant part of the financial statements.

Financial statements shall be prepared in accordance with the following general financial reporting principles:

- **going concern** – *the elements in the annual and consolidated financial statements should be recognized, measured and presented sequentially in time,*
- **the principle of the constancy** - *accounting policies and measurement bases shall be applied consistently from one financial year to the next,*
- **prudent basis** - *considering the elements of financial statements, it should be noted that assets and income have not been overstated and liabilities and expenses are not understated.*

The Directive 2013/34/EU allows small enterprises to prepare abridged financial statements: abridged balance sheets and profit and abridged loss accounts, wherein simplification of financial statements assumes that in abridged balance sheets show only those items in Annexes III and IV of directive preceded by letters and roman numerals. While in Annexe III financial information is presented in horizontal layout of the balance sheet, but in Annexe IV –in vertical layout.

We will present an abridged balance sheet in horizontal form in accordance with the requirements of the Directive 2013/34/EU:

**Assets**

**A. Subscribed capital unpaid**

**B. Formation expenses**

**C. Fixed assets**

**I. Intangible assets**

**II. Tangible assets**

**III. Financial assets**

**D. Current assets**

**I. Stocks**

**II. Debtors**

**III. Investments**

**IV. Cash at bank and in hand**

**E. Prepayments and accrued income**

**Capital, reserves and liabilities**

**A. Capital and reserves**

**I. Subscribed capital**

**II. Share premium account**

**III. Revaluation reserve**

**IV. Reserves**

**V. Profit or loss brought forward**

**VI. Profit or loss for the financial year**

**B. Provisions**

**C. Creditors**

**D. Accruals and deferred income**

It is also possible disclosures, either in the balance sheet or in the notes to the financial statements following information about:

- 1) **long term and current debtors separately** (*trade debtors, amounts owed by affiliated undertakings, amounts owed by undertakings with which the*

*undertaking is linked by virtue of participating interests, other debtors, subscribed capital called but not paid, prepayments and accrued income),*

- 2) long term and current creditors** (*debenture loans, showing convertible loans, amounts owed to credit institutions, payments received on account of orders, in so far as they are not shown separately as deductions from stocks, trade creditors, bills of exchange payable, amounts owed to affiliated undertakings, amounts owed to undertakings with which the undertaking is linked by virtue of participating interests, accruals and deferred income).*

Article 36 "Exemptions for micro-undertakings" of the Directive 2013/34/EU establishes the following benefits for micro-undertakings, which do not:

- 1) *provide information about prepayments and accrued income or accruals and deferred income in financial statements,*
- 2) *draw up notes to the financial statements in accordance with Article 16 of directive,*
- 3) *prepare a management report in accordance with Chapter 5 of relevant directive*
- 4) *publish annual financial statements in accordance with Chapter 7 of the Directive.*

The small enterprises can be allowed to draw up only an abridged balance sheet showing separately at least those items preceded by letters in Annexes III or IV, where applicable. Authors showed abridged balance sheet prepared in accordance with the requirements of the directive as applied to the vertical form, such as:

- A. Subscribed capital unpaid,**
- B. Formation expenses,**
- C. Fixed assets,**
- D. Current assets,**
- E. Prepayments and accrued income,**
- F. Creditors: amounts becoming due and payable within one year,**
- G. Net current assets/liabilities,**
- H. Total assets less current liabilities,**
- I. Creditors: amounts becoming due and payable after more than one year,**
- J. Provisions,**
- K. Accruals and deferred income,**
- L. Capital and reserves.**

In terms of disclosure of income and expenses, the directive allows micro-enterprises to compile an abridged profit and loss account showing separately at least the following items, where applicable:

- *net turnover,*
- *other income,*
- *cost of raw materials and consumables,*
- *staff costs,*
- *value adjustments,*
- *other charges,*
- *tax,*
- *profit or loss.*

By 20 July 2018 the Commission shall submit to the European Parliament, to the Council and to the European Economic and Social Committee a report on the situation of

micro-undertakings taking account, in particular, of the situation at national level regarding the number of undertakings covered by the size criteria and the reduction of administrative burdens resulting from the exemption from the publication requirement.

Currently in Moldova the Ministry of Finance developed a draft law on accounting which was approved by the government at 08 June 2017. In a new project of law on accounting, all enterprises are classified by categories (micro, small, medium and large enterprises) and groups (small, medium and large), depending on the sales revenue, total assets and average number of employees. Below we present a classification of enterprises in accordance with the draft law on accounting of Moldova.

Categories of entities and groups

**Micro entity** - entity that at the reporting date does not exceed the limits of at least two of the following three criteria:

(A) *total assets: 5 600 000 lei;*

(B) *Income from sales: 11 200 000 lei;*

(C) *the average number of employees during the management period: 10.*

**Small Entity** - the entity that at the reporting date does not exceed the limits of at least two of the following three criteria:

(A) *total assets: 63 600 000 lei;*

(B) *Income from sales: 127 200 000 lei;*

(C) *Average number of employees during the management period:50.*

**Medium Entity** - the entity that at the reporting date does not exceed the limits of at least two of the following three criteria:

(A) *total assets: 318 million lei;*

(B) *Income from sales: 636 million lei;*

(C) *Average number of employees during the management period: 250.*

**Large Entity** - Entity that at the reporting date exceeds the limits of at least two of the following three criteria:

(A) *total assets: 318 million lei;*

(B) *Income from sales: 636 million lei;*

(C) *Average number of employees during the management period: 250.*

An entity or group changes from one category to another if, at the reporting date, it exceeds or ceases to exceed the limits of two of the three criteria for the last two consecutive reporting periods.

Micro entities, individuals who carry out entrepreneurial activity after their registration as VAT payers, keep double-entry accounts and prepare abridged financial statements according to the National Accounting Standards. Small entities keep double-entry accounts and prepare simplified financial statements according to the National Accounting Standards. Medium and large entities keep double-entry accounting and prepare complete financial statements according to the National Accounting Standards. Public interest entities keep double-entry bookkeeping and prepare financial statements under International Financial Reporting Standards.

Non-profit organizations and representations of non-resident entities keep double-entry accounting and prepare financial statements in accordance with the methodological guidelines approved by the Ministry of Finance of Republic of Moldova.

Individuals who carry on business, until they are registered as VAT payers, individuals who perform independent activity, individuals who perform professional activity in the justice sector and the offices set up by these, keep it simple bookkeeping on a cash basis, without the

preparation of the financial statements, as of the methodological guide approved by the Ministry of Finance.

Moreover the Entity which has the right:

- ✓ *to keep simple bookkeeping can keep double-entry bookkeeping, beginning with the next reporting period,*
- ✓ *to draw up abridged financial statements can draw up the simplified financial statements or complete,*
- ✓ *to draw up simplified financial statements can draw up complete financial statements.*

It should be noted that in accordance with the provisions of the draft law on accounting of the Republic of Moldova

➤ *abridged financial statements include:*

- ✓ the balance sheet abridged;
- ✓ the situation of the profit and loss abridged;
- ✓ explanatory note.

➤ *simplified financial Statements include:*

- ✓ balance sheet simplified;
- ✓ the situation of the profit and loss;
- ✓ explanatory note.

## **Conclusions:**

In conclusion it is necessary to emphasize that the Republic of Moldova unifies its legislation with the legislation of the European Union, including in the field of accounting and SMEs. However, the criteria that the Republic of Moldova has established for small businesses are somewhat overstated for the republic, based on the net sales that are carried out by local enterprises. At the same time, simplifying the set of financial statements for small businesses and also reducing the information that should be provided by such enterprises is welcomed.

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# Digital Economy: Development Prospects in the European Union and the Republic of Moldova

Alexandru LEAHOVCENCO<sup>6</sup>

## Abstract

*This article focuses on issues related to digital economy. The European Union adopted and implements „Digital Agenda for Europe” constantly adjusting its priorities to the new circumstances. The government of the Republic of Moldova approved the National Strategy for Information Society Development “Digital Moldova 2020” which aim is to create conditions through minimum state intervention but with maximum effect for information society development. National Strategy for Information Society Development will lead to the following measurable results: ranking the Republic of Moldova among top 50 countries in the international rankings in digital technologies.*

*Keywords: digital economy, National Strategy for Information Society Development “Digital Moldova 2020”, cyber security.*

The Organisation for Economic Co-operation and Development (OECD) in its Digital Economy Outlook 2015 gave the following definition of digital economy as a *result of transformational effects of new technologies in the field of information and communication.*(OECD,2015)

In accordance with definition, which was presented in Wikipedia *digital economy refers to an economy that is based on digital computing technologies. The digital economy is also sometimes called the Internet Economy, the New Economy, or Web Economy.*.(OECD,2015)

However, it should be noted that this definition is not unambiguous, for example in specialized literature there is also such a definition as: digital economy is the worldwide network of economic activities enabled by information and communications technologies . It can also be defined more simply as an economy based on digital technologies. Several definitions for this term exist in different variations, therefore the study of the digital economy, analysis of its elements must contribute to the economic paradigm in this matter.

For the first time the term digital economy was invented by Don Tapscott and presented in the book *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*, published in 1995.(Tapscott , Don 1997)

The ideology emerged in the last decade of the twentieth century concept digital/electronic economy as no one is better outlined in 1995 Nicholas Negroponte – American scientist-computer scientist. He used a metaphor of shifting from processing atoms to processing bits.

In 2014 *Digital Economy* has been defined as the branch of economics studying zero marginal cost intangible goods over the Net. (Fournier Laurent, 2014)

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In the USA, often talking about the digital economy, use the term API Economy. (Application Programming Interface economy). It should be emphasized that API economy is a general term that describes the application programming interfaces (APIs) which can positively affect an organization's profitability. An API is a customer interface for technology products that allows software components to communicate. Major companies that have gained revenue from APIs include Twitter, Google SalesForce.com, Amazon, Facebook.

Here was a time when only software professionals knew about APIs. APIs take three basic forms: local, web-like and program-like.

Local APIs offer operating systems or middleware services to application programs (such as Microsoft's .NET APIs, the TAPI (Telephony API) for voice applications, and database access APIs).

Web APIs are designed to represent widely used resources like HTML pages and are accessed using a simple HTTP protocol. Any web URL activates a web API.

Program APIs are based on remote procedure call (RPC) technology that makes a remote program component appear to be local to the rest of the software. Examples of program APIs are: Service oriented architecture (SOA) APIs, Microsoft's WS-series of APIs.

Digital economy influences all sectors economy and social activities, for example, retail trade, transports, financial services, manufacturing, education, health, funds media and so on. It has implications far beyond information and communication technology. In addition, the Internet empowers people in new directions, giving the opportunity to create and share their ideas, creating new content, new businesses and markets.

In his article, published in 2001 Thomas Mesenbourg noted three main components of the digital economy concept, which can be identified as:

- *e-business infrastructure (hardware, software, telecoms, networks, human capital, etc.),*
- *e-business (how business is conducted, any process that an organization conducts over computer-mediated networks),*
- *e-commerce (transfer of goods, for example when a book is sold online).*

The author also proposes to supplement this classification with another component, such as cyber security of digital economy.

The Digital Economy is worth three trillion dollars today. This is six times the U.S.' annual trade deficit or more than the GDP of the United Kingdom. What is impressive is the fact that this entire value has been generated in the past 20 years since the launch of the Internet.

Consider the first component of the business structure will analyze the availability of the Internet in various continents of the world.

World Bank data on Internet activity are shown in table 1.

**Table 1. Global internet activity and internet statistics the population on 31 March 2017**

<b>World Regions</b>	<b>Population (2017 Est.)</b>	<b>Population % of World</b>	<b>Internet Users 31 March 2017</b>	<b>Penetration Rate (%) Pop.)</b>	<b>Growth% 2000-2017</b>	<b>Internet Users %</b>
<b>Africa</b>	1,246,504,865	16.6 %	<b>353,121,578</b>	28.3 %	7,722.1%	9.4 %
<b>Asia</b>	4,148,177,672	55.2 %	<b>1,874,136,654</b>	45.2 %	1,539.6%	50.1 %
<b>Europe</b>	822,710,362	10.9 %	<b>636,971,824</b>	77.4 %	506.1%	17.0 %
<b>Latin</b>	647,604,645	8.6 %	<b>385,919,382</b>	59.6 %	2,035.8%	10.3 %

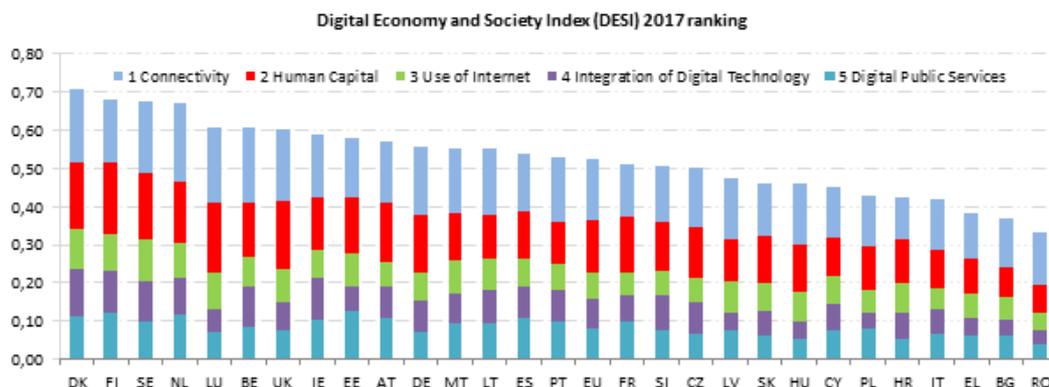
<b>America / Caribbean</b>						
<b>Middle East</b>	250,327,574	3.3 %	<b>141,931,765</b>	56.7 %	4,220.9%	3.8 %
<b>North America</b>	363,224,006	4.8 %	<b>320,068,243</b>	88.1 %	196.1%	8.6 %
<b>Oceania / Australia</b>	40,479,846	0.5 %	<b>27,549,054</b>	68.1 %	261.5%	0.7 %
<b>WORLD TOTAL</b>	<b>7,519,028,970</b>	<b>100.0 %</b>	<b>3,739,698,500</b>	<b>49.7 %</b>	<b>936.0%</b>	<b>100.0 %</b>

Source: <http://www.internetworldstats.com/stats.htm>

Analyzing the data of Table 1, we can draw the following conclusion that, with a share of Europe's population of 10.9%, seventeen percent of Europeans use the Internet. That is quite a high level considering the fact that 77.4% of the population of Europe is Internet users.

However, the digital economy should be viewed in the context of the Society Index. In accordance with data presented by European HYPERLINK "<https://ec.europa.eu/info/indexed>" Commission, index DESI represents indicators in the following countries of the European Union, which are presented in figure 1.

**Figure 1. Digital Economy and Society Index (DESI) 2017 ranking**



Source: <https://ec.europa.eu/digital-single-market/digital-economy-and-society-index-desi>

The Digital Economy and Society Index (DESI) is a composite index that unites relevant indicators on Europe's digital performance and traces the evolution of EU member states in digital competitiveness. The Digital Economy and Society Index (DESI) consists of 5 components (indexes):

- **Connectivity,**
- **Human Capital/Digital skills.**
- **Use of Internet by citizens,**
- **Integration of Digital Technology by businesses,**
- **Digital Public Services.**

The *Connectivity* index measures the deployment of broadband infrastructure and its quality. One of the main and necessary condition for competitiveness is a access to fast broadband-enabled services. In 2016 the highest score on connectivity was registered by the Netherlands. Romania was the weakest for this indicator followed by Croatia, Bulgaria and

Poland. It is important to note that such an indicator as fixed broadband is available to 98% of Europeans, and 76% of European homes can access high-speed broadband.

The skills needed to take advantage of the possibilities offered by a digital society must be measured and represent the *Human Capital* index. These skills represent the ability of the individuals to interact online and consume digital goods and services, to advanced skills that empower the workforce to take advantage of technology for enhanced productivity and economic growth. In 2016 highest score of this index obtained Denmark, Luxembourg, Finland and Romania, Bulgaria, Greece got the lowest ones. However, it is necessary to state that 44% of Europeans still do not have basic digital skills. The European Union is taking steps in the growth of Science, Technology, Engineering and Mathematics (STEM) graduates (19 graduates per 1000 people aged 20 to 29 years old in 2014, compared to 17 in 2012) and in the share of ICT specialists in the workforce (3.6 % in 2015 as opposed to 3.2 % in 2013).

Such indicator as *Use of Internet by citizens* refers to the variety of activities performed by citizens already online. Such activities range from consumption of online content (videos, music, games, etc.) to modern communication activities or online shopping and banking. It is necessary to state that in 2016, internet users are the most active in Denmark, Sweden and Luxembourg. On this dimension, Romania, Bulgaria and Italy are at the bottom of the list. The European Commission analyzed the areas where citizens are most active, such as reading news online (70%), shopping online (66%) or using online banking (59%). Businesses can strengthen efficiency, reduce costs and engage more better customers, collaborators and business partners through adopting digital technology.

Such index as *Integration of technology* in 2016 was highest in in Denmark, Ireland and Finland, and the least developed in Romania, Poland and Bulgaria. In European Union using of digital technologies is significantly increased, such as the use of a business software for electronic information sharing (from 26% in 2013 to 36% of enterprises in 2015), sending electronic invoices (from 11% in 2014 to 18% of enterprises in 2016) or using social media to engage with customers and partners (from 14% in 2013 to 20% of enterprises in 2016). However, it must be emphasized that, e-commerce by SMEs grew slightly (from 15% in 2014 to 17% of SMEs in 2016).

*Digital Public Services* represent level of the digitisation of public services, focusing on e-Government. European leaders in Digital Public Services in 2016 are Estonia, Finland and the Netherlands. For two years there has been a slight improvement of quality of European online public services through growth in the number of public services available online (online service completion score increased from 75 in 2014 to 82 in 2016).

Analyzing the indicators of the digital economy in the Republic of Moldova, we can state the following: more than a 50% of population are using the Internet, more than a half of households have at least one computer connected to Internet, 50% of the population read newspapers online, but only one out of 10 users accesses the government web site and only one out of 20 users has accessed at least one electronic public service in the past 12 months.

According to a number of indicators, Moldova has achieved certain successes, such as the penetration of Mobile telephony exceeded 119% (*covering – 99% of the territory*, EU average – 128%), broadband Internet at fixed locations reached a penetration level of 11.72% (EU average – 27.2%), broadband mobile Internet – modems/cards – 4.7% (EU average – 7.5%), households broadband Internet connection – 35%.

It should also be noted the following information, which is presented in annual national survey conducted in November 2012 by the Institute for Public Policy and Magenta, that: 16% of users practice electronic commerce, 8% use Internet banking services, about 63% of the users download digital content, 33% use Internet for education and training, 16%

command of some services provided by private institutions and of the central public institutions, while only 1 out of 20 uses Internet for accessing electronic public services.

The government of the Republic of Moldova provides more than 570 services and only 5 out of 12 online basic public services for citizens, and 6 out of 8 – for economic agents. Within the framework of the e-Government Transformation Project starting from September 2012 to present, were launched:

- *e-Application for criminal record,*
- *e-Licensing (connected to the mobile signature),*
- *electronic reporting to e-CNAM and e-CNAS (connected to mobile signature),*
- *e-DNC (Normative Documents in Constructions),*
- *SIA “the state register of public acquisitions” services,*
- *M-Cloud - common government technology platform.*

Moldova has moved to the top seven countries in the world that also implement such innovative as mobile electronic signature and the use of this tool shall safely boost access to the available electronic services. Such tool, which shall be implemented, as the electronic identity cards, shall facilitate the access to electronic services. The digital identity management becomes an important factor for the functionality of infrastructure and access to digital services.

E-commerce in the Republic of Moldova is still undeveloped because of the low number of services that accept online payments, that's why 37,7% of the country's Internet user's make on-line purchases, these procurements are mainly from abroad.

Bank's cards in Moldova are issued mostly for cash withdrawals – 87 percent of card holders' cash and 97,7 percent out of the total value of operations realized in the Republic of Moldova).

In the Republic of Moldova the necessary regulatory framework in the field of digital technologies was created, which currently includes about 20 laws, 80 Government decisions, about 70 approved conceptual documents regarding the informational systems of public authorities, more than 20 general purpose regulatory acts and 75 with a specific purpose issued by the National Regulatory Agency for Electronic Communications and Information Technology.

For the purpose of improving the regulatory framework was created the Ministry of Information Technology and Communications and the specialized institutions such as the Centre for Electronic Governance and National Center for Personal Data Protection. In 2011 World Bank adopted the Technological Transformation Strategic Program of governance “e-Transformation”.

In Moldova were implemented such systems as: online fiscal declarations systems, mobile digital signature and online services as: e-Police Clearance Certificate, e-Licensing, biometric passport, automated biometric border crossing systems based on electronic passports. Currently will be implemented cloud computing based services and the interoperability framework based on the open standards.

In the international graduation Moldova occupies the following places on:

- *62nd out of 155 countries according to the level of ICT development (IDI),*
- *69th out of 159 countries, at the e-Governance Development Index (e-GRI) ranks*
- *61st position out of 144 countries according to the Index of Internet penetration in schools (KEI),*
- *78th position out of 142 countries in Training Network Index (NRI)*

The European Commission adopted new priorities for digital economy and society on December 18, 2012. It's necessary to note that the growth rate registered by the digital

economy is seven times higher than the rest of the economy. Implementation of the updated Digital Agenda will lead to the European GDP growth of 5% or 1500 Euro per capita over the next eight years, by improving the computer skills levels of the workforce, by increasing the ICT investments, facilitating public sector innovation and reforming the framework conditions for the Internet-based economy.

In accordance with the strategy adopted by the European Commission the new priorities of the Digital Agenda for Europe are to:

- *elaborate a new legislative framework in the field of broadband services;*
- *create new infrastructures of digital public services through the Connecting Europe facility;*
- *launch the grand coalition for promoting competences and create jobs in the digital domain;*
- *draw up proposals on a strategy and a cyber-security directive at the EU level;*
- *update the EU framework on copyrights;*
- *boost the "cloud computing" system based on the public sector purchasing power;*
- *launch a new industrial strategy in the electronic field.*

However, it is necessary to mention some problems that arise in the process of development of the information society in Republic of Moldova.

First problem is connected to non-optimized infrastructure and irregular access to internet in Moldova, so as about 30% of rural areas still do not have broadband access, the broadband connectivity required to meet present and future needs of the country isn't available throughout the entire territory of the country. But however the Republic of Moldova is among the top 20 countries in the world by Internet access speed.

The next problem is the low availability of electronic services and underdeveloped local digital content. In terms of online promotion the Republic of Moldova's position is quite weak. The number of web top-level domains per 1000 people in the Republic of Moldova is only 2.0 units compared to 22.3/1,000 in Central and East Europe (CEE). This is due to low presence of local enterprises on the Internet, which is a gap for promoting local digital content and domestic products.

Another problem is low level of digital literacy of population, this is most clearly demonstrated in the Global IT Report 2012, in terms of people's skills, the Republic of Moldova was ranked in 65<sup>th</sup> place out of 142 countries, assessed with 5 points out of 7 possible.

If in terms of the digital literacy Moldova was assessed with 4 points out of 7 possible and ranked on 44<sup>th</sup> place, in terms of education in mathematics and science is ranked on 69<sup>th</sup> place. On the quality of education, Moldova is located at 102nd place with 3.2 points out of 7 possible, which is among the last 40 countries included in the report. With regret we have to state that only 10% of the population aged between 45 and 54 years and 14% of population aged between 35-44 years and are Internet users in Moldova.

In modern conditions there is a risk of increasing the danger of cybercrime and risk of low trust in networks and online services.

Cyber security implies application of a set of proactive and reactive measures that ensure authenticity, confidentiality, integrity, availability and trustworthiness of e-information, public and private resources and services in cyberspace.

Global character of cyberspace is able to increase the risks both for private and public sectors.

The most cyber threats that are appeared through the exploitation of human, technical and procedural nature weaknesses, often materialize in:

- *cyber-attacks against the infrastructure of public or state organization which damage could be a threat to national security;*
- *unauthorized access to cyber infrastructure of public or and private sectors;*
- *deletion or damage of information data or illegal access restriction to these data;*
- *cyber espionage, causing a loss of property, blackmail of individuals and legal entities, in the public and private sectors.*

On November 23<sup>rd</sup> in 2001 was adopted Europe Convention on Cybercrime by the European Council in Budapest, which has ratified by the Republic of Moldova.

The provisions of the Convention are aimed at preventing and fighting cybercrime, stipulate the protection and aid delivery to service providers and information systems users; establish the rules of cooperation with other states, international and regional organizations.

There is no unique public authority directly responsible and empowered with rights and duties on cyber security in Moldova. At this moment, there are several institutions involved in this process, each of them providing coverage for this issue on their business segment.

However, the Government of Moldova established the operational e-Governance Center that implements the “e-Government Transformation” project – Strategic program of technological modernization of the governance including:

- *Common M-Cloud Government Technological Platform;*
- *Government Electronic Payment Service;*
- *Government Interoperability Platform;*
- *Paperless Government initiative - SIGEDIA;*
- *Government Platform for e-Business Reporting;*
- *Government platform for business permissive licenses;*
- *e-Acquisitions;*
- *e-Constructions;*
- *e-Justice;*
- *Digitization of Operational Support Systems for the Government;*
- *Government data storage infrastructure.*

The government of the republic approved the National Strategy for Information Society Development “Digital Moldova 2020” which aim is to create conditions through minimum state intervention but with maximum effect for information society development, focusing efforts at three directions:

- 1) Access and infrastructure – improvement of connectivity and network access;*
- 2) Digital content and electronic services - promoting digital content and generating services;*
- 3) Capacities and utilization- strengthening literacy and digital skills to enable innovation and stimulate usage.*

These three directions have a major impact on the following three components of society:

- a) population, that shall enjoy more comfortable life;*
- b) businesses, which shall increase the level of competitiveness;*

*c) governance, which shall improve their performances and provide services to the citizens and companies anytime, anywhere and on any terminal equipment.*

National Strategy for Information Society Development “Digital Moldova 2020” will lead to the following measurable results:

- *ranking the Republic of Moldova among top 50 countries in the international rankings);*
- *at least 60% of households and 75% of citizens shall be connected to broadband Internet;*
- *100% of public services which may be provided electronically shall be available online;*
- *public services shall be provided under the ID card, including electronic or through electronic or mobile identification;*
- *at least 60% of the population shall use digital signature;*
- *20% of the population shall shop online.*

## **Conclusion**

It is unthinkable to build a country’s future without a digital strategy that must create opportunities to innovate and develop based on ICT technologies, to maximize the usage of government data services for the citizens’ benefit.

The European Union adopted and implements „Digital Agenda for Europe” Strategy, adjusting its priorities to the new circumstances.

In addition, countries such as USA, UK, Qatar, which occupy first places in international rankings also approved digital strategies aiming to ensure an accelerated development.

It should be noted that the Republic of Moldova has also approved a similar strategy that must be implemented before 2020.

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# Ecological paints and criteria for awarding the European eco-label

Olesea CERNAVCA<sup>7</sup>

## Abstract

*Due to the fact that the Republic of Moldova does not have a transparent regulation that would contain the criteria and the admissible quantities for some substances included in the production of ecological paints and varnishes, the author has decided that it will be an actual research in the field. The purpose of this paper is to determine the criteria for awarding the eco-label to paints. The objectives of the paper include the determination of the chemical substances present in the paint and the diseases they cause to the human body, the life cycle of the film-forming products, the determination of the ecological markings found on the market of film-forming products, the criteria for awarding the eco-label for paints and varnishes, the mention of ecological local paints and/or varnishes, the presumption of eco-labels and mandatory information to be indicated for consumers. This research can serve as a basis for the elaboration of norms/regulations useful for the verification of ecological paints and varnishes by the accreditation bodies and by the laboratories in the Republic of Moldova, as well as for the awarding of the national label. The research method for the elaboration of this paper was case study and document analysis.*

*Keywords: paints, varnishes, eco-label, regulation, VOC, VAH.*

## 1. Introducere

The market of finishing materials is a large one, offering products from major foreign and local manufacturers. The market of the Republic of Moldova is flooded with finishing materials imported from Romania, Poland, Germany, Italy, Bulgaria, Ukraine, etc. marketed by national dealers. The major local manufacturer of the Republic of Moldova is JSC SUPRATEN, which offers on the market emulsions, special and decorative paints, varnishes for concrete, brick and wood. The problem addressed in the paper comes down to identify the criteria for awarding the eco-label for paints and varnishes.

## 2. Ecological paints on the European market and their content

According to European regulations, the products imported from third countries are accepted on the Community market provided that the manufacturer was inspected by a control body or by a control authority recognized by the European Union Commission and that all requirements regarding the obtaining of ecologic products have been met.

For now, the Republic of Moldova cannot export products whose label states that the product is ecological. The certificates issued in this respect by national authorities are not recognized by the EU, even if the law provides that each agricultural product should be labelled according to the methods by which it was obtained.

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The goods shall be considered as ecologic only when: on the label, on advertising material or on commercial documents, the product, its ingredients or raw materials are described in terms that suggest to the purchaser that they have been obtained in accordance with ecological rules. The term used on the label, in commercial documents or on advertising materials of agri-foodstuffs obtained according to the requirements of the law is “ecologic”. This term is synonymous with “biologic” and “organic” as well as with their abbreviations “bio” and “eco”.

Thus, on the market of finishing materials, it appeared a tendency to produce environmentally friendly paints. The chemicals in wall paints can cause health problems both to those who apply them and to those who live in the house. The dyers are the persons who first inhale toxic vapours. They have a 20% higher risk of having cancer, especially lung cancer. Moreover, they may have fertility problems (according to a study of Manchester University). The paints may contain the following chemicals that can cause diseases and dysfunctions of the body:

- **Formaldehyde:** (carcinogen, can increase the risk of developing cancerous tumours);
- **Organic solvents:** styrene (poison), ethylbenzene (affects the central nervous system, mucous membranes, activity of muscles), kerosene (capable of causing various intoxications), etc.;
- **Phthalate:** (can damage endocrine and reproductive systems);
- **Increased VOC concentration:** Dangerous to inhalation (for example: they are contained in solvents);
- **Heavy metals:** in high concentrations are dangerous not only for humans but also for the environment.

The paints have chemicals that can be harmful, such as solvents and volatile organic compounds. From the moment the paint dries, the VOCs evaporate, being inhaled by the people who provide the painting services. The vapours released by chemicals can aggravate the asthma and the sinusitis. At the same time, if the paint touches the skin, it can irritate it.

At the same time, the solvents can cause headaches and dizziness because they are inhaled by the lungs and then flow into the bloodstream, and VOCs can cause irritation of the nose, throat and eyes. Some studies on animals have demonstrated the links between the inhalation of large amounts of solvents and birth defects, cancer and central nervous system problems.

**Table 1. Chemicals recovered in inhalants**

<b>Solvents</b>	
<i>Diluent for paints</i>	Toluene, methylene chloride, methanol
<b>Aerosols</b>	
<i>Spray with paint</i>	Butane, propane, fluorocarbon, hydrocarbons, toluene

*Source:* Elaborated by the author based on: European eco-label for indoor paints and varnishes. [http://apmdj-old.anpm.ro/upload/9034\\_vopsele\\_lacuri.pdf](http://apmdj-old.anpm.ro/upload/9034_vopsele_lacuri.pdf) [Visited on 14.03.2018]

Two types of paints are known: water based and oil based. Water-based paints are used for walls, and oil-based ones give a glossy finish to surfaces. Oil-based paints are much more harmful than water-based paints. And natural paints, or so-called eco, do not contain solvents or VOCs, so they do not release toxic vapours and have no odour. The author states that JSC SUPRATEN does not produce oil based paints and does not plan to do it.

About two decades ago the lead was removed from the composition of paint due to toxicity. It can accumulate in the body and is associated with a decrease in the level of intelligence and with behavioural problems in children.

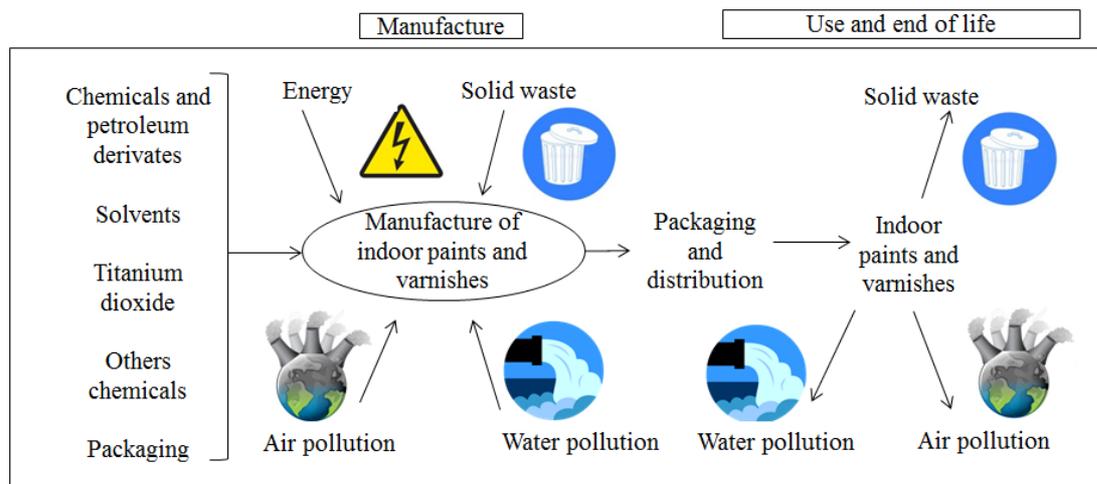
*Commission Decision no. 739/2002/EC establishes the criteria for the award of the European eco-label to the paint and varnish product group.* The European eco-label is awarded to products that comply with certain ecological criteria established by the European Union. These criteria have been identified on the basis of some complete scientific studies on the aspects of entire life cycle of products and are valid for 3-5 years being regularly reviewed to take account of technical progress.

The European eco-label is a graphic symbol accompanied by a short descriptive text applied to the product, packaging, in a brochure or other informative document accompanying the product and providing information on at least one and at maximum three types of environmental impact.

***Products targeted:***

- *paints and varnishes for indoor use;*
- *decorative paints and varnishes;*
- *varnishes for wood protection and other similar products;*
- *varnishes and paints for floor;*
- *colourful/nuanced products by distributors at the request of amateur or professional users;*
- *liquid decorative paints or pastes manufactured or processed by manufacturers to meet the needs of consumers;*
- *primers and other products used under the paint protective coating.*

**Figure 1. The life cycle of indoor paints and varnishes**



*Source:* Translated and elaborated by author based on: European eco-label for paints and varnishes for indoor use. [http://apmdj-old.anpm.ro/upload/9034\\_vopsele\\_lacuri.pdf](http://apmdj-old.anpm.ro/upload/9034_vopsele_lacuri.pdf) [Visited on 14.03.2018]

***The criteria for awarding the European eco-label*** provided for paints and varnishes are aimed at:

- efficient use of the product and reduction of waste;
- reducing the risk related to environmental protection, ozone layer and other risks by reducing solvent emissions;
- reducing the discharge of toxic or polluting substances into water.

The European eco-label applied to paints and varnishes used for indoor surfaces provides the presumption that these products have a low level of VOCs and VAHs, and also do not contain heavy metals and substances dangerous to human health and the environment.

Here are the main labels that are found in shops for eco paints:

- ***Vitality Leaf***
- ***Blue Angel***

- *EU Ecolabel*
- *Nordic Swan*



These signs ensure the fact that paint manufacturers fully comply with ecological requirements. At the same time, the signs suggest that all the restrictions on the content of the noxious substances have been observed in the paint structure. Also, the certification bodies verify the production every year, so product quality is kept at the corresponding level. Certified producers are required to comply with environmental legislation in their own country, to reduce the amount of resources used, to properly store the waste, to inform the consumers on the correct and harmless use of paints and varnishes.

**Table 2. Criteria for awarding the European eco-label for paints and varnishes**

<b>Ecological Criteria</b>	<b>Limitations/ Discounts/ Other</b>
<b>Limiting the substances hazardous for the environment and health:</b>	Content in white pigments less than or equal to 38 g/m <sup>2</sup> of dry film, rate of opacity = 98%.
<b>Reducing air pollution</b>	<b>Emissions from production of titanium dioxide pigment:</b> SO <sub>x</sub> <300 mg /m <sup>2</sup> of dry film, with a 98% rate of opacity
<b>Reducing production of hazardous waste</b>	<b>If the white pigment is titanium dioxide (TiO<sub>2</sub>):</b> - waste containing sulphates <20 g/m <sup>2</sup> of dry film with 98% rate of opacity. - wastes containing chlorides: < 5 g/m <sup>2</sup> of dry film, 98% rate of opacity for tiles made from natural products. < 9 g/m <sup>2</sup> of dry film, 98% rate of opacity for tiles made of synthetic materials. < 18 g/m <sup>2</sup> of dry film, 98% rate of opacity for slag.
<b>Limiting air pollution with solvents</b>	<b>VOC:</b> < 30 g/l - without water – for wall paints. < 250 g/l – without water – for other types of paint with hiding power > 15 m <sup>2</sup> /l and 98% spreading rate. <180 g/l – without water – all other products
<b>VAH</b>	<0.15% of the product for wall paints. <0.4% of the product for all other products
<b>Limiting the use of substances hazardous for the environment and health</b>	The product should not be classified as very toxic or toxic, environmentally hazardous, carcinogenic, toxic for reproduction or mutagenic.
<b>The ingredients used must not contain:</b>	- heavy metals or their compounds: cadmium, lead, chromium VI, mercury, arsenic. - alkylphenol ethoxylates (AFE) - diethylene glycol methyl ether (DEGME) - substances and preparations considered to be highly toxic, toxic, carcinogenic, teratogenic or mutagenic
<b>The following substances are limited:</b>	-active ingredients used as preservatives that may be assigned certain risk phases when using <0.1% of the total paint composition - ingredients which may be very toxic, toxic, harmful and which may have long-term adverse effects in the aquatic environment
<b>The sum of the quantities of all the ingredients that, at the time of use, may be assigned certain risk phases must not exceed 5% of the weight of the product.</b>	- isothiazolinone compounds <500 ppm (parts/mln) - free formaldehyde <10 mg/kg of product

<b>Criteria, regarding the rate of suitability for use</b>	<ul style="list-style-type: none"> <li>- hiding power</li> <li>- resistance to wet rubbing</li> <li>- waterproof</li> <li>- adhesion</li> <li>- abrasion</li> </ul>
<b>Information for consumers</b>	<p><b>The product packaging should include information about:</b></p> <ul style="list-style-type: none"> <li>- the use, the support surface, the conditions of use of the product, including instructions on how to prepare the support surface;</li> <li>- the recommendations on product cleaning and appropriate waste management;</li> <li>- the instructions on storage conditions of the product, including safety measures;</li> <li>- the recommendations on preventive protection measures for the user.</li> </ul>
	<p><b>In order to inform consumers</b>, the following visible text should be written next to the eco-label:</p> <ul style="list-style-type: none"> <li>- good performance when used indoor;</li> <li>- limited use of hazardous substances;</li> <li>- low solvent content.</li> </ul>

*Source:* Elaborated by author based on: European eco-label for paints and varnishes for indoor use. [http://apmdj-old.anpm.ro/upload/9034\\_vopsele\\_lacuri.pdf](http://apmdj-old.anpm.ro/upload/9034_vopsele_lacuri.pdf) [Visited on 14.03.2018]

The local manufacturer JSC SUPRATEN produces ecological paint: Baby Smile. This is certified by the National Public Health Centre and is intended for the use in children's rooms, kindergartens, schools and other institutions for children. It is used for painting walls and ceilings with a normal and high level of humidity, as well as for surfaces requiring frequent washing. It is ideal for painting any mineral surfaces (concrete, cement plaster or plaster, drywall panels) as well as all types of wallpaper. It contains nano biocides, which give the paint additional antibacterial properties. It is hypoallergenic, has a high hiding power, is simple in application, resistant to wear through wet rubbing, and does not contain VOCs. It's odourless. It forms a film resistant to fungus and bacterial contamination. Its price is 33.57 MDL/l.

**Table 3. Criteria for Baby Smile paint**

<b>Criteria</b>	<b>Baby Smile-SUPRATEN</b>
<b>Price/l</b>	33.57 MDL
<b>Composition</b>	Acrylic emulsion, pigments, ecological additives, nano biocides.
<b>Packaging</b>	Buckets of 1.4 L, 4.2 L, 7 L, 14 L.
<b>Normal consumption of a single layer L/m<sup>2</sup></b>	1 L/4.54 m <sup>2</sup>
<b>Drying time</b>	After 30 min (first layer) 4h – after repainting
<b>Drying temperature</b>	Between +5...+25°C
<b>Shelf life</b>	18 months

*Source:* Elaborated by author based on: Baby Smile, <http://supraten.md/ro/catalog/otdelocinie-materiali/kraski/136039/default.aspx> [Visited on 14.03.2018]

The local manufacturer JSC SUPRATEN undertakes to declare only 4 ingredients of the Baby-Smile paint. It does not list its ecological additives. The paint costs 33.75 MDL/l. It is considered that the price dictates the quality, although it is not a set in stone rule, but it is worth mentioning that the eco paint that passed the EN 71-3 chemical test is LAKELAND, by an English producer and costs up to 665.12 MDL/l. This fact enhances the paint content, the

production time, and the quality level. The EN 71-3 test is a presumption that the product meets the new chemical requirements for the safety of EU toys in accordance with the European standard EN71. LAKELAND paint, made in UK is the only one that does not contain solvents, VOCs, pesticides, herbicides, toxins, and it is water-based, believed to be 7000 times purer than regular paints. 1 L of LAKELAND paint covers 13m<sup>2</sup>, and 1L of Baby Smile covers about 5m<sup>2</sup>. The difference is about 8m<sup>2</sup>. The drying time also differs, so the author states that LAKELAND dries a little slower for the first layer, compared to Baby Smile. However, this is not a proof of quality, but only of the composition held.

The LAKELAND paint may be used at both cold temperatures and heat, while Baby Smile is limited to positive temperatures but not to heat. The shelf life is a convincing element for the eco composition of the product. The natural ingredients of any product will shorten the shelf life, and vice versa, their replacement will prolong the shelf life. The difference between the shelf life between LAKELAND and Baby Smile is 6 months, to the detriment of the local manufacturer, which has a longer shelf life.

In the near future, the demand for ecologic paints will increase, because there is indeed a need to apply VOCs-free and HAVs-free products both for workers and the environment and for people living in the premises processed. The local production must review the European conditions and limits for eco products, so they will face competition from abroad as well as from the country in comparison with importers.

### 3. Conclusions.

The tendency to produce, to market and to consume ecological products is on the rise. For this reason it is very important for manufacturers to use ecological criteria established by the competent bodies, whether they will be taken over and translated from the European Union, or that they will be developed at national level. It is also important for consumers to have true information in this area. Due to the lack of transparency, consumers can be misled to eat ecologic products which do not meet the requirements, but manufacturers can also take advantage of the lack of a mandatory regulation in the field of ecological paints and varnishes, and they can also use, without complying with the rules, the presumption of the eco-label. It is necessary for the Republic of Moldova to develop such a regulation in the production of ecological paints and varnishes and to declare it obligatory at national level.

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