COMPUTER PROGRAM AND MODEL FOR ESTABLISHING THE INNOVATIVE DEGREE OF SMEs

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Abstract - The current development stage and model did not drive the Romanian companies to a technological development and research-oriented operation, their tendency towards innovation being reduced. SMEs are more flexible and may adapt faster to demand variations; they have a smaller inertia and, therefore, although they are dependent on the capital available and on infrastructure, they play a key role as innovation engines.

A theoretical model for establishing the viability of an innovative SME through its related innovation degree, and the associated software application, will be developed through a three-year project – INNOINDEX – financed by the National Authority for Scientific Research (ANCS) through Program 4 – Partnerships in Areas of Priority, of the National Plan for Research, Development and Innovation for 2007-2013.

Keywords – computer program, SMEs

1. General information regarding innovative SMEs and the measurement of their performances

Through this article, we intend to present an approach of the innovation from the perspective of the project “COMPUTER PROGRAM AND MODEL FOR ESTABLISHING THE INNOVATION DEGREE OF SMEs”, which is developed within the National Plan for Research, Development, Innovation PNCDI 2, Partnership Programme. The partners of this project are: the Romanian Institute for Economic-Social Research and Polls Center for Technological Transfer - CIT – IRECSON; CORNERSOFT TECH – CST; “Politehnica” University Bucharest - Center of Technological Electronics And Interconnection Techniques UPB-CETTI ITA; National Institute of Research Development for Machines and Installation Designed to Agriculture and Food Industry, Technological and Business Incubator INMA ITA; Academy of Economic Studies Bucharest; Institute for Research Development, Engineering and Manufacturing for Automation Equipment and Systems – IPA; Romanian Association for Technological Transfer and Innovation – AROTT, Craiova.

The current development stage and model did not drive the Romanian companies to a technological development and research-oriented operation, their tendency towards innovation being reduced. SMEs are more flexible and may adapt faster to demand variations; they have a smaller inertia and, therefore, although they are very dependent on the capital available and on infrastructure, they play a key role as innovation engines.

Because of their adaptation capacity, flexibility and very powerful creative potential, innovative small and medium-seized enterprises [SMEs] represent a dynamic and efficient sector of economy. Catalysts of economic and technical and scientific environment, innovative SMEs are determining factors of spectacular economic and social evolutions registered by countries or regions that occupy the first places in the international classification due to the performances they obtained. Within the context of multiple challenges generated by economies’ globalization, to which conditions specific to transition economies (Romania’s situation) may be added, the development of strategies, policies and instruments for the development of SMEs sector and especially innovative SMEs that maximize the positive impact on economic development represents a concern of all governments. Therefore, it is even more important to evidence the internal and external obstacles in SMEs development, on one hand, and to identify the modalities of their removal by means of government interventions and of the practices for successful SMEs operation, on the other hand.

If accelerated technological progress has became a structural phenomenon that transforms competition dynamics in most of the industries, of any type of market and for any company, regardless of their dimension, globalization has radically transformed the operation framework of the companies. Specific
to big corporations till not long ago, globalization influences as much SMEs operation, by means of creating new development opportunities, by the access to technologies, financing sources, information and to new markets. Knowledge-based economy (re)dimensions the importance of intangible assets that thus become essential elements for development, for gaining a dominant position on the market, and for generating profits and, generally, for producing wealth. The fact that companies’ value varies proportionally with the volume and content of knowledge integrated by the personnel, at organization level, into the products and/or services offered, results in investment acquiring the essential requirement in performance attainment, knowledge generation, development-research, education and proficiency. The majority of the interactions between research units and economic participants involve large enterprises. This is due to the fact that such collaboration is considered more durable and more regular than the collaboration with SMEs. Evidently, SMEs represent a diversified clientele as far as knowledge transfer services are concerned. SMEs in the productive field, which carry out their activities in high technology sectors, generally have significant budgets for research and development activities. They have close relations with scientific environments due to the very short production cycles. In traditional sectors, SMEs capacity to be actively involved in knowledge transfer activities is limited by human resources and financial constraints. Therefore, it is important for SMEs to be encouraged to absorb new and external knowledge in order to accelerate innovation.

2. Aspects of characterizing innovative SMEs from the project’s perspective

In a competitive system, characterized by competitors pressure intensification reflected in products price and quality policy for gaining and preserving the market leader positions, the performance of an innovative SME is strictly correlated with the relation between technical progress and economic progress. Progress orientation, by means of the intensification of the scientific research and technological development activities, ensures the innovative enterprise the permanent gathering of knowledge and new capabilities and its development capacity adapting to market evolution.

Taking the considerable influence of the innovation process on the behaviour of all interest-bearers inside and outside a SME, carrying out in good conditions of the activity of any enterprise requires the necessity of the measuring its performances, as a dimension of the domestic resources valorisation, of the opportunities offered by the external environment in order to satisfy all interested parties, and also for enterprise survival and development on long term. Lately, many specialists consider that, when evaluating the performances of an enterprise, especially if this is an innovative enterprise, the following are necessary:

- financial indicators – that characterize past and present evolution and create a certain image on the short-term future evolution;
- non-financial indicators – that characterize future enterprise evolution (ex. products/ services quality, clients satisfaction, market share held, social responsibility, innovation, managerial competencies, etc).

It may be ascertained that a company is successful if it has the capacity and capability to reach its development objectives, to create the value for itself and for its clients so that to ensure its medium and long-term existence. Certainly there are different opinions on the definition of a successful company, so, in some specialists’ opinion¹:

1. the global performance of an enterprise is represented by the interaction of three determining factors: productivity, competitiveness and success, having as purpose social aspect integration;
2. the company is considered successful if it is capable of identifying, mastering and controlling interactivity between domestic and external development sources.

Economic or technological information is essential for measuring the innovative company performances, and the result of its use depends on the identification, validation and presentation modality at the level of superior management for the establishment of the development objectives, but also of the modalities of their achievement².

The complex character of economic efficiency, when related to an innovation process, requires the use of the indicators system, as each of them characterizes a certain economic efficiency criterion. From the quantitative point of view, the correlation between efforts and effects is expressed by means of efficiency indicators. When developing the indicators system, identification and quantification of the resources assigned or consumed, correlated with the type and the structure of the effects generated are very important. In order to observe the modality in which certain dimensions (related to certain innovation influence factors) which interact economically, the influence between the efforts

¹ Nicolescu, 1998 and Gheorghiu, 2001
² Nicolescu, 1999
made in the innovation process and the effect obtained or estimated to be obtained for each activity shall be analyzed.

For this purpose, the matrix\(^3\) effect/effort shall be used with the A.G.\(^4\) model, for the global diagnosis of the company, monitoring the following characteristics related to the innovation process:
- effectiveness – variable effect/constant effort;
- economies – constant effect/variable effort;
- efficiency – variable effect/variable effort.

In order to define as accurately as possible innovation reflection into the analysis of an innovative SME viability, the following indicators shall be taken into consideration:
- profitability – expresses the modality in which the economic operator managed the innovation process for performances improvement;
- sales volume – expresses how the innovation carried out at the economic operator level succeeded in attracting a higher number of clients;
- assets increase – expresses the capacity of the economic operator to increase assets by innovation;
- market share – reflects competitiveness and the position held as related to the competitors;
- market value – reflects market perception as related to the economic operator and its capacity to innovate.

The model for used for establishing the innovation degree (and, indirectly, of the viability) of an SME, which will be proposed within the project, relies on the AGBB\(^5\) model, model that will be developed and transformed into a software application, useful to the management of innovation.

According to the model proposed to be achieved and developed, innovation at enterprise level and especially technologic innovation shall be analyzed as a complex system for the integration of all aspects specific to value creation. In this respect, the development of the indicators system is necessary in order to quantify value and to monitor the performances of an enterprise in compliance with the multi-dimensional characteristics of innovation (inputs, processes, products and strategies, etc.).

Innovation dimensioning at the level of an economic operator is a complex process, and no unit evolution criteria may be established to which a specific indicators system may be related. For these problems settlement, the development of a multi-criteria evaluation model is necessary and it is hereby proposed.

In order to have a general overview of an innovative SME, an evaluation model shall be developed based on 5 essential innovation components, with direct implications in its performances increase, to which evaluation criteria are related. The establishment of a set of 5 criteria for each innovation component is proposed so that, a certain score may be granted for each criterion depending on the degree of achievement of each criterion proposed.

The score granting system shall use values 1–10, and the score is granted depending on the degree of each criterion achievement, after the analysis of the indicators related to each criterion. A weighting coefficient is related to each component subject to evaluation. Also, an importance coefficient is granted for each criterion, so that the value of the weighting coefficient related to the evaluation component represents the sum of importance coefficients established for each criterion in part.

The group of evaluation components and the related weighting coefficients, the criteria system, the criteria-related importance characteristics and coefficients, the criteria evaluation system, and the measures recommended for the improvement of a criterion evaluation represent a model for the establishment of the innovation degree for an economic operator.

3. Expected results of the project and their impact

By means of the model for the establishment of the innovation degree at the level of an innovative SME, the elaboration and development of measurement methods adequate to the study of economic phenomena related to innovation processes and the development of a software, the following specific objectives are intended to be achieved:

- conceptual framework creation:
  - establishing the methodology for determining the innovation components;
  - establishing the methodology for identifying and determining the evaluation criteria related to innovation components;
  - establishing the methodology for identifying and establishing the indicators related to evaluation criteria;
  - establishing the methodology for determining the influence of innovation components on the economic components (economic indicators);
- development of an occupational standard for the innovation manager;

\(^3\) [Gheorghiu, 1998]

\(^4\) [Gheorghiu, Anghel and Vasilescu, 2002]

\(^5\) Alexandru Gheorghiu and George Bala
- development of a computer program (software application) related to the model;
- development of an on-line support portal for innovative SMEs (it shall be free of charge and shall use the simplified version of the computer program and model and shall generate information for orientation purposes);
- development of a set of instructions and recommendations for improving the “condition” of the innovative SMME depending on the degree of achievement of the related criteria;
- “instrument” promotion by means of the chambers of commerce and industry, at the level of economic operators.

By its results, the project will contribute to:

1. increasing the technical and qualitative level in quantitative and qualitative determinations of innovation related parameters;
2. enforcement/compliance with the international accounting standards upon the interaction of innovation components with the economic ones;
3. increase of the accuracy degree, at low costs, of the determinations specific to diagnosis analysis of the viability degree of an innovative company, by means of a software development;
4. valorisation of competitive advantages of innovative companies by the establishment of a set of policies and mechanisms for the implementation of development strategies based on the model proposed to be developed;
5. entrepreneurial abilities development, a system of solutions for activities improvement and decision grounding is related to the model;
6. development of organizational culture and innovation management at the level of innovative SMEs;
7. increase of qualification degree by establishing an occupational standard for the innovation manager (introduced in the occupational code in 2007 upon the request of ANCS-DTTI);
8. development of the framework for the generation, evaluation, increase and protection of intellectual capital at the level of an innovative SME;
9. establishment of relational framework for factors integration and the dynamics of knowledge-based economy when establishing the viability of the innovative company based on the model for the establishment of the innovation degree;
10. provision of a mechanism for the innovative (creative) SMEs development by the efficient exploitation of intellectual property rights.

4. References

