RELISE

ENTREPRENEURSHIP AND TECHNOLOGICAL STRATEGY[1]

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ABSTRACT

This article aims to highlight the importance that technological strategy has to the success and permanence of companies that are in early stages of life cycle. Current organizations are affected by changes in the consumer market and emergence of new technologies that require from firms new technological strategies that allow them to survive and remain in the market. These changes are even more felt by organizations that are in the early stages of life cycle, and this paper draws the attention of firms' executives and managers to the importance of developing a technological strategy. As a novelty, the paper proposes an improvement to the adaptive cycle business to the context, extending the analysis to the field of technological strategy.

Keywords: entrepreneurship, strategy, technology.

RESUMO

Este artigo tem como objetivo destacar a importância da estratégia tecnológica para o sucesso e a permanência de empresas que estão em estágios iniciais do ciclo de vida. As organizações atuais são afetadas por mudanças no mercado consumidor e pelo surgimento de novas tecnologias que exigem das empresas novas estratégias tecnológicas que lhes permitam sobreviver e permanecer no mercado. Essas mudanças são ainda mais sentidas pelas organizações que estão nos estágios iniciais do ciclo de vida, e este artigo chama a atenção dos executivos e gerentes das empresas para a importância do desenvolvimento de uma estratégia tecnológica. Como novidade, o artigo propõe uma melhoria do negócio do ciclo adaptativo ao contexto, estendendo a análise ao campo da estratégia tecnológica.

Palavras-chave: empreendedorismo, estratégia, tecnologia.

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INTRODUCTION

Changes in people's consumption habits, demographic changes, the emergence of new technologies and their incorporation into products and services cause profound impacts on business organizations, threatening their survival or offering new opportunities for growth as well as allowing the emergence of new companies or for the development of entrepreneurial initiatives in existing organizations.

The innovation concept assigned to Schumpeter and created in 1934, considers the entrepreneurship as realization of new combinations of resources, which includes producing new things or manufacture them by new ways. For him, there were five ways to obtain innovation: (i) introduction of new products; (ii) creation of new production methods; (iii) opening of a new market; (iv) identification of new supply sources; and (v) creation of new organizations.

Dealing specifically with entrepreneurial behavior, McClelland (1961), about 30 years later, said that the focus of entrepreneurship meaning falls on what he called entrepreneurial behavior whose main components are: (i) a moderate attitude towards risk; (ii) the development of new and vigorous instrumental activity; (iii) the assumption of individual responsibility for the consequences of the acts related to new initiatives; (iv) the ability to anticipate future possibilities; and (v) the development of organizational and decision-making skills.

Among the most recent definitions, Morris (1998) declares that entrepreneurship is understood as a process by which individuals or groups, integrate resources and expertise to explore opportunities in the environment, creating value in any organizational context, with results that include new business, products, services, processes, markets and technologies.

In entrepreneurial process, technology appears as an important strategic active of enterprises, especially those that are emerging or in their early stages. Technology can be considered as a strategic resource that gives form to the business, since firms need to perceive that successful business in the future will be those who consider technology as a strategic resource.

This paper seeks to highlight the importance of technology strategy to success and permanence of firms that are in the early stages.

ENTREPRENEURSHIP

Entrepreneurship can be understood as a process through which, individuals or groups integrate or recombine resources, skills and actions for creating something new, in order to meet their needs or explore environment opportunities, creating value in any organizational context, with results including new business, products, services, processes, markets and technologies.

To analyze the challenges surrounding the creation of a new business, Gimenez, Ferreira and Ramos (2008) propose three dimensions involving the business operation and that should be considered prior to deployment: the individual, the enterprise and the context. Each dimension can be analyzed from three parameters: attributes, processes and business results. Processes are an integration parameter among the involved dimensions on new business creation.

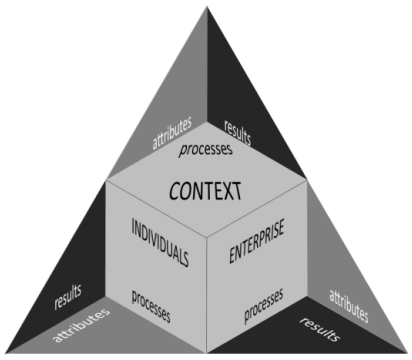

Figure 1– Dimensions and analysis parameters of a new business
Source: adapted from Gartner (1985) and Gimenez, Ferreira and Ramos (2008)

Attributes, according to Gimenez, Ferreira and Ramos (2008), are characteristics that distinguish which is proper of a being, object or phenomenon. In this sense, entrepreneur needs to pay attention to qualitative or quantitative characteristics, which identify or define people, business and environment of the new firm.

Thus, individual attributes may include demographic data such as age, gender, literacy degree, and other characteristics that can describe the profile of those involved with the business and the possible roles that they can take. The exercise of different roles is influenced by factors such as, personal characteristics, previous experiences, life story, desires, beliefs and values.

Regarding organizational attributes, these identify business characteristics as its size (small or large), its origin (independent or corporative); its technological intensity (high-tech, medium or traditional). And the context can be perceived by environmental attributes that describe complexity levels, volatility and hostility competition in a given time. Context attributes can be: stable or dynamic; regulated or competitive; favorable and unfavorable.

On the other hand, the process concept is understood as: (a) ways in which a set of actions is integrated and executed to accomplish something, whether intentionally or in an emerging form; or (b) changes in the state of a system. Therefore, processes analysis allows a more comprehensive understanding of the dynamic and entrepreneurial action properly. Individual processes may relate to learning and the exercise of different roles required by the new business.

The individual's way to behave in the entrepreneurial process reflects its previous knowledge on management, being marked by a management style and decision-making process that vary widely among people. The enterprise processes involving the structuring and execution tasks related to obtainment, organization and application of resources.

So, the context processes concern the changing conditions of the environment in which the enterprise arises, such as business practices, regulatory policies, economic and technological or social pressures. Because of the dual meaning given to the processes in this research, its analysis may support the phases or procedures description performed by entrepreneurial action, and it can help the identification of different situations where this entrepreneurial action occurs (GIMENEZ, FERREIRA and RAMOS, 2008).

The result analysis involves understanding the consequences of entrepreneurial action in personal, organizational or environmental levels. Economical, professionals and even psychological gains that individuals experience in entrepreneurial action should be considered as results of the new venture, just as its political, social or economic legitimacy. In general, the results of entrepreneurial action are viewed positively on literature. However, due to competitive intensification, the speed and frequency of technological and regulatory changes in markets makes to consider the possibilities of unwanted results in a broader approach to the issue. For example, it is important to reflect on the psychological consequences of a failure of entrepreneurial action, or on adverse outcomes that may result from a staggered action of the needs or demands of the market that is intended to meet (GIMENEZ, FERREIRA and RAMOS, 2008).

In order to pursue positive results, taking opportunities and avoid the failure possibility, it is necessary that those responsible for the enterprise strategically use the collected information and the decisions taken in the dimensions and parameters shown in Figure 1. This means to use these settings to align the business features to the context of competitive features to develop competitive advantages (ZAHRA and NAMBISAN, 2012; ZAHRA, 1987).

The configuration proposal and strategic adjustment advocated by Miles and Snow (1978) is still current and appropriate to support the manager to define the structure, process and strategic actions aligned to the competitive characteristics of the context, or in the definition of future scenarios. We present here an advance to the Adaptive Cycle (Figure 2) proposed by Miles and Snow (1978), which can help managers to think strategically during the dimensions and parameters analysis of Figure 1. To define a strategic behavior and to plan how the new venture will stand on environmental changes and characteristics, their managers need to address three sets of problems in a consistently, continuous and concomitantly way.

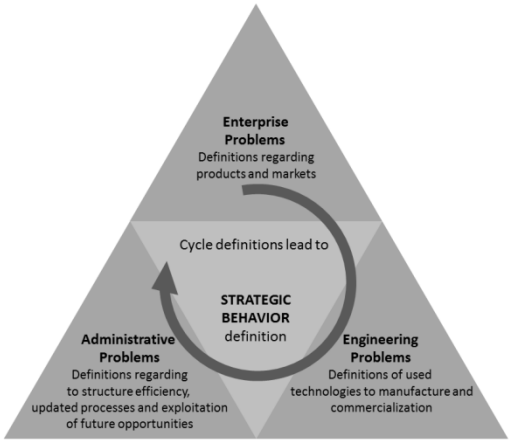

Figure 2 – Business' adaptive cycle to the context
Source: based on Miles and Snow (1978) model

The Business Problem concerns the choice of a firm's field of activity, it means that the manager must decide which market segments the firm intends to operate and what products/services are best suited to the requirements and needs of this market. The Engineering Problem is related to technological choices that enable the output-market relation, i.e., the manager should establish the skills, techniques, tools and equipments he will have available to match production and distribution capacities of products/services in the target market. To complete the cycle, the manager should work towards controlling and acting on the efficiency and effectiveness of the organization's operations,

as well as to structure firm's routines and functions to plan changes and take advantage of future opportunities. That is, the manager must meet the Administrative Problems of his business (GHOSHAI, 2003; MILES and SNOW, 1978).

This research explores more profoundly the action on Engineering Problems of a new business, that is, decisions and entrepreneurial actions to define the business' Technological Strategy. This definition is an important part of business framing as a whole and how the firm will relate to suppliers, service providers and buyers, because the technology used in the firm operations defines the business model used to relate itself with the market (GHOSHAI, 2003; MILES and SNOW, 1978).

TECHNOLOGICAL STRATEGY

Technology is considered as a strategic resource since the 80's as opposed to the strategic management movement based purely on economic relations that prevailed during the 70's. As the competition grew worldwide, firms were pressured to seek new sources of competitive advantages and technology proved to be a powerful competitive source for large-scale production firms, and even more powerful for small high-tech firms such as in semiconductors, computers and software. Thus, the key ingredients for success in this period included the assumption of risks, technology entrepreneurs' intense commitment, fluid and informal organizational structures, and rapid response to changing market (FRIAR and HORWITCH, 1985).

As technology is a complex and wide term, it is needed to define it firstly in order to better understand how technology strategy is important to firms. Technology can be understood as a set of knowledge, techniques, competencies, abilities and skills created or acquired to generate replicable ways to operationalize processes, products or services of a company, and that

is the reason why they are part of the innovation process (Friar FRIAR and HORWITCH, 1985; NIETO, 2004). According to Ford (1988), the core competence of a firm is what it knows and what it can do with what it knows. Therefore, the Technological Strategy of an organization is focused on its policies, plans and procedures to create or acquire technology, choose what advantages it can offer to the firm and to manage this technology to reap these benefits. Ford (1988) states that the technological strategy is important not only to high-tech firms, but for all companies. Teece (2010), on the other hand, explains that to manage strategically the firm's technology enables the redefinition of how the firm creates value and delivery it to the market, i.e., rethink their business model as a whole.

To exemplify the importance of technology strategy in the definition of business model, we bring two types of firms offering the same service: movie rentals. The traditional movie rental store in physical media (VHF, DVD or Blue Ray) is currently competing with firms of various branches that offer monthly subscription services to provide the same titles at consumers residence through digital data transmission. The model called ‘streaming’ is offered by major providers of telephony, television and digital content as well as for entrepreneurs who sometimes act of lawlessness. Aside from traditional stores, the firms used Internet resource and designed different technological strategies to define how to meet the market (TEECE, 2010). The adoption of these completely new strategies changed the way the major motion pictures producers and distributors relate with the supply chain, distribution and the consumer. Nowadays, the traditional movie rental store has practically disappeared from the market.

Studies made within organizations show that formally managing the technological strategies contribute to the maximization of the use of technological resources and this positively influences the performance and

finance these new businesses (ZAHRA and BOGNER, 1999; ZAHRA, 1996a). The technology strategy should take the form of a plan to guide business decisions in the development and use of technological capabilities. Nambisan (2002) states that the adoption of an initial proactive technology strategy determines the ability of a new business in technology domain to quickly and efficiently integrate their existing products with new or additional ones.

According to Zahra (1996b), the technological strategy should cover six areas of the firm:

a) Promotion of pioneering or innovative position of the firm, within the innovation level adopted by the company;

b) Determination of the number of products to be traded;

c) Choosing the extent of the use of internal and external sources of Research and Development (R&D);

d) Decision regarding the level of R&D;

e) Selection of scientific research projects and researches applied to the market;

f) Use of patent applications to protect competitive advantages obtained from R&D activities.

The relationships found between entrepreneurship and technological strategies theories reviewed here, allow us to propose that the analysis of available technology for the development of a technological strategy may be in the same logic of the model dimensions and parameters presented in Figure 1. This happens because technology is a result of knowledge accumulation that, in its simplest form, is stored and used by individuals and it can be organized in systems and transformed into practices, organizational tools, or even be available on the organization's operational context (ZAHRA and NIELSEN, 2002; ZAHRA, SAPIENZA and DAVIDSSON, 2006).

Individual technological attributes are considered as technical knowledge, skills and (administrative or technical) operational competencies, and they can be the result of training or previous experiences of the entrepreneurs themselves (HÜLSHEGER, ANDERSON and SALGADO, 2009).

At the firm level, technological attributes can be called core competencies of the organization and they are perceived in the accumulation and management of knowledge and individual competencies; on capabilities, skills, resources or tools developed through R&D; or externally acquired. Organizational competencies can be grouped into (a) Business Competencies manifested by a strategic vision and planning capacity; (b) Technical Competencies present in the field of technological processes and specific management to the firm's industry; and (c) Social Competencies involving communication, negotiation and teamwork skills (FLEURY and FLEURY, 1999; PRAHALAD and HAMEL, 1990). Focused on R&D, Pegels and Thirymurthy (1996) state that the technological strategy of a company lies on the way it makes the development of R&D into advantages for products and technological processes of a given firm. These efforts provide competitive advantages to the firm which will impact on its performance. Berry and Taggart (1998) found in their research that the SMEs, considering the technological field, have their technological strategy developed by the high degree of informality and flexibility in the early stages of their life cycle. As the company grows, so does the formality and there is a focus transition of the firm, passing from technology (in the initial stage) to market orientation (in the stage of maturity).

Context attributes are external sourced technologies available to the firm and entrepreneurs. These attributes are present in markets or industries more complex and more technology-intensive oriented (i.e. Asian telecommunications industry compared with Brazilian) or in more intense inter-organizational relations as relations of business networks working together on a

common project or production chain (GOMES, KRUGLIANSKAS and SCHERER, 2011; KANNEBLEY, PORTO and PAZELLO, 2005; MACVAUGH and SCHIAVONE, 2010; SWAN et al, 1999).

Technological processes at individual level relate to the use of accumulated technological attributes. The analysis at this point is whether the manager profile is consistent with the role in the organization. To create and to manage a new business demands the exercise of different roles of those who are responsible for it. The entrepreneur role is mainly manifested by the use of creativity and imagination in decisions to create competitive advantages and competencies required for this. At the same time, knowledge in costs and benefits are required to evaluate alternative approaches. This is the executive role, in which it is predominant the use of rational competencies for decisions. In addition, entrepreneurial process requires a role called "Organizational Engineer" manifested in the application of information analysis techniques and projection of trends, as well as identification, acquisition and integration of resources to the operation and successful implementation of the firm (FILION, 1999; FILION and DOLABELA, 2000; GARTNER, BIRD and STARR, 1992).

Organizational technological processes are characterized by routines and current technological management mechanisms or the development of new technologies. One of the dilemmas of a new business is the decision to prioritize the attributes and organizational actions to take advantage of current technology (i.e. exploitation) or to discover new technologies (i.e. exploration versus exploitation CHRISTENSEN, 1997; TUSHMAN and O'REILLY, 2011). The technological processes of the context involve actions and mechanisms to solve another big manager dilemma in analyzing and defining their technology strategy. This dilemma comprises the decision to invest in the internal structure of the business and to maintain internally operations of exploration or exploitation technologies. Or, on the other hand, the manager must decide

whether and which of these operations will be outsourced to an external provider, having to take protective and management mechanisms through formal and informal relationships with other organizations. This dilemma involves defining a more competitive and more collaborative stance of strategic technology (NIETO, SANTAMARÍA and NIETO, 2010; TEECE, 1996; WILLIAMSON, 1981).

As for the results, we return to the same possibilities of results described in the presentation of the Figure 1 model as well as the strategic definition of a solution to the problem of engineering of Figure 2.

CONCLUSION

Among the various facets that can be used to study entrepreneurship, this research aimed to analyze the three dimensions involving a business operation from the perspective of Gimenez, Ferreira and Ramos (2008) which deals with the Individual, Enterprise, and Context, from the parameters of the attributes, processes and business results.

The novelty of this research is the extension of the postulates of Gimenez, Ferreira and Ramos (2008) and Miles and Snow (1978), in which we used the adaptive cycle business context, which is based in the strategy. From the consideration that technology is a strategic resource, source of competitive advantage, to identify what the company knows and what it can do with what it knows has become vital to the design of a technology strategy for a given company mainly in its early stages. It is in these stages where the company is focused on developing (exploitation or exploration) a given technology that is necessary to outline this technological strategy from the point of view of management.

It is expected that this paper will contribute to the executives whose companies are in early stages of their life cycles, with respect to consideration of technology strategy, so the company can survive and remain in the market.

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