



Innovation development process in small and medium technology-based companies

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Abstract

Small and medium-sized technology-based companies are recognized as essential for the economy and business activity. The purpose of this article is to study how the technological innovation process occurs in small and medium technology-based companies located in the metropolitan region of the Paraíba Valley and North Coast – Brazil. The theoretical framework used is composed by six our models of innovation: the technology push, the market pull, the coupling innovation process, the functional integration innovation process, the systems integration and networking innovation process and open innovation. It was used in this research the multiple case studies with a qualitative approach. Data were collected through semi-structured interviews with owner-managers. The sample consisted of four small and medium technology-based companies of metropolitan region of the Paraíba Valley and North Coast – Brazil. In the data analysis, there was an intra and cross case analysis in order to verify the similarities and differences of the cases studied. As a result of observation of innovation development models adopted by companies, it appears that the model is closer to what was proposed in the chain interactions model. The development of innovation depends on the type of economic activity that is developed by the company and the interactions it has with internal and external environment. It was concluded that the small and medium-sized technology-based companies do not innovate in a systematic way, but intuitively and very focused on the ideas of its founders. They innovate focusing for meeting the requirements of customers and the needs observed in the market. The formation of partnerships is still viewed warily by the leaders and owners.

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Introduction

For centuries, innovation has been a phenomenon that serves a single purpose: to make life more comfortable for humans (Kotsemir & Meissner, 2013). Complementing this idea, Leiponen and Helfat (2010) argue that many times the

innovation contributes to the survival of not only individuals but also organizations as a whole.

Given this statement, innovation processes are fundamental to give competitive strength to companies. Innovations actions undertaken in this process can be motivated by entrepreneurial intentions as to meet new market demands; to add value to existing products and services; and to generate new products or services. Such actions reflect organizational competencies that renew the competitive vigor and contribute to the longevity of the enterprise (Freeman & Soete, 1997; Leiponen & Helfat, 2010).

To understand how innovation occurs in small and medium enterprises (SMEs), two essential processes are shown: the acquisition of new knowledge and design of new working

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method on the lines of production of goods and services. Therefore, for innovation to occurs, it is necessary to develop management systems and exploration of subjective capital, which is knowledge, which can be applied for use of organizational resources allowing a new production process (Leiponen & Helfat, 2010; Musiolik, Markard, & Hekkert, 2012).

To explain the occurrence of innovation based on these processes, some authors like Myers and Marquis (1969), Kline (1978), Rothwell and Zegveld (1985), Kline and Rosenberg (1986), Rothwell (1992) and Chesbrough (2003) developed explicative models made up of different stages, where knowledge is managed in order to facilitate such innovation. One of the advantages of working with these models is the possibility of detailed understanding of the origins of knowledge used as the basis for innovation, such as applied research, scientific research and market needs (Lobosco, Moraes, & Maccari, 2011; Viotti & Macedo, 2003).

Innovation development process can vary from enterprise to enterprise, being influenced by, among other things, by the sector of activity or by the size of the company (Conde & Araújo-Jorge, 2003). At this point, that emerges the focus of interest of this research, which comes to the innovation development processes in SMEs. SMEs present a leaner and more flexible structure when compared to large companies and can be considered more organic than mechanical (Mintzberg, 1989).

In the various classifications of SMEs that exist, there are calls small and medium technology-based companies, which serve up highly skilled workforce and few hierarchical levels, few departments, when these exist, and proximity to customers. This means that, in terms of innovation development process, present a potential to manage knowledge more quickly than large companies so that be created new production drawings (Moraes & Lima, 2014).

In the context of regional development, it should be emphasized the economic and social benefits that these companies provide to the region, especially with regard to the process of industrialization, search for competitiveness and scientific and technological development (Berté, 2006). Innovation also propitiates a new opportunity to influence the market direction in which the organization is inserted by different attributes developed in marketed products, which represent a new business perspective (Schreiber & Bohrer, 2014).

The literature review that supports the present paper did not allow us to identify research that explains the innovation development processes specifically of the small and medium technology-based companies. Given the importance of the subject and the apparent lack of treatment in both national and international literature, this study is justified by its potential to generate new knowledge relevant to the search for answers to the following research question:

How the innovation process occurs in small and medium technology-based enterprises located in Metropolitan Region of Paraíba Valley and North Cost – Brazil?

This paper is divided into 5 chapters. The first is about the introduction of the chapter in which highlights the research question that guided this research. The second chapter is a survey in the literature on the evolution of the understanding of the

innovation process. The third explains the methodology used in the research. The fourth chapter highlights the analysis intra and cross cases following the precepts of Miles and Huberman (1994) and the last chapter deals with the discussion of the results and the conclusion of the study.

Evolution of comprehension of innovation process

The evolution of innovation is characterized by the high complexity of actions requiring an unorthodox and integrated thinking, which results in social acceptance (Kotsemir & Meissner, 2013). Thereby, the term innovation includes new technological, economic, social and organizational solutions that are not necessarily marketable, in the economic sense and direct monetary impact, but are applicable and are being used within organizations.

Some authors like Nobelius (2004), Ortt and Van Der Duin (2008) and Kotsemir and Meissner (2013) describe the processes of innovation in six generations of different models, as shown in Table 1. These models vary in the number and format of stages of the innovation process; however, in general, three main steps can be distinguished:

- Idea (or invention) of “something new (product, service or process (organizational or technological));
- Development (production, “doing”) of “something new”;
- Commercialization (diffusion, “selling”) of “something new”.

When analyzing Table 1, it was verified that the first model to arise is the technology push model, which is considered as the oldest model among models of innovation (Viotti & Macedo, 2003). In this model, the development, production and marketing of new technologies are seen as a well-defined sequence of time, which originates in research activities involved in product development and leads to the production phase and eventually the marketing (OCDE, 1992) exemplifies this model in Figure 1.

Innovation is seen as a linear process and it is assumed that is by intensive scientific investments produce significant innovations. The challenge for managers is to invest more in research and development, which this generation works in isolation.

The market pull model can observe the existence of concern to the market need, and this is the main difference of the linear model. Figure 2 illustrates the steps in the model.

The market pull model is born with the investigation of the needs market, pass through the responsible department for the research and development (R&D) that studies, analyses and the process of generating of new ideas and subsequently development of these ideas (Myers & Marquis, 1969).

What draws attention is the importance of market demand factor of this process, which is equivalent not ignore the influence of factors such as the scientific basis and the internal and external technological conditions to the firm on innovation. In the market pull model, there is a question of demand or supply of technical progress, absents questions about other determinants of technological change.

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