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Innovation and Technology Transfer for Business Development

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Abstract

This paper presents a model of approaching the managing the innovation process in case of small and medium-sized companies. The process of development by means of innovation is analysed from two perspectives, namely: from the perspective of companies that apply the innovations and from the perspective of universities as suppliers of technologies and knowledge. Some aspects specific for the management of innovation are given in the first part while the second part contains some aspects referring to the university technological transfer and are presented the main types of legal agreements for the technological transfer.

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Keywords: innovation process, technological transfer, commercializing technologies

1. Introduction

The small and medium sized companies that want to develop by means of innovation have the possibility to develop the projects in their own research department, they can choose the variant to purchase the technology or can use other variants that make the object of technological transfer. On the other hand, nowadays universities focus more and more on applicative research and on rapidly implementing the results in practice. In this context, the actions of technological transfer and the development of partnership between Universities and Companies are encouraged, in order to implement the innovations [3], [7]. Our contribution consists in drawing up a model for managing the innovation process based on the study of literature in the domain of innovation. In this context the process of innovation is a complex process which is based on the company innovation strategy and on a series techniques of innovation management.

2. Managing the innovation process

Innovation represents a way of developing the business and also a condition to survive for companies in case of a more and more merciless competition. On the other hand, innovation is a risky process, but it is also a necessary risk, as Brian C. Twiss wrote "Successful businesses of the future will be those who learn to live with uncertainty and incorporate it into decision-making processes" [1].
Many studies carried out referring to innovation have demonstrated that by applying the management methods and techniques on the innovation process the risk of failure is considerably reduced [1], [3], [4].

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Depending on the type of company (big, medium-sized, small, corporation) and depending on the intended aims, the aspects referring to the Innovation management have specific characteristics [4]. In these conditions, one tries to outline a common direction from the idea to the business for Small and Medium-sized Enterprises (fig.1). This direction will be adapted and customized to the characteristics of the company.
Henry Chesbrough has written it: Today, innovation must include business models, rather than just technology and R&D [2].

2.1. Innovation management

The question arises about who should manage the innovation process at the firm level, and the answer for this question depends on the type of the organization, whether there is a R&D department, whether there is a Chief Innovation Officer, which is the amount of capital at risk [6].
There are several definitions for the innovation management in the literature. In the standard SR 13547 the innovation management is defined as a component of the organization's general management which manages one or more innovation processes by its strategic and operative elements [11]. We say one or more innovation processes because the organization may develop several innovation projects simultaneously.
The innovation management was defined by Sandrine Fernez-Walch and François Romon (2009) [8] as being the "ensemble of the actions done by an enterprise and of the options carried out in order to favor the emergence of the innovation projects, to decide their being launched and to achieve the marketing of new products or the implementation of new processes in the company, in order to increase the competitiveness.
A.T.Kearney [13] developed the model of the "Innovation house". This model shows the most important modules of the successful innovation management. The innovation management specific to the organizations presents five modules: Innovation strategy, organization and culture, innovation life cycle processes, enabling factors, innovation results. "The roof" of the house is the innovation strategy, a planning process that clearly defines which the necessary innovation targets are and how they can be sustained by resources, processes, technologies and behavior within the company. A company oriented towards innovation must include these targets in its organization and its culture.

2.2. Innovation strategy

The innovation strategy is elaborated according to the global strategy of the company.
In the frame Innovative strategy will be realized the following:

- Which is the type of innovation that makes the object of the strategy (the introduction of new products, the introduction of new methods of production, the opening of new markets, the development of new sources of supply for raw materials or other inputs, the creation of new market structures in an industry [9] [10]);
- Which is the degree of innovation (incremental innovation, radical innovation, disruptive innovation);
- What model of innovation is adopted ("technology push", "market pull", "coupling", „models of functional integration", "models for systems integration and innovation in networks – SIN", "Spiral Approach to Innovation",). In the institutionalization innovation model, an innovation has a finite duration and, in the best of cases, it leaves traces of its existence. When it is adopted by an institution, it becomes appropriated so that the innovation loses its newness and energy, is absorbed by the institution, and becomes part of a routine. The innovation is firmly institutionalised when it has found its way into legislation requiring new forms of practice [15].

In elaborating the innovation strategy the following internal and external factors will be taken into account: the company capability to innovate; the culture of innovation; the cooperation between departments; strategic intelligence; market; partners; competitors; legislation.
The components of an innovation strategy are: vision, objectives, methods to achieve the objectives, setting of necessary resources, setting the terms of carrying out the objectives.

2.3. Innovation culture

The innovation culture represents the sum of all practices and results previous to the innovation process carried out by the organization in order to achieve the innovation objectives. The previous practices and results must be validated by bodies specialised in the specific domains of activity and accepted by all the parties involved [11].
The innovation culture implies the existence of such a mentality that each person in the organisation should understand the role and the aim of the innovation. The culture that favours innovation can be carried out by promoting new ideas, communication, collaboration, being aware of conflicts, tolerance in case of failure, etc.
In the paper Building the Innovation Culture [14] it is said: Many management and organization development books and articles exhort their readers to "embrace change." But what, exactly, does it mean to embrace change? I believe it means to build a culture and associated organizational structures and processes that make innovation a daily way of life. Innovation, by its nature, embraces change because it is the stuff and process of change.

2.4. Collaboration

Collaboration in the form of technology-based joint ventures, strategic alliances, and multi-partner R&D projects, is an increasingly important feature in the generation and diffusion of technology and is therefore a key MTI activity [5].
It is checked if the company has a policy for internal and external collaboration in order to promote innovation and technology transfer. Internal collaboration must result in collaborations between the specialists of the organization (production, financial accounting, management, marketing, etc.).

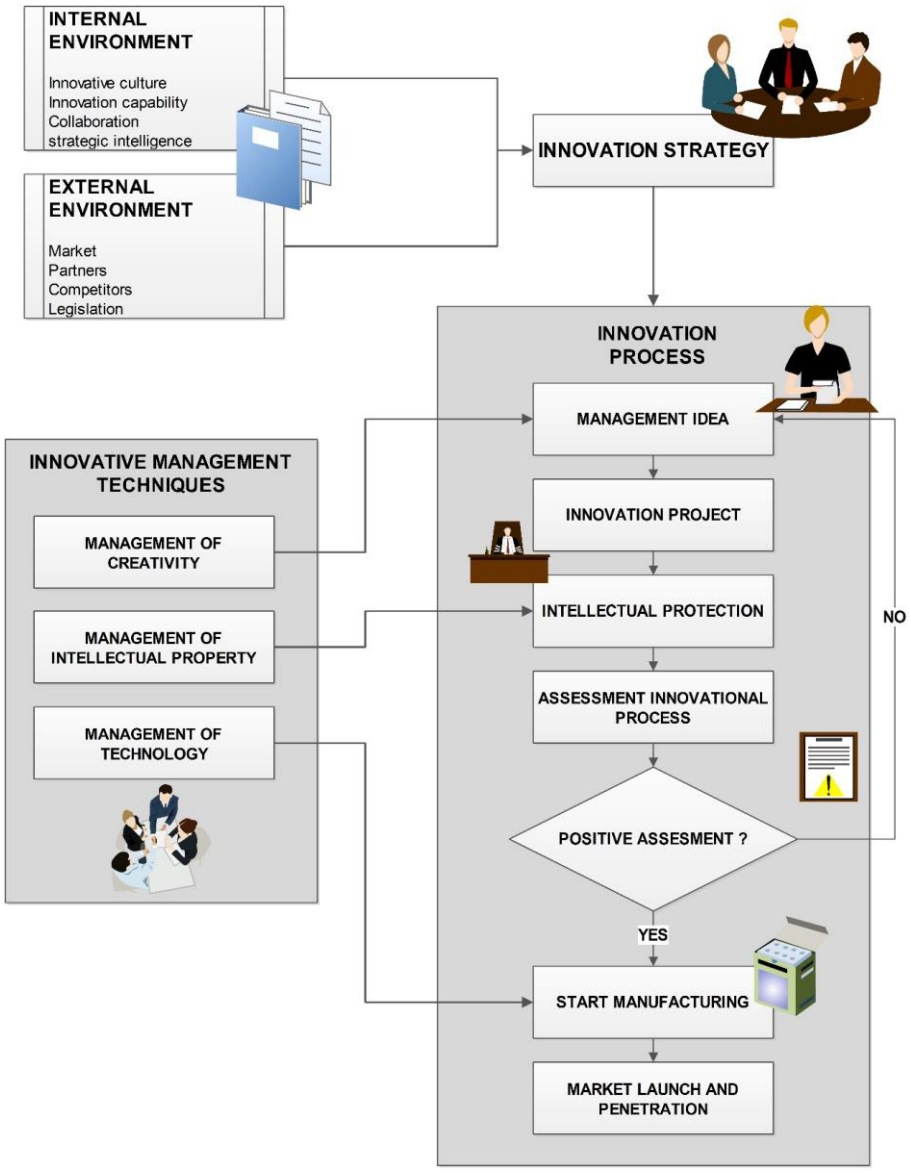

Fig. 1 Managing of innovation

2.5. External environment

It is checked if the company has procedures drawn up and implemented referring to collecting and processing some information from the market and about the market. Of interest for the technological audit is the information concerning the new technologies

and materials, as well as those being under research and development, the information about the competitors' new products, the information about emerging markets, information about clients' new requirements, information about the legal requirements, the existing competitors and about the regulations.

2.6 Innovation project

The project of innovation is realized also in stages and each stage consists of built-in activities. The innovation project will be developed according to capacity, by own means or by external support. If the organization has its own research and development unit, the most efficient way to realize it is by developing the project with own resources and this reflects the organization power of innovation.
Own development of the innovation project is beneficial, but at the same time risky and takes considerable time.

3. University technology transfer

Universities have an important role in the context of the innovation for business development due to the creative potential available. The creative potential of the universities should be directed to the needs of local, regional and international communities to be turned into account and to contribute to their development.
Transmitting the scientific and technological information, the knowledge, and the means of exploitation of the rights of intellectual property to third parties, for manufacturing a product or for developing a process is achieved by the technological transfer.

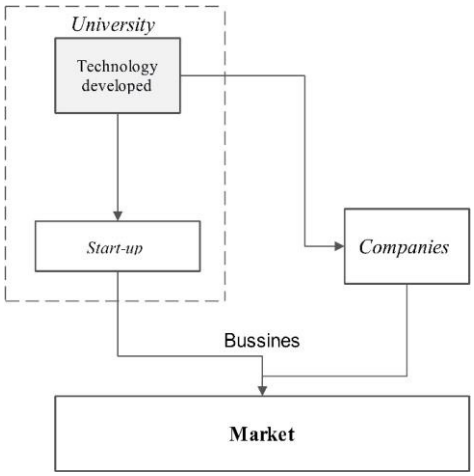

Fig.2. University technological transfer

The role of universities in commercializing technologies has significantly increased beginning with the mid 1980s. This was possible due to some favourable legal changes referring to government financing and changes in the law for the intellectual property, the creation of licensing and technological departments in universities but, the most important channel was the technological opportunities, for example promoting nanotechnologies [3].
In Universities the problem of the management of the activities of technological transfer is dealt with in such a way that the best variant for marketing the created technologies should be obtained. In Universities, the technological transfer is carried out from the research structures to a start-up or to other companies; the ultimate goal is that the result of the research should reach the market (fig.2).
The means by which technological transfers can be carried out from universities are:

- Formal means – by structures of technological transfer based on some specific procedures
- Informal means – by direct contact between the research structures and the companies.

The steps for trading the technologies achieved by centres of technological transfer are [11][12][20]:

a) Applicative research in which innovation projects are created.

In this step, from the point of view of technological transfer, we will follow: the degree of publication of research results, use in research of some materials subject to intellectual protection, rights of prospective sponsors, consulting agreements, etc.

b) Preliminary disclosure.

In this step takes place the first contact between the researcher and the entity of technological transfer. The researcher presents the invention and the experts from the entity for technologic transfer will give recommendations about the description, assessment, protection, etc.

In this phase, the entity for technological transfer will also follow: what the degree of publication is, if the materials submitted to intellectual protection have been used, if there have been sponsors who had contributions to the achievement of the research, what are their rights, if there are consulting agreements, etc.

c) Technology disclosure

An official, confidential element is issued, which is transmitted to the entity of technological transfer and which includes a complete description of the invention.

The necessary key information on the disclosure form should include [16]: the title of the invention, inventors' names, description of the invention, data about sponsorship, if any, design data and data about the practical applicability, data about publications, existing or planned, if any.

d) Assessment

The degree of novelty of the invention is examined, the invention is compared with the competitive technologies, the modalities of protecting the invention are analysed.

The relevance in terms of industrial and commercial potential is also analysed. In this context the entity of technological transfer will analyse the following aspects [12]: if the technology is likely to implement the perspective of achieving (new or cheaper products or products of superior quality), if there are competing technologies and if so, what is the advantage of the invention in comparison with them, if the invention offers a technological answer for an existing problem, if the invention has the potential to create a new market, what is the level of investment, both in time and money to bring the invention on the market, will the inventors continue to work for the invention after it is brought on the market, what will be the estimated profit for an enterprise that will make an investment in order to apply the invention.

e) Intellectual protection.

At this stage the type of intellectual protection is defined (patents, copyrights, etc.) and its coverage (national, international). Whatever the means of achieving the technology transfer, it must necessarily be made in compliance with intellectual property rights.

f) Technology marketing. This stage includes all actions undertaken in order to bring technology to the market.

g) Analysis of business development options through innovation.

h) Contracting.

In case the management of the institution decides not to develop a business an option of trading the invention is chosen. A trading agreement for the invention is a contract between the university and the third party, which describes the rights and responsibilities regarding the use and exploitation of intellectual property and the payments. Royalties will be distributed to inventors and departments according to well established schemes.

Main types of legal agreement for technological transfer [11][12][16] ar:

- Sale contracts or partial or total transfer contracts for IP rights.
- Contracts for exclusive or non-exclusive IP rights.
- Know-how contracts. In some cases the object of the know-how contract is included in the license contract.
- Franchise contracts are the contracts by which the franchisor gives the franchisee the right to exploit the franchise.
- The aim of the contracts for sales and import of capital goods with transfer of knowledge is to sell or buy the products together with the specific know-how for use.
- Joint-venture contracts. Joint-venture is cooperation in business between two or more companies, engaged in a unique specific project for the development of a business through innovation, by creating a new company based on the same business strategy.
- Turnkey projects imply the achievement of a project based on an order by a specialized unit for a third party.
- Consultancy contracts.
- Technical co-operation represents co-operation agreements between two or more organisations in order to develop new products or technologies.
- Commercial Agreement with Technical Assistance represents the sale of some products or technologies with technical assistance included.
- Manufacturing Agreement represents selling the manufacturing right for products or technologies.
- Subcontracting Agreement.

The legal relationship between the individual or the organisation that transfers and that which receives the technology is contractual, therefore the one who transfers technology agrees to transfer the intellectual property rights, the permission or the know-how in question. In many countries these agreements are recorded at the National Office of Intellectual Property.

4. Conclusions

A potential partner for a company that wishes to develop by innovation is a University.

The technology transfer is made on the basis of legal agreements. Within the university technology transfer entities operate, which encourage the implementation of technology transfer by coordinating the efforts for intellectual protection and by assuring the connection with the industrial environment.

If the small companies do not have the capability to develop technologies, they have the following possibilities: to purchase them or to create partnerships with other organisations for this purpose.
The model of managing of innovation proposed within the study and presented in the paper constitutes a working tool for small and medium-sized companies that are at the beginning of implementing the innovation management.

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