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The state of innovation in Romania : the lost key for the economic development

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Objectives of the paper

- The paper investigates the premises, the level and the characteristics of innovation in Romania in the last fifteen years
- The study considers the state of the research and development sector as a precondition for the development of innovation
- The expectation was that the innovation activities, placed at a modest level before the 2008-2009, had a strong throwback in companies of all sizes after the economic crisis; the exploration had as aim to investigate if the gap has been recovered until nowadays.
- The data used were extracted from institutional sources as Eurostat and UNESCO Databank

Introduction (I)

- The issue of innovation becomes the key of global practices in the contemporary economy, because it leads to development, by forcing competitors to react, often in a creative way, and generates change at a larger scale (European Commission, 2002, 2003).
- Innovation cannot be equated with research-development, as it supposes a series of economic activities which are not included in the field of research-development (OECD, 2005), as testing and launching on market. However, the research and development sector, linked with the most advanced sectors of the economy, enables the innovation development (Ariss & Deilami, 2012)

Introduction (II)

The share of innovation active firms reflects the ability of the economy to develop as well as the state of the most advanced economic area which involves the release of new products, the initiation of new processes, of marketing elements or of models of organization. The innovation process is one of the main drivers of development and therefore, it involves significant costs for the process of initiation and for concrete results.

Recalling the definitions of innovation

- “the commercial exploitation of an invention” (Schumpeter, 1939);
- “the capacity to assimilate and convert new knowledge to improve productivity and to create new products and services” (European Commission, 2000)
- „the process through which new economic and social benefits are obtained by using knowledge” (OECD)

Types of innovation (I)

(European Commission, 2003)

- *adaptive* innovations are those that extend the commercial exploitation of some technologies used by other companies;
- *anticipation* innovations are those that explore purposes related to new products or to the development of new markets;
- *facilitation* innovations aim to stimulate changes demanded by the overall social-cultural environment;
- *organizational* innovations refer to managerial aspects of the deploying innovative processes.

Types of innovation (II) (Fagerberg, 2011)

- (a) *incremental/marginal* (improvements of a product or process);
- (b) *radical* (introduction of a totally new product);
- (c) *technological revolutions* (a cluster of innovations that together may have a very strong impact).

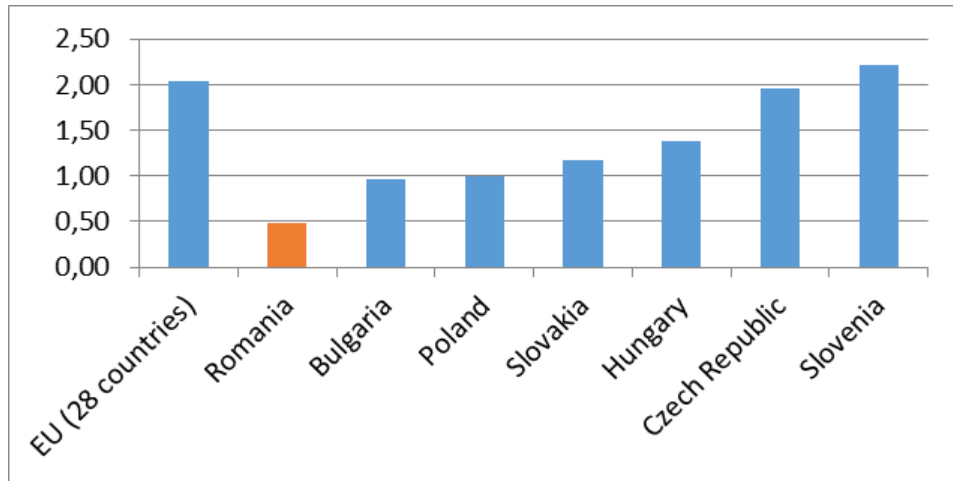
While the radical innovation is often the method used by firms to **enter on a market** and develop rapidly, the incremental innovations are used by large companies in order to **secure the position on the market** and to contribute to the financial performance.

Types of innovation (III) (Francis and Bessant, 2005)

- *Product* innovations are products or services which are significantly different in characteristics and functions from the products already existent on the market.
- *Process* innovation refers to new and more effective ways to produce goods and services for the market.
- *Positioning* innovation is defined as a change of the context in which products are delivered.
- *Paradigm* innovation means changing the organizational perspective regarding to products, markets, or to the approach in the chain of production and connection with markets.

Research and development sector (I)

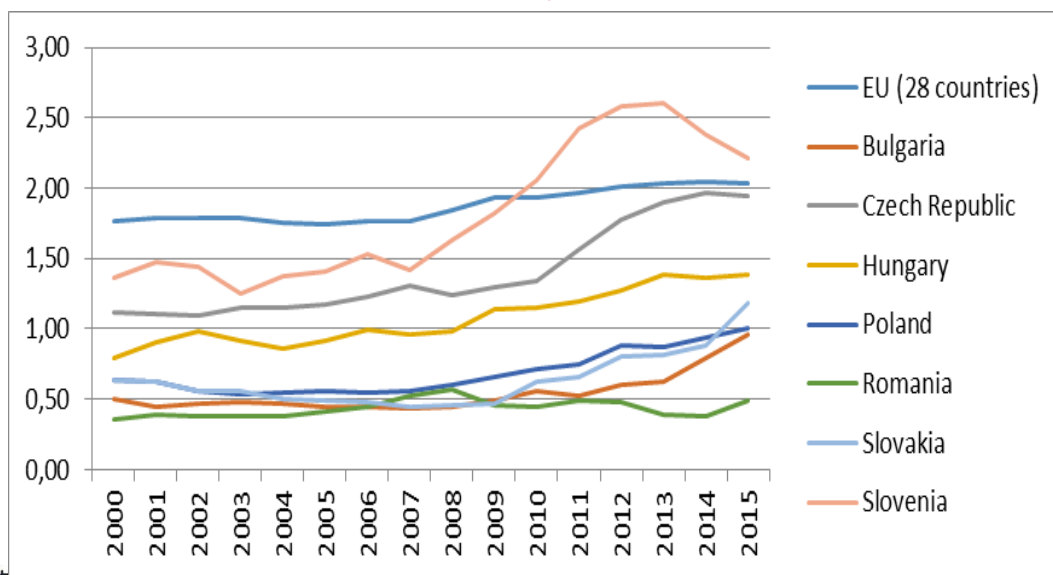
Fig 1. Public expenditure on Research & Development (as a percentage of GDP) in 2015



In 2015 Romania had the lowest value of public expenditure (0.49%) among the Eastern European countries, twice less than Bulgaria and Poland, and nearly three times less than Hungary. When compared to the EU average (2.03% in 2015) or the national target for 2020 (2%), Romania's investments in the R&D sector are four times lower

Research and development sector (II)

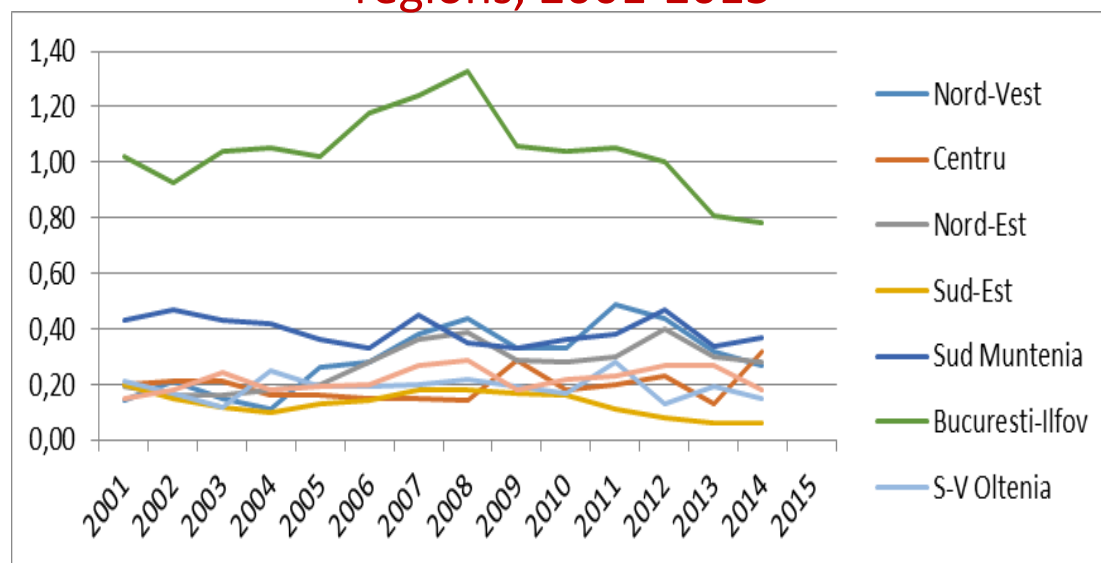
Fig. 2. The evolution of research funding in Eastern Europe after 2000



Between 2000 and 2015, Romania registered almost constantly the lowest level among the Eastern European countries in terms of evolution of research funding and was the only country that did not have a steady growth towards the EU average.

Research and development sector (III)

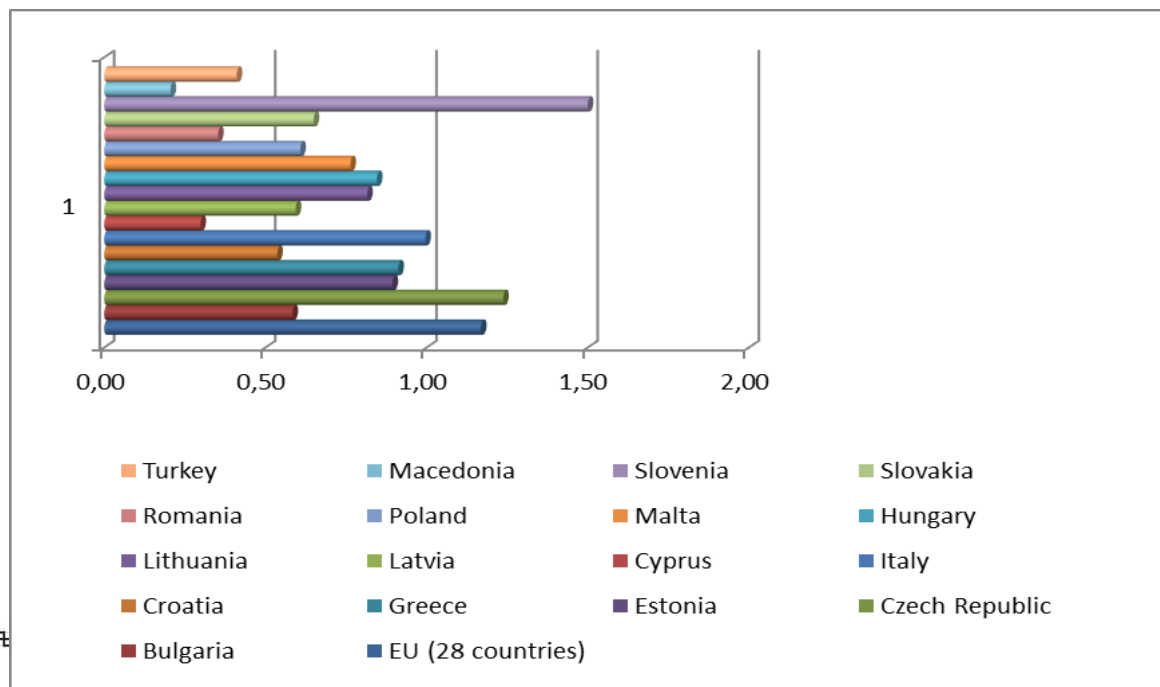
Fig. 3. The evolution of research funding by regions, 2001-2015



The data on the evolution of research funding by regions reveals the existence of a significant gap between Bucharest-Ilfov and other areas of development, this area exceeding with more than double the level of funding allocated for the rest of the country.

Research and development sector (IV)

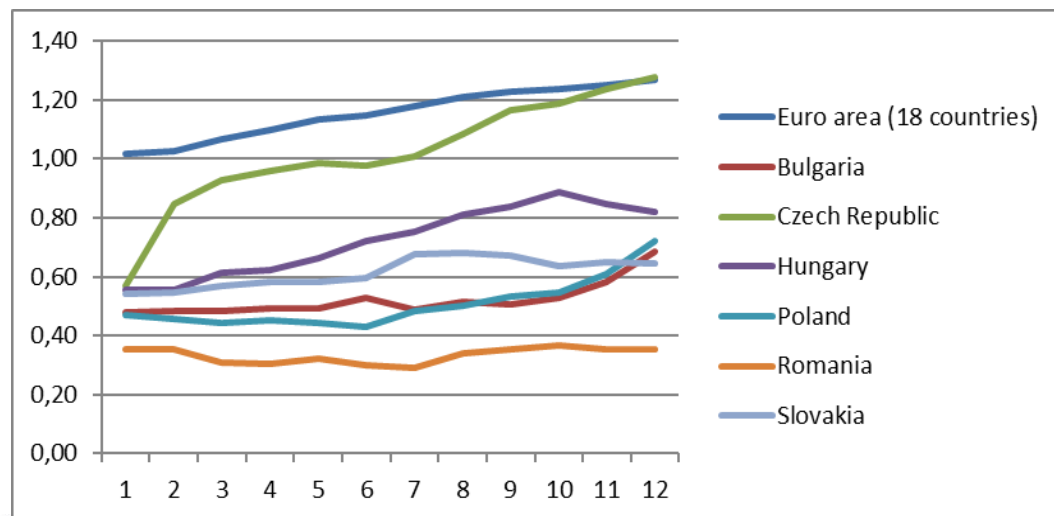
Fig. 4. Research and development personnel, 2014



In 2014 Romania registered a value of 0.35% representing the research personnel from the active workforce, ranking among the last countries in Eastern Europe. Only Macedonia and Cyprus had lower ranks than Romania for the staff in R&D sector.

Research and development sector (V)

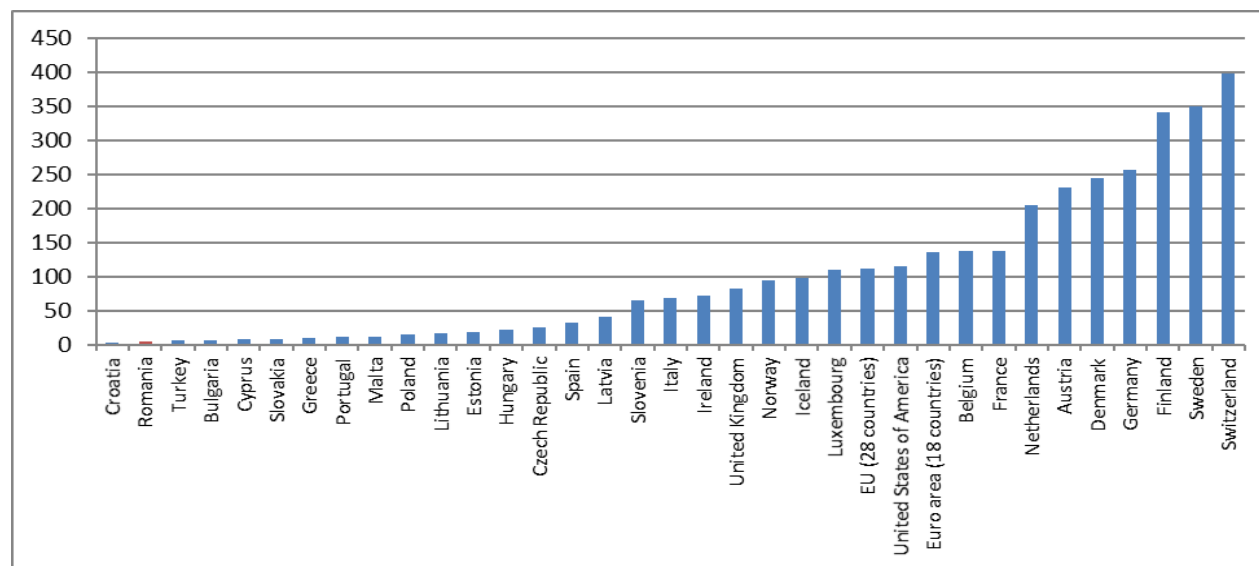
Fig. 5. Evolution of research personnel, 2004-2015



Between 2004 and 2015, only Romania did not show an upward trend in the share of full-time researchers. The other Eastern European countries managed to increase their number of researchers and, for example, the Czech Republic has managed to double the number of researchers in 12 years.

Research and development sector (VI)

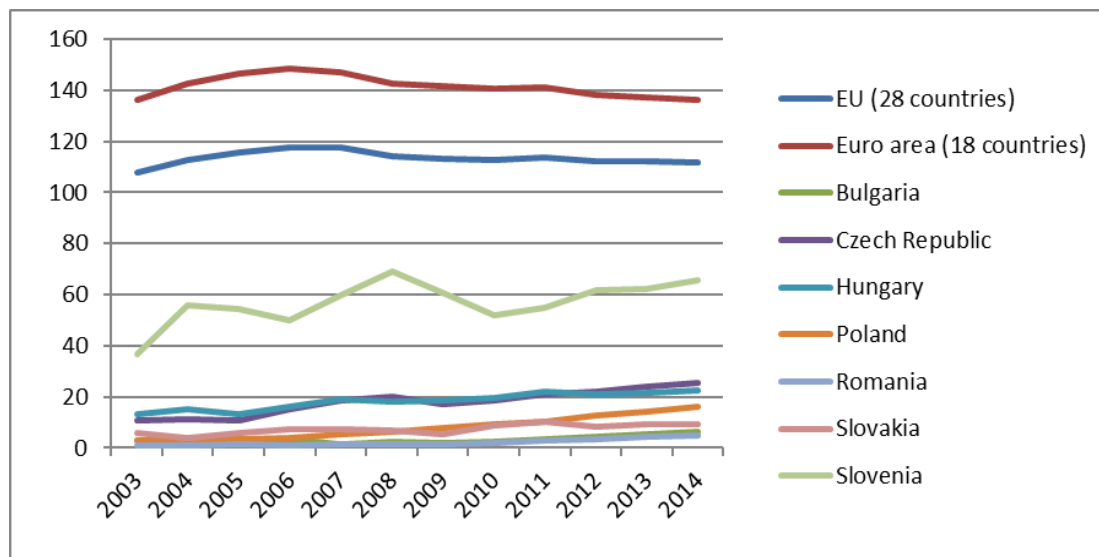
Fig. 6. Patent applications to the European patent office, 2014



Romania has a low level, the registered value was 5.11, the last but one place in the EU, a comparable position only with Turkey and Croatia.

Research and development sector (VII)

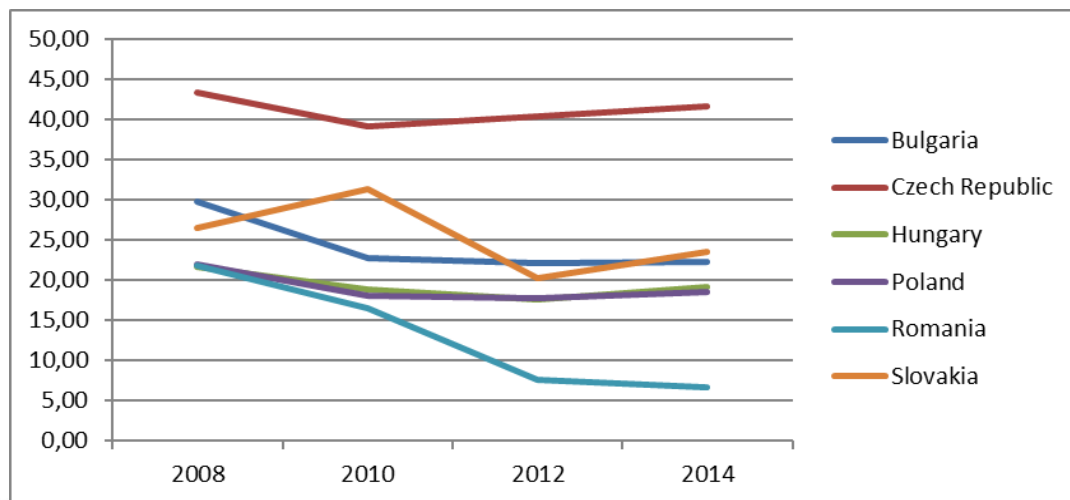
Fig. 7. EPO applications, 2003-2014, East Europe



Between 2003 and 2014, Romania had a very weak growth for this indicator. For example, in the Czech Republic the number of applications increased with more than 50%. The leaders for this category are the Nordic and Western countries

Innovation statistics (I)

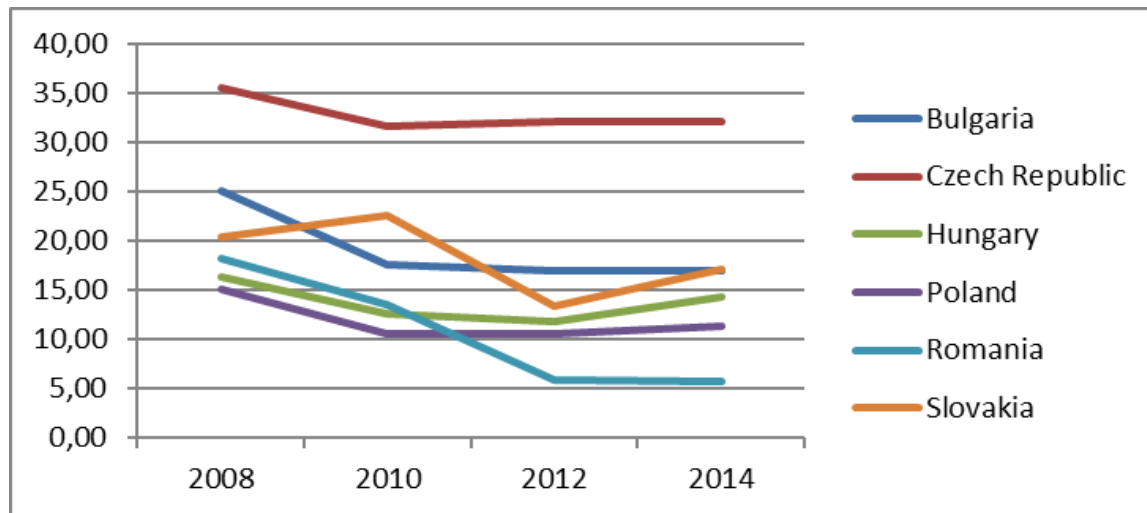
Fig. 8. Innovation active firms, 2008-2014



In terms of innovation active firms, after the crisis Romania registered a collapse for this indicator to a level of 3,5 to 4 times lower than the group consisting of Poland, Hungary, Slovakia and Bulgaria, and 9 times lower than the Czech Republic.

Innovation statistics (II)

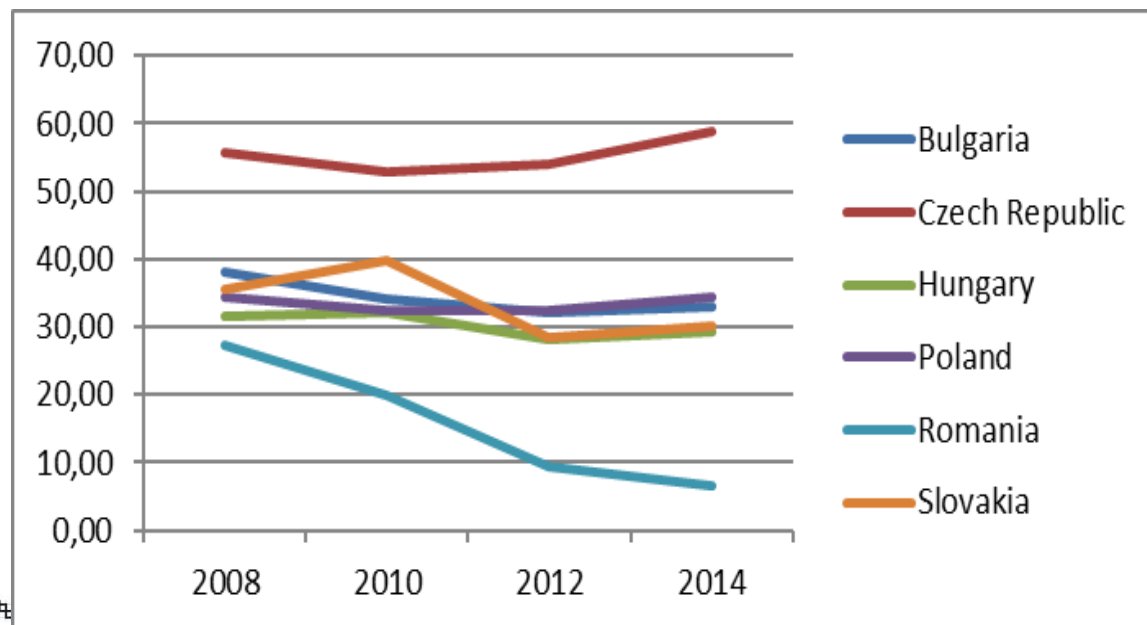
Fig. 9. Small-sized firms active in innovation, 2008-2014



Small businesses have been affected by the crisis of 2008-2009 to the point of survival, in that many companies in Romania did not survive that period. After 2008, the economic crisis led to a fall of 10% for the small-sized firms active in innovation in Eastern Europe

Innovation statistics (III)

Fig. 10. Medium-sized firms active in innovation, 2008-2014

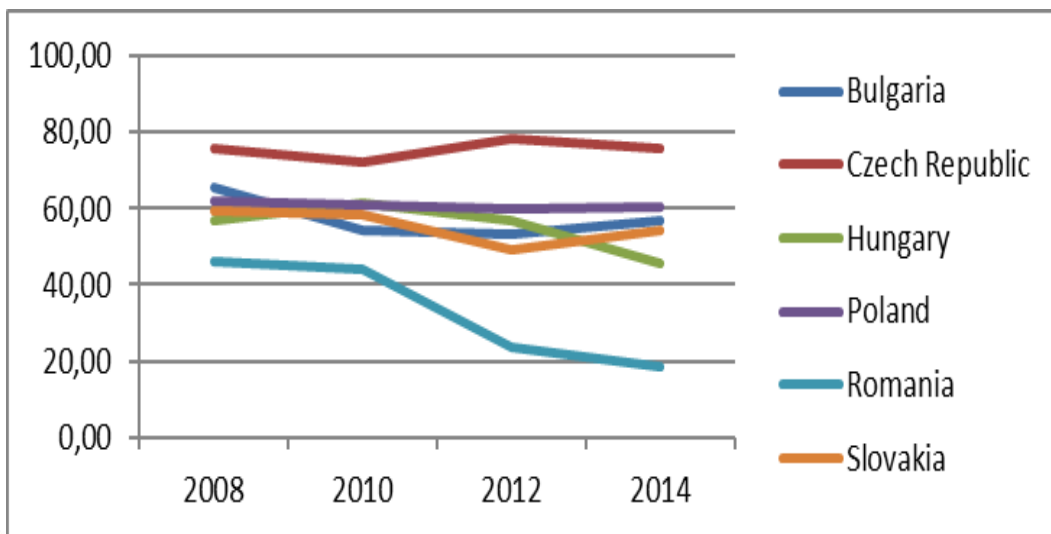


For the medium-sized companies active in innovation, among the Eastern European countries the collapse was by 20% (from 28% to 8%) and the trend is downward.

As the medium-sized companies are the main layer of the national economy, the decrease shows that the crisis of 2008 greatly affected the economy and continues to do so.

Innovation statistics (IV)

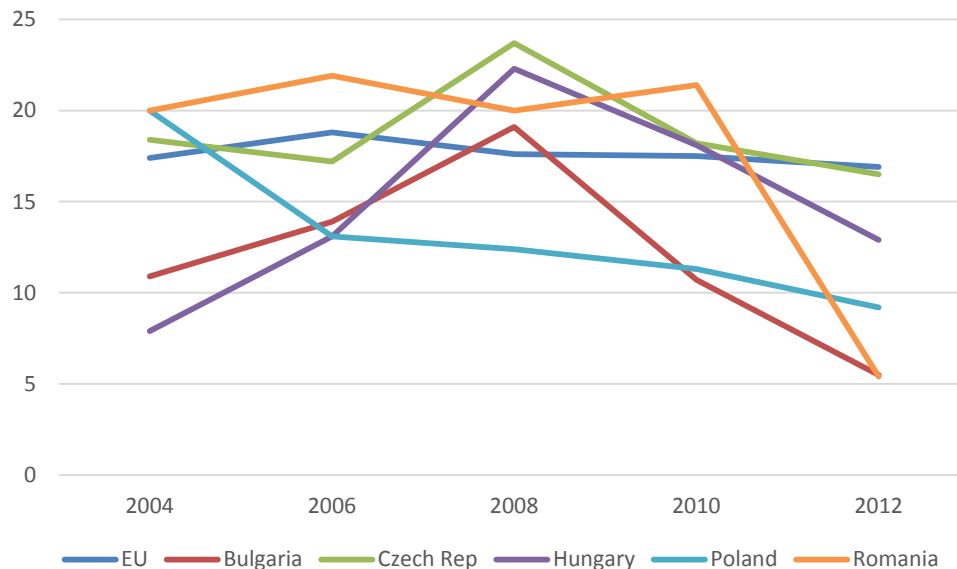
Fig. 11. Large-sized firms active in innovation,
2008-2014



For the large companies active in innovation in East Europe, the fall after 2008 was from 42% to 20% and the trend is also downward

Innovation statistics (V)

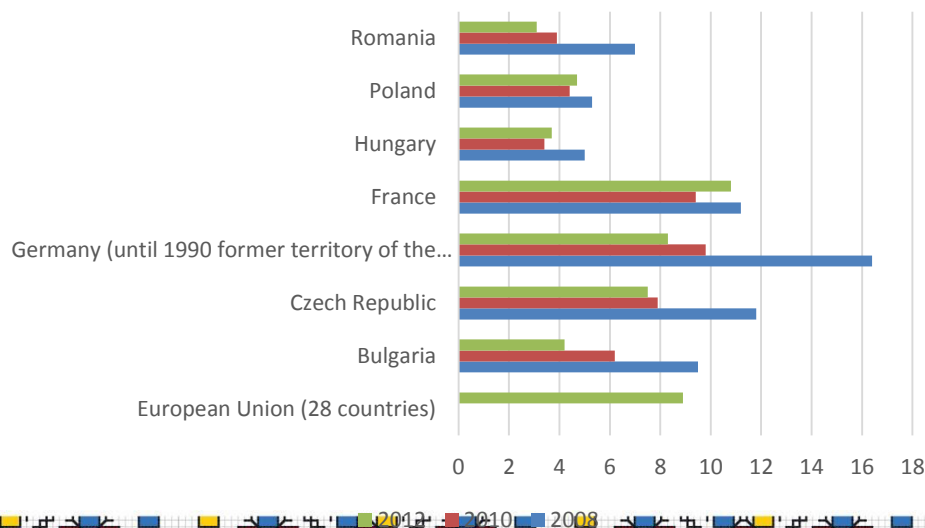
Fig. 12. Turnover from innovation (% from total) in industry



After the 2010 crisis, the Romanian industry faced a dramatic evolution of the turnover from innovation (% of total turnover): from a value superior of EU average, it fell at the lowest value in Europe

Innovation statistics (VI)

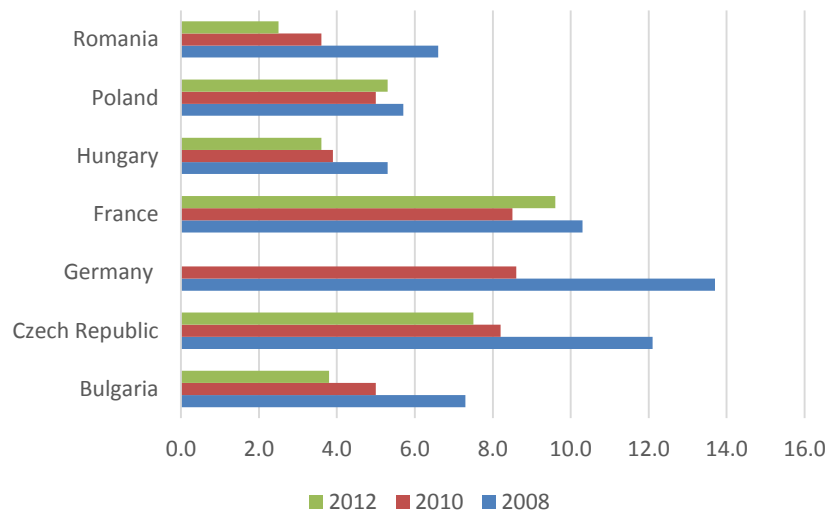
Fig. 13. Product innovative enterprises (% from total)



In the matter of product innovative enterprises, Romania has the smallest percentage (3,1%), three times less than the average of European Union

Innovation statistics (VII)

Fig. 14. Process innovative enterprises , as a % of total number of enterprises



In the matter of process innovative enterprises, Romania has the smallest percentage (2,5%), three times less than Czech Republic and four times less than France

Conclusions

- The low frequency of innovation and the gap that distances Romania from other countries in the region show that the governmental sector/ the business sector should develop mechanisms to stimulate the innovation processes.
- The performance of innovation in Romania is on the last place in the region (and in Europe). The financing of this sector and the share of full-time researchers reveal that the R&D sector is not a priority in Romania;
- Also, the level of innovation is modest and, as a feature of Romania, the decline produced after the economic crisis in 2008-2009 was not repaired after 2010.

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