

## **THE CHARACTERISTICS OF INNOVATION IN ROMANIAN SMES - BASED ON 1375 ENTREPRENEURS AND MANAGERS INTERVIEWS**

Ovidiu Nicolescu<sup>1</sup>  
Ciprian Nicolescu<sup>2</sup>

<sup>1</sup> Romanian Scientific Management Society, inst.manager@gmail.com

<sup>2</sup> The Bucharest University of Economic Studies, ciprian.nicolescu@gmail.com

**ABSTRACT:** The paper aims to analyze the innovation activities within Romanian SMEs, taking into consideration their major role in ensuring competitiveness of this very important sector of companies and implicitly, increasing national economy performances. The analysis was based on results of an empirical research conducted by questioning entrepreneurs and managers from 1375 firms - micro, small and medium sized - from all fields of activity and development regions, sample considered representative for the situation of Romanian SMEs sector. There were approached innovation intensity and nature in the small and medium enterprises from Romania, main ways of innovation within Romanian SMEs and major barriers faced by innovation and R&D activities, which impact decisively national economy competitiveness. The work ends with general conclusions and recommendations regarding economic, information and managerial & organizational elements of the SMEs' innovative activities, that are formulated mainly for entrepreneurs, managers and national political deciders.

**KEYWORDS:** innovation, SMEs, empirical research, research & development, barriers, recommendations

### **1. INTRODUCTION**

One of the main features of the present times is the high intensity of the innovation in almost all mankind fields. Transition to the knowledge based economy has as primordial component the comprehensive, creative and innovative activities. The new knowledge, today's driver force of the human progress and performance is generated by research and development processes, by intense innovative activities in all society components [3].

Without any doubt, in the economy are achieved the most part of innovative activities. Millions of the new products, services, technologies and methods developed in the last decades represent the best expression of this evolution. All types of companies are producing innovations which are very diversified. The best known are the innovations made by large and very large enterprises, especially international corporations. New products, services, management methods, marketing tools, human resources approaches, a.s.o. fulfilled by large corporations like Microsoft, Apple, Toyota, Mercedes, Airbus or Sandoz are very popular. The marketing capacity and financial potential of these companies make their innovations rapidly well known.

The number of large enterprises is small and they represent only a low percentage of the total companies, usually in every country. For example, in Romania we have about 1350 large companies, while in EU there are almost 50.000 big firms. The number of SMEs is more than 20,5 millions in EU and about 600.000 in Romania. Small and medium enterprises are producing a huge amount of innovations in all branches, but many of the best SMEs innovations are taken and marketed by large companies. SMEs innovations are not enough known, however their contribution to the economic and social development is major.

Innovations in SMEs are partially different comparative with the large enterprises, because of the differences in size, resources, types of activities, management and marketing approaches. It is necessary to analyze them in order to be increased and to better developed performant small business.

The Romanian 600.000 SMEs are very diversified and they contribute significantly to the country development. In order to analyze them, we have achieved an extensive empirical research, whose results have been published in 2015 [4].

In our paper we focused on the innovation within Romanian SMEs in 2015, using the results of this empirical research and trying to reveal the essential characteristics of this phenomenon, useful for proposing ways and methods to increase the Romanian economy performance. Such an approach is necessary because of the very modest position of innovation in Romania, comparative with other countries, as we can see in figure 1.

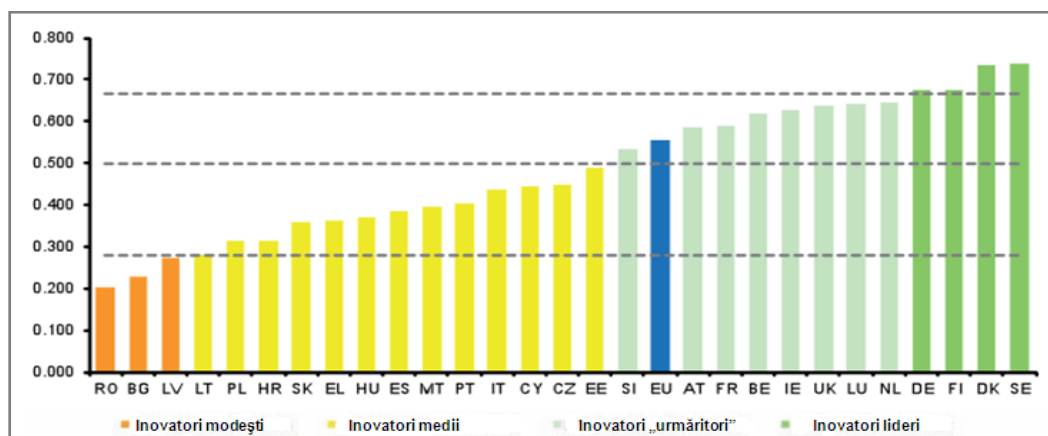


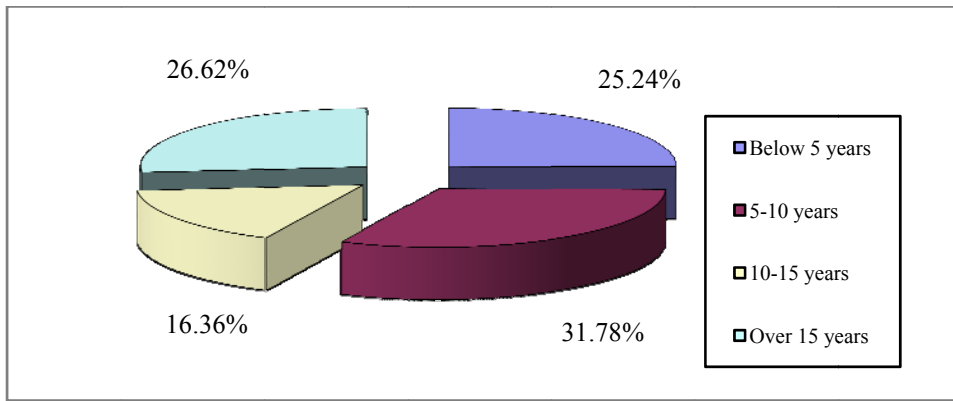
Figure 1. Innovation performances in European Union [5]

## 2. SMES SAMPLE PARAMETERS

The background of our paper is represented by the empirical research achieved in 2015 through interviewing entrepreneurs and managers from 1375 SMEs. This sample is representative for Romanian SMEs.

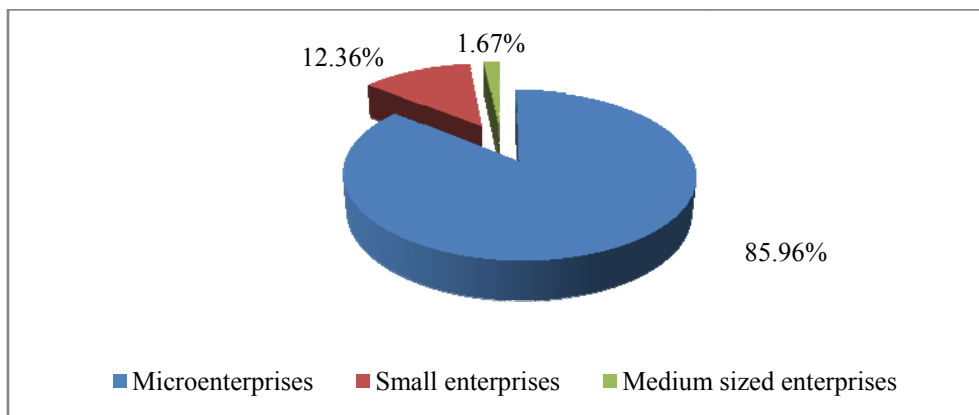
From methodological point of view we want to specify that the investigation was not designed in proportional variant, which involves copying in the sample the proportions of typologies from the reference population. Thus, for example, if there has been used the method of proportionate shares would have been selected and sampled about 90% of micro-enterprises, of which about 40% act in the services sector. Such an investigation structure would have had a low degree of relevance, because the behavior of micro-enterprises that operate in services is relatively similar in terms of management, investment and human resources and, instead, there would have been reduced information from NACE activity areas, in which operate fewer companies. For this reason it was preferred the option of stratified - optimal survey type, in which was reduced within the sample the weight of homogeneous layers (for example the enterprises which have as object of activity services) and in exchange was increased the share of heterogeneous layers (for example was supplemented in compensation the layer of companies with industrial activity). This construction method of the sample ensures a better quality of the information and a superior level of knowledge of the realities investigated. The sample constructed using this methodological approach is presented in next figures.

Taking into account the age of SMEs (figure 2), the most of the enterprises which made up the object of the investigation have the age between 5-10 years (31,78%), being followed by the firms whose existence is over 15 years (26,62%) and those companies with less than 5 years old (25,24%), on the last position being the enterprises with 10 to 15 years old (16,36%).



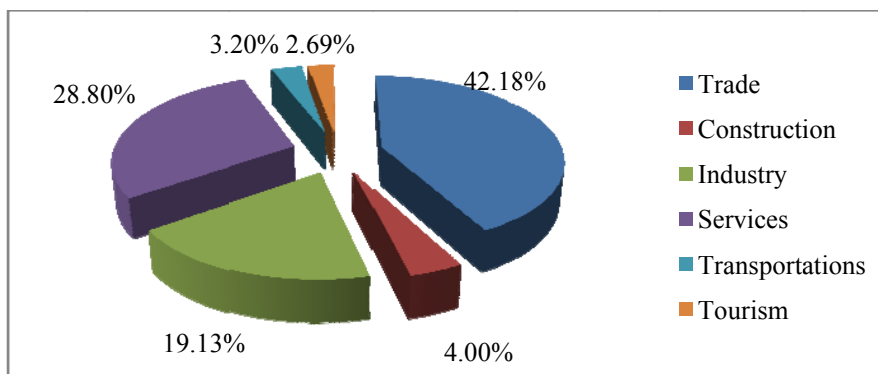
**Figure 2.** The structure of the sample according to the age of the companies

The distribution of the SMEs by dimension is shown in figure 3: microenterprises represent 85,96% of the total of SMEs investigated, small companies accounted 12,36% and medium sized ones hold a percentage of 1,67%.



**Figure 3.** The structure of the sample by the size of the SMEs

Concerning the companies by the fields of activity, the sample of SMEs shows the following structure: 42,18% of companies act in trade field, 28,80% of the companies are in services field, 19,13% are industrial companies, 4,00% of the economic units conduct their business activity in construction field, 3,20% operate in transportations field and 2,69% act in tourism. Many of the companies cover several fields of activity, because they focus on identifying and capitalizing business opportunities, which represent a basic feature of SMEs both in Romania as in other countries. We mention that for each enterprise was considered the NACE code of the main activity area. The graphical representation of the distribution of enterprises by fields of activity is displayed in figure 4



**Figure 4.** The structure of the sample by the activity fields

### 3. INNOVATION INTENSITY AND NATURE IN THE ROMANIAN SMES

The first striking element resulting from the empirical research is the high percentage of SMEs which are not reporting innovations. As we can see in figure 5, almost half of the Romanian SMEs (44,95%) did not mention any concrete innovation in their organizations during last year. This figure is - surprisingly - much more higher than in 2014 with 18,56%. The fact that such high proportions of SMEs are not making innovations represents negative feature of Romanian business environment. This explains to a large extent the low level of productivity in Romanian economy and the modest degree of its competitiveness.

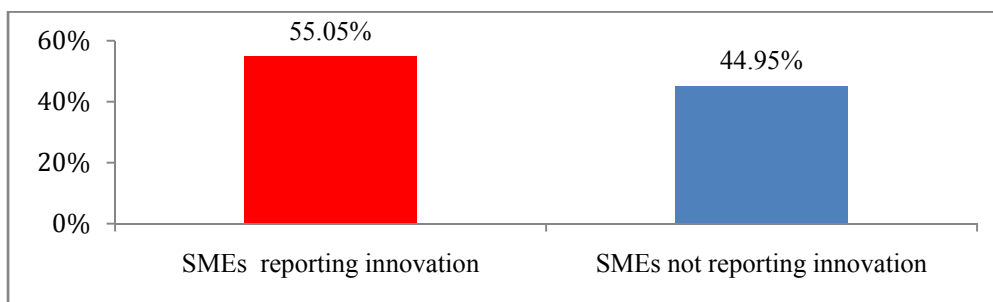


Figure 5. Intensity of innovation in Romanian SMEs

In Romanian SMEs are fulfilled mainly 5 types of innovations.

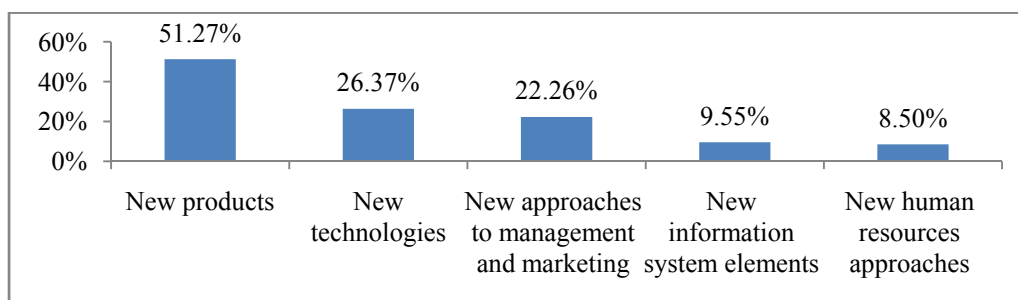


Figure 6. The nature of innovation activities in innovative enterprises

Taking into consideration SMEs which report innovation (figure 6), we could observe that the most frequent type of innovation is represented by new products. More than half of SMEs reporting innovations are making new products. On the second position is the generation of the new technologies made in a quarter of SMEs. New approaches in management and marketing activities are used in average by one out of 5 SMEs. The last two types of innovations - much less made in Romanian SMEs - have as object information systems and human resources approaches, each of them with almost 10%.

Also, if we examine nature of innovation, we notice that the most frequent are technical innovations - new products and new technologies - in almost 80% from SMEs reporting innovations. This is similar with the innovative practice in all countries. The innovation in management and marketing, human resources and information systems is less intensive - all together - 40,31%, representing half of technical innovations. In reality, the difference is not such high, but some of managers and entrepreneurs do not take into consideration the "small" new elements introduced by them in management, marketing, human resources or informatics activities. They do not consider them as being innovations.

The last remark regards the diversification of the innovation in SMEs. According to our figures, almost 18% of SMEs fulfill 2 or 3 types of innovation. Such a situation is normal,

because quite often major innovations in technical activities need innovations in management, marketing, informatics or human resources approaches.

Considering the impact of the SMEs size related to the innovation efforts (table 1), we identify the following significant aspects:

- there is a positive correlation between the size of SMEs and the frequency with which they indicate new products, new technologies and an improvement in human resources;
- there is a negative relationship between the size of enterprises and their tendency to aim innovation efforts toward new approaches in management and marketing, a frequency of 4,35% being registered for medium-sized organizations – 2,29 times smaller (-5,56 p.p.) than the level corresponding to small entities and 3,01 times smaller (-8,76 p.p.) than the level for micro-enterprises;
- the percentage of SMEs indicating an absence in innovation approaches is negatively correlated with the size of SMEs: 46,28% of micro-enterprises do not take innovative actions – a percentage 1,24 times larger (+9,22 p.p.) than the level corresponding to small enterprises and 1,33 times larger (+11,5 p.p.) than that of medium enterprises.

**Table 1.** Differentiation of innovation activities according to the SMEs size

No.	Innovation types	SMEs size		
		Micro-enterprises	Small enterprises	Medium enterprises
1.	New products	27,07%	30,00%	43,48%
2.	New technologies	12,61%	21,76%	43,48%
3.	New approaches to management and marketing	13,11%	10,00%	4,35%
4.	New information system elements	4,40%	10,59%	4,35%
5.	New human resources approaches	4,15%	7,06%	8,70%
6.	Not the case	46,28%	37,06%	34,78%

Examination of innovational activities in SMEs taking into consideration their activity (table 2), indicates the following main elements:

- The most frequent innovation activities are - normally - in industry, where two thirds of SMEs are innovating, mainly in technical activities. The lowest innovation activities are in the tourism and transportation where 6 out of 10 SMEs do not report any innovative activities.
- The creation of new products is most frequent in commerce and industry, in about 1/3 of SMEs from these branches. The smallest intensity of new products is in tourism and transport. Percentage of new products for tourism SMEs is the lowest (13,51%) and this explains - to a large extend - why Romanian tourism is not competitive at international level.
- The highest intensity of new technologies is - normally - in industrial SMEs, used in more than one quarter of them. Absence of new technologies is in tourism SMEs (see also the previous remark). A very small frequency of new technologies is in commerce SMEs, less than 8%.
- The innovations in management and marketing approaches, IT systems and human resources approaches are relatively more frequent in tourism and services.

**Table 2.** Differentiation of innovation activities according to the SMEs field of activity

No.	Innovation types	SMEs size					
		Industry	Construction	Commerce	Transport	Tourism	Services
1.	New products	32,70%	18,18%	33,10%	15,91%	13,51%	20,45%
2.	New technologies	25,48%	23,64%	7,76%	15,91%	0,00%	16,16%
3.	New approaches to management and marketing	8,37%	3,64%	11,90%	11,36%	21,62%	16,92%
4.	New information system elements	3,42%	7,27%	4,31%	4,55%	10,81%	6,82%
5.	New human resources approaches	2,66%	7,27%	2,41%	6,82%	8,11%	8,08%
6.	Not the case	36,88%	52,73%	45,52%	59,09%	59,46%	45,45%

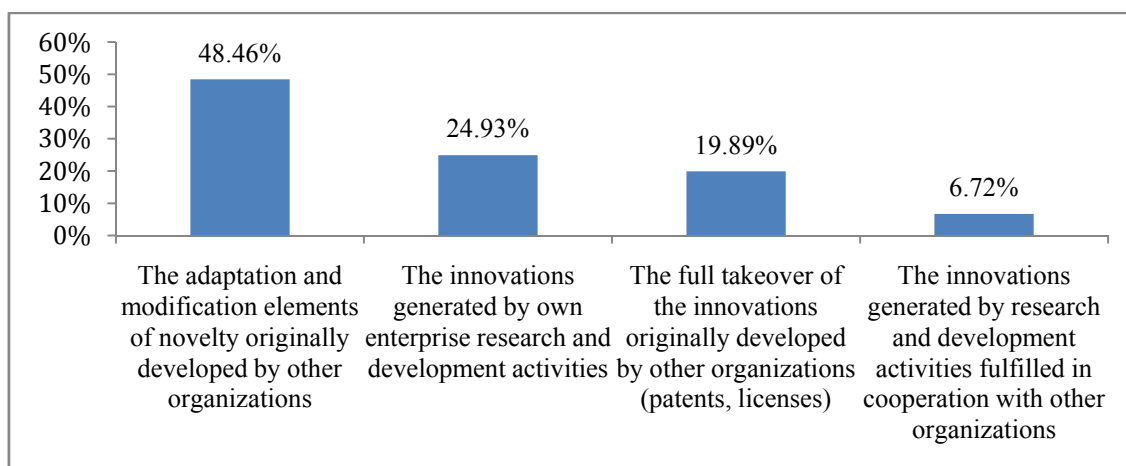
#### 4. MAIN WAYS OF INNOVATION WITHIN SMES

In figure 7 are presented the main ways to innovate in the Romanian SMEs according to empirical research done in 2015.

As we could expect, the most frequent way to innovate in SMEs is by starting from a successful innovation made in other organizations - quite often in the same branch. The original innovation is adapted to the specific context of enterprise, making changes in order to be performant within the new organizational environment, which from human, commercial, technical, financial, management, marketing, a.s.o. point of view is different. We could call this process, innovative adaptation because every time there is necessary to implement new elements comparative with originally innovations. This way to innovate is used in almost half of SMEs.

Producing innovation by own research and development activities is done by almost one quarter of SMEs. This is a very good percentage which shows that relatively numerous SMEs are interested and able to make themselves research and development processes.

The third way to innovate is by buying the patent or license developed in other organization - R&D center, university, company so on - and implementing without any significant changes in the enterprise. This way usually refers to the technical innovation, especially for new products or new technologies. Almost one fifth of SMEs used this innovative way. The generation of innovation by R&D activities developed together by two or more organizations is much more less used (6,72%) because of its superior complexity and special resource needed. Comparative with previous year this way increase almost with 50%, which is very positive.



**Figure 7.** Ways of innovation within SMEs

Regarding the impact of the companies' sizes over the frequency in implementing certain innovation ways (table 3) we have observed the following elements:

- the frequency of innovation is increasing with the size of enterprise. This is valuable in 3 from 4 ways of innovation
- the only exception is represented by the innovation generated by own enterprise R&D which is less frequent in medium enterprises (14,29%) and more frequent in small enterprises (23,29%) and micro enterprises (25,44%)

**Table 3.** Differentiation of innovation ways according to the SMEs size

No.	Ways of innovation	SMEs size		
		Micro-enterprises	Small enterprises	Medium enterprises
1.	The adaptation and modification elements of novelty originally developed by other organizations	48,12%	50,00%	52,38%
2.	The innovations generated by own enterprise research and development activities	6,53%	7,53%	9,52%
3.	The full takeover of the innovations originally developed by other organizations (patents, licenses)	25,44%	23,29%	14,29%
4.	The innovations generated by research and development activities fulfilled in cooperation with other organizations	19,91%	19,18%	23,81%

The analysis of main innovation ways taking into consideration the SMEs field of activity reveals the following important aspects (table 4):

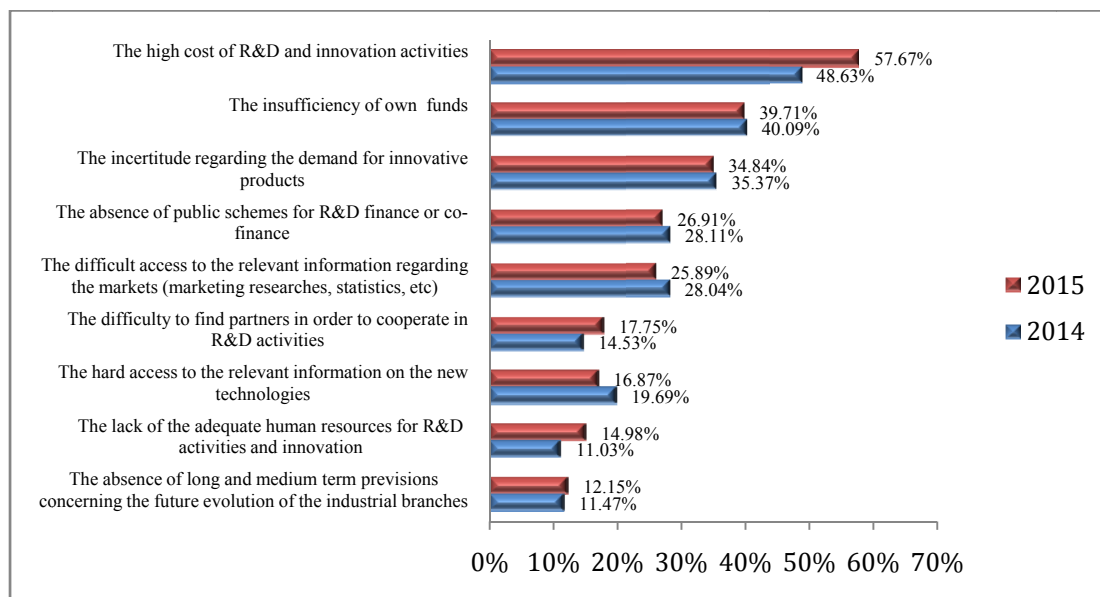
**Table 4.** Ways of innovation in SMEs according to the field of activity

No.	Ways of innovation	SMEs size					
		Industry	Construction	Commerce	Transport	Tourism	Services
1.	The adaptation and modification elements of novelty originally developed by other organizations	43,00%	42,86%	48,83%	42,42%	65,52%	51,38%
2.	The innovations generated by own enterprise research and development activities	6,76%	10,20%	6,34%	9,09%	0,00%	7,03%
3.	The full takeover of the innovations originally developed by other organizations (patents, licenses)	25,12%	24,49%	24,88%	21,21%	13,79%	26,30%
4.	The innovations generated by research and development activities fulfilled in cooperation with other organizations	25,12%	22,45%	19,95%	27,27%	20,69%	15,29%

- There are very big differences regarding ways of innovation among the companies in different branches. The most equilibrated innovation approach is reported in industry and construction and the less equilibrated in tourism where, for example, the innovation way of generating innovation by joint R&D activities is not used, while adaptation of innovation developed in other companies is very high (65,52%);
- The firms from industry and services registered the highest frequency of innovation generated by full takeover of the innovation originally developed by other organizations - more than one quarter; the lowest percentage is in tourism - only 13,79%. This could be explained by very keen competition among tourism enterprises in Romania;
- The companies that prefer the adaptation and modification of new elements initially developed by other organizations are more frequent in the field of tourism (65,52%) and services (51,31%) and less frequent in transport (42,42%);
- The enterprises indicating the full takeover of innovation initially developed by other companies are more frequent in the case of SMEs from the field of transport (27,27%) and industry (25,12%) and less frequent in the case of services enterprises (15,29%);
- The SMEs reporting innovation generated by joint research and development activities achieved together with other organizations, hold high percentages in the field of construction (10,20%) and transport (19,09%), while none of the enterprises activating in tourism have used this option.

## 5. MAIN BARRIERS FACED BY INNOVATION AND R&D ACTIVITIES

The empirical research has identified 9 main barriers to the innovation and R&D activities in Romanian SMEs (figure 8). The greatest barriers are economic: the high cost of R&D activities and the absence of enterprise necessary funds to this type of activities. The first barrier was faced in 2015 by more than half of SMEs, recording even a huge increase - by 18,5% - comparative with previous year. The second barrier - the absence of necessary enterprise funds registered almost the same level - 40% - in 2015 and 2014



**Figure 8.** The main barriers faced by innovation and R&D activities in SMEs

The next two barriers - reported by a significant percentage of SMEs - regard the markets from two points of view: the size of demand for the enterprise innovative products (one third of companies) and, respectively, the absence of the relevant information concerning enterprise markets (more than one quarter of investigated SMEs). Both barriers have registered small decreases in 2015 comparative with previous year.

One out of 6 enterprises indicated two other barriers: the difficulty to identify the partner enterprise in order to cooperate in the innovational activities and the difficult access to the relevant information regarding new technologies. The lowest frequent barrier regards the previsions on the evolution of the enterprise business sector at national, regional and local level. One out of eight SMEs reported such a difficulty. From temporal point of view we have recorded a slight improvement tendency because:

- in 4 out of 9 barriers the frequency of their manifestation has decreased in 2015 comparative with 2014
- with one exception - the high cost of R&D and innovation activities - the decrease of barriers has been to the most frequent barriers

The analysis of differentiation of the SMEs barriers according to the fields of activity (table 5) reveals the following significant characteristics:

**Table 5.** The main barriers faced by innovation and R&D activities according to the SMEs fields of activity

No.	The main barriers faced by innovation and R&D activities	SMEs size					
		Industry	Construction	Commerce	Transport	Tourism	Services
1.	The high cost of R&D and innovation activities	51,33%	61,82%	56,55%	59,09%	75,68%	61,11%
2.	The incertitude regarding the demand for innovative products	29,28%	30,91%	36,21%	38,64%	43,24%	35,86%
3.	The insufficiency of own funds	33,84%	36,36%	41,38%	36,36%	35,14%	42,42%
4.	The absence of public schemes for R&D finance or co-finance	26,62%	16,36%	26,03%	31,82%	21,62%	29,80%
5.	The difficult access to the relevant information regarding the markets (marketing researches, statistics, etc)	24,33%	18,18%	25,86%	38,64%	29,73%	26,26%
6.	The hard access to the relevant information on the new technologies	15,97%	10,91%	17,93%	6,82%	13,51%	18,18%
7.	The difficulty to find partners in order to cooperate in R&D activities	15,21%	12,73%	17,93%	11,36%	16,22%	20,71%
8.	The lack of the adequate human resources for R&D activities and innovation	14,07%	14,55%	15,17%	13,64%	18,92%	15,15%
9.	The absence of long and medium term previsions concerning the future evolution of the industrial branches	11,03%	9,09%	12,41%	15,91%	8,11%	12,88%



- The differences among different branches are quite big. For example, in the case of the high cost of innovation and R&D activities, the frequency in the tourism branch - which is the highest among all 6 fields (75,68%) - is with 47,4% greater comparative with industry, which registered the lowest frequency (51,68%). Similar differences are recorded in all other barriers;
- The main significances of the barriers characteristics revealed by the general analyses at the level of the whole sample are maintained to the level of fields of activities. For example, the high cost of innovation and research activities is on the first position as frequency in all fields of activity and the absence of the long and medium previsions on the evolution of enterprise branch is on the last position (ninth) in 5 of 6 fields of activity. The exception is transport branch;
- The highest level of barriers frequency is concentrated on three branches - services (4 barriers), tourism (3 barriers) and transport (2 barriers) - in which the intensity of innovation and R&D activities is lower comparative with other branches;
- The lowest level of barriers frequency is concentrated also on three branches - industry (3 barriers), transport (3 barriers) and construction (2 barriers). Industry - where we have registered the lowest level of the first 3 barriers - is a field with relatively better innovation and R&D activities.

## 6. CONCLUSIONS AND RECOMMENDATIONS

The information contained in the previous parts of the paper reveals the high diversity of the innovation and R&D activities in Romanian enterprises both from size and field of activity. Innovational differences among the SMEs there are very large even in the same category by size and/ or by branches. Despite of this heterogeneity, we could formulate certain conclusions:

- a) The majority of Romanian SME is fulfilling innovation and is reporting certain innovational activities and results. Without any doubt these have contributed to the general positive evolution of Romanian economy in the last years, to the GDP relatively fast growth, among the highest in Europe;
- b) Comparative with other UE SMEs countries, activities and performance of Romanian SMEs are still low, especially if we refer to the countries from Western Europe - like France, Great Britain, Italy, Germany so on. [2] [6]. The gap between Romania and EU countries indicated the necessity of the amplification of innovation and R&D activities and performances in Romania. The analysis of R&D and innovational activities in Romanian SMEs provides many useful elements for the development of the better legislation, financial approach, management, marketing and human resources measures, in order to increase the innovation performances. The approach should be systemic, correlating different actions and measures and focusing them on a few realistic and ambitious national objectives. In the same time, the approach should be differentiated to a large extent, taking into consideration the large variation of characteristics and contextual conditions of different types of SMEs as field of activity, size, location in Romania and so on;
- c) The innovation and R&D activities in Romanian SMEs registered significant differences according to their size. The increasing in the size of the companies is reflected to a certain measure in the amplification of the innovational activities and performances, especially in technical and human resources areas. From management, marketing and IT areas we could discover the same tendency. Also, the medium enterprises have the highest percentage of the adaptation of innovations initially developed in other companies. Small and microenterprises are buying patents for new products and technologies and they cooperate more frequently in joint R&D activities with other organizations;

- d) The innovation and R&D activities are very diverse from branches point of view and within each branch from size of the enterprise, ways of innovations, innovational barriers and so on [1].

Industry is the branch in which innovative activities and R&D are more intensive - 2/3 of industrial SMEs reported innovative activities. Within industrial SMEs technical innovation - new products and new technologies - are most frequent than in other branches. Comparative with other fields like tourism and transport, frequencies of technical innovation are several times bigger. The less intensive innovative are tourism and transport where SMEs have reported the lowest frequency in innovative activities. 6 out of 10 enterprises from these fields have not made any type of innovational activities. Thus could explain their low degree of competitiveness at national and international level.

The analysis presented, the conclusions formulated and the barriers faced by innovational activities in Romanian SMEs provide the "raw material" for the elaboration of the recommendations set in order to amplify and increase the performances of innovative and R&D activities. We divided the recommendations taking into consideration their nature in 3 areas - information, economic and management & organization.

- a) Recommendations regarding economic elements of the SMEs' innovative activities:

- Improving the legal framework on stimulating investments and state aid schemes, with reducing the awarding criteria to make them more accessible to SMEs, especially to innovative enterprises.
- Supplementing the budget of the "entrepreneurial skills, development program for youth and facilitating their access to funding (START)", which in the previous years have created many innovative companies.
- Diversifying and amplifying the guarantee and the counter guarantee services, valuing the best practices from EU.
- Improving the innovation and the credit policies of the state-owned banks (CEC Bank and EXIM Bank) by implementing strategies that are friendly and stimulative for innovative SMEs.
- Providing seed capital by creating new innovative enterprises through a special fund that is totally or partially funded from European funds, according to the best EU practices.
- Assuring micro-grants and micro-credits for the development of entrepreneurial spirit, innovative approaches and introduction of new technologies in small and medium enterprises, through a special fund that is totally or partially funded from European resources.
- Providing venture capital to finance innovative SMEs and projects in cutting-edge industries through a special fund using funded European resources allocated to Romania.

- b) Recommendations concerning the information elements of the SMEs innovative activities:

- Designing and implementing of a national information and knowledge bank, in which to record all contracts of scientific research financed from public resources (state budget, local budget and/or European funds), the results of performed scientific research and their use by companies. Access to all R&D activities financed from state and public funds should be free for all Romanian enterprises. It is the national interest to take advantage in business of all R&D results research.
- Developing in Romania - at national, sectorial and regional level - of the specific information systems providing the technical, marketing, ecological a.s.o. information necessary to different categories of SMEs, in order to initiate and implement performant innovative activities. These systems should help to overcome the three main information barriers faced by SMEs in innovative activities. Necessary resources could be provided by EU funds for Romania - more than 3 billions € being allocated for SMEs for 2014-2020.
- Developing the networks and advisory and information centers for SMEs, business support services, portals of solutions for SMEs, supporting networks of SMEs cooperation,

research centers and universities, vocational training organization and financial institutions and consultancy, with especially focus on the innovative activities.

c) Recommendations regarding the managerial and organizational elements aiming to increase Romanian SMEs innovative activities:

- Elaborating and implementing the special programs of entrepreneurial training, mentoring, tutoring and coaching for entrepreneurs - financed by European funds - in order to increase innovative abilities and SMEs entrepreneurial and managerial competitiveness.
- Supporting the business advisory services markets in areas of technological transfer, foresight, innovation, and custom-oriented, according to the EU recommendations [6].
- Elaborating and implementing programs to facilitate the adoption of European and international standards in SMEs (technological, of the product, organizational, so on) funded totally or partially from European funds.
- Carrying out and implementing programs for organizing innovative clusters in each region of a country, with focus on products for export, financed from European funds.
- Designing and implementing research programs, development and management consulting, marketing, networking, investments in small and medium enterprises, in order to provide pragmatic solutions to increase functionality and innovative performance of enterprises on internal and external market, using the European funds allocated to Romania.
- Facilitating direct contacts of entrepreneurs and SME organizations with business partners and SMEs organizations from EU and other countries, focused on the innovative activities.
- Achieving the assessment of intellectual property patrimony held by public authorities and setting out of a strategy for the better use and valorification in Romanian enterprises.
- Providing support for creation and development of networks among SMEs, research centers and universities, vocational training organizations and continuous professional training, financial institutions and entrepreneurial consultants, in order to develop innovative activities and to increase SMEs competitiveness.

Conclusions and recommendations regarding SMEs activities based on the extensive empirical research are important and useful both from scientific and pragmatic point of view.

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