

INNOVATION AND COMPETITIVENESS

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Abstract: *This study, addresses the topic of industrial innovation in today's competitive markets and reaches the importance of competitiveness indicators. Any entrepreneurial attempt to produce and promote new and up-to-date products should be carried out, following appropriate mathematical calculations, based on the study of competition, through competitiveness indicators. The concept of innovation will be further investigated in terms of its influence, on industrialized environments. Industrial innovation is conditioned by several specific factors, among which we can list: clear business strategies; setting clearly formulated objectives; correct financing within management programs that benefit the entire innovation activity; the existence of a competent team, that can solve the problems that arise during the innovation projects; the existence of a clear and correct procedure for evaluating the results and the work of the people employed; the existence of a competitive climate inside the company and outside of it, etc. Innovation deals primarily with the introduction of new concepts and values. The present study, serves the transition from conceptualizing competition and competitiveness, through competition indicators, to an easier understanding of innovation, as a necessity for future industrial and commercial development. Of course, the stages of a successful innovative-creative plan includes calculations of competitiveness and market studies, all of which form the object of the activity of some institutions dealing with the part of industrial research and development. The part of economic calculations is summarized in this plan, to a set of formulas and calculations of competitive indicators, which need to be drawn up more for the study of innovation, than for the part of entrepreneurial competitiveness. This is why a breakdown between the innovation part and the study part of the competitiveness indicators, can be produced here. It is important to research in this context also the fact that innovation management, as well as technological management, approaches innovation from an organizational point of view. Innovation in the organizational context, is aimed primarily at the renewal of products and technologies, but also the application of organizational management norms. Innovation management is defined as part of performance management. The innovation rules must be formulated in accordance with the competition rules, hence the need to study the competitiveness indicators in relation to the market and the degree of industrialization. Also, in the future, it becomes imperative to regulate innovation management, stressing that innovation and competition must be controlled with the help of the state or some control and evaluation institutions.*

Keywords: *competition; innovation; invention; performance; creative value.*

Classification JEL: *O31; O32; O33; D41; D42.*

1. Introduction

The innovation has a character of permanent change, which aims to adapt variables, determinants in order to achieve the success of competitive strategies. In order to maintain control of these strategies, we must focus on three more important stages during industrial evolution, namely: the period of flexibility, the intermediate period, during which more and more products are used efficiently and the period of maturity or prosperity, governed by the principles of leadership. Most innovation studies consider that innovation should be viewed as a model for designing new products and services. The problem is, however, that innovation in most industrial countries is limited to incremental adjustments, both at the level of products and at the level of production processes. In fact, the competitive analysis shows that companies are, of no help to us, in understanding the concept of innovation. This phenomenon is explained by the fact, that the study on the evolution of companies does not facilitate innovation. Innovation is orienting us towards the future and through an inverse temporal perception process we can discover the new saving idea. In other words, any future is created through innovation, but the innovation process does not attach too much importance to the present, but rather to a metamorphosis of the present into a new present and a renewed future. Innovation must be viewed as a transition from small scales to larger production scales, where different competition rules are respected. Product performance is generated by new ideas that define the future steps for innovation. Economic growth stimulated through innovation and competition, can be measured both qualitatively and quantitatively. Stimulating innovation depends on the degree of maturity of the units and the degree of technological development. George Stigler teaches us about the stages of development of the production process and how to make it responsible. Innovation must meet the needs of technological and material processes. Organizational strategies for products and control change with the standardization of products and production. The common indicators measure the situations in which the economic agents receive aid or financing, in order to obtain new and new products on the market. This approach also includes researching innovation as a process, in cases where this process contributes to the development of new products on the markets. For this reason, it is necessary to identify the criteria for analyzing the performance and competitiveness indicators and to present them at international and national level. In order to investigate the competitiveness on branches in the urban and rural areas of a country, it is necessary to use a series of indicators that are meant to highlight the level of social and economic development. The analysis of the competition indicators is made according to the typology of the competition or the competitive strategies applied according to a norm for collecting the correct data and information from the market. Competitiveness indicators try to measure strengths, weaknesses, opportunities and threats, faced by entrepreneurs. In order to carry out economic analyzes on the future economy, it is necessary to identify indicators for measuring the degree of use of information and communication technologies (ICT), on the market. The present text tries to define and explain, at great length, the

concepts of innovation and creativity, referring to the calculation of competitiveness indicators as well.

2. The concept of innovation.

Innovation is an activity that develops in order to obtain new (or significantly improved) products (goods), launched on the market, this activity means the introduction into the industry of new, improved processes. Industrial innovation is defined as the transfer of new ideas or the adaptation of new concepts, until the final stage of a product, process or service activity. We know four main types of innovations: product innovation; process innovation; organizational innovation and marketing innovation. The concept of innovation develops in parallel with the development of the concept of innovative company.

J. Schumpeter treats innovation as a function of entrepreneurial action, which is obtained through several "new combinations" of existing resources. Schumpeter gives us this acceptance of innovation in his work "The Theory of Economic Development" (1934).

In the specialty literature, a distinction is made between the concept of innovation and that of invention.

F. Malerba (1977) defines the invention as a new idea or scientific breakthrough, a technological novelty, while the innovation is aimed at a marketable application of an invention, this being due to the integration of the invention in the socio-economic practice.

The Oslo Handbook (2005) defines innovation as an activity that results in new or qualitatively improved products, goods and services, through processes that use new methods of business management and marketing.

According to the Frascati Manual (OECD, 2002), technological innovations include new or technologically significant products and processes and notably technological innovation.

K. Pavitt (1987, p.9) notes about technological innovation: "most technologies are complex and are formed by cumulative developments.

Law no. 324/2003 (Romanian Parliament), defines innovation as being oriented towards the generation, assimilation and capitalization of results, research and development from the economic and social sphere.

R. Vernon (1966) finds that industrial development is implemented through product innovation, in the context of competitive markets. The innovative process together with the technical progress constitute springs for overcoming the impediments intervened at the product level, caused by the moral wear and tear.

For the success of the innovative approach, the entrepreneurs must have an absorptive capacity, of recognition, assimilation and exploitation of the new information, essential to the technological transfer and to be folded on the R&D expenses. (Cohen, Levinthal 1990).

Innovation and competition can be investigated theoretically and empirically through three levels of competitiveness: macroeconomic level, i.e. national competition; microeconomic level, that is, the competitive process at the enterprise level and the commercial level from the point of view of international trade statistics, etc.

Competition has many forms and can be: relative, sustainable, prospective, integrable and comparable, aggregate, dynamic, corrective and irreplaceable to no other notion and so on.

3. Innovation and creativity

The concept of innovation is related to the concept of creativity
Creativity stimulates innovation and gives it new meanings.

The creative process must take place in a quiet educational environment based on a good circulation of information. Creativity can be defined as a constitutive, structural element of human activity, represented by inventive actions, not learned, able to generate new experiences and knowledge. It can also be defined as a global process of technological and commercial creativity, or as a transfer of new ideas or new concepts, to the final stage of a product, process or service activity, accepted on the market. It represents the ability to identify new and new links between elements (goals, events, laws) and different laws. Innovation and creativity are thus seen as a function of management.

The creative process has several stages: good circulation of information, knowledge of the market and marketing, maintaining intelligent links with the scientific community, accepting new ideas, performing efficient teamwork, motivating employees and improving the training process. In the industry, innovation and creativity are conditioned by a number of factors, including: the efficiency of competitive strategies, the formulation of clear objectives, obtaining profitable sources of financing, teamwork with performing teams, improving organizational management and organizational procedures and stimulating the competitive climate.

4. The typology of innovation

Innovation is present everywhere, but new products and technologies are not fully revealed. In everyday life, innovation is associated with technical progress. The innovation processes have been extended to the society level, these being oriented towards the introduction of new strategies, concepts, ideas and organizations that address the social needs. Social innovation is the associated expression of a change, which aims to increase the quality of life and solving social problems.

Innovation can take many forms: product innovation, process innovation, marketing innovation, organizational innovation, incremental innovation, radical innovation, closed innovation and opened innovation.

In order to be successful, innovation must integrate general entrepreneurial strategies and successfully implement change management.

There are several types of innovative strategies: proactive strategies, characterized by the character of radical innovation, which gives companies priority in the market and competitive advantage; active strategies, which aim to efficiently capitalize on existing technologies; reactive strategies, used as imitative strategies of strategies formulated by the leading companies, which are, for example, pursuing the implementation of new ways of communication with consumers, or of delivery and

distribution of new products and passive strategies, which are used by companies expecting market changes.

Table 1. Models of evaluation of innovation systems

Model	Criteria	Evaluation grid
Diamond	Strategy, Processes, organization, links, learning	1-7 levels
Innovation Management Health Check	Vision and strategy of innovation, resources, organizational structure	10 levels
Open Innovation, Maturity Framework	Climate for innovation capacity of partnerships, internal processes	5 levels
Bain Innovation Assessment	Strategy, organization, generation and development of ideas	4 levels

Source: Innovation management, Popescu (2016), webbut.unitbv.ro › Management › Popescu_Management

The indicators of competition on global markets are divided into: macroeconomic indicators (levels and trends); indicators from the sphere of international trade, they express the degree of country integration in the circuits of the world economy and evaluate the level of protectionism or openness of an economy, the components of the current account (exports, imports, transfers), the components of the capital account (foreign direct investment, portfolio and long-term loans); demographic system and labor market indicators, which are oriented towards the supply of human resources, qualifying the force of work and qualitative value indicators (Pelinescu 2006, Anghelache 2017). The competitiveness indicators are over 200 in number, of which, 95 are considered basic indicators (Annual Competitiveness Report, 2001).

Many economic reports focus on twelve pillars of competitiveness.

5. Competitiveness at national level

Competition is a concept that encompasses notions from different environments, but it has no clear, reliable representation and no unanimously accepted definition. Competitiveness can be interpreted with great freedom, depending on factors outside the entrepreneurial activities, but it also depends on factors related to the intrinsic nature of the economic activity. Michael Porter supports the idea that globalization, production and transactions need to be regulated so that every small business can create its competitive advantage.

It defines three major stages of competitive development at national level: the stage of development determined by the factors of production; the stage of development determined by investments and the stage of development determined by the level of

wealth. Among, the most important national economic factors of competitiveness are: local resources; natural resources; labor force; infrastructure; technological and financial resources; the size and structure of the internal demand; the technological level; the efficiency of the subassembly and sub-suppliers industry; industrial structure and competition. Local resources are also divided into: human resources; physical resources; scientific resources; technology; financial and national infrastructure etc. In Romania, most of the competitive structures are oligopolistic, with the objective of conquering new markets for the following reasons: there are conflicts and rivalries that require innovation to obtain the competitive advantage; there are oligopolistic structures that create advantages for most industrial activities through quality, prices and long-term services; the competitive environment is created and recreated through competition with competitors from abroad. The action of the government authorities is another external factor that determines the creation of the competitive advantage of the company. The state can intervene to stimulate competition and innovation through: subsidies; industrial policies; modeling of internal demand through standards and regulations; purchase of advanced products and technologies, such as: IT equipment, telecommunications, computer networks and army tools, etc.

6. Measuring the international competitiveness of economies

The international competitiveness of the economies is measured by a series of indicators that are grouped according to the following criteria: according to the time horizon in: short-term indicators and long-term indicators and depending on the level at which the competitiveness measurement is intended in: indicators microeconomics and macroeconomic indicators. The most used indicators of international competitiveness are

- macroeconomic / short-term: total productivity of the production factors (TFP); real GDP growth rate, real GDP / capital, real personal income; effective real exchange rate; termsexchange and purchasing power parity; international trade, global export quotas, market share analysis; capital market; real capital return, Tobin's Q ratio; external balances, current account balance; foreign direct investment balance; domestic balances; employment rate and inflation rate etc.

- macroeconomic / long-term: real long-term exchange rate; long-term interest rate; long-term inflation rate; long-term standard of living; human development index (HDI)

- microeconomic short-term and long termn: productivity, prices and costs; unit costs with intensive branch work, cost indices and relative prices; exports and related market shares; comparative advantage revealed; foreign direct investment (FDI); technology and innovation; sustainable growth profits, social capital and so on. (Mitschke 2008). International competition is determined by a number of important factors: the size of the international competitiveness of the countries; the attractiveness of the business environment; the international competitiveness of the resident companies; the behavior of the companies and the governmental action, etc.

7. Calculation of competitiveness indicators

This may be an important indicator of the reality of the competition, which is defined in detail by the report prepared by the internal auditors. (Jula 2000, Krugman 1994, Porter 1990).

$$RER = E * P / P'$$

E – represents the nominal exchange rate for the country's currency
P and P 'are the expression of the external and internal prices

When the market is competitive, trade is free, unrestricted by quotas and customs duties, transport costs are low (they tend to 0), and domestic and foreign prices are equal (Single Price Law).

Ecuation can become:

$$P = E * P'$$

$$\text{Or } Rer = e + p - p'$$

The nominal effective exchange rate $NEER = \prod_{i \in \text{Trade}} (R_{xi} / R_{X_Ro})$, at wi

R_{X_Ro} – nominal exchange of rate of Ron to \$

R_{xi} – the nominal exchange rate of the country that refers to the 16 trading partners of Romania against \$

$PPI_{Row_NC} = \prod_{i=1}^n (PPI_i)$ at wi

PPI-industrial production price index

$REER = PPI / PPI_{Row}$,

$REER = PPI / PPI_{Row}$,

$PIB/P = PIB/E * E/PWa * PWa/P$ (1) where: P = total population, E = employed population, PWa = working age population, PIB/P = income/capita, PIB/E = work productivity, E/PWa =unemployed rate

PWa/P =age distribution of the population

$PIB/P = PIBa/Ea * Ea/P / PIBa/PIB = PIBi/Ei * Ei/P / PIBi/PIB = PIBs/Es * Es/P / PIBs/PIB$

$PIB/P = PIBa/Ea * Ea/P + PIBi/Ei * Ei/P + PIBs/Es * Es/P$ (2) a = agriculture, i = industry, s = services

The indicators of competition on global markets are divided into: macroeconomic indicators (levels and trends); indicators from the sphere of international exchanges; indicators of the demographic system and of the labor market, these being oriented towards the supply of human resources, qualifying the force of work, qualitative value indicators, quality level, degree of education, complexity of the system of individual social values, preferences, motivations; indicators of the efficiency of government policies (macroeconomic management). The competitiveness indicators are over 200 in number, of which 95 are considered as basic indicators (Annual Competitiveness Report, 2001).

Michael Porter divides the modalities of evaluation of the economic competitiveness and productivity in two important areas: sophisticated strategies and actions of the companies and the quality of the business environment. Porter's competition model is determined by five key elements: new potentials entering the sector, suppliers, customers, substitute products and competitors in the sector. In Romania,

competitiveness indicators need to be addressed at the national level through specific indicators that can reveal different aspects under investigation (Pelinescu 2006, Mereuță, Chilian 2005, Vincze 2003);

Table 2. The twelve pillars of competitiveness

Competitiveness	The efficiency of goods market
	Higher education
	Primary health and education
	Macroeconomic situation
	Infrastructure
	Institutions
	The size of market
	Technical endowment
	Innovation
	Development of the financial market
	Labor market efficiency
	The sophistication of the business environment

Source: Methodology and computation of the global competitiveness, 2017-2018
[www3.weforum.org > docs > GCR, 2017-2018](http://www3.weforum.org/docs/GCR/2017-2018)

8. Conclusion

Innovation is an essential process for economic growth and for the survival of the new companies. At organizational level, innovation is addressed to new products, technologies, structures, management methods or business models.

The innovation process must be conceived in relation to the research-development activities, being part of the trinome Research-Development-Innovation and mathematical calculations of competitiveness.

The future of technology and information is generated by innovation and creativity and it's construction, will be possible, through in-depth studies and research on the indicators of competitiveness.

Innovation management will become important for economic development, and the managerial approach will have to contain several processes: management processes, basic processes and support processes. In order to establish a revolutionary innovation management, we must have a strong leadership base and focus the management of the organization on: the computerization process; the data collection process; the development of entrepreneurial processes and the development of individual creativity. Entrepreneurs who will use innovative strategies to carry out their own successful activities, will integrate new competitive and innovative models, which take part of the innovation management system.

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