Theoretical and Applied Economics
Volume XIX (2012), No. 7(572), pp. 85-96

Entrepreneurial behaviour consequences on small and medium-sized firms' innovation

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Abstract. *The European framework regarding innovation is dominated by the assumed objectives of the Lisbon Strategy and by its major reviewing demarches. In this perspective, the paper is based on a proposed model for the entrepreneurial process in Romania, depending on the economical development stage and the competitiveness level of the country, according to which there are set, on the one hand, the relationships between the conditions of the entrepreneurial framework and entrepreneurship, and, on the other hand, between entrepreneurship and innovation output in the cases of small and medium-sized enterprises.*

Keywords: entrepreneur; entrepreneurship/entrepreneurial behaviour; entrepreneurial process; innovation; economical development stages.

JEL Codes: L26; O31.
REL Codes: 14D; 19I.

1. Introduction

Entrepreneurs are considered innovative, proactive and calculated risk-taking individuals (Caree, Thurik, 2002, p. 8). They create and develop economic activities, by identifying new opportunities in order to generate value, depending on the time and space context they act.

At microeconomic level, entrepreneurship is the process of value creation that connects entrepreneurs' skills and attitude with two types of events: seizing and/or creating business opportunities in the external environment, respectively the exploitation of identified and evaluated opportunities in terms of allocated resources and associated risks. Explicitly, entrepreneurship reflects the strategic directions implemented by a firm in order to achieve continuously superior performance. Two main components of entrepreneurship can be delimited: the first considers the attitude of the entrepreneur and his desire to pursue new market opportunities to create value, while the second is related to the entrepreneur and firm behaviour, according to their understanding of opportunity creating imbalances and the necessary resources in order to exploit them (McDougall, Oviatt, 2000, p. 903). Given the attitudinal component, entrepreneurship considers the entrepreneur perceived as innovative individual or as intermediary in relations between agents who have control over resources. From behavioural perspective, entrepreneurship emphasizes the entrepreneurs' individual effort in implementing the company's vision, respectively strategic activities and continuous learning.

At macroeconomic level, entrepreneurship implies the existence of the general conditions within the national framework and of the business environment that provides efficiency and innovation increase, and seen as the engine of economic growth (Bosma et al., 2009, p. 9).

The paper is organized as follows: section 2 contains the conceptual model of entrepreneurial process in Romania, the empirical results of the entrepreneurial frameworks' impact on entrepreneurships and entrepreneurships' effects on innovation output, section 3 highlights the data and variables used, the econometric analysis and main the results of statistical estimations, while section 4 highlights the main implications of these results and conclusions drawn from the undertook research.

2. Problem formulation

2.1. Literature review

The entrepreneur concept, as innovator, rests on the foundation of the underlying paradigm, based on which the entrepreneur is the individual

preoccupied with the identification of business opportunities in the external environment and who uses innovation as a tool for creating a new business (Schumpeter, 1930, in Stel, Carree, Thurik, 2004, p. 10). In a continuously changing dynamic external environment, entrepreneurial behaviour and innovation are dynamic and holistic processes, complementary and vital to organisational success and sustainability. In addition, organisational culture and management style are crucial factors affecting the development of entrepreneurial and innovative behaviour in organizations (Zhao, 2005, p. 29).

In the circumstances of globalization and rapid technological changes, that have fundamentally altered the importance of the innovation process, entrepreneurial small and medium-sized firms appears as engines of innovative activity (Ács, Audretsch, 2003), being in the same time factor of economic growth.

2.2. The entrepreneurial process model for Romania

The proposed conceptual model of the entrepreneurial process in Romania (Figure 1) has as its' starting point the model proposed by the Global Entrepreneurship Monitor (GEM) in 2008, to which a few reappraisals were bought (Sala-i-Martin et al., 2009, p. 8, Bosma et al., 2008, p. 10, European Commission, Innovation Union Scoreboard, 2011, p. 6). The reference GEM model highlights different economical development stages that can be assumed by a country and sustains that the activity of large firm changes based on the general conditions of the national framework, whilst the entrepreneurial activity varies considering the conditions of the entrepreneurial framework. The aim of this research constitutes the assurance of data necessary to globally evaluate the role of entrepreneurship in the growth of economies.

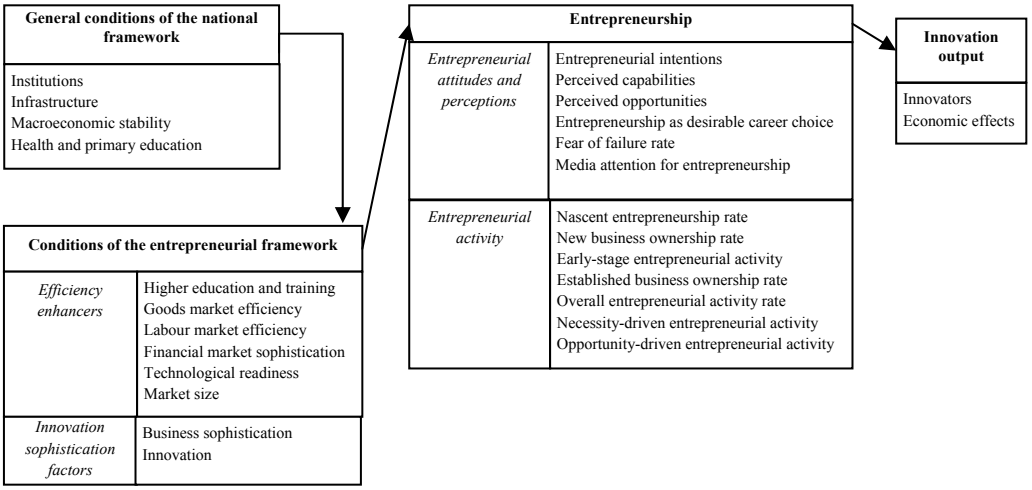

Figure 1. *The proposed research model of the entrepreneurial process in Romania*

Hence, as from a part of the specific elaboration principles for the reference GEM model, the proposed conceptual model of the entrepreneurial process for Romania considers only the entrepreneurial behaviour of individuals in the moment of new firm creation and administration of a business. The proposed model is not a time-lagged one, which required for the operationalisation of the entrepreneurial behaviour the elimination of the entrepreneurial aspirations. Moreover, because of the lack relevant statistical data for Romania, in the model it has been made abstraction of the entrepreneurial behaviour manifested in large firms on national and international level (intrapreneurship), considered externalising strategies practiced by these firms. Consequently, the model refers exclusively to the Schumpeterian entrepreneurs and to the owner-managers of the small- and medium-sized firms (Wennekers, Thurik, 1999, p. 442). The first are individuals, who allocate resources in order to start a new business owned by them, being motivated of opportunity exploitation from the business environment and of the necessity of self-employment (nascent entrepreneurs). In this category there are also included those entrepreneurs who motivated by the necessity of self-employment, in the sense that even if they aim to exploit opportunities, consciously or not, they might take in consideration, concomitantly but not exclusively, self-employment as well. After achieving the proposed objectives, frequently nascent entrepreneurs became owner-managers of firms, who posses and administrates new firms, active for a period between three and 42 months, or consecrated firms when they are active for more than 42 months (Reynolds et al., 2005, p. 209). It must be also mentioned that a part of the nascent entrepreneurs fail to start the business, exiting the entrepreneurial sector, but with impact on the economy, through the pressure exercised upon the existent firms. Considering the referred operational definition of entrepreneurship, in the proposed model a synonymy was regarded between the terms of entrepreneurship and entrepreneurial behaviour. This becomes operational through the entrepreneurial perceptions, attitudes and also the entrepreneurial activity**.** Early stage entrepreneurial activity includes nascent entrepreneurs and owner-managers of new firms, while the persistence in time of this activity is assured and provided by business owners-managers of established companies**.** Starting with the major economic development stages transited by aspiring countries, production factor driven economies, efficiency driven economies, innovation driven economies (Porter, Schwab, 2008, p. 7), the conditions of the entrepreneurial framework appears only in the last two stages of development. But the presence of an adequate infrastructure, of a level of primary education and a good health status, as the essential conditions of a production factor driven economy, constitutes a starting point for the actual stage of economical

development and the competitiveness of Romania (Györfy et al., 2008, p. 10). In this country, the conditions of the entrepreneurial framework depend of the increasing efficiency and innovation, reflecting the main characteristics of the economy and society (Reynolds et al., 2005, p. 206, Györfy et al., 2008, p. 8).

2.3. Research hypotheses

Depending on the economical development stage and the competitiveness of Romania, the proposed research model aims to highlight the cause-effect relationship between the conditions of the entrepreneurial framework and entrepreneurship/entrepreneurial behaviour, one hand and, on the other hand, between entrepreneurship/entrepreneurial behaviour and innovation output. Consequently, 32 pillar indicators were used, grouped as follows:

- Indicators defining the general conditions of the national framework measuring the different aspects of the basic conditions necessary for the country to pass to the next economical development stage and competitiveness, respectively institutions, infrastructure, macroeconomic stability, health and primary education;
- Indicators referring to the conditions of the entrepreneurial framework, depending on the economical development stage and competitiveness of the country. These measures various aspects of conditions and features in order to stimulate, sustain or stop the entrepreneurial process, respectively refers to: efficiency enhancers (higher education and training, goods market efficiency, labour market efficiency, financial market sophistication, technological readiness, market size) and innovation sophistication factors (business sophistication, innovation);
- Indicators for entrepreneurship, measuring the entrepreneurial activity dynamics at national level by considering the determinants of the entrepreneurial behaviour, respectively the entrepreneurial perceptions and attitudes (entrepreneurial intention, entrepreneurship as desirable career choice, fear of failure rate, media attention for entrepreneurship, perceived necessary capabilities, perceived opportunities), entrepreneurial activity (nascent entrepreneurship rate, new business ownership rate, established business ownership rate, total early-stage entrepreneurial activity, improvement-driven opportunity entrepreneurial activity, necessity-driven entrepreneurial activity);
- Innovation outcome indicators, measuring different effects of the entrepreneurial process, like innovators (number of SMEs introducing product or process innovations, SMEs introducing marketing or organisational innovations**)** and economic effects related to innovation

(employment in medium-high & high-tech manufacturing, employment in knowledge-intensive activities, medium and high-tech product exports, knowledge-intensive services exports, sales of new to market and new to firm innovations, license and patent revenues from abroad).

Next, the following research hypotheses were considered:

Hypothesis 1: There is a positive relationship between the general conditions of the national framework and entrepreneurship (entrepreneurial behaviour);

Hypothesis 2: There is a positive relationship between the entrepreneurial framework conditions and entrepreneurship (entrepreneurial behaviour);

Hypothesis 3: There is a positive relationship between the enhanced efficiency of the entrepreneurial framework and entrepreneurship (entrepreneurial behaviour);

Hypothesis 4: There is a positive relationship between the entrepreneurial framework defining innovation sophistication factors and entrepreneurship (entrepreneurial behaviour);

Hypothesis 5: There is a positive relationship between entrepreneurship (entrepreneurial behaviour) and innovation output;

5a: There is a positive relationship between entrepreneurship (entrepreneurial behaviour) and innovators;

5b: There is a positive relationship between entrepreneurship (entrepreneurial behaviour) and economic effects of innovations;

Hypothesis 6: There is a positive relationship between the entrepreneurial perceptions, attitudes and innovation output;

6a: There is a positive relationship between the entrepreneurial perceptions, attitudes and innovators;

6b: There is a positive relationship between the entrepreneurial perceptions, attitudes and economic effects of innovations;

Hypothesis 7: There is a positive relationship between entrepreneurial activity and innovation output;

7a: There is a positive relationship between entrepreneurial activity and innovators;

7b: There is a positive relationship between entrepreneurial activity and economic effects of innovations.

3. Problem solution

3.1. Model operationalisation and data collection

Data used in the statistical analysis are of external secondary data type, collected for the 2007-2011 period, thanks to the methodological modification for data inclusion and treatment regarding the national competitiveness starting from 2007, alike the absence of entrepreneurship data before year 2007 for Romania.

Descriptions regarding the general conditions of the national framework and entrepreneurial framework have as data source the Global Competitiveness Report. Data about the national characteristics of the entrepreneurship are derived from the national and global reports: Global Entrepreneurship Monitor, Country Report for Romania and Global Report, all based on regular inquiries. From the Global Entrepreneurship Monitor there were selected data referring the entrepreneurial perceptions and attitudes, respectively the entrepreneurial activity.

Data about innovation output for Romania were obtained by querying the European Unions' database, Enterprise and Industry section, Pro Inno Europe (European Union Scoreborad 2007, 2008, 2009; Innovation Union Scoreboard 2010, 2011).

In the conducted exploration a simultaneous equation model was applied. For operationalisation, the proposed research model includes independent and effect variables, while the statistical analysis was realised in two steps. In the first stage, correlations were made between the general conditions of the national framework and of the entrepreneurial framework (independent variable) and entrepreneurshipial behaviour (dependent variable). In the second stage, there were pursued the existence of correlations between entrepreneurial behaviour (independent variable) and innovation output (dependent variable).

3.2. Econometrical estimations and results

The data processing and analysis was realised with Microsoft Excel, Data analysis tools. The measuring scales are defined in the World Economic Forum and GEM Consortium methodologies, assuring internal validity, therefore the study of their reliability is not essential.

3.3.1. Correlations

In conformity with the correlation matrix (Table 1) of the main variables and considering the sign of the correlations, for Romania, within the 2007-2011 time period, there can be observed:

- a positive and moderately significant influence between the general conditions of the national framework and entrepreneurial behaviour (0.757), respectively conditions of entrepreneurial framework and innovation output (0.796);

- an acceptable degree of association between the general conditions of the national framework and innovation output (0.358), respectively entrepreneurial behaviour and innovation output (0.426);
- a weak negative influence between the general conditions of the national framework and entrepreneurial framework conditions (-0.079), respectively the conditions entrepreneurial framework and entrepreneurial behaviour (-0.187).

Table 1

Correlation matrix of the main variables for the entrepreneurial process model in Romania

	General conditions of the national framework	Conditions of the entrepreneurial framework	Entrepreneur-ship	Innovation output
General conditions of the national framework	1			
Conditions of the entrepreneurial framework	-0.07936943	1		
Entrepreneurship	0.757677843	-0.187020243	1	
Innovation output	0.358309539	0.796205707	0.426330574	1

3.3.2. Hypotheses testing and results

In order to test the validity of the research hypotheses simple linear regressions were imposed and made in two steps, by taking in consideration the significance level (p), the unstandardized value of the regression coefficient (β), calculated value of a t test (t). It is considered that a hypothesis is valid only if $p< 0.05$, β has high or relatively high values and t exceeds the critical value of the Student repartition, in our case 2.776445105 for four degree of freedom, because of five year data availability.

Table 2

Results for the research hypotheses testing through the entrepreneurial process model for Romania

Hypothesis	R	R^2	β	t	p	Results
1. general conditions of the national framework → entrepreneurship	0.99495	0.98994	0.05305	19,84133	0.00003	Validated
2. conditions of entrepreneurial framework → entrepreneurship	0.99231	0.98468	0.05529	16,03914	0.00008	Validated
3. the efficiency enhancing factors of the entrepreneurial framework → entrepreneurship	0.99294	0.98593	0.05366	16,74262	0.00007	Validated
4. innovation sophistication factors of the entrepreneurial framework → entrepreneurship	0.98740	0.97497	0.06506	12,48304	0.00023	Validated
5. entrepreneurship → innovation output	0.96908	0.93911	95,71166	7,85502	0.00141	Validated

Hypothesis	R	R^2	β	t	p	Results
5a. entrepreneurship → innovators	0.97852	0.95750	105,16093	8,22175	0.00376	Validated
5b. entrepreneurship → economic effects	0.95797	0.91771	91,8967	6,67907	0.00261	Validated
6. entrepreneurial perceptions and attitudes → innovation output	0.95747	0.91675	57,66606	6,63703	0.00267	Validated
6a. entrepreneurial perceptions and attitudes → innovators	0.97065	0.94216	61,55578	8,07213	0.00127	Validated
6b. entrepreneurial perceptions and attitudes → economic effects	0.94302	0.88930	55,16469	5,66877	0.00477	Validated
7. entrepreneurial activity → innovation output	0.97745	0.95541	157,52683	9,25817	0.00075	Validated
7a. entrepreneurial activity → innovators	0.98052	0.96142	166,39009	9,98406	0.00056	Validated
7b. entrepreneurial activity → economic effects	0.96939	0.93971	151,73986	7,89649	0.00139	Validated

R – multiple R; R^2 – R square; β – the unstandardized value of the regression coefficient, t – calculated value for Student test, p – significance level,

Based on the research model lacking time-lagged variables, from data analysis (Table 2) we can conclude: (i) the existence of a positive relationship between the general conditions of the national framework (independent variable) and entrepreneurship (dependent variable), because $p<0.05$ ($p=0.00003$), β has an acceptable value ($\beta=0.05305$), and $t>2,7764$ ($t=19.84133$); (ii) the existence of a positive relationship between the entrepreneurial framework conditions (independent variable) and entrepreneurship (dependent variable), since $p<0.05$ ($p=0.00008$), β has an reasonable value ($\beta=0.05529$), while $t>2.7764$ ($t=16.03914$); (iii) the existence of a positive relationship between the efficiency enhancing factors at entrepreneurial framework level (independent variable) and entrepreneurship (dependent variable), in the conditions of $p<0.05$ ($p=0.00007$), β has a tolerable value ($\beta=0.05366$) and $t>2.7764$ ($t=16.74262$); (iv) the existence of a positive relationship between the innovation sophistication factors of the entrepreneurial framework (independent variable) and entrepreneurship (dependent variable), for the reason that $p<0.05$ ($p=0.00023$), β has a high value ($\beta=0.06506$), whilst $t>2.7764$ ($t=12.48304$). In all the mentioned cases, a significant and influential ($R>0.9$) relation can be detected between the independent and dependent variables ($R_1=0.99495$; $R_2=0.99231$; $R_3=0.99294$; $R_4= 0.98740$) and in the same time over the 97% of the dependent variable variation ($R^2>0.97$) owes to the cumulated influence of the independent variables variation ($R_1^2=0.98994$; $R_2^2=0.98468$; $R_3^2=0.98593$; $R_4^2= 0.97497$).

In addition, also from the analysis of the results (Table 2) it can be pointed out: (v) the existence of a positive relation between entrepreneurship/entrepreneurial behaviour (independent variable) and

innovation output (dependent variable) because β has a high value (β = 95.71166), p <0.05 (p = 0.00141) and t> 2.7764 (t = 0.00141); (vi) a positive link between entrepreneurial perceptions and attitudes (independent variable) and innovation output (dependent variable) while the β value is high (β = 57.66606), p <0.05 (p = 0.00267) and t> 2.7764 (t = 6.63703); (vii) a positive connection between entrepreneurial activity (independent variable) and innovation output (dependent variable) because β has a high value (β = 157.52683), p <0.05 (p = 0.00075) while t> 2.7764 (t = 9.25817). In all the above situations it can be revealed a very strong relation (R> 0.9) between independent variables and the dependent variable (R_5= 0.96908, R_6 = 0.95747, R_7 = 0.97745), and over 91% of the variation of the dependent variable (R^2> 0.91) is due to the combined influence of changes in independent variables (R_5^2 = 0.93911, R_6^2= 0.91675, R_7^2 = 0.95541).

Nevertheless, for hypotheses (v $_{a, b}$)-(vii $_{a, b}$) there can be observed an existing positive linkage between the considered independent variable components and innovation output (innovators, economic effects). Similarly, relationships are characterised by a very strong degree of association (R> 0.9), with a variation in the dependent variable of over 88% (R^2> 0.88) due to the influence of independent variables' variation (R_{5a}^2 = 0.95750, R_{5b}^2 = 0.91771, R_{6a}^2 = 0.94216, R_{6b}^2 = 0.88930, R_{7a}^2 = 0.96142; R_{7b}^2 = 0.93971).

4. Conclusions and research limitations

In the context of policies concerning European and national competitiveness, innovation appears as a solution to the dynamics of the economic and technological environment. At European level, the theme of innovation has been reactivated in the context of the Lisbon Strategy (2000) and through its revisions. Nationally, one of the general objectives of the 2007-2013 National Research, Development and Innovation Plan is to increase the innovation capacity, technological development and research results assimilation in the production in order to improve national economic competitiveness and the quality of life, with the specific objective of strengthening the innovative capacity of firms and enforce their contribution to create knowledge based new products and markets.

In Romania, the presence of an adequate infrastructure, the level of primary education and good health are the starting points for ensure the conditions entrepreneurial framework related to efficiency and innovation. These competitiveness factors positively influence the role of entrepreneurship and the nature of the entrepreneurial activity in the country. Checking the validity of research hypotheses emphasized an entrepreneurial behaviour

stimulated by the general conditions of the national and entrepreneurial framework would generate positive effects on innovation, in all the cases and at the same time, mostly for innovative small and medium enterprises and their economic influences. Further research using longer time series or time-lagged variables may lead to an even better validation of research hypotheses. The transformation proposed model in a time-lagged one would permit the inclusion of entrepreneurial aspirations within the entrepreneurial behaviour operationalisation. Additionally, the results of innovation portrayed by multiple indicators and the inclusion within the entrepreneurial behaviour model, of the existent large firms too, besides the newly created small ones, acting at national and international level (intrapreneurship), may lead to possible sharper results regarding the role of entrepreneurship on innovation results.

Acknowledgements

This paper received financial support through "Postdoctoral Studies in Economics: Training program for leading researchers – SPODE", co-financed by the European Social Funds, Human Resources Development Operational Programme 2007-2013, contract no. POSDRU/89/1.5/S/61755.

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