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Research & Development as a Strategy for Survival in Mexican Companies

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Abstract- The aim of this paper is to analyze the processes of adaptation and survival of companies in Mexico to compete in increasingly demanding markets, that create uncertainty them. In this context, some companies have decided to develop adaptation strategies through research and development (R & D). This study, being exploratory, provides empirical evidence on what factors (internal and external) leading the entrepreneurs to assess the implementation of R & D in their companies.

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Research & Development as a Strategy for Survival in Mexican Companies

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Abstract- The aim of this paper is to analyze the processes of adaptation and survival of companies in Mexico to compete in increasingly demanding markets, that create uncertainty them. In this context, some companies have decided to develop adaptation strategies through research and development (R & D). This study, being exploratory, provides empirical evidence on what factors (internal and external) leading the entrepreneurs to assess the implementation of R & D in their companies.

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Resumen- El objetivo de estetrabajoesanalizar los procesos de adaptación y supervivencia de lasempresas en México al competir en mercadoscadavezmásexigentes, lo que les genera incertidumbre. En estecontexto, algunasempresashandecididodesarrollarestrategias de adaptaciónmediante la investigación y desarrollo (I+D). Este trabajo, aunque de carácterexploratorio, aportaevidenciaempíricasobrecuáles son los factores (internos y externos) quellevan al empresario a valorar la implementación de la I+D en susempresas.

Palabras Clave: investigación, desarrollotecnológico, innovación, estrategia, adaptabilidad, supervivencia.

I. Introduction

Mexico faces major challenges in the area of science and technology. In this regard, although it has implemented policy instruments aimed at improving the conditions for conducting scientific research and technology transfer, the results so far have neither been what it has been expected nor necessary for Mexico to achieve a development to become more competitive and therefore to have improved the living conditions of Mexicans. The Mexican country ranks last in investment for research and development in relation to gross domestic product among the member countries of the Organization for Economic Cooperation and Development (OECD). Furthermore, it is disappointing that there are no indications that this may improve in the short term.

As in other countries, in Mexico the main actors in the development of production processes and technological innovation are the companies. However, this does not mean they should conduct themselves technological developments from start to finish. On the contrary, knowledge and skills that build businesses rely heavily on their internal possibilities to use technology and knowledge developed within the country or elsewhere. In addition, some of the technology and production processes are often developed by the research areas of universities and research institutes of the public and private sectors.

Entrepreneurs and their leaders have in mind that a bad strategy can make the difference between staying and leaving the market for their products. All organizations are vulnerable to changes that occur in their environment, especially the cycles and transitions of economies, market crisis, and technological change, financial speculation of the large conglomerates and regulations and institutional structure countries. Some companies cannot change their structures fast enough to adapt to changes in volatile markets.

Importantly, not only the decisions of employers and agents influence the survival of businesses. There are other factors also determinants, such as company size, seniority, training or education of their staff, the direction toward innovation, reactive or proactive strategic approach, and the centralization of decision making and the level of formalization within the organization as well as the barriers to innovation.

It has been postulated that the strategic and organizational adaptation companies is a critical capability for the sustainability of the organizations in a changing and competitive world.

The search for scientific explanations for the longevity and performance of enterprises has been a constant concern for specialists in the field. They wonder how it is that a stay or survive, while others disappear, and why only a few manage to stand out from most recently created and some come to displace other already established.

II. Theoretical Background

The accelerated growth and market size have prompted companies to invest in applied research and development of new products (Schmookler, 1966). There is the idea that knowledge and technological capability of a given epoch are applicable in diverse industrial areas. Industrial sectors that use these skills and invest in the means to apply them to improve their production processes and products are those that have large and growing markets.

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These markets assume that there is greater profitability in companies that invest in research and development (R & D). The R & D resources are all assets, capabilities, organizational processes, attributes, information, knowledge, etc. controlled by a firm that used to conceive and implement strategies to increase their efficiency and effectiveness (Barney, 1991). The resources include the static aspect which in turn includes the stock of productive factors that the company owns and controls. Capabilities are considered a flow, i.e. represent the dynamic aspect, and are those that define the way companies use their resources to R & D (Grant, 1991). In this context, the majority of companies in Mexico have the resources to develop strategies that enable them to have a differentiated value through the implementation of R & D, so they can have growth and stay in the market.

According to Peng (2006), strategies that a company must propose must be based essentially on the combination of actions deliberately planned and emergent activities in those who are not. However, the basic premise for the design of strategies is that companies must know themselves before that can meet their competition. This knowledge of the firm is obtained through an assessment of their strengths (F) and opportunities (O) and weaknesses (D) and threats (A) present in their environment. Therefore, the capabilities are fundamental for the implementation of strategies. These are based on organizational knowledge frequently not coded, which is stored in the memory of the organization, in such a way that they automatically respond to certain stimuli.

Thus, the ability has to be understood as a routine or set of routines. Organizational routines are a number of policy measures that indicate regular and predictable tasks to be performed and how to carry them out. Understand complex patterns of interaction between people and between these and other resources, which have formed slowly as a result of collective learning of the organization and at all times define what the organization can do and what is impossible. This implies that only resources can be used in a limited scope of possibilities (Amid, and Schoemaker, 1993).

According to the Frascati Manual (OECD, 1994), scientific and technological innovation can be considered as the transformation of an idea into a new or improved product as it is introduced in the market, in an new industrial and commercial process, new or improved commerce or a new service model that provides to society. The word innovation has different meanings in different contexts, and the right choice in each case will depend on the particular objectives of the measure and analysis. Innovation also involves a series of scientific, technological, organizational, and financial and trade activities.

The R & D is only one of these activities and can be part of different phases of the innovation process. It is not entirely of the original source of ideas and inventive but also one way of solving problems (OECD, 1991)

III. Definition of the Problem

Competitive intensity has resulted in economic globalization has resulted in volatility also companies as a result of competitive fragility at the progress of R & D. This has enabled more efficient production processes and distribution of products. The volatility of the companies not only affects newly created but many that have been considered immovable leaders have been affected by resisting the "creative destruction" that represents business innovation. In contrast, many other organizations have responded with new strategies.

According to De la Cerda (2007), there are four strategies that have the greatest impact on business. These strategies can achieve the durability and superior performance: Securitization and other financial strategies, internationalization, diversification of business lines and the constitution or business group affiliation. In addition, two other strategies that do not yet have significant value are vertical integration and technological modernization.

On the other hand, in contrast, there are two strategies that are negative, as they have weakened the durability and performance: Mergers with other companies and commercial and technological alliances, joint ventures or outsourcings. These strategies are not available to all companies, and face the problem that it is no longer enough to have access to raw materials and have cheap labor, should also have the knowledge to enable them to produce more competitive. But this is not so easy. There is a need to develop skills that enable them to transform their information into useful knowledge applicable and that its use gives them a sustainable advantage.

This leads us to formulate the following research question: How Mexican companies have achieved strategic fit, as a result, has allowed the survival and development within a competitive market?

Mexican companies have had to diversify their sources of knowledge, ranging from the generated and managed within the company until that occurring in universities and technological research centers. This allows them to adapt and survive.

IV. Justification

Most Mexican companies innovate by acquiring or adapting technology. To do this, companies establish various means of collaboration with other companies, without necessarily being R & D, and thus integrate into

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complex production chains taking advantage of market incentives (De Gortari and Santos, 2007).

In short, innovation processes of Mexican companies are ranging from the ability to acquire relevant technologies and their subsequent assimilation into their own conditions and according to the local environment to the development of new processes and products. While such processes are often not located in the advanced knowledge, they allow the company to solve problems and help them to compete in local and global markets.

Innovation processes in Mexican companies are more related to assimilation, application and use of technological knowledge in project development. As already mentioned, their innovation processes are ranging from the ability to acquire relevant technologies and their assimilation. Some companies develop their own technology, which gain advantages over those that decide to acquire outside. Perhaps most important of the first is that with their own innovation, firms maintain their competitive advantage, which is based on internal developments (Nonaka, 1991, Winter, 1987).

V. Theoretical Assumption

The intangible nature of knowledge makes it can be copied to a relatively low cost, with the consequent problem of the appropriation of results of the effort and innovation that a company develops. In this situation, it is unclear the final effects on property rights in R & D. While dissemination of information innovation performance of the company may discourage innovative efforts to your competitors, it has the opposite effect, i.e., so spread the benefits of technological advances, which can be exploited by other companies.

To mimic or copy the innovation performance of another company, the imitating firm must have technical knowledge and, on the other hand, the dissemination of results encourages investment in R & D by companies that might be interested to imitate or copy the leader. Furthermore, there is not a clear relationship between the intensity of R & D and the use of patents in business. Therefore it is difficult to know whether the competing companies are interested in imitating or copying technologies.

VI. Background

Why do some firms outperform others? It is a question that continues in the air. It is known that companies change their business strategies to increase their performance, sell more and better, produce and operate more efficiently, increase brand value or gain prestige in the market. But not all can have the expected success. In the long term, to differentiate their paths, some fail to improve, and only a few manage to survive adversity and improve their participation in their industries for a long time. On the other hand, large firms should implement different strategies if they want to stay in the market, as not only small and medium are subject to change.

There are two main perspectives or paradigms of strategic management:

Perspective A. The performance of the companies is based on the competitive structure of an industry in the market. Companies with greater market power have the ability to raise prices above the level of competence, because they operate in industries or economic sectors where the entry of new competitors is constrained by impassable barriers for most of them. Performance differences persist until such entry barriers are overcome by other companies or are smoothed by government regulations (Porter, 1980, 1985).

Perspective B. The performance of the companies is based on the capacity created by organizations; they can develop superior capabilities that make them more efficient or productive than others. The most unique, inimitable, value creating differentiated are those skills, the more costly for other firms to obtain these skills and, therefore, differences in performance and yields can be sustained over time (Rumelt, Shandel and Teece, 1991 ; Wernerfelt 1984; Barney, 1991; Barney and Clark, 2007).

Companies operate to adapt to the changing environment and competition within their industries and the situation by passing in a given time, especially economic or technological conditions.

What does business survival mean? According to Senge (1990), few large corporations that manage at least half the time that lives a person. The author examines the difficulty of organizations to survive many years in turbulent environments. La average duration of an industrial company in the second half of the twentieth century was less than forty years (De Geus, 1997). The same Senge (1990) argues that the fact that companies are born and disappear continuously can be good for society as a whole, because there is always the doubt that the economy distributes resources so efficient, however, always be the doubt whether the continuing mortality of companies at the bottom is not due to that organizations are a poor learners immersed in a terrible mediocrity, of which only a few are able to develop their potential for adaptation and transformation.

According to De la Cerda (2007), there are missing data and business retention for the Mexican case and some other interesting Latin America as a whole. In Mexico, in a sample of 3,604 large and medium enterprises, where 75% are of Mexican or Latin American and 25% are foreign non-Latin American, 58% (2,091) disappeared or ended his original life cycle. Thus, wounded and beaten, many companies have succumbed to instability and disorder, and the survivors have acquired the instinct of rapid adaptation to unstable contexts. In this, it may be the competitive advantage of firms (Schneider, 2007).

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According to the strategic theory of the firm, organizations not only have the ability to adapt to competitive environments, but they can also reconfigure their sectors through most significant actions (Barney and Hesterly, 1996, Porter, 1980). Companies who want to increase their chances of survival can make adaptive changes within and outside their domains.

Table 1 : Organizational Survival in Mexico: leading destinations during the years from 1976 to 2006)

Reasons volatility	Frequency	Percentage
Organizations disappeared by asset liquidation or closing of business.	1,091	40.2
Organizations that were acquired by foreign multinational groups and became their affiliates.	101	3.7
Organizations that were acquired or merged by other national groups, and although their operations remain; now they are part of another company.	488	18
Organizations whose original property was the federal government, but were privatized, either by domestic or foreign investors.	29	1.1
Organizations divested, reduced their size and sales fell, but survive as businesses.	181	6.7
Organizations that have remained as national investors, but their business migrated to the maquila, franchises, distributors or licensees of foreign companies.	109	4
Organizations that became or were formed as heads of holding companies, whose operations are primarily corporate.	173	6.4
Organizations that have remained the property of the federal government and never have been privatized.	33	1.2
Organizations that have maintained their original version as independent national companies, producing and expand their own operations and product portfolio since its founding.	331	12.2
Organizations that did not offer sufficient information to recognize your path and determine their current status.	176	6.5
Total	2,712	100

Source: De la Cerda (2007: P. 49)

The data show that over 40% of the leading organizations disappeared by asset liquidation, bankruptcy or closure. The missing or terminated organizations for reasons of privatization, acquisition or merger represent 23%. Other 181 have survived, although they have weakened or over the years, so have been losing market share and, therefore, left the list of the most competitive in Mexico.

VII. Key success Factors of R & D

Brown and Svenson (1998) studied the success of the R & D from the perspective of systems theory. They consider the production system in these departments is characterized by resource consumption subject to a process that leads to the outputs in the R & D that are considered intermediate for the organization, which helps achieve the overall objectives of the corporation.

In particular, the dimensions of the system are:

1. The inputs, which are system resources that generate a cognitive process. Include human factors, information, ideas, equipment, organization and funding sources. Following Autio and Laamanen (1995), the indicators used to measure the inputs are of three types: monetary and physical resources, capacity, and technological inputs.
2. The production process of an R & D Department transforms inputs into outputs through conducting research projects, proper planning of activities, human resource training and technology services, among others.

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3. The output of these departments include, among others, the publication of books, software development, product and process innovation, technology transfer, both internally and externally, patents and utility models. Indicators of outputs used, following Autio and Laamanen (1995), are of three types: research and technological outputs, commercial outputs and monetary outputs. Geisler and Rubenstein (1987) outputs added as change indicators in production rate, productivity and profit.
4. The final consumer of the output of R & D would be different, depending on the type of company, public or private, divisional or not. Also, it is important to highlight the fact if the transfer occurs to production departments or to the marketing, or outside the company.
5. The results of R & D outputs also depend on the final consumers of the outputs of R & D. Shareholders seek to maximize profits and managers the minimization of costs, increased sales and market share, or the development of new products.

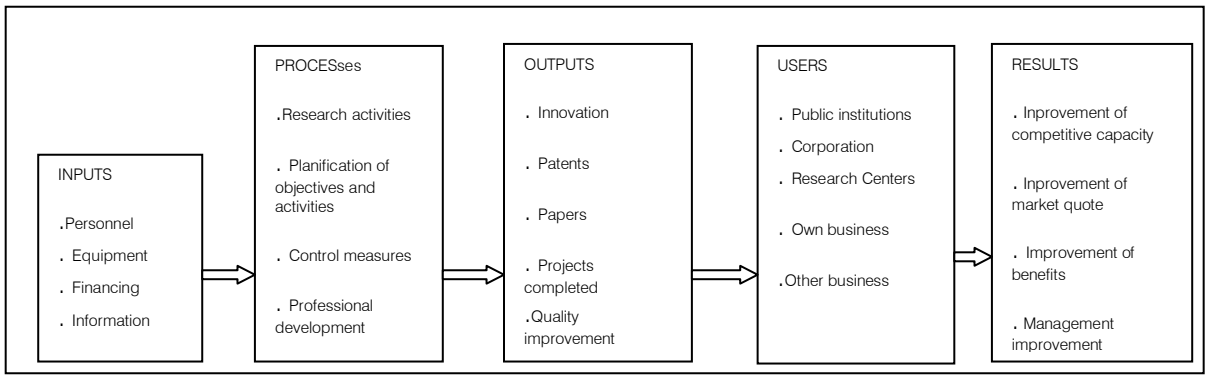


Figure 1 : Production system of Research and Development Department.

Source: Taken from Garcia and Mendigorri (1998: P. 19)

VIII. Strategic Change

Strategic change is an uncertain process, which often tends to be redundant and repetitive, sometimes reactive. It builds through a sequential logic and is often interrupted by the decisions of management or external factors. Senior managers of a company are the initiators of strategic change. They design strategies for the transformation, which can vary according to their training, allowing you to adopt the best strategy. Table 2 shows how to make strategies based on decision theory, which is usually safer methodical difference and in behavior, according to which strategies are adopted from existing resources without analyzing decisions.

Table 2 : Choice of strategies according to the theory of decisions versus organizational behavior

According todecision theory	According tobehavioral theory
Strategyis chosenaccording toobjective goals, clearandgeneral consensusabout the future.	It is chosena strategy withouthaving goalscomplete, clearanddefinedaslong-termgoalsoften lackabsoluteconsensusabout the future.
Itchoosesthe best strategy fora range of alternativesanalyzedobjectively.	Itchoosesthe best strategyknownbythe group whodecides onlesser-knownalternatives.
Strategyis chosentaking intoaccount all the variablesthat may be involvedin its implementation.	Strategyis chosenbased onthe known variables,leaving outmany factors.
Ideal strategyis chosenindependentlyofthe resources needed toimplement it.	Strategyis chosenfrom apragmaticapproachaccording tothe available resources.
It choosesthe optimal strategy.	Successful strategyis chosen.

Source: De la Cerda (2007: P.70)

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IX. Results

Companies are highly vulnerable to changes in the business environment and market. Only a few manage to adapt and survive because their life cycle is getting shorter. Also depend on the strategies implemented by their managers, links, resources and location.

According to the data presented above, in the second half of the last century more than 40% of organizations disappeared by asset liquidation, bankruptcy or closure. The 23% longer exist because of privatization, acquisition or merger. Another 6.7% (181 companies), but survived, weakened or with over the years have been losing market share.

Important indicators of R & D are patents and process improvement models. Most companies that decide to patent their products see a clear benefit and prefer to develop and improve their own against those of their competitors and win a greater market share.

X. Conclusions

Companies are vulnerable to changes in their environment, especially to economic cycles. Current firms have had to diversify their sources of knowledge, ranging from those that are created and managed within the company to those carried out in universities and technological research centers in order to adapt and survive.

Companies with a high level of failure are those with disadvantages in size, lack of experience, lack of knowledge of the industry and the market, as well as insufficient resources to compete with larger companies. Currently it cannot be known exactly how many companies have disappeared from the market. There are no records of these disappearances, and if there are scattered. The little information that is available includes certain periods of time and is prepared by magazines, newspaper, internet or news. Most of the time there are just about alarming notes, and few research papers that fully address the issue of mortality and survival of firms.

Among the results of R & D in Mexican companies, in some cases include patentable products. But in the business sector, and even academics, it is not yet clear the benefits of the processes. Furthermore, according to the characteristics of Mexican businessmen, they tend to be reluctant to cooperate, are distrustful and prefer to work in isolation in their company. This behavior can influence positive or negative, as it depends largely on the experience and knowledge that has to uncover opportunity areas that may benefit or impact business.

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