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BIOECONOMY DEVELOPMENT AND USING OF INTELLECTUAL CAPITAL FOR THE CREATION OF COMPETITIVE ADVANTAGES BY SMEs IN THE FIELD OF BIOTECHNOLOGY

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Abstract

The article aims to present a thorough research on the perceptions and opinions of the Romanian managers of small and medium enterprises in applied biotechnology on the importance of intellectual capital and the application of knowledge management principles to create and maintain competitive advantages.

At the basis of the development of bio-economics, there is a successful implementation not only of top biotechnologies but also of new economic models that engage the economic agents in complex exchanges. Biotechnology companies are a true "engine" that helps the development of bio-economy basic mechanisms, optimization of their work having long-term repercussions. Companies that develop a sustainable knowledge management system that they integrate into their marketing strategy have the most prominent position on the market and gain multiple competitive advantages. The research, based on the qualitative research methodology in the form of an in-depth interview, highlights that the strategic decision regarding the implementation of a knowledge management system and the intelligent use of intellectual capital resources are correlated with variables such as: the managers' level of education in the field, correlating managers' activity to organizational culture.

Knowledge, for new business models, is a good asset that can be capitalized; from this perspective, the implications at the level of marketing strategies are in the same time diverse and complex. Biotechnology SMEs will adapt to requirements by developing competitive advantages as a result of establishing relationships and developing exchanges within strategic alliances and less according to a classical model based on attributes that aims positioning of products or services above those of the competition.

Key words: intellectual capital, bioeconomy, knowledge management, biotechnology, competitive advantage

JEL classification: M31

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Introduction

The effort of any organization is geared towards better integration within the business environment. This means that the organization has the tools, the know-how and the strategy to provide stable and effective feedback for any factor from the evolution of the environment. In this equation, organizations use marketing information and information generated by marketing research to gain competitive advantages and become more market-oriented. It is becoming increasingly clear that the generation of quality information produced and disseminated in various departments of the organization, in the most appropriate form, ready to be used, can bring companies closer to an appropriate market oriented development and competitive marketing activity (Menon and Varadarajan, 1992).

The use of knowledge has been extensively studied in the scientific literature. Thus, the use of knowledge can be associated with a one-dimensional or multidimensional construction (Larsen, 1980; Van de Vall and Bolas, 1982). In a synthetic context, knowledge was used from the perspective of three basic dimensions: instrumental use, conceptual and symbolic use. At the very basis of transformations that are taking place within the economy, there are knowledge under different circumstances – raw material, production factor or finished product. Thus, economic processes actually, will transform and adapt to changes and new requirements through knowledge (Nicolescu and Niculescu, 2005). The use of knowledge can be considered a function of direct and indirect effects from a number of factors such as: environmental factors, complexity of tasks (variability and difficulty of the task), organizational factors (the degree of structural organization, the culture of information and innovation, internal and external communication), information factors (cost of information, perceived credibility of information, perceived utility of information) (Menon and Varadarajan, 1992).

In this context, knowledge and information requires a different management approach than the classical one, as long as the products or services of companies themselves have begun to incorporate information into their intimate structure. In general, the degree of incorporation of information and know-how into products or services will be different, depending on companies being more or less information intensive (Glazer, 1991). To an extreme, there will be offers of companies that have information independent products whose characteristics are the same regardless of the information exchanged as part of the company's transactions with customers – this category includes companies such as public catering providers or providers of various standardized services as well as the providers of the majority market products, and at the other extreme are companies offering the information that was originally used to make offers but later became a marketable product in itself (an example being airline booking systems or other trading information systems as well as financial ones). As the importance of information is analyzed in terms of value, it is clear that information was originally a base to create product offers to reduce costs and increase revenue from future transactions and only later on came the sale of information itself. Competitive position is a function of a particular set of strategic actions and directions chosen by the company in light of the analysis of its overall situation.

This paper highlights a series of conclusions from the application of qualitative research in the form of in-depth interviews at the level of the managers of SMEs in the field of biotechnologies present on the Romanian market. These conclusions point to a series of trends that require additional validation by future research: the dissolution of existing boundaries between traditional strategic options and the dissolution of conventional criteria

used to define competitive position, the decline of the "classic" product used as a basis for differentiation from competition, the dynamic nature of the buyer's and supplier's power and role, the need for flexibility in production, and the decision making process in marketing.

Research results lead to conclusions highlighting the need to develop competitive strategies for biotechnology firms in their efforts to grow and to make a substantial contribution to the bio-economy promotion. Managing knowledge and intellectual capital is indissolubly linked to the application of the principles of the knowledge-based economy, principles that are also underpinning the current evolution of bio-economy.

1. Literature review

1.1. Implications of the use of intellectual capital in the activity of SMEs within the context of bio-economy development

The development of bio-economy requires a complex, interdisciplinary approach, to which several fields of human activity contribute, both conceptually and operationally. Thus, three basic perspectives for bio-economy development can be identified: biotechnologies, biological resources and bio-ecology respectively. In terms of biotechnology, the importance of innovation and the trading of biotechnology products and services at the level of different industrial sectors is highlighted. (Bugge, et al., 2016)

Bio-economy, in its current form, is based on knowledge-based bio-economy – a branch defined at the level of the European Union as a way of applying knowledge from life sciences to produce products based on biological resources in an ecological way. (Aguilar et al., 2009). Also in the context of the European Union, the birth of the bio-economy concept was based on biotechnology, one of the elements that stimulated the development of bio-economy being the "Cell Factory" key action from the EU Framework Program implemented from 1998 to 2002, which aimed at developing biotechnologies to identify new solutions that could replace old technologies with a negative impact on the environment (Patermann and Aguilar, 2017). Thus, the importance of the biotechnology field is obvious for the development and affirmation of bio-economy, the companies in the field being called upon to identify and use the most efficient ways of optimizing the activity and maintaining the highest level of competitiveness.

Bioeconomy will be part from economy development models which emphasize flexibility. Generally, in order to discuss about a flexible economy and a high rate of structural change, a high rate of investment is extremely important, at any time the structure of production and the number of jobs are determined by the stock of capital (Uță, 2008).

In the context of the current market, there is a high degree of complexity and unpredictability, with competition between companies at all levels. In addition to the existing competition between products and services offered in the context of various businesses, there will also be competition between business models of companies, which will lead to the development of innovation in the field. Intellectual capital represents both the expression and the framework of manifestation of these business innovation models (Elia, et al., 2017). At the same time, intellectual capital will also be a mediator between the organizational performance of an enterprise and its strategic alliances (Ferreira and Franco, 2017). Research based on multiple interviews with SME managers has provided some

interesting conclusions from the perspective of intellectual capital seen as part of the company's dynamic capacity based on strategic resources. Although the study has been conducted in Mexico, its results can be valid in other emerging economies (Daou, Karuranga and Su, 2013):

- the competitive advantage gained by a SME cannot be sustainable without adaptation to the environment that is constantly changing,
- competitive SMEs have set up specific processes that have allowed them to adapt more quickly to the changing environment, providing them with enhanced dynamic capabilities,
- SMEs with enhanced dynamic capabilities are generally more willing to accept the risks, thus being able to value opportunities that make them more competitive within the business environment,
- human or organizational intellectual capital is an important factor in the management of knowledge, being also a key element in identifying and using opportunities,
- SMEs compared to larger firms are forced to base their strategies more on intellectual capital because they generally have to cope with more financial restrictions.

From the point of view of the content that intellectual capital implies, it can be appreciated that its main component is represented by human capital. The development of human capital in SME-type organizations has been taking place since their establishment by attracting one of the most important strategic resources – the entrepreneurs themselves – who, through their previous experience, motivation, knowledge and abilities, manage to coagulate in a creative way the basic elements for its evolution. (Gavrilă-Paven, Dobrescu, and Dobre, 2014). The human capital, seen as an intellectual capital source within the enterprise, stands in a direct connection with knowledge. In this context, the creation of intellectual capital within an organization is in fact a process of knowledge creation that leads to improved relations with the economic environment (relational capital) and gaining competitive advantages. Thus, intellectual capital will be influenced constantly by the process of knowledge management. Intellectual capital can be used by itself by SMEs to improve their competitive advantage only in the medium term. When used in conjunction with other types of resources and skills, intellectual capital can also lead to competitive advantages in the long run.

Intellectual capital also mediates the relationship between the company and its dynamic business environment in terms of its sustainability. In fact, the degree of sustainability of a SME is given by the proper management of knowledge and the innovation process, both of which are linked to intellectual capital (Akhtar, et al., 2015). In this respect, if human capital is not well-managed, the skills of human resources and knowledge have a poor influence on the overall performance of companies. Thus, through a continuous management process, the skills and abilities of the company's staff can be transformed into competitive advantages and sustainability.

With a direct reference to biotechnology companies, a strong relationship can be identified between business innovation models and the cascade innovation process. Biotechnology companies are typically doing more innovations, both in their field of activity and in the business model they are proposing (Niosi and McKelvey, 2018). From this perspective, the

contribution to the development of the overall framework for bio-economy implementation is more than obvious, innovation being a key factor in promoting the knowledge-based economy. Knowledge is a key element in the development of bio-economy, its integration into profitable research and development flows being a characteristic of the knowledge-based society (Ahmed, 2018).

Intellectual capital at an enterprise level will also have two dimensions: human capital and capital in relation to customers. Both dimensions are strongly linked to the enterprise's innovation capability. In this context, the entrepreneurial orientation will be a moderating factor between the intellectual capital and the company's performance and innovation (Alzuod, Isa, 2017). Competitive advantages need to be sustainable in order to ensure survival in the economic environment. The competitive advantage of a company in order to be sustainable must be based on intelligent management of the available knowledge coupled with innovation. Internal resources are a key element for a company in its effort to gain competitive advantages. Among these internal resources, intellectual capital, though intangible, is one of the most important, being essential for knowledge management at the company level. Despite the fact that SMEs are often in a situation where they lack sufficient tangible resources, the existence of an adequate intellectual capital can help them to survive in a hostile environment and even gain competitive advantages (Ngah, Abd Wahab, Salleh, 2015, Todericiu, Stăniș, 2015). In the context of intellectual capital, innovation capital is more important than relational or structural capital. This is because the existing intellectual capital within the organization may lose its value due to changes that can occur in the economic environment, while innovation is the one that ensures sustainability (Suddaby, Bruton and Si, 2015).

Organizations wishing to implement important changes must be based on proper knowledge management because such a program will lead to inevitable changes within the organization. Because of this, organizations that want to implement important changes need to prepare and motivate those human resources that want to make changes. In this context, organizational culture is a very important element that leads to different approaches from the perspective of knowledge management (Montequín, et al., 2006). Additionally, the difficulty of preparing adults to develop new skills requires creative approaches based on new communication and information transmission techniques (Uță, 2009).

The process of innovation at the level of organizations has a mediating role between human, structural and relational capital. Innovation is the dynamic factor that keeps intellectual capital up-to-date. At the same time any improvements to the intellectual capital of an enterprise leads to improvements in the ability to innovate. For this reason, a company's leadership should focus on training its staff and improving the company's information infrastructure (Khan, Terziovski, 2014). Innovation, in any of its meanings – the renewal or diversification of the range of products or services, or their associated markets, development of new production, supply and distribution methods, introduction of new management practices, introducing new ways of organizing work processes, changing working conditions or labor skills- is indispensable for the capitalization of intellectual capital and other strategic resources of firms (Barna, Epure and Baicu, 2010).

1.2 Knowledge management and the creation of competitive advantages in the activity of SMEs

Research has demonstrated the importance of strategic knowledge management for the company's economic performance. Thus, answers from a sample of SMEs in Mures county, Romania, show that although managers are aware of the importance of a knowledge management decision-making system in order to achieve success in the market, most enterprises do not have such a system, the explanations for this situation that was offered being related to the human, financial or legal restrictions that Romanian companies face (Fărcaș, 2016).

The amount of data available for marketing is now impressive, so it cannot be managed properly without the use of dedicated tools. One of the basic requirements for managing a large amount of data is to extract useful knowledge, an activity that involves filtering, sorting and processing information using information technology. The use of dedicated datamining techniques as well as an IT toolkit improves knowledge management capabilities, enabling companies to provide better services and gaining competitive advantages in products (Shaw, et al., 2001).

Effective knowledge management involves aggregating consumer data and data related to their behavior. From this point of view, the elucidation of the mechanisms that explain the intentional behavior and its connection to subjective attitudes and norms is a challenge for modern organizations that is justified in the context of identifying new competitive advantages (Untaru, et al., 2016). Currently, the management of marketing information flow requires the use of specific tools for direct marketing – creation and management of customer databases, designing, organizing and conducting direct communication campaigns or actions, creating the specific offer by incorporating several elements within the marketing mix (Veghes, 2003). The data format must be consistent, used categories have to be easy to understand, unambiguous, and has to exclude each other (Groff, Jones, 2012).

A performance knowledge management that provides prerequisites for creating competitive advantages should also include information categories about the intangible assets of organizations (Rust, et al., 2004). To successfully integrate different forms of knowledge and information, companies can develop a systemic perspective on the markets they are present in. This systemic perspective requires new methodologies and methods by which companies investigate the marketing environment and synthesize information in the form of a system (Vargo, et al., 2017). There is also present the effective implementation of knowledge management systems, with complete functions of creating, transferring and implementing knowledge (Gottschalk, 2007).

A category of important information for creating competitive advantages is represented by information about the effective communication channels that the organization can use at some point to optimize communication with target consumer segments. In this context, it is noted the development of communication through social networks, communication that allows not only the efficient transmission of messages but also quantification of feedback and integration with already existing customer databases. (Gardan, Geangu and Rosu, 2011). Social media communication enables organizations in various fields to become visible and successfully manage various image attributes essential to the desired positioning at a certain time (Capatina, et al., 2017). From the point of view of creating competitive advantages, successful management of the customer information flow also implies the

creation and development of their loyalty. And on this level, social networking can make a significant contribution, and it is possible to develop brand loyalty by increasing brand confidence and emotional attachment (Orzan, et al., 2016). The sources of competitive advantages are multiple, being determined by the specific situation each organization has in relation to its business environment, the stage of the company's life cycle, the particularities of the field in which it operates. Thus, the sources of competitive advantages lie at the level of each type of relationship that the organization develops with each element of the external marketing environment either at micro level (customers, competitors, suppliers, partners etc.) or macro (the technological environment, the legislative environment, the demographic environment, the cultural environment etc.).

Thus, for SMEs, the strategic management of the flow of information regarding the partners in the value chain is also required (Dumitru and Căescu, 2013). The optimized relationship with them can lead to the development of competitive advantages, resulting from a better ability to react to any major changes that may occur within the market or to mobilize additional resources with partners. In addition, the development of an optimal relationship with the marketing environment presume the implementation of quality management models such as the EFQM model involving the mobilization of human, material, financial, etc. resources as a result of the integrated action of principles of organizational excellence (Olaru, et al., 2010, Jawadekar, 2013).

2. Research methodology

Within this article, we have used a qualitative nature research, using in-depth interview technique. The in-depth interview technique is consistently used generally when exploratory research is desired, and especially when research is being done on decision-makers who consider their business vision information as being sensitive. The goal of the research is to characterize manager's perception about the status of intellectual capital seen as a strategic resource and emphasize ways of using knowledge management within the marketing strategy of SMEs in the field of biotechnology. The decision-making problem subsidiary to the research is represented by identifying the means of optimal integration for the owned and assimilated intellectual capital of biotechnology field organizations, as well as the optimization of the knowledge management principles implementation in order to create, maintain or develop competitive advantages based on this. The specific objectives addressed within the research can be defined as follows:

- Characterization of biotechnology field SME's managers attitude regarding innovation in general;
- Identification of managers' perceptions regarding the importance of intellectual capital;
- Measuring the extent to which managers are aware of the concrete forms in which intellectual capital can be highlighted in their own organizations
- Characterization of managers' opinions on the connection that can be established between the human dimension of intellectual capital and the generation of competitive advantages;
- Identify managers' perception on marketing activity importance for modern companies

- Measuring the degree of integration of knowledge management within the organizational culture of biotechnology field SMEs;

- Identify managers' perception of the necessity to implement a coherent marketing activity designed to ensure competitive advantages for the organization.

The qualitative research method enables us to obtain relevant information through the interview, the technique of the in-depth interview being applied. The technique appropriately corresponds to the purpose of the research and the intention of the authors to know in a direct and explicit way the views and perceptions of the biotechnology field managers. Qualitative research generally involves a non-structured, exploratory methodology based on small samples, capable of providing new perspectives for understanding the framework for defining the decision-making problem (Malhotra and Peterson, 2006).

After the in-depth interview a series of primary data will be obtained through a direct, unconcealed approach, allowing for a qualitative understanding of the causes and motivations underlying the phenomena studied, so that the research method is suitable for situations where it is necessary to more clearly define the decisional problem, and for situations where there is a high degree of uncertainty when the concluding results are different from what is expected. The in depth interview technique is particularly useful for managers' perceptions research because it can lead to draw real "cause and effect mental maps" (Jaworski and Kohli, 2017). At the same time, the technique is suited to the research objectives, as it allows to identify the roles that managers assume, how they represent the economic and social reality of their own organizations. (Belk, 2007).

In case of the present research, it was opted for a partially structured interview guide with pre-arranged discussion themes in a certain order. Even if a predetermined order is already in place, the researcher will be free to introduce additional questions, spontaneously, necessary for the proper conduct of the discussion and the complete approach to the discussion theme. In the case of this research, which has an exploratory nature, the use of a semi-structured interview guide is justified, as much flexibility as possible being needed in order to obtain as diverse information as possible. The sampling method, which is also specific for qualitative research type – in-depth interviewing, was the quota method-driven sampling, a method validated through other previous approaches.

In the case of non-probability sampling, which is specific to the qualitative research, the units are deliberately selected to reflect the particular characteristics of the groups within the sampled population. The sample is not intended to be representative, the chances of selection for each element are unknown, but, on the other hand, population characteristics are used as the basis for selection (Ritchie and Lewis, 2003).

The sample was selected from the relevant statistical population – small and medium-sized enterprises operating in different sub-areas of biotechnology developed in our country. The selection was based on a selection questionnaire containing filter questions relevant to the purpose and objectives of the research. There were selected 21 people who participated in the interviews on a voluntary basis, and the interview guides for each of them were then applied.

Due to the qualitative nature of the research, the sample does not have a statistical representativeness, as stated above, still the relevance of the results obtained through the

structuration specific for situation encountered within analyzed field is ensured. The sample structure from the perspective of the niche activity field presents as follows: 8 companies from the field of natural bio-products, 5 companies from the field of medical and pharmaceutical biotechnologies, 4 companies – industrial biotechnologies, 4 companies – environmental biotechnologies. In order to ensure that research results are as valid as possible, the authors sought to follow firm principles of information gathering based on strong interaction between researchers and interviewees. Respondents were selected to meet an essential condition, namely increased corporate decision-making capacity and access to basic information on the strategic direction of the firm. Thus, of the 21 interviewed respondents, the following functions were assigned to the respondents: 3 production managers, 2 managers responsible for the research and 16 general managers.

From the structural point of view, the interviewed sample is as follows: 7 people with 18 years of management experience, 6 people with 10 years management experience and 4 people with 23 years of management experience (table no 1):

Table no. 1. Structure corresponding to the respondents' sample

Sample structuring criteria	Group respondents according to each criteria			
	35-45 years of age (5 persons)	45-55 years of age (10 persons)	55-65 years of age (6 persons)	
1. The respondents' age				
2. The level of education and the degree of competence	Bachelor studies-Polytechnic (12 persons)	Bachelor studies Agronomy Faculty (4 persons)	Master studies biotechnologies (2 persons)	Doctoral studies in the field of biotechnologies (3 persons)
3. The position within the company	Production managers (3 persons)	Research and development managers (2 persons)	General managers 16 persons)	
4. Years of work experience	14 years (3 persons)	23 years (2 persons)	27 years (7 persons)	31 years (9 persons)
5. Leadership experience	5 years (4 persons)	10 years (6 persons)	18 years (7 persons)	23 years (4 persons)

It was also followed, as explained earlier, the representativeness of the sample from the perspective of the type of company that is active within biotechnology filed according to their structure on the subdomains, as they are identifiable at the level of the biotechnological subdomains in the domestic economy. Interviews were conducted both at the headquarters of the companies, subject to the availability of the respondents. Discussions were recorded, being afterwards transcribed and the information processed using the content analysis technique.

3. Results and discussions

The first discussion theme within the semi-structured interview guide referred to managers' perception of the concept of innovation, namely how innovation is useful for biotechnology companies, and, last but not least, if a link can be established between innovation and the marketing activity of the companies. In order to meet the research objective of characterizing attitudes of biotechnology SMEs managers towards innovation in general, 3 questions were put forward in the interview guide. In order to explicitly characterize managers' perceptions on innovation, an appropriate scale for 15 innovation defining factors was used. The results highlighted the following situation (table no. 2):

Table no. 2. Distribution of interviewed managers' opinions on the defining factors that influence the innovation capacity of organizations

Defining factors which influence the innovation capacity of organizations	Very much	Much	Indifferent	Little	Very little
Financial resources	17	3	1	0	0
Logistics for research and development	12	5	2	1	1
The company size	9	6	1	4	1
Patrimonial resources availability	9	8	1	2	1
Managerial know-how and management style	12	4	4	1	0
Organization model	9	8	0	3	1
Level of training and personal skills	16	5	0	0	0
The institutional environment	7	8	5	0	1
Technological capacity	18	3	0	0	0
Consumer preferences	13	4	2	1	1
Economic environment	11	4	6	0	0
Organizational culture	10	6	4	0	1
Organizational learning capacity	18	3	0	0	0
Market orientation	9	8	3	1	0
The competitive advantages	7	8	0	5	1

The average score calculated for each factor is presented within table no. 3.

Thus, the answers received show the situation according that the innovation capacity of SMEs is directly dependent on the organizational learning capacity as well as on the technological capacity. At the same time, staff training and skills as well as purchasing capacity are contextual factors that lead to positive levels of innovation performance. Financial resources, managerial know-how and leadership style, consumer preferences, research and development logistics are elements of the secondary plan but also have a considerable influence on the innovation process. During the discussions on the first topic, the managers' opinion about the importance of the financial resources for the innovation process within the company is noted. Thus, 17 managers of the 21 interviewed consider that financial resources are indispensable for maintaining a high level of innovation and ensuring a constant flow of knowledge.

Table no. 3. Average scores for factors influencing organizations' innovation capacity

Innovation influence factor	Average score obtained
Financial resources	4,762
Logistics for research and development	4,238
The company size	3,857
Patrimonial resources availability	4,048
Managerial know-how and management style	4,286
Organization model	4
Level of training and personal skills	4,762
The institutional environment	3,952
Technological capacity	4,857
Consumer preferences	4,286
Economic environment	4,238
Organizational culture	4,143
Organizational learning capacity	4,857
Market orientation	4,190
The competitive advantages	3,714

The concept of innovation is associated in terms of content with "offering new products and services on the market", "introducing new technologies for obtaining the same products in terms of higher efficiency", "implementing new organizational systems at the enterprise level" and "the development of new value creation chains – networks of more than one enterprise". Particularly, this latter aspect has been highlighted by younger managers, being considered a true trend, at least for the field of biotechnology.

From the point of view of the particular aspects that characterize the issue of innovation and advanced scientific research in the field of biotechnology, a series of opinions can be found that can be summarized as follows:

- The specific niche areas for the content of biotechnology refer to: microbiology, genetics of microorganisms, genetic engineering, biochemistry and industrial bioengineering. All of these are considered by managers to be areas of activity that are based on a continuous innovation process without which their very existence and manifestation would not be possible;
- It is not possible to speak of a biotechnology industry itself, but of businesses operating in different sectors using different methods and instruments;
- Biotechnology-specific research is always considered by managers to be a long-term activity requiring a wide range of skills, ranging from fundamental research to industrial experience, and the exploitation of technical knowledge;
- The success of the biotechnology companies is ensured by a number of favorable factors – advanced fundamental research, constant investment, entrepreneurial spirit, the existence of specialized staff with a solid, interdisciplinary training;
- Correctly substantiating the activity of biotechnology companies requires the application of major innovations because they essentially allow the modification of the status of the human being through intervention at the level of natural mechanisms;

- In the opinion of the managers, in the field of biotechnologies it is necessary to better involve universities to collaborate with the economic agents in the field, mainly related to R & D activities and closer interaction with the industry. A real problem is the difficulty of identifying high-skilled technical and research staff which is properly trained. Graduates of faculties are often demotivated and without a horizon of expectations comparable to similar graduates from abroad.

From the perspective of the link that can be established between the innovation process within the company and the marketing activity, most managers have indicated that marketing should help identify sources of innovation. It is noted that there is a dual link: on the one hand, innovation is considered a necessary process for implementing an effective marketing activity, on the other hand information from marketing research or market research is considered essential to ensure the process continuous innovation in the firm as a necessary measure to adapt to the dynamic demands of customers.

Most managers considered that the requirements of the markets where biotechnology firms are present are in constant change, which requires a strong connection of decision-makers to first-time information that is constantly updated. Market orientation is regarded by specialists as an antecedent to innovation (Jaworski, Kohli, 1996). The more a company is involved in a deeper level of market orientation, the greater the ability to innovate. Innovation is needed to meet the demands of customer service dynamics and optimize market relationships.

The results obtained in the context of qualitative research can be compared with the information available at the level of the statistics of the European Union. Thus, in a survey carried out in 2016 (Figure 1), it can be seen that Romania is part of the group of states (besides Finland, Sweden, Croatia, Spain and Portugal), which recorded decreases in the share of R & D expenditure of GDP over the period 2008-2013. Managers' opinion on the need for a steady stream of financial resources to maintain a high level of innovation is legitimate in the context of the scarcity of resources attracted and spent at national level for R & D as shown in the data presented. As long as there is no massive investment in R & D, there will be a net perception of the lack of financial resources seen as an important restrictive factor for innovation.

In order to meet the research goal of identifying managers' perceptions about the importance of intellectual capital, two questions are highlighted within the interview guide. The analysis of the answers shows that the managers' opinions regarding the importance of intellectual capital refer to three hypostases they agreed with, namely: human capital, structural capital and relational capital. Human capital, in managers' view, includes the skills and abilities of the staff, commitment, attitude, skills, talents, creativity and knowledge - all of which are seen as intangible assets that can "turn" into competitive advantages. Human capital manifests itself in the form of creativity, availability for innovation, adaptability, flexibility, motivation towards persistence, experience, devotion to the organization, ability to establish relationships with other employees of the company. The structural capital includes the systems, structures, corporate culture, organizational processes, databases, information, and production technologies. The relational capital consists of all relationships that the firm establishes with different stakeholders such as customers, suppliers, community, and state. Specifically, this type of capital encourages knowledge-based behavior, provides a source of ideas for change and improvement by processing and using market information and marketing strategies.

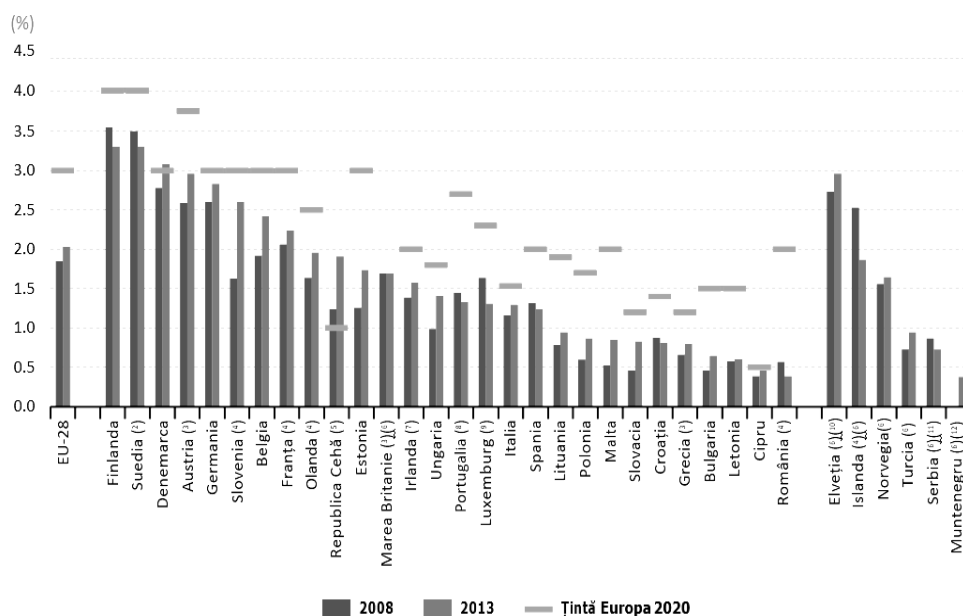


Figure no. 1. The intensity of R & D investments - percentage of Gross Domestic Product, compared to 2008 and 2013, respectively the Europe 2020 target, at the level of The European Union

Source: Eurostat regional yearbook, 2016.

With regard to the objective of measuring the degree to which managers are aware of the concrete forms in which intellectual capital can be highlighted in their own organizations, the synthesis of the information received allows the particularization of intellectual capital in biotechnology on the following sub-domains:

- The agri-food sector requires the application of biotechnologies aimed at improving the quality of agricultural products and animal feed, preventing disease and reducing risk factors;
- For the energy and pharmaceutical industries, biotechnologies will be useful for improving the use of raw materials;
- Another direction in which the process of innovation and the use of intellectual capital is developed is the protection of the environment, especially in areas like air, soil, water protection and high-risk waste management.

Patents, certificates as well as advanced technological research projects represent concrete forms of manifestation of the intellectual capital in the companies represented by the interviewed managers.

Once again, respondents highlighted the fact that for biotechnology companies, maintaining a minimum level of identification and management of the various forms of intellectual

capital existence represents an essential condition for surviving on the market and ensuring a competitive position.

The areas in which efforts are made for innovation activity and the development of intellectual capital are: bio nanotechnologies, environmental biotechnologies, agri-food biotechnologies, industrial biotechnologies, medical and pharmaceutical biotechnologies. Each of these niche areas of biotechnology has specific requirements, businesses working within them adapting to individual mechanisms for each case.

The objective of characterizing managers' views on the connection that can be established between the constituent elements of intellectual capital and the generation of competitive advantages has considered 3 questions at the level of the interview guide. The competitive advantages represent a definite differentiation element for 8 of the interviewed managers, who are able to identify as sources of competitive advantage – patented proprietary technologies, the broad base of possible applications of the developed biotechnologies, the optimized communication with traditional customers.

For managers, these competitive advantages will be tailored to the stage of the life cycle of the products or services they provide – in this case, specific services (consultancy, biotechnology design etc.). Respondents mentioned the leading strategy through costs and differentiating products and services from competition. Creating competitive advantages means " ...to create value and to do it differently ...".

From the perspective of ways to identify competitive advantages, company managers did not present coherently structured ways, within companies' not existing protocols that would ensure that competitive advantages are identified on a consistent basis. The development or existence of competitive advantages in relation to intellectual capital or knowledge management is formally highlighted by concerns within the company about the development of intellectual capital and the protection of the technological knowledge flow. Conclusions about managers' perceptions of the link between competitive advantages and intellectual capital are underlining the fact that, in the field of biotechnology, intellectual capital is the most important source of competitive advantage.

Managers interviewed are of the opinion that their own firms have established a distinct market position through the development of technologies, products or niche research methods that are often patented. Thus, the core of competitive advantages is made up of those technological elements developed through proprietary research that highlight original ideas, methods and techniques for developing biotechnologies.

Information targeting the goal of identifying managers' perception of the importance of marketing for modern firms highlighted the existence of 8 managers who consider marketing and sales activity a problem for their company, 4 managers out of a total of 21 which considers human resource management a source of problems, 3 managers out of a total of 21 who consider management to be a source of problems, and 2 managers out of a total of 21 who believe that production management is actually a source of problems. Based on the analysis of the answers, it is emphasized that only 4 managers out of the total of 21 were satisfied with the content of the marketing activities submitted within their own companies (making promotional materials for participation in exhibitions, updated clients databases, internet and social networks communication etc.).

Asked what they consider to be the appropriate content of the marketing activity that a company should run, only 3 of the respondents indicated a series of activities that capture in a more complete way the potential of marketing activity in its entirety. For them, marketing also translates into market research, forecasting, consumer segmentation, positioning etc., not just in the implementation of a marketing mix.

Information on the objective of measuring the degree of integration of knowledge management within the organizational culture of biotechnology SMEs was obtained on the basis of 4 questions that raised the interest of most managers, although their opinions regarding the content of organizational culture and the relationship between innovation and organizational culture were different. Organizational culture is present at the level of managers' perception in terms of the need to promote labor relations to facilitate scientific research, exchange of ideas and innovation. It is to be noted that in only 6 of the cases it was stated that the represented organizations defined an organizational culture that is anchored in a consistent way in values sent periodically to the employees. The mission defined by these organizations is firmly anchored in a proactive attitude from the point of view of innovation and fundamental research.

It is shared the view that all employees are to be involved in the development of the organizational culture, this being not only a management problem. Some of the respondents had difficulty in formulating their views clearly and consistently on the concept of organizational culture, in fact they did not find a real justification for promoting the concept at the level of the organizations they represent.

The two managers responsible for research and development distinguish themselves by more coherent views on the need to promote an organizational culture based on continuous innovation.

Managers' views on the topic of an existing framework for the implementation of knowledge management specific principles are marked by some heterogeneity. Thus, there have been diverging views on the need for knowledge management to be widely deployed within firms, with the setting up of strict security protocols regarding data and information access, reports regularly received on information used by staffing hours, daily duties, and monthly briefing sessions in front of senior management on all aspects of the activity.

Also, the heterogeneity of responses has led some managers to believe that knowledge management is only a purely theoretical desideratum without a real basis of application and that it does not justify its costs and effort to be implemented.

The objective of identifying managers' perceptions of the need to implement a coherent marketing activity designed to ensure competitive advantage for the organization was highlighted by two questions in the last discussion topic of the interview guide. Creating competitive advantages by implementing the consistent principles of an effective marketing strategy has led to discussions that have clarified a number of issues mentioned in previous themes.

Thus, there have been opinions that have reaffirmed the need for their own companies to invest more in a coherent marketing activity that involves more than promoting the company's service offer directly to organizational customers and maintaining an online promotion interface.

The idea of substantiating marketing strategies leading to the creation and development of correctly formulated competitive advantages has been embraced especially by younger and pharmaceutical managers.

Also, the idea of obtaining a correct market position based on competitive advantages resulting from innovation and the intellectual capital assets held (patents, inventions, own patents) is specifically and unquestionably embraced by some of the managers.

The main types of competitive advantages that managers have agreed to refer to: lower prices for some of the products; offers of products or services with dynamics adapted to the requirements of consumers; consulting services personalization and increased innovation capacity – providing new technical solutions in a short time

Conclusions

The in-depth interview with the managers of SMEs in the field of biotechnology on the Romanian market revealed a number of essential aspects regarding the process of creating competitive advantages by capitalizing on the intellectual capital and by managing the knowledge. The information obtained is predominantly of a qualitative nature, providing a starting point for performing pertinent value judgments concerning the perceptions of interviewed managers.

A first conclusion is that innovation in the investigated SMEs is directly dependent on organizational learning capacity and technological capacity. At the same time, staff training and skills as well as purchasing capacity are contextual factors that lead to positive levels of innovation performance.

Financial resources, managerial know-how and leadership style, consumer preferences, research and development logistics are secondary elements, but they also have a considerable influence on the innovation process. In the process of identifying and creating competitive advantages, innovation is an intrinsic condition, as long as the very nature of biotechnology products and services now incorporates much of the worldwide scientific research effort.

A number of interesting opinions have also been revealed in terms of how managers refer to the notion of organizational culture. This reveals a complex concept, having a major importance for the activity of different nowadays types of organizations which presumes integration of the individuals within a complex of values, norms, expectations and different ideologies types or social and cultural interaction mechanism. Lack of coherent preoccupations in terms of capitalizing on organizational culture can bring important damage to staff cohesion, long-term commitment, and even to innovation capacity or to optimal management of intellectual capital. A positive element is, however, the fact that managers have expressed their opinion that all employees are involved in the development of organizational culture, and this is not just a matter of management.

From the perspective of the ability to identify competitive advantages, interviewed managers are of the opinion that their own firms have established a distinct position on the market through the development of technologies, products or niche research methods, often patented. Thus, the core of competitive advantages is made up of those technological

elements developed through proprietary research that highlight original ideas, methods and techniques for developing biotechnologies.

Regardless of the nature of intellectual capital components and forms, respondents have highlighted the fact that for biotechnology firms, maintaining a minimum level of identification and management of the various forms of intellectual capital is an essential condition of market retention that insures a competitive position.

A general conclusion is that, despite some opinions indicating the openness to the concepts under discussion, culminating with the need to implement a genuine marketing activity in the represented SMEs, interviewed managers do not have a firm stance regarding the development of a complete marketing strategy based on competitive advantages resulting from innovation and intellectual capital assets (patents, inventions, proprietary patents). Possible causes lie in the lack of specialized knowledge and lack of a thorough marketing culture which limits the decisional level of these decision-makers quite a bit.

The limitations of the research presented in the article are those specific to qualitative research in general – lacking the possibility of statistical generalization of the results, the inability to completely eliminate the subjectivism of the respondents and the difficulties inherent to communication with decision-makers sometimes marked by their position.

In this respect it is necessary to continue the investigation of the subject with the specific instruments of quantitative researches that highlight the correlation of the variables related to the determining factors for innovation identified by the interview with the other elements defining the perception of the managers regarding the creation of the competitive advantages and the role of the intellectual capital

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