

REVISTA ECONOMICĂ

No. 6(64)/2012

Journal of economic-financial theory and practice

CNCSIS reference: B+, Code 478

Frequency: 6 issues / year

ISSN: 1582-6260

Indexed in:

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THE DYNAMIC OF THE EU AND ROMANIAN AGRICULTURAL COOPERATIVE ENTERPRISES IN THE CURRENT CRISIS

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Abstract

The paper is referred to a comparison of specific evolution of cooperatives in EU and in Romania in the last decade. This phenomenon which had a huge social importance is in continuous rising over the world and some relative connections with the world global situation will be made in this review in the current world crisis. In the EU more than 9 million people work in agriculture. Compared with the figures above the Romanian economy is still at the beginning of investors accumulate into associative cooperatives in agriculture only 435 bodies entities are presented.

Key words: cooperative model, comparison, dynamic of rising, business development, European Union.

JEL classification: Q13

1. Introduction

This report begins by providing historical evidence that cooperatives are good in a crisis time. This sets up a plausible generalisation that they will continue to be good in the current crisis (Birchall et al., 2009). It recognises that the co-operative business model is a major factor in realising economic and social development and calls on governments, international institutions,

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co-operatives and other stakeholders to support the development and growth of co-operatives worldwide. Cooperatives provide a broad range of goods and services to their members.

Generally speaking, cooperatives represent 263,000 co-operative enterprises in the EU. These enterprises are owned by 163 million EU citizens (1 in 3 EU citizens) and employ more than 5.4 million people. They actively contribute to the economic and social objectives of the European Union. Cooperatives are enshrined in treaties and recognized in the statutes of the European Cooperative Society. They have the support of the European Parliament, the Committee of the Regions and the European Economic and Social Committee. 25 of the 27 European member states have specific legislation for co-operatives. Co-operatives Europe is the largest membership organisation in Europe (Meyer, 2008). Cooperatives are member-owned businesses. The simplest way to understand them is that they aggregate the market power of people who on their own could achieve little or nothing, and in so doing they provide ways out of poverty and powerlessness. The internationally recognized definition of cooperatives included in both United Nations Guidelines aimed at creating a supportive environment for the development of cooperatives (2001) and ILO R.193 (2002) and as established by the representative body for cooperatives, the International Co-operative Alliance (ICA), is: “An autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations, through a jointly owned and democratically controlled enterprise” (www.ica.coop). The movement of European investors toward the cooperative association is still strongly coordinated at the continental level by the COOPERATIVES EUROPE – the European region at branch of the International Co-operative Alliance – is the biggest membership organization in Europe promoting the co-operative model of enterprise for sustainable economic progress with social objectives. It represents a force for economic growth and social change of 163 million member co-operators owning 250.000 co-operative enterprises and giving jobs to 5,4 million European citizens.

In Romania the co-operative movement has a long tradition and is beginning almost one hundred years ago when in 1895 was built the Romanian Cooperative Association which was a founder member of the International Co-operative Alliance which still exists today. After 1990 the co-operative movement was reborn under the auspice of the Law 1/2005. Few

reports were made showing the directions and the structure of co-operative movement in EU (Bercu et al., 2011).

2. Material and Methods

In order to characterize the evolution of co-operative movement in EU and in Romania, the following indicators were used: dynamic of the number of cooperatives from EU involved in agriculture in the last decade, sex structure of employees, workers categories of personnel employed, the turnover and outputs of investments, the education level of employed people, the main sectors of cooperatives from EU and Romania, the number of members from cooperatives, the employees in Romanian cooperatives. The study is made by collecting data from The European region of the International Co-operative Alliance, which have been statistically processed and interpreted for the period of the last decade.

3. Results and Discussions

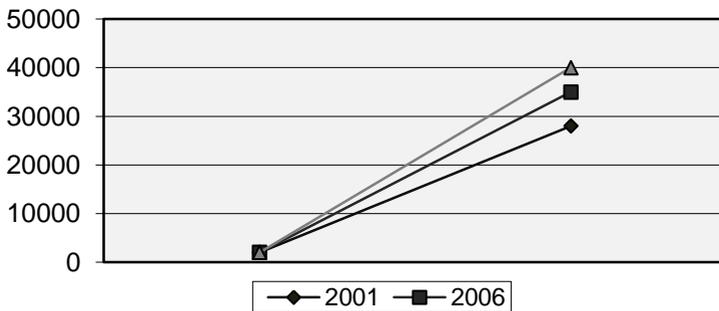
In European Union, COOPERATIVES EUROPE welcomes the EU 2020 Strategy document published on March, 3, 2011 by the European Commission, and supports the view that Europe needs a sustainable economy, putting people and responsibility first with a sustained fight against exclusion and a transition to a green economy. The targets are ambitious putting emphasis on the implementation and follow-up. All stakeholders, including co-operatives organizations at European and national levels must be included in the process. Co-operatives are determined to contribute to the achievement of the EU2020 Strategy's targets. Regarding employment, initiatives for the creation of new jobs should be accompanied by efforts to maintain existing jobs. Co-operatives have proven successes through business transfers to employees (worker buy-outs), ensuring the saving of the company and jobs.

COOPERATIVES EUROPE welcomes the intention to promote technical and technological innovation, but also insists on the need for social and managerial innovation. Enterprise support services should be promoted and should integrate the specificities of co-operative societies and employee and member-owned forms of enterprise. Among the various business support services needed, a key one is management consultancy and training. COOPERATIVES EUROPE welcomes the fact that the Commission is

willing to renew the EU strategy to promote Corporate Social Responsibility (CSR). Co-operatives by their very nature integrate CSR and put a lot of effort into promoting it; acting for local employment, social inclusion, economic stability and participative governance.

However, COOPERATIVES EUROPE regrets that Co-operatives, and even the plurality of forms of doing business, are not mentioned into the EU 2020 strategy. In the current economic climate, cooperatives show their stability and sustainability, representing a model of enterprise particularly fit to tackle and overcome the present crisis. Defending and promoting them is necessary for the achievement of the Single Market and the maintenance of the European Social Model, as is stated in Article 54 of the Treaty on the functioning of the European Union. However, all this arguments speak clearly if we are looking about the dynamic of continuous rising of cooperatives in the last decade in EU (Figure 1).

Figure 1. Dynamic of rising of investments in cooperative associations in EU agriculture



Source: Ministry of Agriculture and Rural Development, unpublished data

In 2011 over 40,000 cooperatives were active in European agriculture, mostly in well developed countries but the raising of the figures indicates that the trend is the same for all countries.

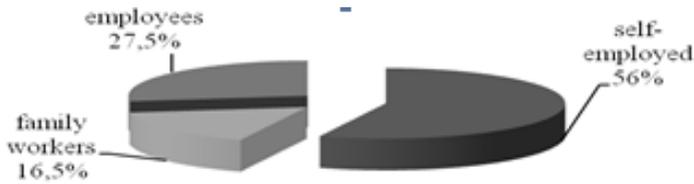
In Romania the development of the associative movement for cooperative work in agriculture has been evolving over the last two years and had two directions: to regional development and to developing policies which more properly reflect the nature of our movement and our resources. This means more integration with our partners and providing services from the

regions to those partners which complement each other. The aim is to have properly planned development programmes in which all partners, regions and co-operatives work against poverty. The cooperatives bring a much-needed practical purpose to the campaign showing how co-operative based businesses will bring not only self-help, self-responsibility and solidarity, but the much vaunted democracy. Only co-operatives advocate democracy in business without which challenges the vicious circle and downward spiral of poverty, partly caused by the emphasis on capitalist business. The model of case study is unfortunately poorly developed into marketing co-operative movement at the continental level. We are closely related to the Spain Mondragon model which has proven to be a sustainable system of economic and social organisation – built by a business group made of 218 companies and entities organised in three sectorial groups: finance, industry and agriculture.

The mission was to combine the basic objectives of a business organisation competing in international markets with the use of democratic methods in its organisation, job creation, promotion of its workers in human and professional terms and commitment to the development of its social development. This is the fundamental aim to promote the movement in Romania too, connected with two important factors: the migration of human worker force to Western Europe and the necessity of strengthen and accumulate the power of investments even in the crisis period.

The European Union represents the good climate for business associations for agricultural investment and aid supply and the very good model for is officially recognized by the representative body of General Confederation of Agricultural Co-operatives in the European Union (COGECA). Besides the important function of representing political interests vis-à-vis the Community authorities, COGECA activities aim at promoting relations between co-operatives across borders. Diverse activities have been undertaken in the past in order to offer an intensive exchange of information, experience and opinions to the co-operative business representatives. The statistical points of our analysis in the study are jointly offered by this body structure. In the EU more than 9 million people work in agriculture. The majority of them are self-employed (56%) or family workers (16.5%), whilst 27.5% have employee status with full-time work dominating (80.5%)(Figure 2).

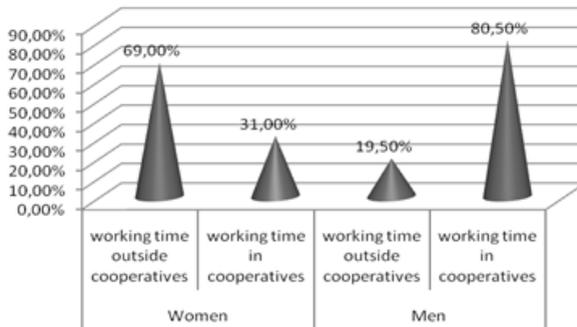
Figure 2. Structure of personnel employed in agricultural cooperatives in EU



Source: Ministry of Agriculture and Rural Development, unpublished data

Women make up 33% of the total agriculture workforce and account for 31% of working time, and the men represent around 67% and accounts for 80.5 of working time on the employee with full-time work dominating (Figure 2).

Figure 3. Working time affected by sex structure involved in agriculture cooperatives

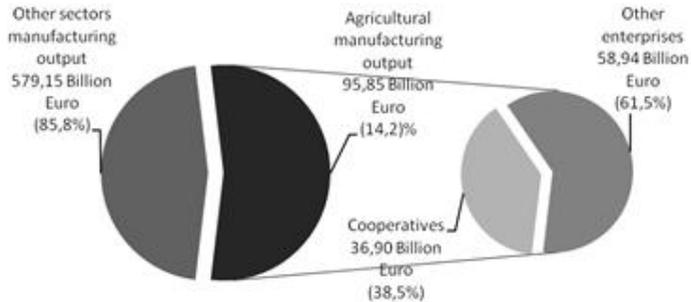


Source: Ministry of Agriculture and Rural Development, unpublished data

The majority of enterprises are small-scale and 93.4% of the workforce have a low or intermediate education level. The agricultural sector accounts for 14.2% of total EU manufacturing output, with 675 billion euros worth of production (Figure 4). 38.5% of this output is generated by the co-operative sector. The 2004 enlargement meant an increase of 30% of agricultural land, while production expanded by about 15% for most products. In order to be more market-oriented and more sustainable, the CAP (Common Agricultural Policy) has been in a process of ongoing reform since the early 1990s. This

has focused mainly on increasing the competitiveness of agriculture by reducing support prices and compensating farmers through the introduction of direct aid payments. Trade liberalisation discussions in the framework of the WTO Doha Development Agenda have had a direct impact on this sector and further restructuring is expected, including a reduction in aid and an opening up of world markets.

Figure 4. The total turnover value involved into products of agricultural cooperatives from total investments in EU.

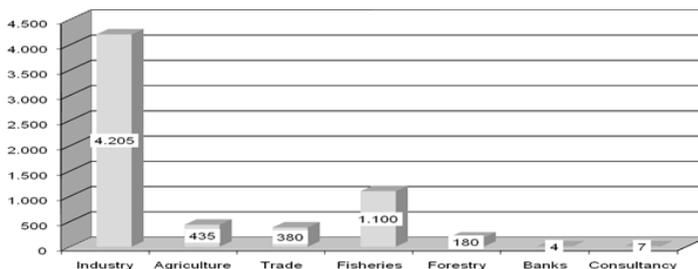


Source: Ministry of Agriculture and Rural Development, unpublished data

In Romania the associative cooperative movement began in 1895 with the creation of the Romanian Cooperative Association, member of the International Cooperative Alliance.

The importance of agricultural cooperatives is important as well in the Romanian economy but the level of the body structures representatives hadn't reached the level of COGECA but even the association itself had not well done the social dialogue and the role in the development of local communities and at the national level. The diverse activities and data (investment inputs, turnover values, economic interests and so on) had not been undertaken in order to offer an intensive exchange of information, experience and opinions to the co-operative business representatives. The agricultural sector is poorly represented still in the economy group of investors (Figure 5), only 435 cooperatives are involved into agricultural field including forestry and fisheries.

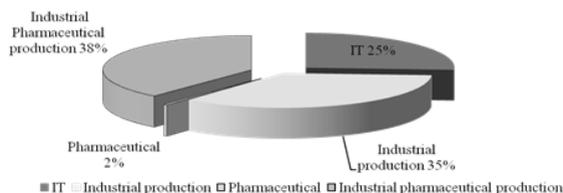
Figure 5. Representative Cooperative associations number in Romanian economy



Source: Ministry of Agriculture and Rural Development, unpublished data

Well done were represented the industrial cooperatives (especially those involved in the food industry and goods production). The pharmaceutical compounds production is well developed as well as the IT domain (Figure 6). Among the agricultural cooperatives which are well present at the local and national level we could mention the Federation of Sugar Beet Cultivators built according to the Law 21/6.02.1924 in July, 1, 1997, member of CIBE (Confédération Internationale pour la Betterave en Europe) from 2005 which is located in Paris, France and Association of the Cereals and Oleaginous Crops Producers located in Constanța. Both of them had the major objectives to obtain investments for development, to better life of people assurance and to rebuild the national irrigation network system.

Figure 6. Industrial structure of Romanian cooperatives



Source: Ministry of Agriculture and Rural Development, unpublished data

4. Conclusions

From the associative forms of EU investors, agricultural cooperatives are the most powerful accumulation of capital resources in the crisis period;

The trend of dynamic number of cooperatives in the last decade is continuous by rising; the EU members represented by COGECA accounts over then 40,000 bodies entities;

The indicators in order to characterize the evolution of co-operative movement in EU was statistically established jointly with the help of International Co-operative: number of people working in agriculture, workers categories, sex structure of the workforce and so on;

For Romanian economy the cooperative movement is still at the beginning, the most important domain of investments are the industrial cooperatives.

5. Acknowledgements

This article was developed under the project “Doctoral scholarships to increase the quality of training young researchers in the field of agronomy and veterinary medicine” (contract POSDRU/88/1.5/S/52614), project cofinanced from European Social Fund by Human Resources Development Operational Programme 2007-2013 and coordinated by the University of Agronomic Sciences and Veterinary Medicine Bucharest.

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THE GLOBALIZATION OF THE ECONOMY: DRIVING FORCES, PRINCIPLES, AND NATION-STATE REACTIONS

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Abstract

Globalization is deploying currently in a variety of forms and manifestations many of them unknown and beyond analysis. The paper attempts to build a comprehensive picture of this dimension explaining the linkages between a number of factors and how these linkages determine the nature of the effects for a nation-state. Globalization's magnitude is the one of a phenomenon, and many nation-states are unable to influence the process itself. Nevertheless, the analysis revealed that there are a number of factors that could influence the effects of economic globalization for a nation-state.

Key words: *economic globalization, competition, natural resources, nation-state, reactions*

JEL classification: *F20, F40, F50*

1. Introduction

In the history of economy components of globalization could be found in the earliest trade of products, but the enforcing of a globalization process on the overall economic space of the world becomes obvious at the middle of the 1980' and accelerates in the 1990'.

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There are a wide variety of definitions for the globalization of the economy. In this paper we will consider that globalization is the process that strengthens and widens the linkages among national economies on the global market of goods, services, and capital (Bran and Ioan, 2009). In other words globalization is the very dynamic process of increasing interdependencies among nation-states due to expansion and deepening of transnational relations in wider and more various areas of economic, political, social, and cultural life, leading to the fact that problems become rather global than national and necessitate rather global solutions than national ones (Bari, 2005).

The globalized economy's outcome is expected to be a larger volume of goods and services, with lower consumption of resources, fulfilling the conditions of a continuous growth of global GDP. Our paper pursues to build a picture that comprises the most important milestones of the process and state of globalization based on its core driver – economy. Such an overview would be a useful management support for a variety of stakeholders, but also for further studies in the development of new hypotheses or research of the currently debated theories.

2. The premises of the globalized economy

Along time the process of economic globalization defined its own philosophy, principles, goals; developed action tools; accumulated experience and strength that allowed its expansion in the world economic space, and by intensity and wideness justifies the affirmation that it turn from a process to a phenomenon and have a significant footprint on the evolution of the modern economy. The drivers that lead to this position comprise, among others, the following (Bran et al., 2010):

- Liberalization of service trade, especially in the field of telecommunication and bank insurance, took place, firstly, in the 1980' in Great Britain, then in the European Union, Japan, and continued in Central and Eastern Europe.
- Liberalization of capital market – premise for the development of global financial market and consolidation of global financial institutions which in turn led to the unprecedented growth of foreign direct investment (FDI) that reshaped the geography of investment and stimulated the development of national economies.

- Put in practice of global environmental management that is one of the pillars of action toward sustainable development. Other concepts such as global common goods support this pillar and pushed decision at the level of global environmental institutions and agreements.
- Progress, regardless to its forms, is a factor that magnifies global flows of information, products, capital, and services. Supported by significant financial and human effort of governmental institutions or of companies the limits of progress are pushed further and further within a synergy favored framework.

Globalization of economy could be considered and outcome of two simultaneous processes: firstly, trans-nationalization until over-nationalization; secondly, continuous decentralization of the nation-state's attributions on the benefit of local communities. Thus, administrative, social, education, budget, culture, and health tasks are performed at local level, while the nation-state is qualified to perform diplomacy, national defence, legislation and internal order.

3. Principles and forms of globalization

The concept of globalization evolves within a set of principles that outline its shape, dimension, theoretical and practical basis and allow its driving forces to be inferred. Some of the most important principles and how they are related with certain forms of globalization are briefly presented further. These principles include: gaining profit, competition, and distribution of benefits.

Gaining profit is by far the most important driver of action for the stakeholders of the global market. Thus, the wider the market, larger the chances of profit are. This principle supports the expansion of transnational companies and the liberalization of markets. The size of transnational companies increased at such extent that many of them held the power to direct the economy.

Competition among the globalized economy's stakeholders is fierce, in accordance with their economic potential, amplified by the ability to generate progress. In order to fight competition companies use alliances, cooperation with national economic bodies, mergers, dislocations and relocations of branches and even headquarters.

Globalization of economy is not the salvation for every body. Its outcomes are unevenly *distributed* among stakeholders, but especially among nation-states. The literature points this as the “winners and losers” principle. This outcome is to be expected since global businesses are driven by profit, not by morality. There is an asymmetry between actors and forces on the global market, explained by the difference between the development level of nation-states, presence and access to global markets and natural resources, business climate, quality of policy class that manage the national economies etc. This asymmetry is most obvious in the economic gap that exists among the developed and the developing countries, comparative and competitive advantages, economic “force”, strategic goals, geopolitical influences etc.

The disparity among countries in terms of economic “force” could be noticed by considering the following data: the annual budget of some transnational corporations acting on the global economic market is exceeding the GDP of many countries (including Romania). For instance, in July 2011, Apple owned 76.2 billion dollars in cash and tradable titles, while in the same time, the treasury of USA stated that its balance was of 73.8 billion dollars.

The history of globalization did not prove that this modern form of organization for the economic space succeeded in reducing the gaps between poors and riches. The size of wealth held by the riches of the world could be considered as a measure of the negative effects of globalization.

4. Effects of the globalized economy

It is not easy to separate the effects of economic globalization in good and bad because criteria to distinguish between good and bad are to be established, along with procedures to deal with opposite effects among stakeholders. Nevertheless, the literature provides enough support to make an attempt of grouping these effects in positive and negative ones. Positive effects include:

- Globalization unleashes the energies of a latent economy and lead to a more efficient use of world resources and the maximization of world wealth with economic benefits for all nations;
- Capitalism spreads from developed countries to developing countries and where it is necessary it brings in and enforces democracy;

- Reduction of production costs due to economies of scale;
- Speeding up transactions that occur in real time although parties are in different locations;
- Emergence and expansion of markets that are independent from natural resources;
- Reduction or elimination of custom taxes have a positive effect on merchandise circulation and favor a better defined division of labor. For instance, the expansion of trade for components led to the increase of foreign trade which in turn exceeded the world production. The final effect was that national economies dependence on the world economy increased;
- Globalization facilitate the access of developed countries to the natural resources held by developing countries allowing their efficient valuation;
- Spreading of various forms of progress, from management practices to social assistance and environmental protection by having transnational corporations as agents (Nastase et al., 2009);
- Reducing the effects of geographical distances on foreign economic relations, process facilitated by the communication technologies, financial flows, and mobility of human resources.

The negative effects of globalization of the economy include:

- In the management of global businesses there is little or no consideration given to moral principles. For example, natural resources and raw materials held by developing nations are accessed by developed countries at low prices due to the intermediation performed by transnational companies; agricultural products are heavily subsidized in developed countries restraining the access of agro-food products coming from countries where such subsidies are not available; preservation of certain tax and non-tax custom barriers in developing countries;
- Dislocation of certain economic activities that are energy or labor intensive or have heavy and long term environmental impact in countries where such costs are significantly lower, usually on the expense of the quality of life and weak support of development by immature governmental institution;
- Introduction of criminal organizations in the economic space. These build up a parallel economy, which is illegal, but

have important connections with the real and legal economy and even with political power.

On the interface between good and bad there are the countries that have the know-how and the will to benefit from the components of globalization that fit their national policies and strategies. These countries are the so called “emerging” countries and they provided already a number of transnational corporations (e.g. China, India, South Korea etc.). Meanwhile, there are countries that encounter difficulties in the assimilation of globalization. For them isolation is not an option because it leads to difficulties in trading domestic goods on foreign markets, lack of competitiveness, dislocation of certain activities, unemployment and poverty.

5. Nation-states’ reactions to the globalized economy

There are numerous actors that interplay in the global economic space with a variety of relations among them. From this complex picture, there are selected several reactions on the behalf of transnational corporations and nation-states.

From the perspective of the nation-state, the reactions to the economic globalization comprise a wide range of possibilities that include adaptation, resistance (defensive rejection), negligence, proactive attitude (offensive), minimization of loss (cost-benefit approach) (Bajureanu, 2008). In fact, the range could be narrower or wider depending on the capacity of the state to react and manage its reactions. On its turn, the reaction capacity could be influenced by globalization through harnessing the interplay between personal attitudes and interests of governmental representatives.

Conflicts of interest between globalization and nation-states could be resolved by means of diplomacy, policy, economy, military in open confrontations. Nevertheless, such situations are usually avoided by both parts, some of the explanations being presented below.

Transnational forces are mainly anonymous, difficult to be identified. They are organized in network type systems, that are impossible to be approached by any state (von Wright, 1992). This lack of information triggers fear which is maintained by certain tools of globalization, which include political pressure, military pressure, offensive and aggressive marketing and mass-media manipulation. A good example of the range of tools that are possible to be used by a transnational force is the Rosia Montana Glod

Corporation investment project in Romania. In this case, important financial resources allowed the transnational company to initiate an unprecedented media offensive to support the project (Bran and David, 2010). Brutal manipulation of public opinion and high level lobby are important ingredients of this offensive.

The “erosion” of nation-states is carefully monitored by transnational forces because nation-states are the sole sources of real political initiatives. Through these initiatives, transnational corporations could pursue their interests and gain easy access to valuable resources, which will increase its power and wealth.

The theory of conflicts states that winners are the ones that take over the control, but in case of globalization – nation-state conflict it is difficult to distinguish who is the one in charge (von Wright, 1992), although it could be inferred.

Box 1 Reasons to withstand economic globalization

The rational of state to defense its nation and state entity.

Autonomy in deciding to drop part of sovereignty in the favor of a foreign entity.

Not all that is globalization has harmful effect on the nation-state; some components of globalization are bearing progress and accelerate the path toward a modern society.

Benefits are to be harnessed from the integration in the global flow of products, services, information, knowledge, and capital.

Negative effects could be minimized by carefully prepared policy, based on a realistic problem statement.

Reactions give substance to national policies and strategies of economic and social evolutions and make clear the goals and directions of action for a long turn.

Timely and firm reactions could inspire proactive means of action for enhancing intervention forces prompted for managing the effects of globalization (e.g. alliances).

In general terms, the position of the nation-states are weak against the offensive of transnational forces. Nevertheless, there are good reasons to withstand in order to improve the shape and terms of conditions that are to be accepted. Some of these reasons are presented in box 1.

6. Factors that influence the reaction of nation-states to economic globalization

How a nation-state reacts to economic globalization depends on numerous factors, their range defining the patterns of a complex interaction. Nevertheless, some of these factors were found to be more important in determining the type of the reaction. These include: state of national economy; quality of management; tenacity in pursuing national interest.

The state of national economy is one of the most important factors that will define the reaction of a nation-state. A poor country, with heavy foreign debts, weak political class, domestic conflicts, without industry, widespread corruption among authorities will have little or no reaction to globalization, surrounding to its forces. Such countries are integrated by transnational forces in the process of globalization due to their ownership upon valuable natural resources, which will be exploited with no or little benefits for the owner country.

The importance of the management quality in defining the reaction of a nation-state could be illustrated by the case of several emergent countries: China, India, South Korea, Brazil etc. In these countries the subsystems of strategic, tactic, and operative management are functioning properly, are harmonized and subordinated to a strategic goal built on the interests of the population. For instance, in China, national interest investments are made in three shifts, compared to the same investments in Romania, where delays and renegotiations are constant presence.

A third factor that determines a proper reaction to economic globalization is the capacity to use national resources in the interest of the people of that nation-state. Tenacity in pursuing this goal is an important condition for a successful reaction.

7. Conclusion

The globalization of the economy is a contemporary reality with a variety of understandings and practical consequences. Their interplay illustrates a situation featured by complexity, which limits the possibility formulate solid theories. In addition, powerful stakeholders are defending their interests at such extent that certain relevant information is not available. In this framework, the opinions became polarized with patchy evidence that support

each side. Our paper attempted to build up a comprehensive picture of the economic globalization, in which the positions and reasons of both sides were examined in order to give management support for various stakeholders, but especially for governmental authorities that are facing the need to react to the assault of the exponents of economic globalization.

The drivers of economic globalization could be tracked down far in history, but the global economic space is a product of the last decades. Gaining profit, intensification of competition and controlled distribution of benefits are among these drivers. There are both positive and negative effects of globalization for a nation-state. Their balance is depending on the nation-states reaction to the process. Low level of development, poor management and failure in pursuing the national interest will allow negative effects to be prevalent on the positive ones.

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DISCOVERING SOCIAL MEDIA BEHAVIOR PATTERNS IN ORDER TO IMPROVE THE MARKETING STRATEGY IN THE CURRENT CHAOTIC ENVIRONMENT

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Abstract

Marketing used to imply paying for your target audience’s attention. Nowadays, with the development of inbound marketing, marketers have to attract customers with valuable and useful information that will make them eager to buy. The ever-evolving technology has led to an intense focus on inbound marketing, in its many forms, in order to lower marketing costs and gain a position in the social web. In this context, this paper explores how companies can benefit from social media marketing by understanding how much of their time customers spend on social media, and which platforms do they find the most engaging.

Key words: consumer behaviour, social media marketing, inbound marketing

JEL classification: M31

1. Introduction

A great marketing challenge is to see the full experience of a customer online, a holistic perspective. To best tailor marketing strategies marketers need to see the customer in a full context and fully comprehend his/ her behavior as it happens. After this first step, marketers have to use this

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invaluable knowledge in order to trigger the best opportunities for them and hopefully lead to a sale.

Some companies see customers as isolated transactions, but that is not how customer behavior happens in general, and especially in the online environment where people spend a lot of their time and ask for interaction and engagement from the companies they intent to buy or are loyal to.

However, to best study the online behavior, the first thing is important to research and study is how much of their time is spent on these social media sites because this timeframe can provide insights regarding general involvement in social networking and availability for potential brand engagement. Therefore, social media can be used for marketing opportunities.

2. Inbound Marketing and Online Behavior

The ever-evolving internet has caused many changes in marketing. Now, there is search engine marketing (SEM), email marketing, blog marketing, viral marketing, social marketing and so many more. These, however, can be encompassed under one concept – inbound marketing.

In its most basic form, inbound marketing represents the marketing focused on getting found by prospects and customers. In a more expanded form, inbound marketing has 3 main components: content creation, search engine optimization and social media.

Needless to say, inbound marketing is the opposite of outbound marketing, or traditional marketing, where a marketer would push his/her message to poorly targeted audiences without regard of whether that particular message interrupted their activities. For example, instead of inconveniencing people with a television ad, marketers can create a viral video or an informative video that potential customers want to see and hopefully share with their friends leading to electronic-word-of-mouth (eWOM).

This point of sharing is where inbound marketing gets enhanced through social media marketing. Social media amplifies the content and the process of any business. When anything related to a particular business gets distributed and discussed on social networking sites, that is when a company becomes authentic in their messaging and it attracts the right customers and draws their attention in a valuable way.

Social media is about the shift of power to consumers. More than ever, companies are feeling the power of social media in developing and reliably delivering on a compelling brand promise (Barwise, Meehan, 2010).

3. Using Social Media Marketing in a Chaotic Environment

Today's chaotic environment is filled with an uncertainty that covers everything from the economy's trend to the loyalty of customers and brand reputation. Companies are turning to social media marketing because it represents a smarter and more efficient way of allocating marketing resources. Basically, a social media marketing strategy is better in this chaotic environment because of three main aspects:

- *Higher marketing ROI* – The return on investments is considerably higher because it costs far less to create content and promote it by sharing in on different social platforms.
- *Customer interaction* – Social media marketing is re-writing relationship marketing and companies should get involved in order to create a long lasting engagement through interactions, valuable information, promotions, contests and dealing quickly with complaints.
- *Customer service* – Using social media marketing, any complaint or negative comment can be addressed in a rewarding manner for the person who expressed dissatisfaction. A prompt response and a solution to the problem can provide an opportunity for connecting, helping. In the online environment, customers want to see that they matter, they are heard and their problems are fixed by the company they trusted by purchasing a product or service. If these conditions are met, the person who first complaint may further develop positive word-of-mouth
- *Targeted visits to company websites* – Social networks are a very important tool in driving targeted prospects on company website that can further lead to sales.

4. Researching Online Consumer Behaviour Patterns on Social Media

In order to study the online behavior in an appropriate and rewarding manner, the first thing that is important to research is how much of their time is spent on social media sites. Social login patterns can represent a marketing multiplier because every business has two main tasks: to acquire customers and to sell them products and services. Therefore, the purpose of the present research is to identify the applicability of the corresponding analysis regarding the amount of time spent on social networking sites and discover which social media websites are most engaging for the respondents. These two aspects are critically important to study in order to fully comprehend the social media behavior and develop a successful marketing strategy accordingly. To fulfill the main purpose of this exploratory research, the following objectives and hypotheses were established:

Objective 1: Determining dimensions that reflect a pattern of the time spent on social media.

Hypothesis 1: At least one dimension is identified.

Objective 2: Determining which social media websites are the ones respondents frequent the most.

Hypothesis 2: Facebook and YouTube are favored by the respondents.

For this study, a survey was used as research method and a questionnaire as research instrument. The data was gathered online from individuals, namely from the students of the “Lucian Blaga” University of Sibiu, Romania, studying for a Bachelor, Master or Ph.D. Degree.

As a sampling technique, we used the convenience sampling which implies a non-probability sampling. The sample size was represented by students of the “Lucian Blaga” University of Sibiu, Romania in the following proportions: 26.69% (Bachelor degree, first year of study), 18.22% (Bachelor degree, second year of study), 31.36% (Bachelor degree, third year of study), 7.2% (Master degree, first year of study), 15.25% (Master degree, second year of study), 0.42% (Ph.D. degree, first year of study) and 0.85% (Ph.D. degree, second year of study).

The sample size was computed by the formula $n = \frac{z^2 x s^2}{e^2}$, where z is a known tabular value for a specific level of significance, s represents the sample standard deviation of the selection variable (number of students by their year of study and study cycle) and e is the standard error. A confidence

level of 95% was chosen, therefore the $z_{0,95}$ is 1.96 and the sample standard deviation is $s = 28.65$ students by their year of study and study cycle. The chosen sampling standard error is $e = 3.66$ students by their year of study and study cycle. By applying the formula, we have determined a sample size of $n = 235.51 = 236$ students. The sampling process was executed by applying an online questionnaire to these 236 students.

The data was collected using a primary research, which involved getting original data by conducting a field research. For this research, the information was collected directly from respondents via the internet, from September 17 to November 18, 2011. Also, this paper is based on an exploratory research whose primary objective is to provide insights into and an understanding of marketing phenomena; therefore a exploratory statistical technique was used for this study, namely correspondence analysis.

Correspondence analysis is a multidimensional scaling technique used for scaling qualitative data that scales the rows and columns of the input contingency table in corresponding units so that each can be displayed in the same low-dimensional space (Malhotra, Birks, 2007). The results of this analysis provide information that is similar to the results produced by Factor Analysis, only by exploring the structure of categorical variables as opposed to scale variables. The normalization method used for this procedure was symmetrical.

Table 1: Summary of correspondence analysis

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia	
					Accounted for	Cumulative
1	,429	,184			,702	,702
2	,236	,056			,213	,914
3	,150	,022			,086	1,000
4	,000	,000			,000	1,000
Total		,262	62,020	,000	1,000	1,000

The correspondence analysis solution that represents the relationship between the row and column variables should imply as few dimensions as possible. In this case, the maximum number of dimensions should be $\min(\text{number of rows, number of columns}) - 1 = \min(5,5) - 1 = 4$.

In this first table (Table 1) that characterizes correspondence analysis, the singular values can be viewed as the correlation between the row and column scores. They are equivalent to the Pearson correlation coefficient in

correlation analysis. For each dimension, the eigenvalue represents the inertia and thus denotes the measure of the importance of that dimension.

The term inertia in correspondence analysis is used by analogy with the definition in applied mathematics of "moment of inertia," which stands for the integral of mass times the squared distance to the centroid (Greenacre, 2007). Inertia is a measure of the variation in the data

As observed, the first dimension displays the highest inertia whereas the second is orthogonal to the first and displays as much of the remaining inertia, and so on. Also, the inertia of any dimension can be evaluated by comparing it to the total inertia. For instance, the first dimension shows 70.2% (0.184/0.262) of the total inertia, while the second dimension displays only 21.3% (0.056/0.262).

In this procedure, the chi-square is not a model fit statistic and is not used in its traditional way of comparing models with different variables. In this case, chi-square tests the hypothesis whether or not the

total inertia value is different than zero. In this model, the significance value is smaller than 0.05 which indicates that the inertia of the model is significantly different than zero.

The Correspondence Analysis further explains the dimensions that account for most of the variation, namely in this model there are two such dimensions, since the third dimension only accounted for 8.6% of the inertia.

Table 2: Overview row points

Log in pattern	Mass	Score in Dimension		Inertia	Contribution		Contribution		
		1	2		Of Point to Inertia of Dimension		Of Dimension to Inertia of Point		
					1	2	1	2	Total
Always connected	,110	-1,790	-,358	,155	,822	,060	,978	,022	,999
Several times a day	,636	,118	,324	,021	,020	,282	,184	,767	,950
Every three days	,157	,335	-,424	,016	,041	,119	,465	,410	,876
Once a week	,021	,683	-,073	,021	,023	,000	,202	,001	,203
Occasionally	,076	,727	-1,292	,050	,094	,538	,346	,602	,947
Active Total	1,000			,263	1,000	1,000			

Table 3: Overview column points

Time spent per log in session	Mass	Score in Dimension		Inertia	Contribution		Contribution		
		1	2		Of Point to Inertia of Dimension		Of Dimension to Inertia of Point		
					1	2	1	2	Total
		Less than 5 minutes	,097		,306	- 1,054	,034	,021	,458
5 – 15 minutes	,356	,270	,028	,023	,060	,001	,490	,003	,493
16 – 29 minutes	,208	,386	-,199	,016	,072	,035	,839	,123	,962
30 – 60 minutes	,186	,150	,797	,036	,010	,500	,051	,786	,837
More than 61 minutes	,153	- 1,535	-,095	,155	,836	,006	,998	,002	1
Active Total	1			,263	1	1			

As a statistical method, correspondence analysis decomposes the overall Chi-square statistic as $Inertia = \frac{Chi-square}{Total N}$, leading to the discovery of a smaller number of dimensions so that the deviations from the expected values can be represented visually. This technique resembles Factor Analysis because the total variance is decomposed in order to arrive at a lower-dimensional representation of the variables that allows the reconstruction of most of the variance or covariance of the matrix of interval or ratio variables.

For correspondence analysis, each row and column point contributes to the inertia observed, but the points that contribute the most to the inertia of a dimension are the highly important to that particular dimension. A point's contribution to a dimension's inertia is the weighted squared distance from the projected point to the origin divided by the inertia for the dimension.

For example, always connected students are dominant points in the first dimension, contributing 82% of the inertia (Table 2). Among the column points (Table 3), the students who spend more than one hour per session contribute 83.6% of the inertia for the first dimension alone.

In addition to examining the contribution of the points to the inertia per dimension, the final part of the tables examines how the inertia of a point

is spread over the dimensions by computing the percentage of the point inertia contributed by each dimension. The first two dimensions contribute virtually all of the inertia for students who are always connected, log in several times a day or occasionally. However, the inertia for users who log in once a week is not contributed by the first two dimensions. (Table 2).

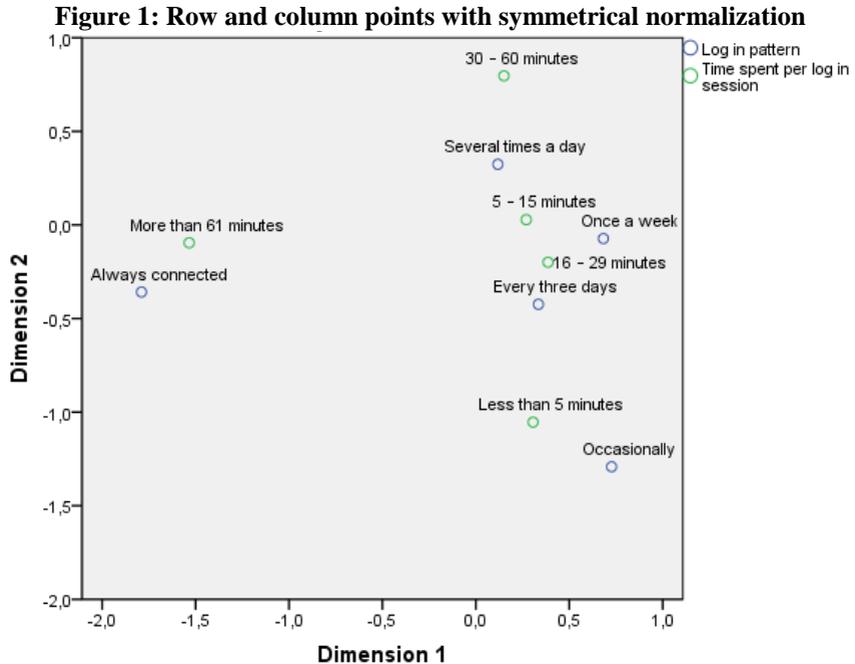
Similar results occur for the column points (Table 3). The first two dimensions contribute all of the inertia for more than an hour spent on social media sites. For every active column point, two dimensions contribute at least 86.6% of the inertia. The third and fourth dimensions contribute very little to these points, however they do contribute to the timeframe of 5 to 15 minutes log in.

The row and column scores are the coordinates of the row and column points in the bi-plot (Figure 1). The symmetrical normalization helps the interpretation of this figure as the row and column point that are close together are more similar than the points that are apart.

The second dimension separates the respondents who are always connected, and as a consequence spend more than one hour per session on social media sites. The first dimension separates the students with different log in and time spent patterns, while still providing an examination of the relationship between these two variables, as a result of the symmetrical normalization. For instance, the respondents who engage in social media several times a day are more likely to spend from 5 to 15 minutes per session (Figure 1).

However, those who only get online once a week are just as likely to spend from 5 to 15 minutes or from 16 to 29 minutes per session. The students who log in every three days are near the 16 to 29 minutes per session, while the ones who are not frequent users (less than once a week) seem to stay on such sites less than 5 minutes. Interestingly, the 30 to 60 minutes timeframe spent per session is not strongly associated with any particular log in behavior.

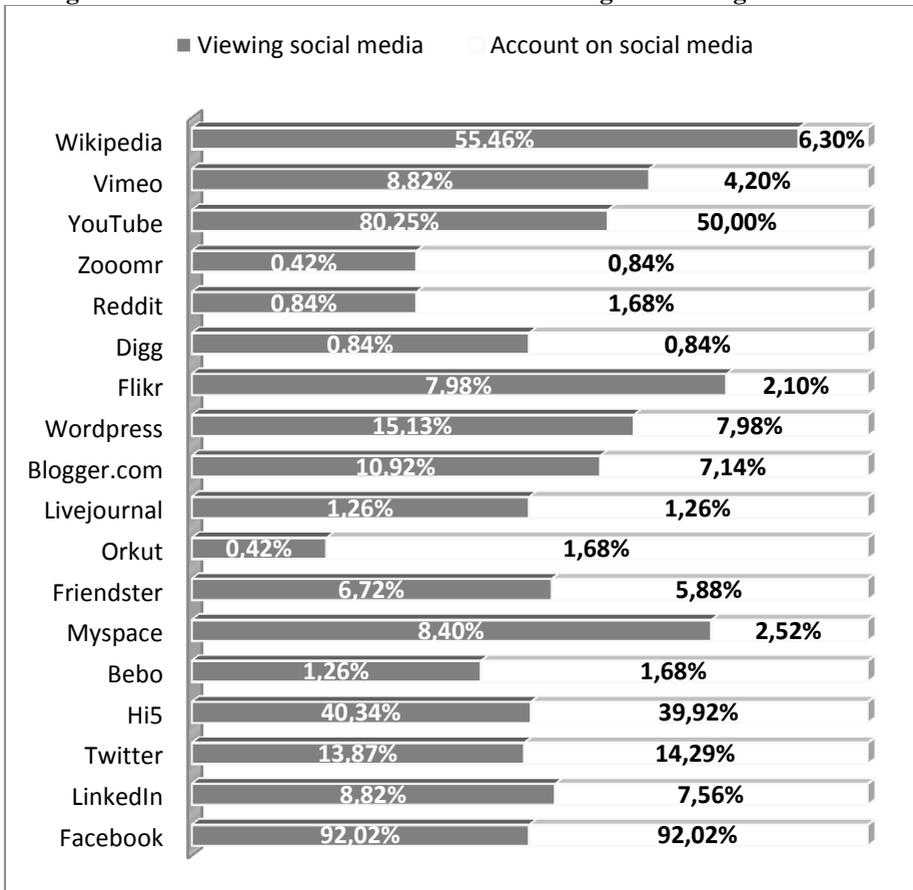
Giving the results discovered after performing the correspondence analysis, we proceeded to discover on which social media sites they spend time and which one of these platforms are most frequently accessed by the respondents of this research. We studied how many respondents just view social media, and how many actually have accounts on these social media websites. The results are displayed in the figure below.



As expected (Figure 2), Facebook is the most popular social network that gathers the highest proportion of respondents who are viewing it, and also have a personal account. Facebook is the most interactive social networking platform and allows people to add friends, comment on profiles, join discussions or chat with friends, or engage in social games such as Farmville or Cityville. These are some of the reasons 92% of respondents stated that they view and have a Facebook account. Similarly, the respondents enjoy spending time on Hi5, another social network but with less features that what Facebook provides.

The other social networking websites studied through this survey question (Friendster, Orkut, Bebo) are not very popular with the respondents of this research, but they do present an interest to some extent to the people who are very active online and want to be present on all the social networking sites. Myspace is social media site that gets views particularly because it promotes music and artists, but not as many respondents have an account on this platform.

Figure 2: Social media metrics in terms of viewing and having an account



The other social networking websites studied through this survey question (Friendster, Orkut, Bebo) are not very popular with the respondents of this research, but they do present an interest to some extent to the people who are very active online and want to be present on all the social networking sites. Myspace is social media site that gets views particularly because it promotes music and artists, but not as many respondents have an account on this platform.

Social media news sites like Reddit and Digg have not registered high scores indicating that respondents do not interact by voting articles and commenting on them. However, to some extent, the respondents are engaging

in blogging or reading blogs on Wordpress, Blogger and Livejournal. The microblog social network, Twitter, allows respondents to post tweets in 140 characters, but this platform is used only on an average of 14% in terms of views and accounts.

Regarding sharing and watching videos online, YouTube is more popular than Vimeo. More than 80% of the respondents watch videos using Google's platform, but only 50% actually have an account which allows them to create playlists, share videos and subscribe to different channels. Similarly, from the social media platforms concerned with sharing photos, respondents favor Flickr over Zoomr.

As observed from the chart above, Wikipedia is highly used in terms of views and checking for information, but few respondents (6.30%) have an account and contribute on this free internet encyclopedia.

The business-related social networking site, LinkedIn, gathers more than 150 million professionals worldwide, however, the respondents of this research have displayed a small interest in this website.

The information obtained through the data analysis confirms all the hypotheses developed for this research, leading to the achievement of all of the proposed objectives.

5. Conclusion

Discovering the pattern of customers on social media can lead to a better targeting of how to approach them with brand messaging on social media.

More specifically, a company would not want to be too pushy with its customers if they fall into the category of those who engage in social media several times a day and spend 5 to 15 minutes per online session. There should be engagement in the form of games, interactions, information or viral aspects, but these activities should be segmented in a way that the customers do not perceive them as intrusive or too much.

In the online environment the key is to create valuable content and engagement so that consumers will want to share it with others. Also, due to the magnitude of online marketing and social media, it is important for companies to find out where their customers spend their time, on which social networking site and pursue them there with engaging activities and interactivity. A relevant positioning on social media can make or break a

company of any size, because consumers now have the power to search and choose the brands they want to be in contact with, and give positive or negative reviews or feedback on different platforms.

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DESIGN AND IMPLEMENTATION OF A CLUSTERING MODEL TO STUDY CUSTOMER BEHAVIOR IN TOURISM ACTIVITIES

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Abstract

The aim of this paper is to introduce models for customer behavior clustering based on some tourist's characteristics. Cluster analysis is realized using hierarchical and non-hierarchical methods in order to obtain the optimum number of classes. The implementation is made using an open source environment that provides complex processing to achieve modular operators, build by data mining techniques.

Key Words: *cluster analysis, hierarchical clustering, non-hierarchical clustering, customer behavior*

JEL classification: *C38, C61, C81, C83*

1. Introduction

The present paper goal is to propose an efficient model to study customer behavior in tourism activities and to choose an adequate data mining system for implementing our model.

The frequently used techniques of classification are based on the cluster analysis using hierarchical or non-hierarchical methods with various partitioning or agglomerating methods based on similarity or dissimilarity measures. Usually agglomerative clustering and the associate dendrogram are

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used. The main disadvantage of this technique is that is unable to make an automatic choice of the optimum number of clusters.

For a specified type of data corresponding to a given classification problem the result are influenced by the type of the specific clustering algorithm, the similarity measures and the arbitrary determined of classes number. On the other hand, the results of a specified clustering or classification technique are strongly dependent on the type of data. Techniques that work well for some types of data may give unsatisfactory results for other ones. Therefore many aspects must be taken into consideration when solving a classification problem: data analysis, choice of variable to be use in the clustering analysis, choice of classification techniques and evaluation of the classification results by an economical point of view (P. Giudici, S. Figini, 2009).

Our main aim is to realize a model for customer classification capable to automatic give the number of classes, their components and the tourist attributes hierarchization.

The rest of article is organized as follows. In section 2 we define the model specification. Implementation details are given in section 3. The results for the considered case study are presented in section 4. Results interpretation from computational and economical point of view, conclusions and further directions of study can be found in section 5.

2. Model specification

2.1. Input data

The input data of our model are represented by tourist's variables: regarding age, gender, married, children, own car, revenue, residence, favorite destination, type of services. These variables were measured for 130 tourists. Dataset was centralized in an EXCEL document.

Data collected were coded as follows:

- age: 1 = [16-22], 2 = [23-35], 3 = [36-58], 4 = [59,...];
- gender: 1 = male, 0 = female;
- married, children, own car: 1 = true, 0 = false;
- revenue: 1 = under 1200 Ron, 2 = between 1200 and 1999 Ron, 3 = between 2000 and 2599 Ron, 4 = more than 2600 Ron;
- residence: 1= urban, 0 = rural;
- favorite destination: 1 = Turkey, 2 = Greece, 3 = Bulgaria, 4 = Italy;

- type of services: 1 = accommodation only, 2 = accommodation with breakfast, 3 = HB, 4 = all inclusive.

2.2. Cluster analysis

Cluster analysis is a descriptive data mining method whose purpose is to cluster the observation data into groups that meet the internal cohesion and external separation conditions, i.e. the groups are homogeneous inside but heterogeneous from one group to another (B.S. Everitt. 1993).

In the following we describe the stages of cluster analysis made for our considered tourists clustering. The data EXCEL sheets the observations are situated on rows and columns represent the variables.

2.2.1. Clustering methods

There are two types of clustering methods: hierarchical and non – hierarchical.

Hierarchical clustering gives the groups in a tree – like structure (dendrogram), each level of the structure corresponding to a fixed number of groups. The most used in existing studies in economy is hierarchical agglomerative clustering that forms the groups using a bottom – up strategy that consists in combining the existing clusters starting from leaves to root. The main disadvantage of this method is that it does not give the optimal number of groups. From a computational point of view the complexity order of an agglomerative clustering algorithm is at least quadratic.

Another hierarchical clustering method is divisive clustering, that adopts a top – down strategy for the construction of the clustering structure through recursive partitioning, from the root to the branches. Initially all the elements are situated in a single cluster. The method is more efficient if we do not need the whole hierarchy and it is capable to give the optimum number of clusters. It is more complex than agglomerative clustering methods because it requires a second flat clustering algorithm as inner function.

In our model we chose divisive clustering method together with k-means (non - hierarchical clustering method).

Non-hierarchical methods need as input data the number of clusters and use an optimality criterion in order to give a unique partition of data in the given number of groups. The optimality criterion can be the maximization of internal cohesion for the specified number of groups.

Regardless of the clustering method the distance between clusters must be computed at each step. Several distances can be defined. The distance chosen in our model is the centroid distance, i.e. the distance between two clusters is defined as the distance between their centroid.

Many criteria for deciding which attribute is more relevant for data grouping at some level are available. For our model we use two criteria: information gain and gain ratio.

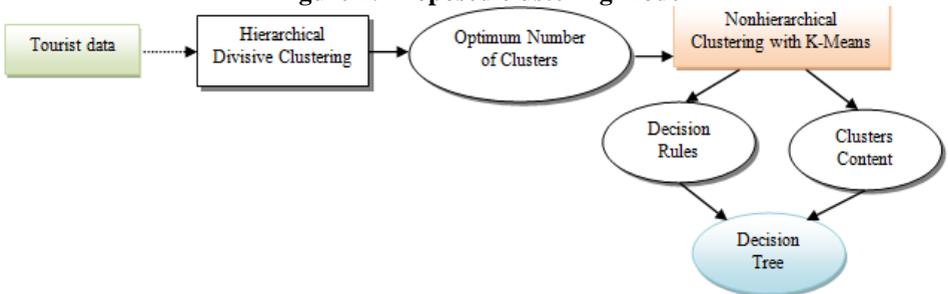
As a output of the k-means method results the clusters contents and the decision rules.

2.2.2 Model definition

In Figure 1 is defined the proposed model. The input data and algorithms operators are included in rectangles and output data are included in ellipses. We also chose two type of results visualization:

- visualization of clusters content as list of elements together with the decision rules for clusters construction;
- visualization equivalent decision tree.

Figure 1: Proposed clustering model



3. Model implementation

We chose RapidMiner (RM) for implementation of our model (Mierswa, I. and Wurst, M. and Klinkenberg, R. and Scholz, M. and Euler, T., Yale, 2006). The main reasons which recommend RapidMiner for our model implementation are:

- is one of the most powerful open-source systems for data mining;
- it includes a large collection of modular operators for design and processing of complex data mining problems;

- knowledge and data miner processes are represented by means of tree-operators. The leaves of the tree correspond to the simplest steps from the modeled process; the interior nodes correspond to the abstract steps and the root to the whole process;
- for each operator are defined the input and output data and many settings parameters;
- all RapidMiner processes are described using XML;
- it has a user friendly interface;
- it supports a flexible arrangement/rearrangement of operators;
- it allows data import from various formats such as: Excel, CSV, XML, Access, AML, ARFF, XRFF, SPSS, Stata, Sparse, DBase, C4.5;
- offers many types of output data visualization thereby providing an easier understanding and interpretation of the results.

In our model input data are given in Excel format, therefore we need to use the RM import operator **ReadExcel**.

For the hierarchical clustering we use **TopDownClustering** operator. **KMeans** operator solve the non-hierarchical clustering task offering as output data the clusters and **ClusterModel** operator gives the clusters content in the form of a list. The representation of the clustering solution as a decision tree is realized using **DecisionTree** operator.

The k-means clustering algorithm (Daniel T. Larose, 2005) is a straightforward and effective algorithm for finding clusters in data. The algorithm proceeds as follows.

- Step 1: Ask the user how many clusters k the data set should be partitioned into.
- Step 2: Randomly assign k records to be the initial cluster center locations.
- Step 3: For each record, find the nearest cluster center. Thus, in a sense, each cluster center “owns” a subset of the records, thereby representing a partition of the data set. We therefore have k clusters, C_1, C_2, \dots, C_k .
- Step 4: For each of the k clusters, find the cluster centroid, and update the location of each cluster center to the new value of the centroid.
- Step 5: Repeat steps 3 to 5 until convergence or termination.

The “nearest” criterion in step 3 is centroid distance (distance between the centroids of each cluster), although other criteria may be applied as well.

Technically speaking, the algorithm steps are:

- Assume the existence of N vectors $x^l = (x_1, x_2, \dots, x_n)$;
- Identify a representative set of k vectors c_j , where $j = 1, 2, \dots, k$;
- Partition data in k disjoint subsets S_j containing N_j points, so to minimize the clustering function given by:

$$J = \sum_{j=1}^k \sum_{l \in S_j} \|x^l - c_j\|^2 \quad (1)$$

where c_j is the average centroid data from the set S_j , given by:

$$c_j = \frac{\sum_{l \in S_j} x^l}{N_j} \quad (2)$$

One attractive classification method involves the construction of a decision tree, a collection of decision nodes, connected by branches, extending downward from the root node until terminating in leaf nodes. Beginning at the root node, which by convention is placed at the top of the decision tree diagram, attributes are tested at the decision nodes, with each possible outcome resulting in a branch. Each branch then leads either to another decision node or to a terminating leaf node.

Classification and decision trees are used to forecast membership of objects / instances in different categories, based on their measures in relation to one or more predictor variables. Classification tree analysis is a major data mining techniques. The flexibility of this technique makes it especially attractive, particularly because the benefit of present and suggestive views (tree which summarizes the classification obtained).

Conceptually, the construction algorithm and decision tree classification is as follows:

- Let D_t training set which is at node t ;
- If D_t is the empty set, then t is a leaf labeled default C_ϕ ;
- If D_t contains instances belonging to the same class C_t , where t is a leaf labeled C_t ;
- If D_t contains several instances belonging to one class, then use an attribute node test to divide D_t in smaller subsets. The procedure is applied recursively for each node.

The strategy underlying the optimal partitioning of a node type is a greedy method, a recursive construction "top down" *divide et impera* type.

In principle, the methodology for classification and decision tree induction consists of two phases:

- Construction of the original tree, using the available training set until each leaf is "pure" or almost "pure".
- "Forming" tree as "increased" to improve the accuracy obtained by the test set.

Briefly, the algorithm behind the building and decision tree classification is as follows:

```
Build tree (training data T)
{
    Partition (T)
}
Partition (S data)
{
    if (all points of S are in the same class)
then
        returns
    for each attribute A do
        evaluates the split on attribute A;
    using the best split found for partitioning S
in S1 and S2
    Partition(S1)
    Partition(S2)
}
```

The implemented processes and the practical results are presented in the next section.

4. Practical results

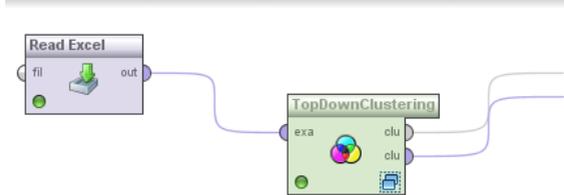
The model developed uses three processes: one process for determining the optimal number of clusters, a second process for obtaining the decision tree that determines the cluster membership of each entry and a third process for determining the composition of each cluster.

The first process determines the optimal number of clusters, using a hierarchical clustering algorithm for division (*Figure 2*). The algorithm uses

operator **TopDownClustering**. A top-down generic clustering can be used with any clustering as inner operator. Note though, that the outer operator cannot set or get the maximal number of clusters, the inner operator produces. This operator will create a cluster attribute if not present yet. The parameters used are:

- **max depth**: specifies the maximal depth of cluster tree;
- **max leaf size**: specifies the maximal number of items in each cluster leaf.

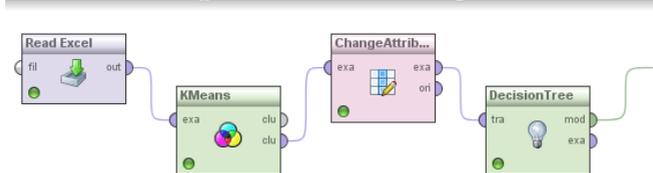
Figure 2: TopDown clustering



The optimal number of clusters obtained for the input data set is 3. This value will be sent as input parameter **KMeans** operator.

The second process building decision tree based on which inputs will be distributed in clusters. The process uses **KMeans**, **ChangeAttribute** and **DecisionTree** operators. Decision tree representation of the solution is obtained using the process illustrated in *Figure 3*.

Figure 3: Decision Tree process



KMeans operator represents an implementation of k-means. This operator will create a cluster attribute. The parameters used are:

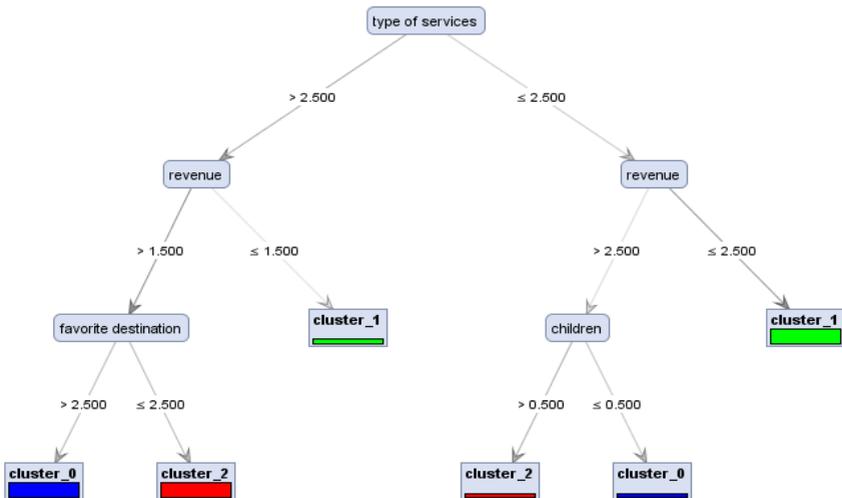
- **k**: specifies the number of clusters which should be detected;
- **max runs**: specifies the maximal number of runs of k-Means with random initialization that are performed;
- **max optimization steps**: specifies the maximal number of iterations performed for one run of k-Means.

DecisionTree operator learns decision trees from both nominal and numerical data. Decision trees are powerful classification methods which often can also easily be understood. In order to classify an example, the tree is traversed bottom-down. Every node in a decision tree is labeled with an attribute. The example's value for this attribute determines which of the outgoing edges is taken. Parameters:

- **criterion**: specifies the used criterion for selecting attributes and numerical splits;
- **minimal size for split**: specifies the minimal size of a node in order to allow a split;
- **minimal leaf size**: specifies the minimal size of all leaves;
- **minimal gain**: specifies the minimal gain which must be achieved in order to produce a split;
- **maximal depth**: specifies the maximum tree depth (-1: no bound);
- **confidence**: specifies the confidence level used for the pessimistic error calculation of pruning;
- **number of prepruning alternatives**: specifies the number of alternative nodes tried when prepruning would prevent a split.

Tree obtained for a number of $k = 3$ clusters is shown in *Figure 4*.

Figure 4: Decision tree for tourist's characteristics



From the above decision tree can observe that all clusters obtained are pure. The rules are extracted from the decision tree are:

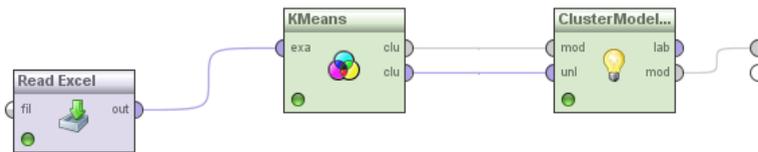
```

type of services > 2.500
|   revenue > 1.500
|   |   favorite destination > 2.500: cluster_0
{cluster_0=41, cluster_1=0,
cluster_2=0}
|   |   favorite destination ≤ 2.500: cluster_2
{cluster_0=0, cluster_1=0,
cluster_2=41}
|   revenue ≤ 1.500: cluster_1 {cluster_0=0,
cluster_1=5, cluster_2=0}
|   type of services ≤ 2.500
|   |   revenue > 2.500
|   |   |   children > 0.500: cluster_2 {cluster_0=0,
cluster_1=0, cluster_2=3}
|   |   |   children ≤ 0.500: cluster_0 {cluster_0=2,
cluster_1=0, cluster_2=0}
|   |   revenue ≤ 2.500: cluster_1 {cluster_0=0,
cluster_1=38, cluster_2=0}

```

The third process determines the components of each cluster using a non-hierarchical clustering algorithm (Figure 5). This process uses **KMeans** and **ClusterModel2ExampleSet** operators.

Figure 5: Non- hierarchical process

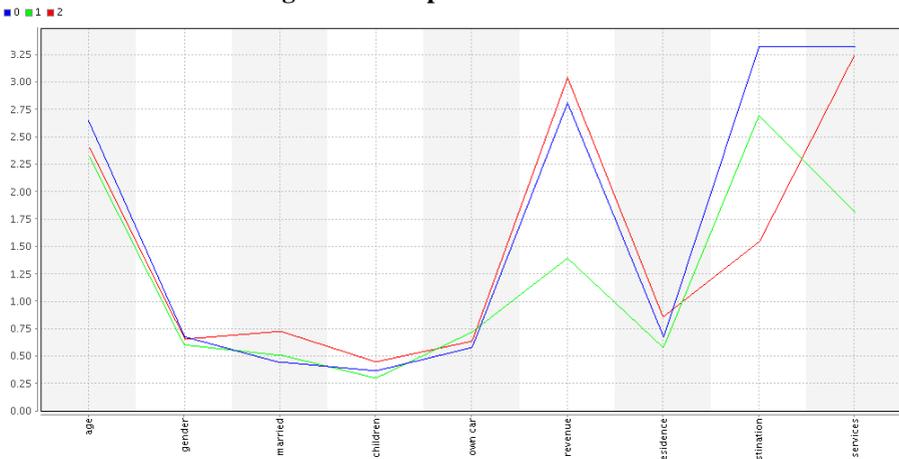


Rapid Miner give the possibility of better understanding the clusters construction offering tables and diagrams with centroid distances used in *k-means* method, as illustrated in Figure 6 and Figure 7. We use both the gain ratio and gain information criteria and the results were the same.

Figure 6 – Centroid Table

Attribute	cluster_0	cluster_1	cluster_2
age	2.651	2.326	2.409
gender	0.674	0.605	0.659
married	0.442	0.512	0.727
children	0.372	0.302	0.455
own car	0.581	0.721	0.636
revenue	2.814	1.395	3.045
residence	0.674	0.581	0.864
favorite desti	3.326	2.698	1.545
type of servic	3.326	1.814	3.250

Figure 7 – Graphic of centroid distances



The results obtained are very interesting. From above figures we can see that the main attributes depending on which division into clusters is done is *type of services* and *revenue*, which have the highest values for centroid distances.

5. Conclusion

In this paper we proposed a model customer behavior clustering based on tourist's characteristics. Using a hierarchical divisive clustering method followed by *K-means* algorithm, we obtain the optimum number of clusters, the clusters effective and a hierarchy of most relevant attributes.

In the tourism sector it is vital to understand customers' needs very quickly and respond to them with adequate offers – whether in the online or the offline business. At the same time companies in the tourism sector dispose of large amounts of historic data collected from their clients – a perfect field of application for data mining.

By dividing on the group of favorites, can be obtain further conclusions about future promotions and establish service packages.

Our future direction of study consists in using our proposed methods for other case studies to see their level of generality.

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FISCAL POLICY'S INFLUENCE ON ECONOMIC GROWTH IN THE EUROPEAN UNION

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Abstract

In this paper we study the impact of the fiscal policy on the economic growth for European Union, for the period 2000-2009. This subject represents a very debated problem in the economic literature. Our findings shows that, from the analysis of correlation between economic growth rate and total rate of taxation, there is generally an inverse relationship, meaning that an increase in the tax rate adversely affects economic growth. Continuing the analysis of the correlation between economic growth rate and total tax rate components it can be seen that there is an inverse relationship between labor taxation and capital taxation and economic growth in EU Member States. Both labour and capital taxes are part of direct taxes, so we conclude that a rise in direct taxes will cause a reduction in real GDP growth rate. In contrast, between taxes on consumption and real GDP growth rate there is no significant correlation.

Key words: *fiscal policy, economic growth, taxes on labour, taxes on capital, taxes on consumption.*

JEL classification: *E62, H20.*

1. Literature Review

The issue of a state fiscal policy, although widely recognized as being of major importance, still raises many questions such as: what kind of

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relationship exists between fiscal policy and economic growth? Increasing the total tax rate affects the real growth rate of GDP? How should act fiscal policy measures during the economic crisis: state must act pro-cyclical, neutral or countercyclical? How does total tax rate components act; does it matter the ratio's size, or its structure? These questions have tried to answer them for centuries, many researchers and specialists.

Afonso A. si Jalles J. T., based on a study of OECD countries related to "The Fiscal – Growth Nexus", concluded that "*government revenue has a negative impact on growth. Taxes on income are usually detrimental to growth, as well as public wages, interest payments, subsidies and government consumption have a negative effect on growth (António Afonso & João Tovar Jalles, 2012, page 25).*" The same authors, in a study published in February 2012 for the EU member states, have demonstrated that the fiscal rules set by the Stability and Growth Pact influence economic growth in the sense that restrictive tax provisions inhibit economic growth. (*António Afonso & João Tovar Jalles, February 2012, page 5*). The negative relationship between fiscal policy and equitable growth was also demonstrated by *Hyun Park*: "*...when fiscal policy is endogenously chosen at a social optimum, the relation between the rate of growth and tax rates is always negative, and when fiscal policy is exogenous an inverse U-shaped relationship exists between tax rates and growth rates (Park H., 2010, page 122).*"

The relationship between fiscal policy and economic growth was also studied by *Martin Zagler and Georg Durnecker*, and they concluded that "*taxes on savings, R&D, profits, raw capital and labour, have a direct impact on the growth rate of the economy, while the total tax rate has an indirect effect on economic growth, as they may finance growth enhancing government expenditures (Zagler M., Durnecker G., 2003, page 409).*"

R.H. Day and Yang Chengyu are reluctant to issue a rule related to relationship economic growth - tax rate, because in their view this depends on the time horizon and from a long-term perspective "*the effects of an increase in public spending and a decrease in taxation on economic growth and government budget balance depend on the relative size of marginal propensity to consume and invest and could be positive under certain conditions; ... both positive and negative effects on growth and budget balance of the same fiscal policy are found in different time periods (R. H. Day, Yang C., 2011, page 218).*"

Obreja L. Brasoveanu and Brasoveanu I, analysing the relationship between taxation – economic growth for the Romanian economy, “applying the regression technique for the period 1990-2007 concluded that *in Romania the effects of the distortionary and nondistortionary taxes on economic growth are negative (Obreja Brasoveanu L., Brasoveanu I, page 25).*”

Most of the studies demonstrate a negative relation between taxation and economic growth, or more accurately, no study shows that a high rate of taxation stimulates economic growth.

In the next section of this paper we test the correlation between fiscal policy and economic growth in European Union member states for the period 2000-2009.

2. Study Regarding The Relationship Between The Fiscal Policy And Economic Growth In The European Union

This study aims to objectively analyze the relationship between fiscal policy, expressed through taxation rate and economic growth rate in the EU, expressed in real GDP growth rate in the period 2000 to 2009. Following this analysis one can identify the operation mode of the fiscal policy on the economic cycle phases. Using statistical analysis software SPSS, there was made an analyses of the correlation that exists between the total rate of taxation and real GDP growth rate of each year, by Pearson correlation coefficient and the correlation between real GDP growth rate and total tax rate components: the average consumption tax, the average capital tax and the average labour tax. This type of segmentation was performed to capture the component of fiscal policy that most affects the economic growth, and in this way directions to follow will be drawn, in mater of the taxation in Romania in the period to come.

Table 1: Analysis of correlation between real GDP growth rate and total tax rate, the average consumption tax, the average capital tax and the average labour tax in the EU during 2000 - 2009

	total taxes rate (%GDP)	taxes on consumption (%GDP)	taxes on labour (% GDP)	taxes on capital (% GDP)
2000				

real GDP growth rate	Pearson Correlation Sig. (2-tailed) N	-.221 .258 28	-.082 .677 28	-.213 .276 28	-.070 .723 28
2001		total taxes rate	taxes on consumption	taxes on labour	taxes on capital
real GDP growth rate	Pearson Correlation Sig. (2-tailed) N	-.565** .002 28	-.214 .274 28	-.357 .062 28	-.511** .005 28
2002		total taxes rate	taxes on consumption	taxes on labour	taxes on capital
real GDP growth rate	Pearson Correlation Sig. (2-tailed) N	-.638** .000 28	-.055 .783 28	-.455* .015 28	-.539** .003 28
2003		total taxes rate	taxes on consumption	taxes on labour	taxes on capital
real GDP growth rate	Pearson Correlation Sig. (2-tailed) N	-.628** .000 28	-.084 .669 28	-.409* .031 28	-.580** .001 28
2004		total taxes rate	taxes on consumption	taxes on labour	taxes on capital
real GDP growth rate	Pearson Correlation Sig. (2-tailed) N	-.562** .002 28	.028 .889 28	-.364 .057 28	-.655** .000 28
2005		total taxes rate	taxes on consumption	taxes on labour	taxes on capital
real GDP growth	Pearson	-.573**	.106	-.413*	-.605**

rate	Correlation				
	Sig. (2-tailed)	.001	.591	.029	.001
	N	28	28	28	28
2006		total taxes rate	taxes on consumption	taxes on labour	taxes on capital
real GDP growth rate	Pearson Correlation	-.608**	.040	-.339	-.723**
	Sig. (2-tailed)	.001	.840	.078	.000
	N	28	28	28	28
2007		total taxes rate	taxes on consumption	taxes on labour	taxes on capital
real GDP growth rate	Pearson Correlation	-.667**	-.051	-.484**	-.446*
	Sig. (2-tailed)	.000	.797	.009	.017
	N	28	28	28	28
2008		total taxes rate	taxes on consumption	taxes on labour	taxes on capital
real GDP growth rate	Pearson Correlation	-.251	.320	-.382*	-.024
	Sig. (2-tailed)	.198	.097	.045	.905
	N	28	28	28	28
2009		total taxes rate	taxes on consumption	taxes on labour	taxes on capital
real GDP growth rate	Pearson Correlation	.218	-.123	-.013	.684**
	Sig. (2-tailed)	.264	.533	.947	.000
	N	28	28	28	28

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Source: authors' own computations

The analysis of correlation between economic growth rate and total rate of taxation can be seen that overall, there is an inverse relationship, i.e. increasing the tax rate in effect unfavourably affects growth. The exception is in 2009 when there is no significant correlation registered. Hence the importance of adopting countercyclical fiscal measures as market intervention levers and adjustments for economic activity. The same idea is shared by Nouriel Roubini who identified the directions need to be followed by fiscal policy during an economic crisis, namely (Roubini N., Mihn S., 2010):

- Increase public spending on investment, even if this requires expenses incurred on the budget deficit;
- Fiscal loosening through tax cuts that encourages, at least theoretically, consumers to consume more and thus to boost market demand;
- Making direct payments by the state to social disadvantaged groups.

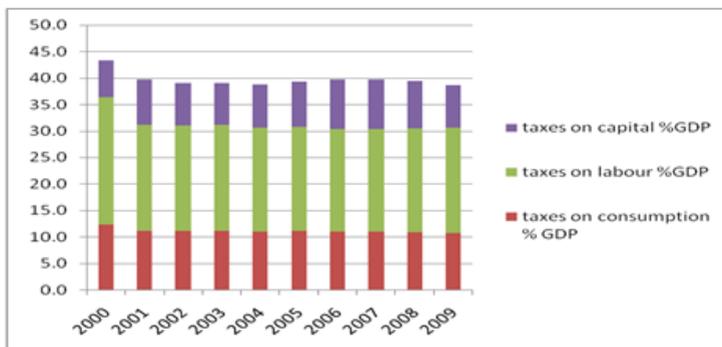
Even if Roubini agrees with these three types of state fiscal and budgetary interventions during crisis, in order to stop the economy from freefall, is aware of the major risk associated with these measures applied simultaneously, namely that of strong increase of public debt: “*fiscal policy is not a free lunch* (Roubini N., Mihn S., 2010, page 278)”. U.S. massively made use during the recent crisis of all three fiscal strategy supporting a total cost of 787 billion dollars in 2009 (Roubini N., Mihn S., 2010, page 277), circumstances which justify the accumulation of huge sovereign debt. Similar measures have been taken in the EU member states, but not too extensive, and not in block. In Romania, for example, the state tried to boost investment, but on lower current expenditures (with goods and salaries), total rate of taxation has not recorded any loss, on the contrary, the tax rates for indirect taxes (VAT and excise) increased, and by the state payments for vulnerable social groups took the form of investment subsidies (i.e. “First Home” program, vehicle fleet renewal program). Romania's public debt increased, but until now has not exceeded the level of 60% of GDP, a level considered sustainable by the EU.

Continuing the analysis of the correlation between the economic growth rate and total tax rate components can be seen that there is an inverse relationship between labour taxation, capital taxation and economic growth in EU member states. Both labour taxes and ones on the capital are part of direct taxes, so we conclude that a rise in direct taxes will cause a reduction in real

GDP growth rate. Instead, between taxing consumption and real GDP growth rate there is no significant correlation. Taxes on consumption are part of indirect taxes, and you can see from Table 1 that in the 10 years analyzed there is usually an inverse relationship between the two indicators, but not significant. For these reasons, Romania did in July 2010, during the economic crisis, increase in VAT from 19% to 24%, increasing excise duties on tobacco and fuel unit, leaving the direct tax rates unchanged. Thus, the negative impact of increased total taxation (from 27% of GDP in 2009 to 28.1% of GDP in 2010) on real GDP growth rate was minimal (real growth rate of GDP in 2009 to was -6.6% and -1.6% in 2010), because the increase was based on indirect tax rates.

Based on the results of this analysis can be said that in order to stimulate the economic growth based on the fiscal policy is generally indicated to undertake a decrease total tax rate due to decrease taxes on labour and capital, meaning distorted taxes. Especially labour tax rate should be decreased because it has a high share in forming the overall rate of taxation (see chart 1).

Chart 1: The structure of total tax rate in EU 27, in 2000 – 2009 period



Source: authors' own computations based on data from European Commission, Taxation and Customs Union, (2011 edition), *Taxation Trends in the European Union*. Data for the EU Member States, Iceland and Norway.

Related to reducing taxes on labour and capital we do not definitely support the idea to decrease tax rates, but rather applying an incentive regime for deductions to generate private sector investment.

3. Conclusions

Fiscal policy has an important role on the economic development of a state, but at the same time, gives rise to many controversies about the types of measures to be undertaken. From the analysis made in section 2 on EU countries during 2000-2009, shows that between total tax rate (expressed as % of GDP) and real growth rate of GDP there is an inverse relationship, meaning that policy measures tax must be countercyclical nature. Analyzing components of tax rates is observed that the taxation of labour and capital exert the greatest influence on economic growth, consumption taxes do not show a significant influence. The correlation between the real rate of growth of the GDP and the three components of the total tax rate in European Union reveals a link of negative causality between the economic growth and distorted taxes and inconclusive between the non - distorted taxes. According to Barro's classification, the distortionary tax revenues are: personal income taxes, corporate income taxes, social security contributions, property taxes and non-distortionary tax revenues are value added tax, excise duties.

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FINANCIAL MARKET TESTS OF INFORMATIONAL EFFICIENCY: THE CASE OF EMERGENT MARKETS

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Abstract

Efficient Market Hypothesis (EMH) has attracted a considerable number of studies in empirical finance, particularly in determining the market efficiency of an emerging financial market. These efficiency tests in the emerging financial markets are rarely definitive in reaching a conclusion about the presence of market efficiency in terms of information. This paper tests the weak-form market informational efficiency in Romania. We test the random walk hypothesis of stock exchange index BET of Bucharest Stock Exchange using statistical tests. To test for the existence of the normality hypothesis of distributed instantaneous yields (logarithmic) of stock index we employ Jarque-Bera and QQ-plot tests. The stationary tests for instantaneous yields (logarithmic) of BET that we use are unit root tests, run tests and variance ratio test. The used tests determined empirically the presence of linear dependences for the returns series.

Key Words: *efficient market hypothesis, information, emergent, random walk*

JEL Classification: *G14, D8, G00*

1. Introduction: efficiency market hypothesis and random walk

For someone who analyzes the evolution of a price for a security, the key question is whether the movement is random or not. If the evolution is random, the probability to build a profitable strategy declines. More inefficient

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a market is, more predictable trading opportunities arise. Tests for the market efficiency should be carried in order to discover the dimension of the predictable trading opportunities. The availability of trading opportunities represents the degree of market inefficiency.

Considerations concerning the efficiency of financial markets lay under two theories: random walk and the theory of efficient markets. The first theory, random walk, is the theory of random movement of the financial assets. Elaborated during the 6th decade of the 20th century, it supports the idea that the future movement of an asset is independent from past movements of assets on a market. In an informational efficient market, price movements are unpredictable, because they encompass the information and expectations of all market participants.

The second theory, which refers to the hypothesis of efficient markets, was established in the early 60s and assumes that asset markets process with great sensitivity the economic intelligence which they receive and react quickly to adjust the course of financial assets. The **efficiency market hypothesis (EMH)** is a statement about:

- the theory that stock prices reflect the true value of stocks;
- the absence of arbitrage opportunities in an economy populated by rational, profit-maximizing agents;
- the hypothesis that market prices always fully reflect available information (Fama 1970).

The **Random Walk Model (RWM)** is the model which assumes that subsequent price changes are sovereign and homogeneously distributed random variables and concludes that changes in assets prices cannot be forecasted through historical price changes and movements. The Random Walk Model is generally used to test the weak-form Efficient Market Hypothesis (Hamid K. et all, 2010).

Random walk theory claims that stock market can be analyzed as random walk according to the next three facts (Vulic, 2010):

- efficient markets respond very fast to new information;
- if the share price is a reflection of all available information, it is impossible to use that information for market predictions;
- it is impossible to predict market movement other than randomly.

The empirical evidences show that the random walk hypothesis is “almost approximately true”. More precisely, if the financial assets returns are partial predictable, both on the short time, and on the medium and long time,

the degree of predictability is generally low comparative with the high volatility of these returns.

A random walk is a usual example of a non-stationary series:

$$y_t = y_{t-1} + \varepsilon_t$$

where ε_t is a casual perturbation with stationary character. The series y_t present an upward variance in time, while its 1st difference is stationary because:

$$y_t - y_{t-1} = (1 - L)y_t = \varepsilon_t$$

Regarding the independence property, Fama states the fact that random walk represents an ideal model, it is not a fair copy of the reality, because it is improbable to find perfect independent prices in the market. Even so, it can be accepted as a good model of reality.

This paper is structured as follows: section 2 presents some previous applied tests on emerging capital markets informational efficiency. Section 3, data and empirical methodology, discusses the statistical tests used in testing the weak-form of informational efficiency of Romanian capital market. The empirical results of these tests are presented in section 4. The conclusions are given in the last section 5.

2. Previous tests of informational efficiency applied on emerging capital markets

Emerging equity markets are widely thought to be places of substantial trading profits and weak and semi-strong form market inefficiencies when compared to developed markets. In their article, Griffin, Kelly and Nardari, 2009, examine the extent to which this is true using a variety of methodologies and data from 28 developed and 28 emerging markets. Emerging markets exhibit similar autocorrelation in firm returns, suggesting that they are not under or overreacting to news contained in past returns any more than in developed markets. Emerging markets incorporate past market and portfolio returns into prices slightly better than developed markets.

Using the article of Basu and Morey (2005), who developed a theoretical model that explores the effect of trade openness on stock return autocorrelation patterns, the paper of Lim and Kim, 2008, brings their proposition to the data, examining the impact of liberalization policies, both trade and financial, on the informational efficiency of 23 emerging stock markets. In general, the key results from fixed effects panel regressions

support their prediction that trade liberalization, rather than financial openness, matters the most for informational efficiency.

Employing both cointegration analysis and a variety of Granger causality tests, Guttler, Meurer, Da Silva (2007) examine whether the Brazilian stock market is efficient in processing new information about public macroeconomic data (semi-strong efficiency). They found the stock market to be inefficient, which is in line with most results for other emerging markets. They found a long run relationship between selected macroeconomic variables of the Brazilian economy and its stock market index.

Islam, Watanapalachaikul, Clark (2007) proposed a theory-free paradigm of non-parametric tests of market efficiency for an emerging stock market, the Thai stock market, consisting of two tests which are run-test and autocorrelation function tests (ACF), to establish a more definitive conclusion about EMH in emerging financial markets. The result of this research demonstrates that an autocorrelation on Thai stock market returns exists particularly during the post-crisis period.

Regarding Romanian capital market, it has been investigated rationality of Romanian investors, and efficiency market hypothesis represented a useful tool in order to achieve this goal (Dragotă, Mitrica, 2004). The tests suggested by Fama [1970] have been successfully applied by many authors. Therefore, for many Romanian researchers it was incentive to proceed on investigating informational efficiency of Romanian capital market. Most of these studies have focused on the weak form of informational market efficiency using in that sense autocorrelation coefficients, normality and stationarity tests (Augmented Dickey-Fuller and Phillips-Perron) in order to test random walk pattern for stock returns.

One particular study, relatively recent and different from those existing, is that of Voineagu and Pele (2008), in which the efficiency of the capital market in Romania is tested using an econometric model based on the random walk theory, proving the weak form efficiency of this market.

Another recent paper (Brătian, Opreana, 2011) tested the hypothesis of efficient market in the case of capital market in Romania during the economic financial crisis. Following statistical tests applied to stock indexes BET, BET-C and BET-FI to detect random-walk type behavior, led to the rejection of hypothesis behavior of these daily series of stock indexes. They have not obtained sufficient evidence to support the efficient market hypothesis in weak form, for the daily stock indexes.

Lazăr and Ureche (2007) tested weak-form market efficiency of eight emerging markets: Romania, Hungary, Czech Republic, Lithuania, Poland, Slovakia, Slovenia and Turkey. The used tests determined empirically the presence of linear and nonlinear dependences, for most of the returns series. Most of these emerging equity markets were not weak-form efficient.

In their paper, Omay and Karadagli (2010) addressed weak form stock market efficiency of emerging economies, by testing whether the price series of these markets contain unit root. The results of ADF and PP indicated that Bulgarian, Greek, Hungarian, Polish, Romanian, Russian, Slovenian and Turkish stock markets were weak form efficient, while the results of nonlinear unit root test implied that Russian, Romanian and Polish stock markets were not weak form efficient.

The analyze done in their paper (Dima, Barna, Pirtea, 2007) suggests the following aspects: the financial sector of the market reflected by the BET-FI index can be described „up to a point” as being „informational efficient” (in the weak way of the concept), but the assembly of the weak characteristics does not fully respect the demands raised by such a characterization.

In their paper, Dragotă, Caruntu, Stoian (2005) reveal that it is not necessary that a market is informational efficient only if prices follow a random walk. In other words, this is a necessary condition, but not a sufficient one. For example, on Romanian capital markets, some studies reveal a random walk evolution of prices. However, their study proves that there is a significant difference between price and an intrinsic value for some assets, which represents a major feature of Romanian capital markets, because that anomaly is persistent in time. Basically, the results of their study put in question investors' rationality on Romanian capital markets.

3. Data and empirical methodology

The data used for this study is the market value-weighted equity index BET of Bucharest Stock Exchange in Romania. The time series cover a period of 10 years, from october 2002 to october 2012. The data consist of 2500 daily values of this index. The returns have been measured using the first difference of monthly logarithmic price index:

$$R_t = d \log_e(C_t) = \log_e(C_t) - \log_e(C_{t-1})$$

Arithmetic and logarithmic returns are not equal, but are approximately equal for small returns. The difference between them is large only when

percent changes are high. We used logarithmic returns because the main advantage is that the continuously compounded return is symmetric, while the arithmetic return is not: positive and negative percent arithmetic returns are not equal.

As we mentioned before, the phenomenon such as white noise and random walk are always connected with EMH. Investors react instantaneously to any informational advantages they have and no profit can be made from information based trading. It should be noted that the EMH and random walks do not amount to the same thing. A random walk of stock prices does not imply that the stock market is efficient with rational investors. A random walk is defined by the fact that price changes are independent of each other. If analyzed time series follow random walk they are nonstationary so it could be concluded that they are unpredictable. In that case the capital market is indicated as efficient.

In order to solve the data statistical processing problems, it implies in general the approximation of an experimental distribution with the most corresponding theoretical distribution. Because almost all processes comply with normal (or Gaussian) distribution, the most frequent used tests apply to normality testing.

For this purpose, our empiric test followed the research of the random walk hypothesis of BET index of the Bucharest Stock Exchange, using the following tests:

- Tests looking for the existence of the normality hypothesis of distributed instantaneous yields (logarithmic) of stock index;
- Stationary tests for instantaneous yields (logarithmic) of stock index.

A first analysis we took into consideration to assess normality and homoscedasticity was the study of the graphics of logogrammatic returns of BET. An extra test consists in the study of error variance that has to be normal distributed, zero mean and constant variance. To study the normality, we used the following indicators: Kurtosis, Skewness and Jarque-Bera.

The Jarque–Bera test is a test of whether sample data of returns have the skewness and kurtosis matching a normal distribution. If the data come from a normal distribution, the *JB* statistic asymptotically has a chi-squared distribution with two degrees of freedom, so the statistic can be used to test the hypothesis that the data are from a normal distribution. The null hypothesis is a joint hypothesis of the skewness being zero and the excess kurtosis being

zero. Samples from a normal distribution have an expected skewness of 0 and an expected excess kurtosis of 0 (which is the same as a kurtosis of 3). As the definition of *JB* shows, any deviation from this increases the *JB* statistic. If kurtosis is bigger than 3, the distribution is called leptokurtotic and if it is less than 3, platykurtotic.

Also, to test the hypothesis of normality of instantaneous returns of index BET, we used QQ-plot test. Theoretical quantile-quantile plots are used to assess whether the data in a single series follow a specified theoretical distribution; *e.g.* whether the data are normally distributed (Cleveland, 1994; Chambers, *et al.* 1983). If the two distributions are the same, the QQ-plot should lie on a straight line. If the QQ-plot does not lie on a straight line, the two distributions differ along some dimension. The pattern of deviation from linearity provides an indication of the nature of the mismatch.

From an economic point of view, a series is stationary if a dash on the series is temporary (is absorbed in time) and not permanent. If the series is not stationary, by differences, it can be obtained a stationary series. So, the order of integration of the series represents the number of consecutive differences required to obtain a stationary series (or the number of unit roots of the series). In economy, the most frequent non-stationary series are integrated by order one (they need only one difference, having one unit root). The stationary tests for instantaneous yields (logarithmic) of stock index we used are: unit root tests, run test and variance ratio test.

Unit root tests are used to show if the series is stationary or not. The most used stationarity tests are Augmented Dickey-Fuller (ADF) and Phillips-Perron (P-P).

ADF is the most popular stationary test. It was presented by the statisticians David Alan Dickey and Wayne Arthur Fuller in 1979 and 1981. ADF test is used to test the unit root hypothesis. If one time series has unit root that means it is nonstationary and it follows random walk. ADF Test Statistic and PP Test Statistic represent the t test for accepting or rejecting the null hypothesis of the Dickey-Fuller and Phillips Perron tests. To reject the null hypothesis (series is unit root), if the value of the t statistic test is less than the critical value for the significant level chosen.

As a test on independence of the instantaneous returns distributions, we calculated the autocorrelation between the instantaneous yields with a lag of *k* according to the formula:

$$\rho_k = \frac{\text{cov ar}(d \ln S_t, d \ln S_{t-k})}{\text{var}(d \ln S_t)}$$

The autocorrelation function test is examined to identify the degree of autocorrelation in a time series. It measures the correlation between the current and lagged observations of the time series of stock returns. If time series has unit root, than the autocorrelation function slowly decrease starting from the value of one and the partial correlation function has only first value which differs from zero. If one time series has two unit roots, ACF act the same way as for the one unit root series, but the PACF has only first two nonzero values.

Another technique that will be used for testing the autocorrelation is Ljung-Box (1979), for autocorrelations with lag more or equal to 1. The Ljung-Box test is a type of statistical test of whether any of a group of autocorrelations of a time series are different from zero. Instead of testing randomness at each distinct lag, it tests the "overall" randomness based on a number of lags, and is therefore a portmanteau test. This test is sometimes known as the Ljung-Box Q test, and it is closely connected to the Box-Pierce test. The Box-Pierce test statistic is a simplified version of the Ljung-Box statistic for which subsequent simulation studies have shown poor performance. Ljung-Box test provides a superior fit to the chi-square distribution for little samples.

The run test is a non-parametric test whereby the number of sequences of consecutive positive and negative returns is tabulated and compared against its sampling distribution under the random walk hypothesis. In the stock market, run test of randomness is applied to know if the stock price of a particular company is behaving randomly, or if there is any pattern. Run test of randomness is basically based on the run. Run is basically a sequence of one symbol such as + or -. A run is defined as the repeated occurrence of the same value or category of a variable. It is indexed by two parameters, which are the type of the run and the length. Stock price runs can be positive, negative, or have no change. The length is how often a run type occurs in succession. Run test of randomness assumes that the mean and variance are constant and the probability is independent.

The procedure first classifies each value of the variable as falling above or below a cut point and then tests to ensure that there is no order to the resulting sequence. Because it is a function of the number of positive and

negative cases, the expected number of runs always depends on the cut point. The results of the runs test may depend on the choice of cut point.

Under the null hypothesis that successive outcomes are independent, the total expected number of runs is distributed as normal with the following mean and the following standard deviation:

$$E(R) = \frac{n + 2n_A n_B}{n}$$
$$\sigma_R = \sqrt{\frac{2n_A n_B (2n_A n_B - n)}{n^2 (n - 1)}}$$

where n is the total number of observations, n_A is the number of first run cycle, and n_B is the number of second run cycle. Number of runs is marked with R . If the number of observations is large its distribution is almost equal to normal distribution. The test for serial dependence is carried out by comparing the actual number of runs, to the expected number. The null proposition is: $H_0 : E(\text{runs}) = E(R)$. and checks a randomness hypothesis for a two-valued data sequence. It can be used to test the hypothesis that the elements of the sequence are mutually independent. If the number of observations is large its distribution is almost equal to normal distribution. That is why we can use standard normal Z distribution for implementing Run test. The formula for standard score is:

$$Z = \frac{R - E(R)}{\sigma_R}$$

If calculated Z value is different than critical value with appropriate significance level, than we can reject Null hypothesis and conclude that analyzed stock index cannot be predicted. In that case capital market will satisfy weak form of market efficiency.

The question of whether asset prices are predictable has long been the subject of considerable interest. One popular approach to answering this question, the Lo and MacKinlay (1988, 1989) overlapping variance ratio test, examines the predictability of time series data by comparing variances of differences of the data (returns) calculated over different intervals. A significant assumption of the random walk theory is investigated through variance ratio test. If we assume the data follow a random walk, the variance of a q -period difference should be q times the variance of the one-period difference. Evaluating the empirical evidence for or against this restriction is the basis of the variance ratio test.

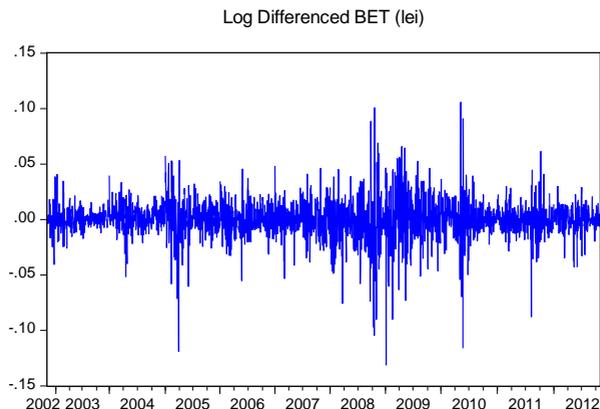
4. Empirical results

4.1. Tests on the hypothesis of normality of instantaneous returns of BET

In order to test the normality distribution hypothesis of the logarithmic (or continuously compounded) returns of BET we use the graphical analysis, Jarque-Bera test and QQ-plot test.

a. Graphical analysis

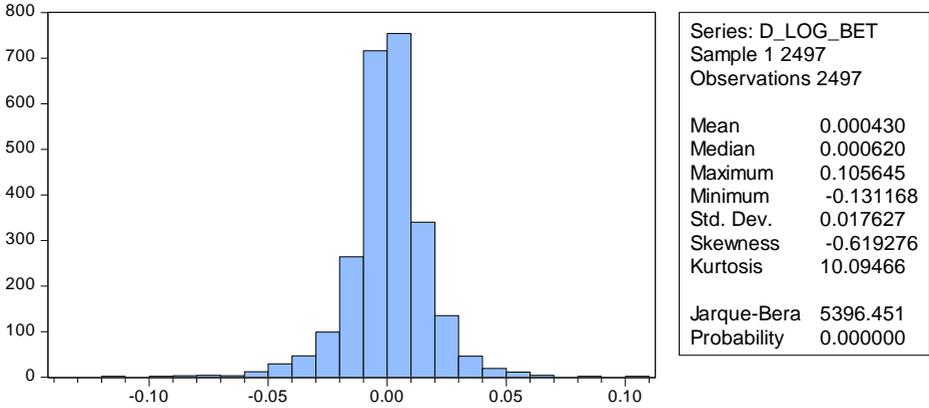
A first analysis we can take into consideration to assess normality and homoscedasticity is the study of the graphics of logogrammatic returns of BET, as:



Graphically we notice that in this 10 years period the lack of normality is not very clear but heteroscedasticity is quite easy to be grasped by the irregular amplitude of variations.

b. Jarque-Bera test

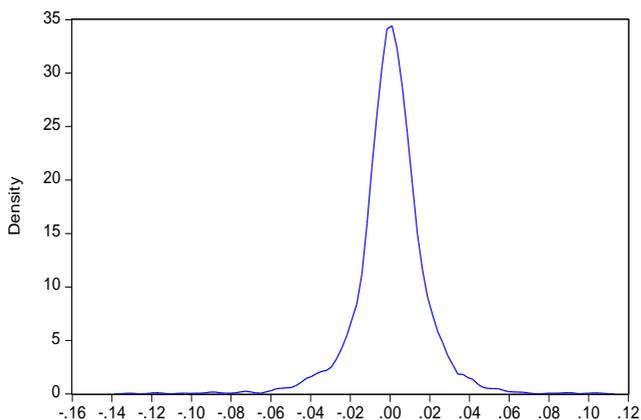
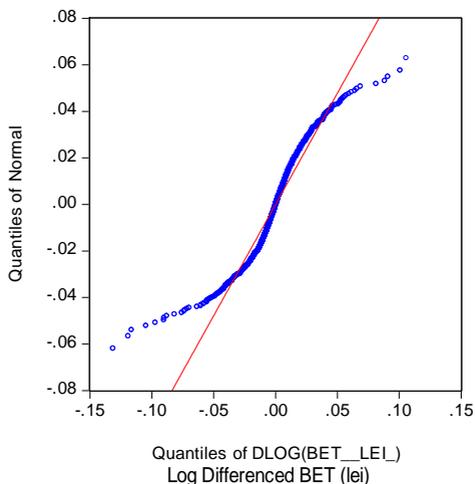
The **Jarque-Bera test** is a test of whether sample data of returns have the skewness and kurtosis matching a normal distribution. The results of this test are shown below:



The BET series is asymmetric on the left, because the Skewness indicator (the asymmetry coefficient) is negative, and the Kurtosis indicator (the flattening coefficient) shows us that the series have a vaulting superior to the one specific to the normal distribution ($k=3$), the distribution of the daily instantaneous returns of BET being leptokurtosis. If the associated probability of the test is bigger than the chosen relevance level (1, 5, 10%), the null hypothesis of normal distribution is accepted. In our study, because the value of the associated probability is zero, the null hypothesis of normal distribution is rejected.

c. Quantile-Quantile (QQ-plot)

Other form to test the normality of the distribution is Quantile-Quantile plot. Our test displays the QQ-plot comparing the quantiles of the data with the quantiles of a fitted normal distribution. If the two distributions are the same, the QQ-plot should lie on a straight line. If the QQ-plot does not lie on a straight line, the two distributions differ along some dimension. The graphical representation of the BET distribution is obtained through the Kernel Density chart:



As it can be noticed from the analyzed data, the QQ-plot chart for BET index highlights the fact that the daily yields are not normally distributed. Also, we cannot conclude that the series distributions are normal based on the Jarque-Bera test. Because of the correlation existing between yields, and because they do not have a normal distribution, we reject the hypothesis that these time series are random walk type and so, serious question marks are raised regarding the existence of weak form informational efficiency on the Romanian capital market.

4.2. Stationary tests for instantaneous returns of BET index

a. Unit root tests

To test the stationary for instantaneous returns, daily calculated, of the stock indexes on the Romanian capital market, we use Augmented Dickey-Fuller (ADF) and Phillips-Perron tests. Also, the autocorrelation coefficients are calculated and the Ljung-Box test is used.

ADF test implies that the series of natural logarithms of BET index, analyzed by us, follow the stochastic process¹, type AR(1). In other words, ADF Test Statistic represents the t test for accepting or rejecting the null hypothesis of the Dickey-Fuller test. Phillips-Perron test is a test that does not include in the tested equation differences between the past series and is using the method of least squares in a simple form. The test itself is a t-statistic for regression coefficient, but adjusted to remove errors.

After the data adaptation using EViews 7, the results of ADF test for the level and for the first difference are shown below:

Augmented Dickey-Fuller Unit Root Test for Log(BET) (for level)

Null Hypothesis: LOG_BET_ has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=26)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.108449	0.2414
Test critical values:		
1% level	-3.432776	
5% level	-2.862498	
10% level	-2.567325	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LOG_BET_)

Method: Least Squares

Date: 10/27/12 Time: 16:16

Sample (adjusted): 3 2498

Included observations: 2496 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_BET_(-1)	-0.001515	0.000719	-2.108449	0.0351
D(LOG_BET_(-1))	0.102336	0.019905	5.141248	0.0000
C	0.013186	0.006080	2.168648	0.0302
R-squared	0.012288	Mean dependent var		0.000432
Adjusted R-squared	0.011496	S.D. dependent var		0.017630
S.E. of regression	0.017529	Akaike info criterion		-5.248764
Sum squared resid	0.765980	Schwarz criterion		-5.241765
Log likelihood	6553.457	Hannan-Quinn criter.		-5.246223
F-statistic	15.50803	Durbin-Watson stat		1.996665
Prob(F-statistic)	0.000000			

The first part of the test displays the result of the test, the critical values for every relevance level (1,5,10%) and the associated p probability with the test. In our study, for log_BET, ADF value is -2,108440 and the associated p is 0,2414. If the test value is bigger than the critical one, the null hypothesis is not rejected (the series has one unit root, it is non-stationary). In our case the null hypothesis is not rejected (it means that the BET series is non-stationary for the level). These results don't admit the rejection of the null hypothesis of random walk evolution of the returns, implying an important probability that the weak-form of informational efficiency exists in romanian capital market. But still these tests are not sufficient in order to assert certainly that the capital market is weak efficient in terms of information.

The second part of the test presents the estimated equation, which is the basis of the ADF test calculation. In order to determine the order of integration of the series, we test the stationarity of the first difference of BET series (dlog(BET)):

Augmented Dickey-Fuller Unit Root Test for DLog(BET) (for the first difference)

Null Hypothesis: D(LOG_BET_) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=26)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-45.05436	0.0001
Test critical values:		
1% level	-3.432776	
5% level	-2.862498	
10% level	-2.567325	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LOG_BET_,2)

Method: Least Squares

Date: 10/27/12 Time: 16:19

Sample (adjusted): 3 2498

Included observations: 2496 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG_BET_(-1))	-0.897400	0.019918	-45.05436	0.0000
C	0.000387	0.000351	1.103047	0.2701
R-squared	0.448705	Mean dependent var		1.43E-06
Adjusted R-squared	0.448484	S.D. dependent var		0.023619
S.E. of regression	0.017541	Akaike info criterion		-5.247783
Sum squared resid	0.767346	Schwarz criterion		-5.243118
Log likelihood	6551.233	Hannan-Quinn criter.		-5.246089
F-statistic	2029.895	Durbin-Watson stat		1.996659
Prob(F-statistic)	0.000000			

The value of ADF statistics is significantly smaller than the critical values at 1%, 5% and 10% significance level. The Null hypothesis is rejected. Time series $dlog(BET)$ is stationary and it doesn't have a unit root nor it follows random walk. At the same time we reject the hypothesis of weak for efficiency for the capital market in Romania.

Phillips-Perron test operates using the same principle as ADF. The obtained results are similar using P-P test:

Phillips-Perron Unit Root Test for Log(BET) (for the level)

Null Hypothesis: LOG_BET_ has a unit root

Exogenous: Constant

Bandwidth: 14 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-2.095866	0.2465
Test critical values:		
1% level	-3.432775	
5% level	-2.862497	
10% level	-2.567325	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.000310
HAC corrected variance (Bartlett kernel)	0.000394

Phillips-Perron Test Equation

Dependent Variable: D(LOG_BET_)

Method: Least Squares

Date: 10/27/12 Time: 16:58

Sample (adjusted): 2 2498

Included observations: 2497 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_BET_(-1)	-0.001529	0.000722	-2.118783	0.0342
C	0.013342	0.006104	2.185669	0.0289
R-squared	0.001796	Mean dependent var		0.000430
Adjusted R-squared	0.001396	S.D. dependent var		0.017627
S.E. of regression	0.017615	Akaike info criterion		-5.239377
Sum squared resid	0.774134	Schwarz criterion		-5.234713
Log likelihood	6543.362	Hannan-Quinn criter.		-5.237684
F-statistic	4.489240	Durbin-Watson stat		1.795260
Prob(F-statistic)	0.034207			

Phillips-Perron Unit Root Test for DLog(BET) (for the first difference)

Null Hypothesis: D(LOG_BET_) has a unit root

Exogenous: Constant

Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-45.09237	0.0001
Test critical values:		
1% level	-3.432776	
5% level	-2.862498	
10% level	-2.567325	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.000307
HAC corrected variance (Bartlett kernel)	0.000312

Phillips-Perron Test Equation

Dependent Variable: D(LOG_BET_,2)

Method: Least Squares

Date: 10/27/12 Time: 17:00

Sample (adjusted): 3 2498

Included observations: 2496 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG_BET_(-1))	-0.897400	0.019918	-45.05436	0.0000
C	0.000387	0.000351	1.103047	0.2701
R-squared	0.448705	Mean dependent var		1.43E-06
Adjusted R-squared	0.448484	S.D. dependent var		0.023619
S.E. of regression	0.017541	Akaike info criterion		-5.247783
Sum squared resid	0.767346	Schwarz criterion		-5.243118
Log likelihood	6551.233	Hannan-Quinn criter.		-5.246089
F-statistic	2029.895	Durbin-Watson stat		1.996659
Prob(F-statistic)	0.000000			

By putting into practice the two methodologies of testing we can conclude: the null hypothesis is accepted for level, and for the difference it is not accepted, therefore the BET is of 1 order (with 1% level of significance).

In order for a time series to be integrable by order 1, the autocorrelation coefficients must be close to 1, and the autocorrelation coefficients for the first difference must be (statistically significant) less than 1. Using EViews 7 application we obtained the following results regarding these tests. We analyzed the autocorrelation coefficients for different lags and the partial correlation coefficients of the series for the level - log(BET) and for the first difference - dlog(BET) in the following correlograms:

Correlogram of LOG_BET_

Date: 10/27/12 Time: 14:59						
Sample: 1 2498						
Included observations: 2498						
Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	0.998	0.998	2493.3	0.000
		2	0.997	-0.047	4979.3	0.000
		3	0.995	0.001	7458.0	0.000
		4	0.993	0.011	9929.4	0.000
		5	0.992	0.006	12394.	0.000
		6	0.990	-0.017	14851.	0.000
		7	0.989	0.007	17301.	0.000
		8	0.987	-0.007	19744.	0.000
		9	0.985	-0.026	22179.	0.000
		10	0.983	-0.011	24607.	0.000
		11	0.982	-0.003	27026.	0.000
		12	0.980	-0.012	29438.	0.000

Correlogram of D(LOG_BET_)

Date: 10/27/12 Time: 14:55						
Sample: 1 2498						
Included observations: 2497						
Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
		1	0.103	0.103	26.317	0.000
		2	-0.006	-0.016	26.398	0.000
		3	-0.030	-0.028	28.631	0.000
		4	-0.022	-0.017	29.872	0.000
		5	0.039	0.043	33.773	0.000
		6	-0.009	-0.019	33.999	0.000
		7	0.012	0.014	34.335	0.000
		8	0.055	0.055	41.928	0.000
		9	0.029	0.019	44.020	0.000
		10	0.003	-0.002	44.049	0.000
		11	0.049	0.055	50.050	0.000
		12	0.003	-0.005	50.070	0.000

Based on the results of correlogram, ACF and PACF statistics for Dlog(BET) we can make a conclusion that the BET index represent stationary time series. Correlogram so as the values of ACF and PACF decrease slowly and ACF and PACF have very small values which all implies that the analyzed series is stationary. Stationary goes hand in hand with inefficiency of Romanian capital market. Also, the linear dependence of the returns is highlighted by the significant values of the autocorrelation coefficients for the level (e.g. for lag 1 – 0,998). Also, by applying the Ljung-Box test we determined the fact that **there are linear dependencies**, the p values being smaller that the critical value of 0.05.

b. Run test

The results of basic parameters for the Run test applied on time series BET are given in the table bellow (performed in SPSS):

Descriptive Statistics

	N	Mean	Std. Deviation	Min.
DLOG_BET	2497	,000429868	,017626908	-1,3116800E-1
	Percentiles			Max.

	N	Mean	Std. Deviation	Min.
	25th	50th (Median)	75th	
DLOG_BET	-7,209000000E-3	,000620000	8,858000000E-3	,1056450

Runs Test 2

	DLOG_BET
Test Value ^a	-,0003360 ^b
Cases < Test Value	1149
Cases >= Test Value	1348
Total Cases	2497
Number of Runs	1152
Z	-3,609
Asymp. Sig. (2-tailed)	,000

a. Mode

b. There are multiple modes. The mode with the largest data value is used.

Runs Test

	DLOG_BET
Test Value ^a	,0006200
Cases < Test Value	1248
Cases >= Test Value	1249
Total Cases	2497
Number of Runs	1135
Z	-4,584
Asymp. Sig. (2-tailed)	,000

a. Median

Run Test (Median dlog(BET))		Run Test 2 (Mode dlog(BET))	
n _A	1248	n _A	1149
n _B	1249	n _B	1348
n	2497	n	2497
R	1135	R	1152
E(R)	1249,5	E(R)	1241,57

σ_R	24,979	σ_R	24,8212
Z	-4,584	Z	-3,609
$Z_{\alpha=0,05}$	$\pm 1,96$	$Z_{\alpha=0,05}$	$\pm 1,96$
Ipoteza	H_1	Ipoteza	H_1

The number of runs represents the observed runs in the test variable. As we mentioned before, a run is defined as a sequence of cases on the same side of the cut point (or the test value from the table). In the first table, the cut point is the sample median and in the second test table, the cut point is the mode. The distribution of ratings is actually bimodal. If the order of the ratings is purely random with respect to the median value, you would expect about 1250 runs across these 2497 cases. Because they are observed only 1135 runs, the Z statistic is negative (-4,584). The second run test, with respect to the median value, you would expect about 1242 runs across these 2497 cases. Because they are observed only 1152 runs, the Z statistic is also negative (-3,609).

So the final conclusion would be that the Romanian capital market doesn't satisfy the weak form of efficiency. It is inefficient because movement of the stock prices can be predicted.

However, these results must be testified by using the more modern Variance Ratio test introduced by Lo and MacKinlay (1988). If the Variance Ratio test statistic > 1 , then the series is positively correlated.

c. Variance ratio test

We used EViews 7 application to perform the Lo and MacKinlay variance ratio test, in order to determine whether differences in BET series are uncorrelated, or follow a random walk or martingale property. The results are shown below:

Null Hypothesis: Log SERIES01 is a random walk
 Date: 10/28/12 Time: 19:33
 Sample: 1 2498
 Included observations: 2497 (after adjustments)
 Standard error estimates assume no heteroskedasticity
 Use biased variance estimates
 User-specified lags: 2 5 10 30

Joint Tests	Value	df	Probability
Max z (at period 2)*	5.126382	2497	0.0000
Wald (Chi-Square)	50.36277	4	0.0000

Individual Tests

Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.102589	0.020012	5.126382	0.0000
5	1.124450	0.043844	2.838472	0.0045
10	1.173494	0.067568	2.567687	0.0102
30	1.565846	0.123398	4.585519	0.0000

*Probability approximation using studentized maximum modulus with parameter value 4 and infinite degrees of freedom

Test Details (Mean = 0.000429863889932)

Period	Variance	Var. Ratio	Obs.
1	0.00031	--	2497
2	0.00034	1.10259	2496
5	0.00035	1.12445	2493
10	0.00036	1.17349	2488
30	0.00049	1.56585	2468

We performed the test using the log differences data in BET series (we assumed that the data follow an exponential random walk so that the innovations are obtained by taking log differences). We analyzed the basic Lo and MacKinlay variance ratio statistic assuming heteroskedastic increments to the random walk. We identified four test periods (2, 5, 10, 30), as the intervals whose variances we wished to compare to the variance of the one-period innovations.

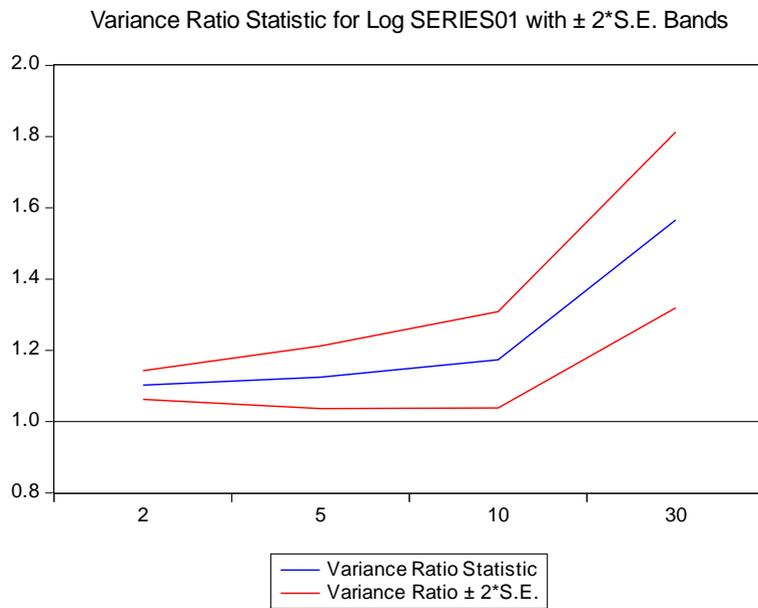
Of interest for our analysis is whether the BET returns, as measured by the log differences of the prices, are *i.i.d.* or martingale difference, or alternately, whether the BET returns themselves follow an exponential random walk.

Since we have specified more than one test period, there are two sets of test results. The “Joint Tests” are the tests of the joint null hypothesis for all periods, while the “Individual Tests” are the variance ratio tests applied to individual periods. Here, the Chow-Denning maximum z statistic of 5.126382 is associated with the period 2 individual test. The *p*-value of 0 is obtained using the studentized maximum modulus with infinite degrees of freedom so that we strongly reject the null hypothesis of a random walk.

The individual statistics generally reject the null hypothesis (though the period 10 variance ratio statistic p -value is slightly greater than 0.01), so the series cannot be fairly treated as random walks. It suggests that the indexes are imperfectly adjusted under the impact of informational shocks and displays some rigidities in their formation mechanisms.

The bottom portion of the output shows the intermediate results for the variance ratio test calculations, including the estimated mean, individual variances, and number of observations used in each calculation.

EViews 7 displays a graph of the variance ratio statistics and plus or minus two asymptotic standard error bands, along with a horizontal reference line at 1 representing the null hypothesis:



We can see a graphical representation of the fact that the null reference line lies outside the bands (with the exception of the test against period 10 which is very close).

5. Conclusions

The applied statistical tests to detect random-walk type behavior of BET index led to the rejection of hypothesis behavior of this daily series of returns. We have not obtained sufficient evidence to support the efficient market hypothesis in weak form, for the daily stock index.

Even in cases when the normality hypothesis of the instantaneous returns can not be dismissed, the statistical tests performed for BET indicate the fact that the evolution of returns is dependent from one period to another (autocorrelation coefficients are significantly different from zero), which invalidates the efficiency hypothesis of weak form market. They may suggest using past information to obtain abnormal returns. Under these conditions, using models based on the efficiency hypothesis seems unspecified in order to obtain useful results.

These conclusions we have reached in this article will be carried out by further analysis of the emergent capital markets in U.E. By applying these tests we determined the fact that there are linear dependencies. Emerging markets are typically characterized by a non-linear information behavior in stock prices. In these conditions we will use in the future studies BDS Independence Test in order to test for time based dependence in a series. It can be used for testing against a variety of possible deviations from independence including linear dependence, non-linear dependence, or chaos.

The research of emergent markets efficiency will have new dynamics because, beside the classical analysis instruments, new research models will be applied based on the technical progress and on the high speed of incorporating the information. As a conclusion, all the efficiency tests, the scientific identification of markets inefficiencies help the improvement of our knowledge regarding the assets behavior and the returns evolution in time. They help to improve the assets evaluation models, but also the practices and the vision of professionals in the capital markets.

6. Acknowledgements

This work was supported by the project "Post-Doctoral Studies in Economics: training program for elite researchers - SPODE" co-funded from the European Social Fund through the Development of Human Resources Operational Programme 2007-2013, contract no. POSDRU/89/1.5/S/61755

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ENTREPRENEURSHIP AND ECONOMIC RECESSION – SOME CONNECTIONS

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Abstract

The aim of this paper is to present some of the effects of the economic downturn on attitudes, perceptions and aspirations of Romanians in regard to entrepreneurship, highlighting the main changes of the entrepreneurial activity in the last few years in Romania. The article will provide a brief overview of most used indicators by Global Entrepreneurship Monitor.

This introductory analysis is not meant to be exhaustive, nor is it a static one, but reflects a personal perspective and it will serve as starting point for further studies in trying to understand the entrepreneurship and its contribution to economic growth.

Key words: entrepreneurship, entrepreneurial activity, global entrepreneurship monitor, self-employment.

JEL classification: L26, M13, O10

1. Introduction

“Entrepreneurship” is a term widely used in the last years and the study of entrepreneurship enjoyed a special attention in the specialized literature.

Even though the field of entrepreneurship is less explored and it gained the attention of many scholars only in the last years we could trace its roots back to 1755 when Richard Cantillon pointed out the importance of the entrepreneur in his “Essai sur la nature du commerce en general”. He pointed out the entrepreneur, the arbitrageur who was bearing the risk, as an important

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economic factor.

Another economist who played an important role in defining the entrepreneur in beginning of 20th century was Alois Schumpeter. Schumpeter in his vision of “creative destruction” presented the entrepreneur as an innovator. More recent theories such as does developed by Shane and Venkataraman (2000) argue that “entrepreneurship involves the nexus of two phenomena: the presence of lucrative opportunities and the presence of enterprising individuals”.

Other renowned economist and scientist, who are not mentioned here, contributed to defining entrepreneurship but our goal here is not to uncover the history of it but just to make a brief introduction of the concept.

Many others tried to define and to analyze the concept of entrepreneurship and contributed to recognition of entrepreneurship as an important phenomenon. Scholars from the field of economics and business or from fields like management , psychology and sociology studied the entrepreneur and the entrepreneurship, that’s why we could argue that entrepreneurship is multidimensional concept and it is needed a cross-disciplinary approach to better understand it.

Due to the fact that there is no unanimously accepted definition for entrepreneurship and there no clear indicators to define this phenomenon it is very difficult to measure it.

Despite all this debate about entrepreneurship most authors consider it a key economic factor and the entrepreneur is central to economic growth (Simon C Parker, 2009) and an often encountered definition of the entrepreneur is the person who “perceives an opportunity, and creates an organization to pursue it” (Bygrave and Hofer, 1991, p. 14), this implies that new venture creation is the essence of entrepreneurship.

2. Data used

The main source of data used in this article was obtain from the Global Entrepreneurship Monitor (GEM) 2007-2011 and Adult Population Survey database for Romania

And I used also data from:

- OECD Structural and Demographic Business Statistics (SDBS) Database.
- Entrepreneurship in the EU and beyond A survey in the EU –

Analytical report 2009

Global Entrepreneurship Monitor (GEM) defines the term “entrepreneur” as “an adult who is engaged in setting up or operating a new venture which is less than 42 months old”. The index of “Total Entrepreneurial Activity” (TEA) is defined as the proportion of the population who are entrepreneurs.

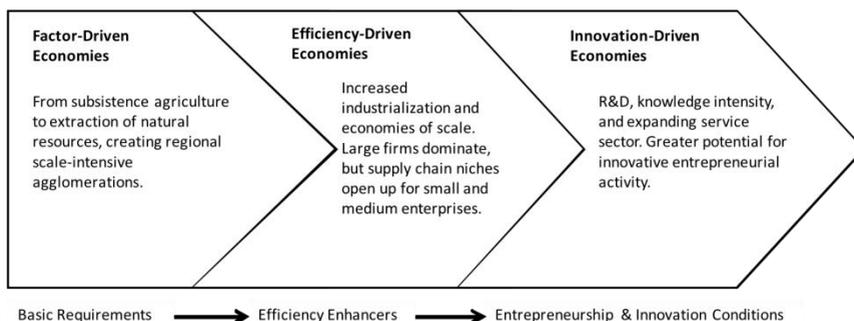
The Global Entrepreneurship Monitor (GEM) is a research project and its aim is to study the complex relationship between entrepreneurship and economic growth, and argues that the widely acknowledged phenomena of entrepreneurship “is one of the most important forces shaping the changes in the economic landscape” (GEM – Entrepreneurship in Romania 2010 country report. Dumitru Matiş, Ágnes Nagy, Tünde-Petra Petru, Annamária Benyovszki) . According to the Global Competitiveness Report edited by the *World Economic Forum* countries are classified into three groups:

- factor-driven economies,
- efficiency-driven economies,
- innovation-driven economies.

and countries that are situated between two of this three stages are considered to be “in transition.

The criteria used for this classification of stages of development were the level of GDP per capita and the share of exports of primary goods in total exports. World Economic Forum's Global Competitiveness Report (Schwab, 2010, p. 8). Romania is classified according to these criteria as a country in transition from stage 2 to stage 3.

Figure 1: Classification of countries according to World Economic Forum



Source: World Economic Forum's Global Competitiveness Report

The sample size of Global Entrepreneurship Monitor (GEM) Adult Population Survey (APS) for Romania, as in depicted in the table below, had a total of 8,580 respondents in 4 years. The survey was conducted either by telephone or face to face interview with persons of the adult population aged between 18 and 64 year.

Table 1: Sample sizes

Years	2007	2008	2009	2010
Respondents	2,046	2,206	2,093	2,235

Source: Adult Population Survey Sample Sizes 2001-2010

1. Economic crisis and entrepreneurial activity

The economic recession can generate 2 opposite effects on the entrepreneurial activity.

Firstly in time of crisis it is more difficult to create a new business because it is harder to raise the needed capital to run and develop the business, banks are being more risk averse, and it also harder to find an to retain customers due to the declining demand for product and services.

Secondly, in contrast with the above, crisis contributes to the growth of unemployment which means that qualified workforce is easier to find, the prices for renting office and depot spaces are lower and competition is reduced compared to periods of economic boom.

So high unemployment and the reduced competition could motivate people to start their own business in order to maintain their income level or at least to provide a minimal level of income for a decent lifestyle and by doing that they will stimulate self-employment and start-up activity among population and this may lead to an increase of necessity-motivated entrepreneurship.

“Moreover, during an economic downturn people have lower opportunity costs in terms of foregone earnings from employment and more free time to start a new business and have a greater need to do so”. (Olga Rastrigina, 2009). Some empirical studies even suggest that during economic downturn the proportion of self-employed and individual entrepreneurs generally increases (Van Stel et al., 2008).

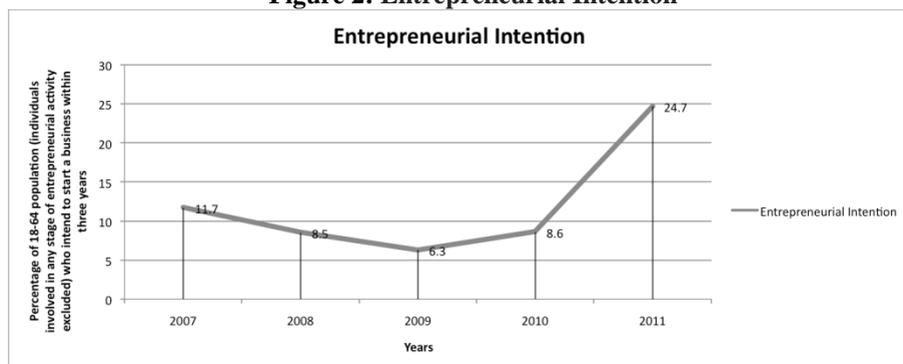
2. The evolution of the entrepreneurial perceptions, attitudes and entrepreneurial activity in Romania from 2007-2011

We will have a quick look at some of the indicators used by GEM to measure attitudes and perceptions as well as aspirations and the entrepreneurial activity.

Entrepreneurial Intention

We can observe that the entrepreneurial intention (individuals who intend to start a business in the next 3 years) was dropping from 11.7% in 2007 to 8.5% in 2008 and to 6.3% in 2009 which may prove that the crisis affected in a negative way the intention, but it seems that in 2011 the rate doubled which can mean good news in the case that the intention materialize.

Figure 2: Entrepreneurial Intention



Source: Global Entrepreneurship Research Association (GERA)

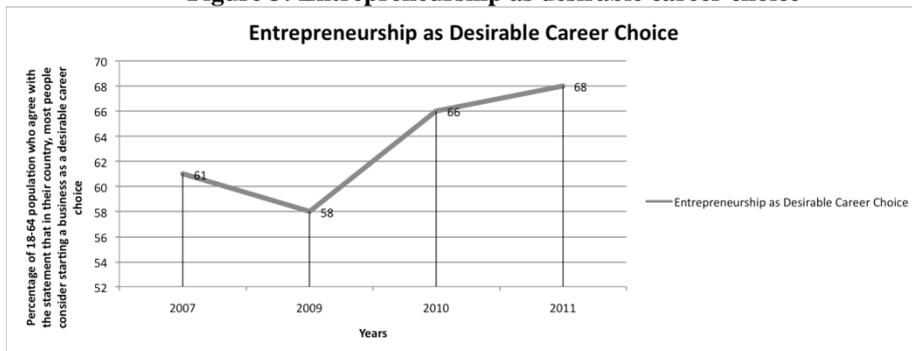
Entrepreneurship as Desirable Career Choice

Entrepreneurship as a career path had a downturn in 2009 but the rate continued to increase in 2010 and 2011. The downturn from 2009 (year of economic crisis) may be connected with the need of people to have safe income (salary as an employment) rather than taking risk and start its own business.

According to Eurobarometer (Entrepreneurship in the EU and beyond Analytical report December 2009) the main two reasons for Romanian

respondents' preference for employee status are regular fixed income, lack of finance for self-employment and stability of employment.

Figure 3: Entrepreneurship as desirable career choice



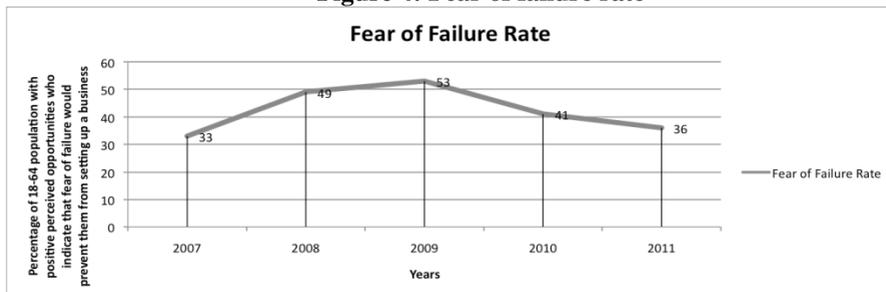
Source: Global Entrepreneurship Research Association (GERA)

Fear of Failure Rate

Due to the economic condition in 2008 and 2009 we can observe an increase of this rate, people being more afraid to start a business in years of economic downturn

Answering the question “If you were to set up a business today, which are the two risks you would be most afraid of?”, 55% of Romanians mentioned the possibility of going bankrupt, 43% were concerned about the uncertainty of not having a regular income and 31% selected the risk of losing their property. (Eurobarometer - Entrepreneurship in the EU and beyond - Analytical report December 2009)

Figure 4: Fear of failure rate



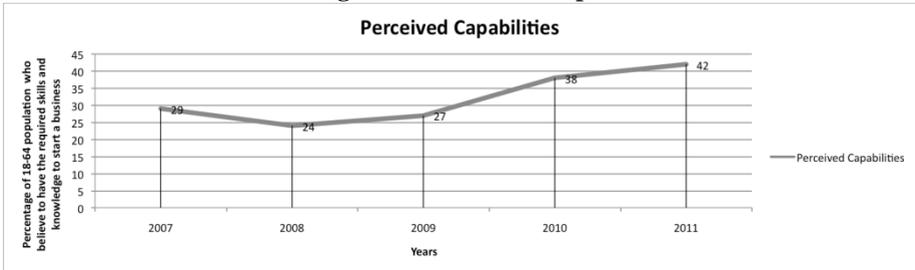
Source: Global Entrepreneurship Research Association (GERA)

Perceived Capabilities

Percentage of 18-64 population who believe to have the required skills and knowledge to start a business.

2008 marked a slow reduction in the perceived capabilities and it seems that from 2009 it recovered and it is slowly growing

Figure 5: Perceived Capabilities



Source: Global Entrepreneurship Research Association (GERA)

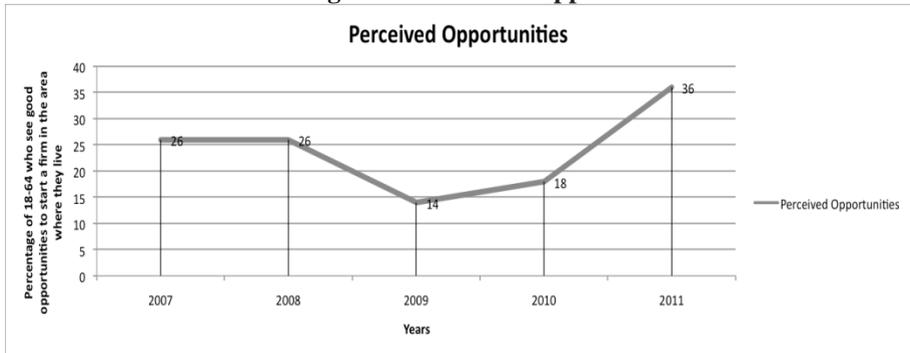
Perceived Opportunities

Percentage of 18-64 who see good opportunities to start a firm in the area where they live.

2009 marked a steep reduction of the perceived opportunities to start a new venture probably due to the economic condition, but the good news is that from 2010 it slowly recovered and 2011 even surpassed the value from 2007, which is a good sign.

Romanians maybe discouraged to open new business despite the fact that they believe that the area in which they live is offering opportunities for new venture creation, because of t A majority of respondents across the country also agreed that “it was difficult to start up one’s own business” due to complex administrative procedures; the total level of agreement was of 84% in Romania. (Eurobarometer - Entrepreneurship in the EU and beyond - Analytical report December 2009)

Figure 6: Perceived Opportunities



Source: Global Entrepreneurship Research Association (GERA)

Even though the rate of perceived opportunities increased in a World Bank study Romania is situated on 53th place regarding the ease of doing business.

Table 2. Ease of doing business

Ranking (1 = most easy)

New Zealand	2	Switzerland	21	Portugal	48
United States	4	Belgium	22	Mexico	51
United Kingdom	5	Estonia	24	Slovenia	53
Denmark	6	Germany	25	Romania	55
Ireland	7	Lithuania	26	Spain	62
Canada	8	Latvia	27	Luxembourg	64
Australia	9	Austria	28	Poland	72
Norway	10	Israel	29	Turkey	73
Iceland	14	Netherlands	30	Czech Republic	74
Japan	15	France	31	Italy	78
Finland	16	Slovak Republic	42	Greece	109
Sweden	18	Bulgaria	44	Brazil	128
Korea	19	Hungary	47		

Source: World Bank, *Doing Business*, 2009.

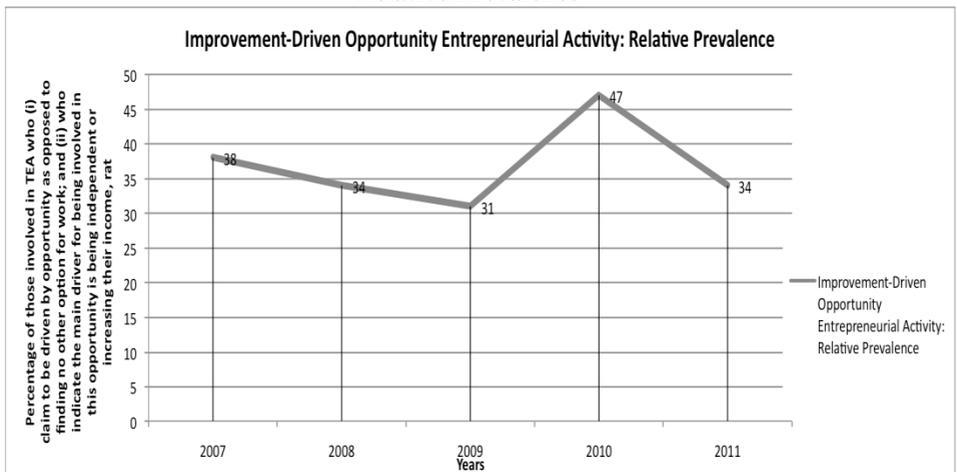
Improvement-Driven Opportunity Entrepreneurial Activity

Percentage of those involved in TEA who (i) claim to be driven by opportunity as opposed to finding no other option for work; and (ii) who

indicate the main driver for being involved in this opportunity is being independent or increasing their income, rather than just maintaining their income

Even if the crisis may offer more opportunities to entrepreneurs because of reduced competition or lower cost with employees the rate of improvement driven opportunity entrepreneurial activity dropped reduced from 38 to 34 and 31 % in 2009 but it had a peak (47%) in 2010 and then it dropped to 34 % again.

Figure 7: Improvement-Driven Opportunity Entrepreneurial Activity: Relative Prevalence



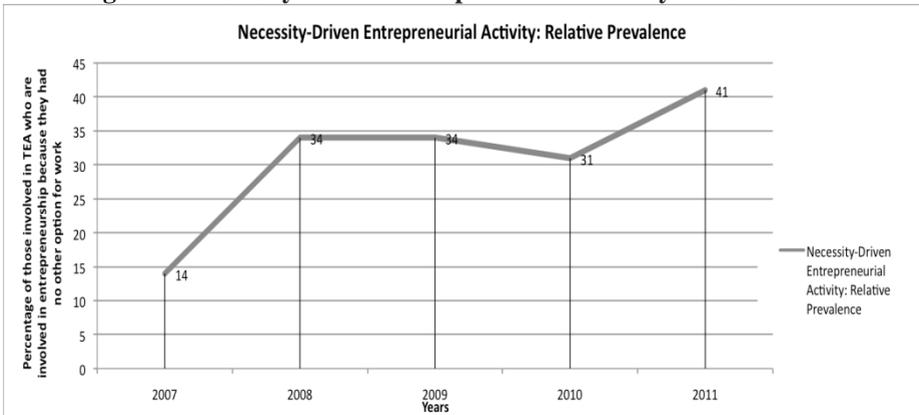
Source: Global Entrepreneurship Research Association (GERA)

Necessity-Driven Entrepreneurial Activity

Percentage of those involved in TEA who are involved in entrepreneurship because they had no other option for work

The lack of jobs on the market may drive people to start new businesses or to become self-employed as an alternative to being jobless and we can observe that during the years of economic downturn the rate of necessity driven entrepreneurial activity rose from 14% in 2007 to 34% in 2008 and it is increasing continuously to 41% in 2011.

Figure 8: Necessity-Driven Entrepreneurial Activity: Relative Prevalence



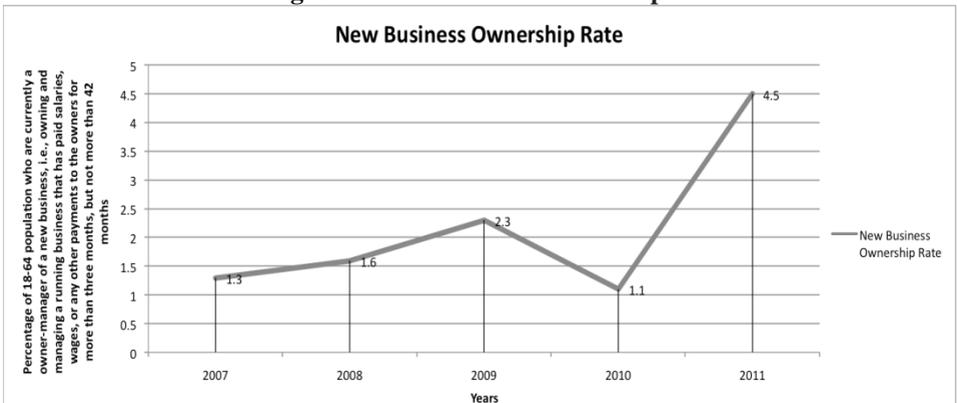
Source: Global Entrepreneurship Research Association (GERA)

New Business Ownership Rate

Percentage of 18-64 population who are currently a owner-manager of a new business, i.e., owning and managing a running business that has paid salaries, wages, or any other payments to the owners for more than three months, but not more than 42 months

In the last years with the exception of 2010 the rate of new business ownership increased, this is a good indicator that entrepreneur are getting over the negative effects of the economic downturn.

Figure 9: New Business Ownership Rate



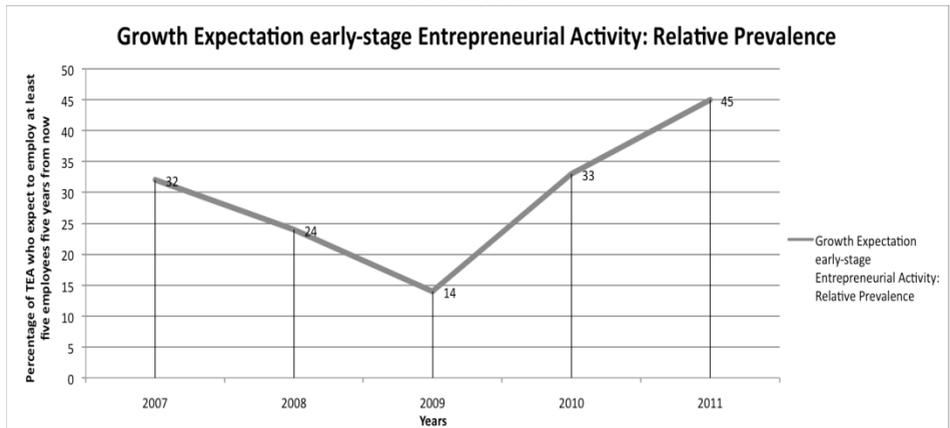
Source: Global Entrepreneurship Research Association (GERA)

Growth Expectation early-stage Entrepreneurial Activity

Percentage of TEA who expect to employ at least five employees five years from now

During the first years of economic crisis the expectation for growth were dropping from 32% to 14 % which is probably normal and it recovered the percentage lost in 2010 and even surpassed the value from 2007 in 2011.

Figure 10: Growth Expectation early-stage Entrepreneurial Activity: Relative Prevalence



Source: Global Entrepreneurship Research Association (GERA)

3. Conclusion

More people intend to start a business and entrepreneurship is becoming a more desired career path in the last 2 years. Fear of failure is slightly decreased which is another good sign. The increasing confidence in its own abilities to start and run a business together with increased perceptions about possible opportunities may contribute to more start-ups

New business ownership rate has increased in 2011 as well as the growth expectations which may be an indicator for SME economy.

Improvement-Driven Opportunity Entrepreneurial Activity increased and necessity driven decreased which could mean that Romanians follow the path of entrepreneurship because they are searching to obtain an income, having no place to work, rather than being driven by a opportunity they identified.

The effects of the economic recession influenced the entrepreneurial activity and most indicators about attitudes, perceptions and aspirations were affected in a negative manner but starting with 2010 the indicators demonstrates a slow comeback which means good news for an economy. Surely it is too early to make some affirmation about the economic recovery but entrepreneurship may offer us a way to surpass more quickly the negative effects generated by the international financial crisis into the economy

Entrepreneurship can play an important role in the growth of economy. Any new business (small or big) creates new jobs, contributes to the well-being of the community in which it operates, pays its suppliers, pays taxes and by doing so it contributes to the GDP.

Despite the fact that most economic mass media press is writing about big corporation the back bone of an economy is represented by SME, and we tend to forget that most new ventures start as SME. So supporting the development of SME and encouraging entrepreneurship should be on the agenda of any government.

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CASE STUDY ON THE STATE OF PROJECTS ACCESSED BY PUBLIC INSTITUTIONS IN CENTRE REGION

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Abstract

The article is mainly designed to identify the types of funds accessed by public institution in Centre Region and the fund with the highest degree of access. Consequently, a sample of public institutions in Centre Region was established, most of which have accessed funds. This research also tries to identify the main investment priorities of the institutions, as well as the way these have been correlated with the projects they have accessed. In the article there were identified the number of accessed projects, approved projects and the extent to which they have resulted in research contracts signed with the authorities.

Key words: projects, funds, European, financing, accessing.

JEL classification: M16.

1. Introduction

The article seeks to identify the degree of maturity of project management in the Romanian economy and if we can speak about a culture of projects in our country.

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Although we often hear talking about projects and European funds, the signals we are being given regard the low rates of absorption of these European funds. After the first 5 years of European Union membership Romania paid to the community budget a contribution of over 6,5 billion euro. However, the amounts received do not exceed 3,5 billion euro, which means that so far Romania has financed the European Union with 3 billion euro. The situation could be different because Romania's contribution represents approximately 47 euro/inhabitant every year, while each Romanian receives annually 71 euro more than the contribution. Thus, Romanian should focus more on turning European funds into opportunity.

The present article contains an exploratory research, based on a questionnaire, which begins with the definition of the issue, the objectives of the research and ends with a presentation of the results of the study.

The main issue identified in this research is the low rate of absorption of European funds. Currently, Romania is situated on the last place in the rate of absorption of European funds, with a rate of 25%. The objectives of the research are:

- Identifying the main types of funds accessed by the social actors in the Centre Region during 2007-2011;
- Identifying the type of fund with the highest rate of access by the social actors in the Centre Region;
- Identifying the main objectives aimed by them through the projects they developed;
- Identifying the main investment priorities of the social actors in the Centre Region.

The following hypotheses were taken into consideration:

- The most accessed fund is the European Social Fund;
- The public institutions have had as main objectives in the carried projects the investments in human resources and infrastructure;
- The main investment priority of the social actors is infrastructure, followed by perfecting the attraction of foreign investors, etc.

The research's target group consists of public institutions (town halls, local councils, foundations, public administrations, prefectures) or NGOs from the Centre Region (the counties of Alba, Brasov, Covasna, Harghita, Mures and Sibiu), most of them who have accessed European funds. A number of 95 questionnaires were collected, of which 73 questionnaires were processed, the

remaining 22 respondents being institutions that that not accessed any type of funds and whose processing would have vitiated the results.

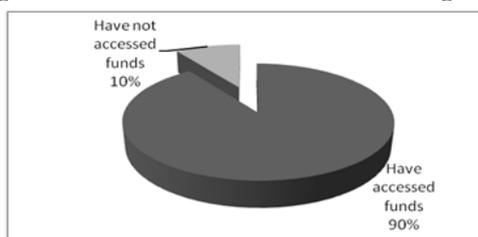
A questionnaire was used for the study that would provide the necessary information to solve the issues raised and the investigated aspects. Through the type of questions used, the way they were formulated and their sequence, as well as through the general appearance of the questionnaire, we have tried to get the respondents' cooperation, their motivation to reach the best results at the end of the interview.

2. The situation of projects accessed by institutions included in the research

Most institutions (90%) that were included in the research have accessed grants, either European, or from the state.

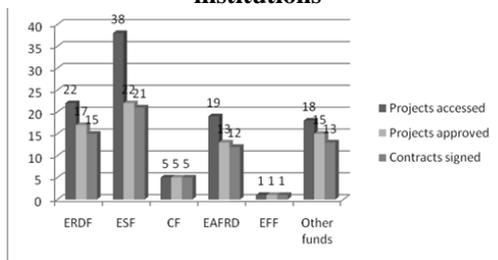
In addition to the European funds mentioned in the questionnaire (ERDF, ESF, CF, EAFRD, EFT), institutions mentioned having accessed funds like: PHARE, SAPARD, European Union "Culture" Programme (2007-2013), Comenius, Life+, Norwegian Cooperation Programme, United Nations Development Programme, URBACT, FRDS (Romanian Social Development Fund), PNFI (National Infrastructure Development Programme).

Figure 1 Situation of institutions accessing funds



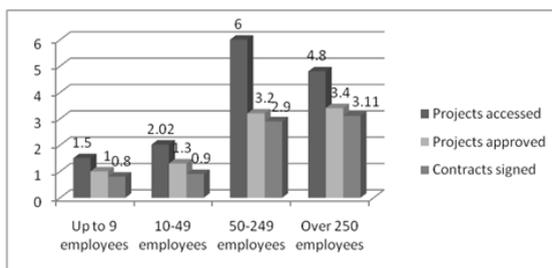
The figure below shows the number of projects that have been accessed, approved and benefited from signed contracts for the above mentioned funds. Overall, the surveyed institutions have submitted 103 funding requests, of which 73 projects were approved and only 67 were completed with the signing of contracts with the payment agencies. Since the sample consists of 73 institutions, there are currently institutions that have not implemented any project.

Figure 2 Situation of projects accessed and approved by the surveyed institutions



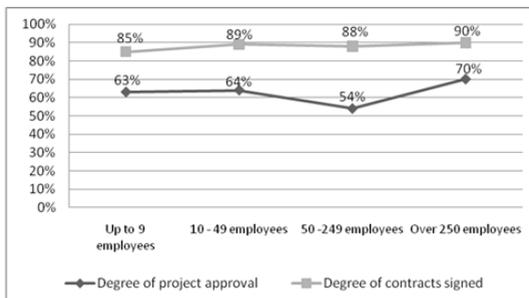
The information in figure 3 allows us to analyse the level of access and the projects approved by institutions depending on their size. It can be noticed that the number of accessed projects increases directly proportional to the size of the institution and it decreases at the institutions with more than 250 employees. The largest number of projects accessed/institution is held by the institutions that have 50-249 employees, 6 projects accessed per institution.

Figure 3 Accessed, approved projects and contracts signed by the institutions depending on the size of the institution



But in terms of accessed programmes and signed contracts, it can be noticed from the figure above that their number increases directly proportional to the number of employees, from an average of one project approved/institution for the institutions of up to 9 employees, to 3,4 projects approved/institution for the institutions of over 250 employees. Institutions having between 50-249 employees, although they have a large number of projects submitted, they have a low rate of approval for them.

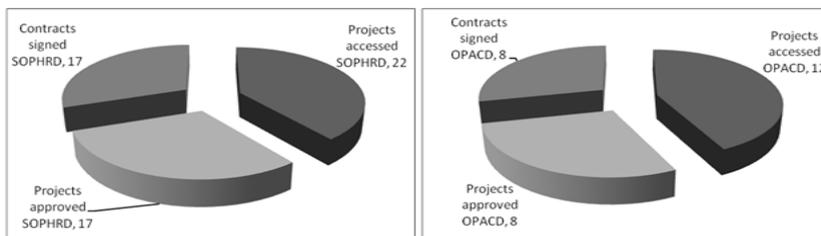
Figure 4 Extent to which projects have been accessed and contracts signed depending on the size of the organisation



It can be noticed from figure 4 that the degree of projects' approval increases with the size of the institution, exception being the institutions having 50-249 employees. These, although they have a large number of application forms submitted, have received only 54% of approved projects. Overall, the number of requests submitted by institutions and that have received the approval vary between 54%-70%. With regard to the contracts signed with the payment agencies, between 85%-90% of the projects approved have resulted in contracts. As a result of the situation of projects accessed by institutions, we can suppose that the greatest difficulties they face are in the stage of filling out the application form.

It can be noticed from Figure 2 that one of the hypothesis of the research is being verified, according to which the most accessed fund is the European Social Fund, with 38 projects accessed, of which 22 through the Operational Programme Human Resources Development (SOPHRD) and 12 through the Operational Programme Administrative Capacity Development (OPACD).

Figure 5 Situation of projects accessed through SOPHRD and OPACD



Among the main objectives aimed by the respondents through these projects (submitted through ESF), the most often mentioned are:

- Facilitating employment of youth from the rural areas;
- Improving the quality of life and working conditions by diminishing disparities between development opportunities offered by the urban environment to the rural one;
- Access of Romanis on the labour market;
- Improving the quality of education in upper secondary education;
- Increasing the training of personnel and diversifying the personnel's area of training;
- Integrating into society the children from disadvantaged families, preventing school dropout;
- Facilitating integration on the labour market of young and long-term unemployed from the urban and rural areas;
- Developing a modern, flexible and inclusive labour market.

Institutions were questioned regarding investment priorities considered important to them. Identifying them was considered important to identify the way these priorities have been met through the submitted projects. The following priorities were considered important for the surveyed institutions (most of them public administrations):

- Investments in infrastructure;
- Social inclusion development;
- Attracting investors in the area;
- Promoting equality of opportunity;
- Employees' training;
- Increasing utility of lands;
- Others: environmental protection, investments in facilities

Figure 6 Importance given to investments in infrastructure and to the development of social inclusion

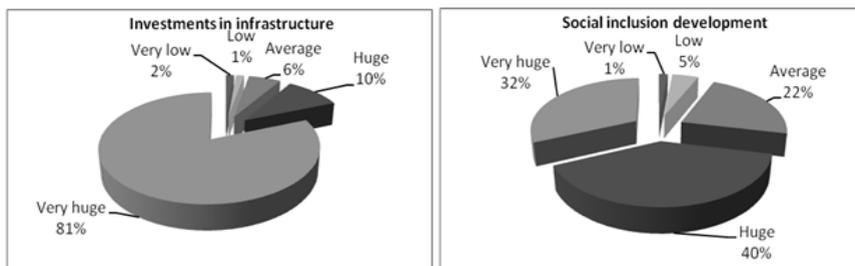


Figure 7 Importance given to foreign investors and the promotion of equal opportunities

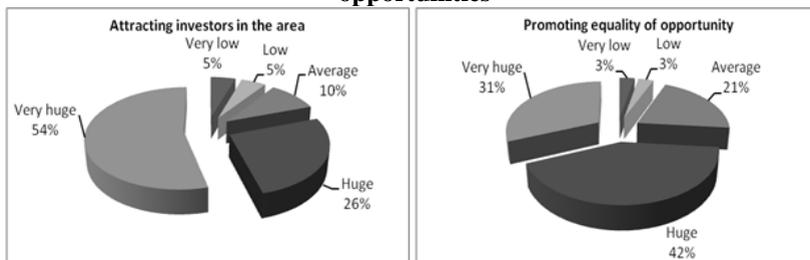
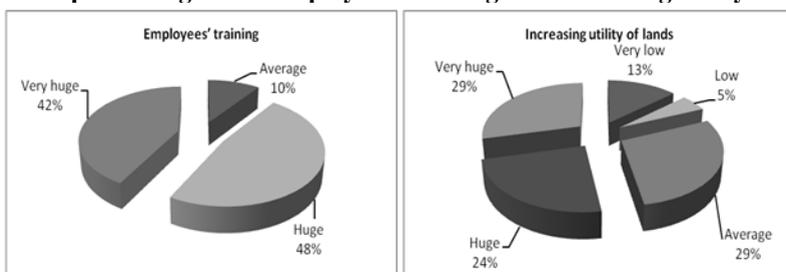
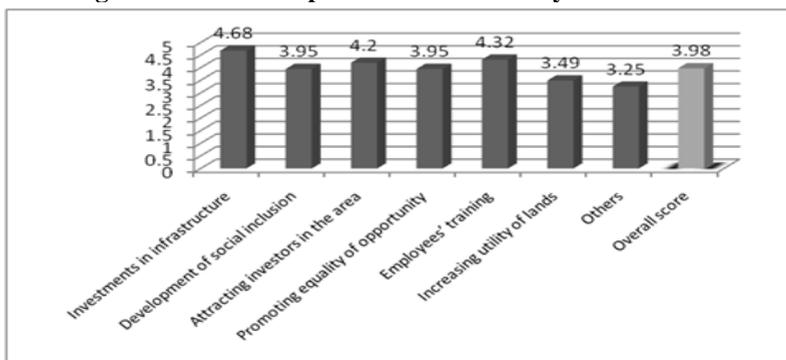


Figure 8 Importance given to employees' training and increasing utility of lands



Figures 6,7 and 8 show the extent to which each investment priority is considered important for the surveyed institutions. In the figure below, a score is given to each priority, calculated based on the coefficients of importance each institution has assigned.

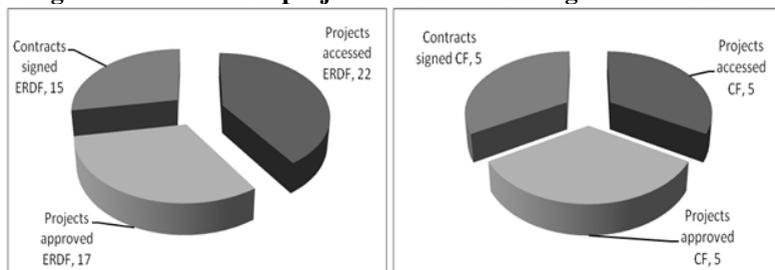
Figure 9 Investment priorities of the surveyed institutions



Three of the priorities, development of social inclusion, promotion of equality of opportunity and employees' training are often found among the objectives aimed by institutions in the projects submitted on the European Social Fund, although we are referring to few projects, 38 submitted resulting in 25 signed contracts for a number of 73 institutions.

Another priority considered important and very important can be found in the projects accessed through the European Regional Development Fund (ERDF) and the Cohesion Fund (CF). Although in a smaller number, there are 27 projects submitted by the surveyed institutions. The situation of projects submitted through the two types of funds is outlined in the figure below.

Figure 10 Situation of projects submitted through ERDF and CF



It should be noted that town halls also receive governmental funds for investments in infrastructure (e.g. National Infrastructure Development Programme), funds that do not require such a difficult mechanism of accessing and reporting.

3. Conclusions

The research, whose target group is represented by public institutions in Centre Region aims to obtain information from the respondents regarding the programmes accessed by them and the way they have been correlated to the institutions' investment priorities.

In terms of accessed programmes, the study shows that the number of programmes accessed increases directly proportional to the size of the institution and it decreases at the institutions that have more than 250 employees. The largest number of projects accessed/institution is held by the

institutions with 50-249 employees. The projects' degree of approval increases the size of the institution, exception making the institutions with 50-249 employees. These ones, although they have a large number of application forms submitted, have received only 54% of approved projects. And with regard to the payment agencies, 58%-90% of the approved projects resulted in signed contracts.

The below table outlines the correlation of obtained results from the research to the hypotheses formulated in the methodology.

Table 1 Correlation of hypotheses with the obtained results

HYPOTHESES	OBTAINED RESULTS
The most accessed fund is the European Social Fund;	The most accessed fund is the European Social Fund, with 38 accessed projects, of which 22 through the Operational Programme Human Resources Development (SOPHRD) and 12 through the Operational Programme Administrative Capacity Development (OPACD).
The public institutions have had as main objectives in the carried projects the investments in human resources and infrastructure.	Public institution have had as main objectives the investments in human resources (youth, Romanis, unemployed, children from disadvantaged families, etc.).
The main investment priority of the social actors is infrastructure, followed by perfecting the attraction of foreign investors, etc.	The main investment priority of the social actors is infrastructure, followed by the employees' training and attracting foreign investors, etc.

Regarding the usefulness of the results, it should be mentioned that we consider the information obtained from this research as useful not only to possible beneficiaries of European funds but also to the entire Romanian society because investments that will take place with this European money will contribute to the increase of economic stability, with direct benefits to the population, such as the increase of jobs, development of social sector, increase of living standards, etc.

A recommendation for the project development institutions to obtain better results in the development and implementation of programmes with

benefits on the community they represent is the correlation of main investment priorities to the developed projects (although the respondents claimed that infrastructure is the main investment priority, the objectives aimed by projects are mostly of investments in human resources).

Recommendations for institutions dealing with European funds in Romania:

- Increasing availability in providing assistance and support to project development institutions both in completing the application form and in the technical and financial reporting;
- Elaboration of Funding Guides that provide as detailed and explicit information to possible project applicants to ease the filling out of the application form.

Improving the absorption capacity of European funds – which has become a constant concern and worry of the government so far – requires first of all identifying the main gaps, insufficiencies and inefficiencies encountered by the persons responsible for writing the projects and implementing them.

Romania, as member state of the European Union should act towards stimulating the potential for economic growth, maintaining and getting high rates of growth. To achieve real convergence with the average development in the European Union, Romania's strategy should focus on the necessary investments to increase long-term competitiveness, to promote the creation of jobs and sustainable development.

4. Acknowledgements:

Research conducted within the project SOPHRD/6/1.5/S/26, cofinanced by the European Social Fund through the Sectoral Operational Programme "Human Resources Development" 2007-2013.

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THE POLITICS OF OPEN SOURCE SOFTWARE – A TREND TOWARDS LIBERALIZATION IN E-GOVERNMENT

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Abstract

This paper is synthesizing world policies regarding the adoption of software in the public sector. The point of interest is represented by policies from the EU and how they evolved in time, but there will be presented a few cases of policy making from other countries because they represented milestones and best practices regarding policy making. The public sector is a huge consumer for the software and hardware industry, thus policy making regarding software adoption has to be at the best level possible to ensure that the best decision in economical terms is being taken.

Keywords: *policy making, open source software, open data standards, liberalization*

JEL classification: *M15, O21, O33, O34, O38*

1. Introduction

The evolution in policy making will show a trend towards open source software adoption and open data standards, wherever they can represent the best solution for the money. This is named by some as being a policy of liberalization from the closed format of data and software imposed by proprietary software vendors, leading public authorities into vendor lock-in and contracts of exclusivity. These politics made public authorities less dependable on proprietary software solutions and opened an opportunity for in-house development. Most important, it opened ways of getting out of the monopolistic relations between some software vendors and public authorities.

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In production and development environments open source is a philosophy or a methodology that promises free distribution and access to a products design and implementation details (OpenSource.org). Opening the source code of software products created many copyright issues but most important it lead to a self-enhancing community in which software products evolved in an unscheduled way and based on needs.

The motivation for using open source software (OSS) in e-government has evolved after the year 2000 from motivations like costs to motivations like increasing interoperability between data standards (Kantor et al., 2004). Open source software uses open data standards (ODS) as format for data input thus the output will be also in an ODS format due to the input and to the free nature of open source software. ODS represent formats for data which can be widely used because its specs are available with no restrictions. Just to mention a few formats we can state the .PDF files format from Adobe, or the HTML language for coding web pages, or the JPEG/MPEG formats for pictures and video.

2. The general context of e-government development

Information and Communication Technologies (ICT's) have changed the way many administrative operations are done in public administration. The tools made possible by ICT helped administrations to provide better public services to citizens and businesses. This can be called the core idea for e-government: government agencies that make use of ICT to transform the relations they have with citizens, businesses or even relations between the agencies themselves in the sense of obtaining better delivery of information, of improving interactions and increasing efficiency of operations. Examples for such technologies are the internet, computer networks, use of databases, planning and project management software and many more.

E-government developed at the same time with ICT and involved three main groups: the citizens, the government and businesses. The objectives of e-government can be internal, meaning focused on the government itself (Backus, 2001), or external meaning focused on the citizens, businesses or other interest groups.

The development of e-government can be assessed in phases. Taking into consideration that the purpose of this article is not in depth study of delivery models of e-government but policy making, we will present one of

the simplest but comprehensive overviews regarding phases of development of e-government correlated with the actors participating in e-government.

As e-government development progresses, it moves from a state of just informing the actors to interacting with them and then transforming this relationship to a more personalized one. As e-government moves from phase to phase the tools that it uses become more specialized and the use of ICT is more and more present. Due to complexity, the investments in ICT needed to move from phase to phase are increasing considerably by adding further usability or facilities to e-government systems. The trend of development is to integrate and offer personalized assistance and access for all services regarding the interaction with the government.

Table 1: Development phases of e-government

Phases	External: Government to Citizen	External: Government to Businesses	Internal: Government to Government
Phase 1 : Information	Local/Departmental/National Information (mission statements and organizational structure, addresses, opening hours, employees, telephone numbers, laws, rules and regulations, petitions, government glossary, news)	Business information, addresses, opening hours, employees, telephone numbers, laws, rules and regulations.	Knowledge base (static intranet), knowledge management (LAN).
Phase 2 : Interaction	Downloading forms from websites, submitting forms, online help with filling in forms (permits, birth / death certificates), intake processes for permits etc. e-mail newsletters, discussing groups, polls and questionnaires, personalized web page, notification.	Downloading forms from websites, submitting forms online, help with filling in forms (permits), intake processes for permits etc. e-mail notification.	E-mail Interactive knowledge databases, complaint handling tools.
Phase 3 : Transformation	Personalized Website with integrated personal account	Personalized website with	Database Integration.

	for all services.	integrated business account for all services.	
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Source: (Backus, 2001)

The movement towards OSS and ODS has a few disadvantages also. Some of them would be: fewer of-the shelf applications, limited and conditional warranties and indemnification, a 20% to 30% bigger salary or skilled personnel due to the difficulty of finding skilled administrators specialized on OSS, an increased liability and exposure in data sensitive networks.

Many debates are raising the question of why using open source in e-government. There were many public administrations all over the world that implemented open source software in their e-government initiatives and found a series of benefits. It is also true that some public administration that tried to implement open source software found that moving from proprietary software solutions to open source solutions proved to be more expensive. In short, the less developed the e-government system is, the easier and more convenient is to move to open source software. The benefits brought to discussion are represented by the cost of licensing fees, which is small or zero, followed by the diminished dependency on software providers. Vendor lock-in is an issue that public administrations are trying to avoid when purchasing software. Open source software has also better scalability compared to closed source products, meaning that it runs better on older hardware systems. The possibility to customize is also to be taken into accounts because of the nature of OSS some public administrations would take into account in-house development and customization of software. Less obvious benefits come in the form of an increase in internal costs that can be viewed as an investment in the local resources of the administrations and keeping knowledge and know-how locally. Using OSS and spending more internally makes skills and knowledge to develop in-house and keeps ownership of the result. The public administration can retain full control over the project and be cost-effective and flexible in implementation.

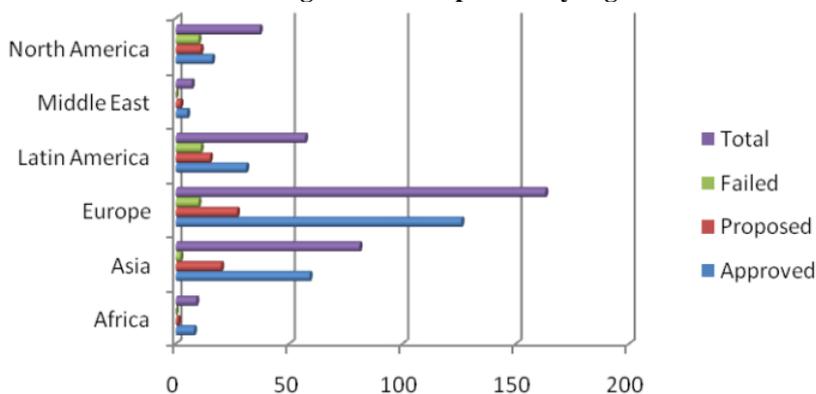
Most often behind in-house development methodology based on OSS are either political or cultural causes or the absence of a possible strategic partner or a mature outsourcing market. Even so, a project like this can benefit of consultancy from the outside of the institution.

3. Up-to-date policy making development for OSS in e-government

OSS adoption by public administrations is widely discussed topic by economists from both public and academic environments (Federspiel, Brinker, 2010). For start, Lewis (2006, 2007, 2008, 2012) wrote and improved a set of public policies for supporting OSS adoption in the public sector. From his work, there are three observations to take into account: the most numerous initiatives of implementing OSS in public administrations, that were also approved, come from European countries; the most common policies regarding the use of OSS in public administrations are recommendation policies, followed by preference and research policies; the number of public policies to regulate public administrations regarding software acquisition is increasing.

The majority of policies made by the EU regarding regulating software use in public administration were issued between 2001 and 2005. After 2005, when EU previously set guidance regarding OSS in public administrations, many countries from Europe started to issue local laws within the European framework. Policy initiatives can be of different natures such as advisory, preference, research and development (R&D) and mandatory. Most of the policies that were made by the EU were advisory, R&D or preference policies (Lewis, 2007).

Figure 1: Total policies by region



Source: (Lewis, 2010)

In 2001 a resolution on network and information security approved by the Council of EU encouraged EU member states to initiate security solutions on recognized standards including open source software in their e-government and e-procurement initiatives. Under the IST (Information society technologies) program the EU Commission launched in 2002 the “Three Roses Initiative” to provide funding for the use of open source software in e-government services in the member states. In the same year a resolution urged the member states to develop open source encryption software and eEurope 2005 action plan recommended open source for a EU interoperability framework. A communication on the role of e-government from the Commission in 2003 stated that the exchange of experience in the use of open standards and open source amongst public administrations should be promoted. Through R&D initiatives, in 2003 the EU released an open source migration guide that provided practical and detailed recommendations on how to migrate to OSS on a series of components like office based applications, calendaring, email and other standard applications (Lewis, 2006). The 5th Framework Program of the EU listed over 20 R&D projects supporting and developing OSS that contributed to the development of essential components of a free software infrastructure and associated development tools. Through research and development initiatives in 2003 was established a service supporting public administrations using open source software with the intention of encouraging the spread of good practice. The open source observatory established by the EU in 2004 looked to provide support for initiatives that encourage the use of OSS. The same year EU formulated a draft normal resolution for governments to promote the introduction and use of free and OSS within their public administrations and governmental bodies. Other regulations from the same year encouraged the use of OSS where considered appropriate within governmental bodies and insisted to deploy as much as possible open source software for all aspects of inter and intragovernmental operations (Lewis, 2008). In the end of 2004 and beginning of 2005 EU provided 2.86 million euros to study OSS. The initiatives above represent some of the most representative initiatives regarding OSS made by EU.

The initiatives of the EU were followed by initiatives in different countries all over Europe. We are going to review some of the most representative from different countries. United Kingdom finished in 2009 its policy regarding OSS. They have established that the government will actively

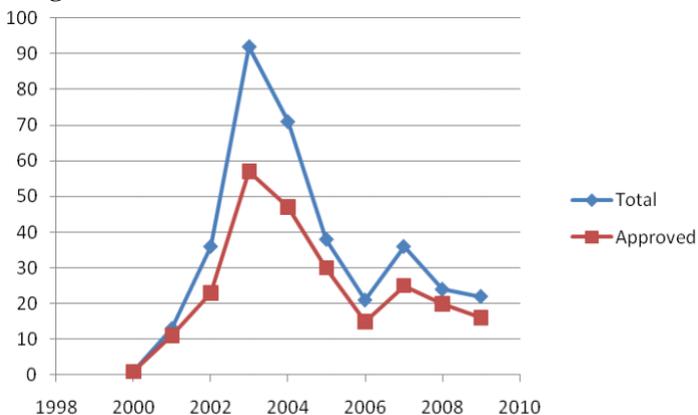
and fairly consider OSS alongside proprietary solutions in making procurement decisions on the best value for money to the business requirements. They are expecting to use a mix of open source and proprietary solutions to ensure the best possible overall solution is obtained. In the situation where there is no overall cost difference between OSS and proprietary products, OSS will be selected due its improved flexibility.

Also in 2009, in Austria, the third edition of a special version of a GNU/Linux distribution for schools was published. As part of the EU Action Plane i2012 Austria plans to promote installation of open source software onto Austria's school computers. In Germany, from 2009 an open source collaboration suite named Kolab is used in all public administrations after the recommendation of the Agency for Information Technology. In Netherlands, policy on open standards and preventing discrimination against certain operating systems were issued. In Finland, in an attempt to increase the use of OSS in the country's public administration the Ministry of Interior published a policy document to help public bodies with procurement and deployment (Lewis, 2012).

France is also doing important steps from 2008 toward open source after an economic commission set up by President Sarkozy recommended that France should increase its use of OSS and consider the tax benefits to stimulate OSS development. The same year, the Gendarmerie, part of the French police, started migrating 70,000 desktops from proprietary to open source. Also the Ministry of Education from France made available more OSS licenses to France's educational institutions to offer more choice (Lewis, 2008).

A resolution of the Spain parliament in 2008 urged the government to promote free software after providing 12 million euros the year before for OSS research projects. In 2006 in the Spain parliament there was a nearly unanimous resolution to promote the use of OSS in public administration. From 2007, Norway and Denmark switched to ODS as a mandatory format for governmental data. In Italy there are projects that stimulate information society due to a provision of the government that favor projects using OSS. In 2007 the Macedonian government installed open source Ubuntu distributions of GNU/Linux on all 180,000 of its school computer workstations. The same year, Turkey's Military Recruitment Division installed Pardus Linux on 4,500 of its desktops and 500 of its servers.

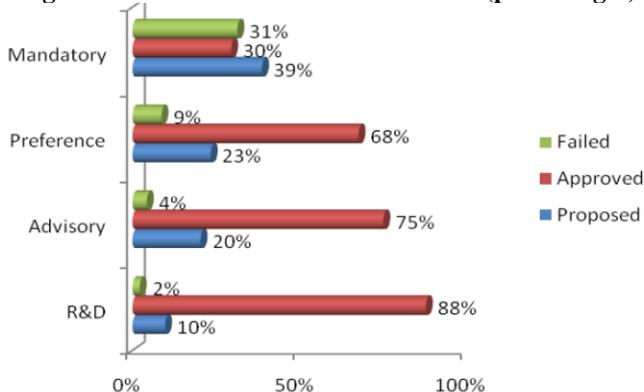
Figure 2: Number of OSS initiatives worldwide over time



Source: (Lewis, 2010)

Worldwide, the peak of the open source initiatives was during the year 2003, the period between 2002 and 2005 being the period that set the bottom rules regarding the use of OSS. What we can observe from the figure above is that immediately after EU strongly delivered policies between 2002 and 2005, there still was a peak in 2007, year in which many countries made their own policy to align with EU's policy. After that we observe a steady 15 to 25 policies a year to better manage and obtained results.

Figure 3: Total OS initiatives worldwide (percentages)



Source: (Lewis, 2010)

As it is expected for supporting a strong development of OSS, most of the successfully approved policy initiatives worldwide were the ones of research and development. A vast majority of these initiatives was approved and funded. At the opposite end, mandatory policies were harder to pass through, the number of fails, approvals and proposed being at the same level. Advisory policies were well viewed taking into consideration the high rate of approvals for them. Preference policies for OSS were also appreciated and have been widely approved.

By looking over policy making regarding the use of OSS we observe that OSS is a topic of high interest at a worldwide level. EU is the leading agent regarding policy making on OSS maybe in the attempt of better regulating a market that was dominated by a certain category of providers of proprietary software. Now that the landmarks are set, it is a matter of market economics regarding how OSS will develop in the public sector. More initiatives regarding research and development will have a positive effect on the development of OSS and will spread the benefits to the other actors involved in the e-government act.

4. Conclusions

EU regulations set the main rules regarding the development of OSS in the public sector. Public and governmental bodies are now obliged to look into the OSS possibility when procuring software services. Now in the turn of developing countries to develop and enhance their e-government facilities by using the best solution available, either open source or proprietary.

Open source development is now linked to the development of e-government. There are a series of key factors that would enable OSS to develop at the same time with e-government. One of these factors is the human capital. Education regarding ICT is a priority according to EU and will help ensure that the future generations have a positive attitude regarding technological advancements. Also, a solid education in ICT would provide those specialist needed for OSS development and administrations, specialist for which now the labor market is increasing. The development of e-government is linked with computer penetration rates, thus enhancing efforts in enabling the access of the people to Internet and having a personal computer is a matter of interest. OSS can also develop on this side, as client

operating systems and software without licenses for the open public. Diminishing the digital divide is essential for both e-government and OSS.

Developing countries which until now had barriers in implementing e-government can now benefit of the knowledge EU offers regarding implementing OSS for supporting e-government and also can consider the possibility to outsource some e-government services.

At the most developed stage of e-government, security is a matter of high interest. Due to the open nature of OSS, at this level the use of OSS raises a few security issues thus in-house development aimed at improving security of a mix of proprietary and OSS could be used to properly satisfy the business needs of governmental and public bodies.

Software procurement made by public bodies worldwide represents a high marker ratio from the overall market of software. The way public bodies make their procurement decision can have an important economic influence on how this market is developing. Due to the high economic interests, policy making can be influenced in certain region to some extent. We have here the example of the United States of America where the software procurement market is less regulated by coherent policies and the use of OSS is diminished and not promoted as a viable option, being just a few exceptions from this rule. The influence of the biggest software producer in the world can be seen as a lack of regulating policies regarding its activity in its home country.

Most important, OSS must to be seen as a “savior” or as the right choice but as a choice to be taken into account. Many times, proprietary solutions can prove to better satisfy the requirements or a mix of OSS and proprietary solutions can interact in providing top services.

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