PERSPECTIVE OF THE TECHNOLOGICAL INNOVATION IN THE SMALL AND MEDIUM MEXICAN MANUFACTURING COMPANIES

Alfonso Salazar
Department of Engineering Projects, Technical University of Catalonia (UPC)

ABSTRACT
The changes that Mexico has experienced in the last years in the management ambient, have been originated fundamentally by the Agreement of the Free Commerce and the opening of markets which have increased exponentially, the commercial activity with the rest of the world and the United States, its most important counterpart. This situation generates itself a greater competition and the necessity of the SME's (which constitute the base of the economy of the country) to find alternatives to increase its enterprise capacities. In this way elements such as the quality, the qualification, and the product design, receives a great importance, this last one is being an integral part of the development and the starting in practice of the product innovations.

Keywords: Design, innovation, SME's.

1 INTRODUCTION

In the present time, in which the company moves in an economic turbulent environment, the emphasis on the quality, the particularization of the demand, the internationalization of activities and the globalization of markets, more than never, the company needs to make use of the technological explosion of the last decades to adapt itself in its managerial performance without loss of competitiveness

It is very important to emphasize in strategic factors which it stands out the incorporation of technologies to the productive processes and the organization of the company, with a special consideration to the previous and subsequent activities to the productive process and to the mechanization of the enterprise functions. The technological innovation becomes in this way, in a basic strategic resource for the enterprise competitiveness.

The objective of this article is to give a general idea of the situation of the Mexican small and medium enterprises (SME's) in the context of the technological innovation and to exhibit alternative forms for its introduction to the Mexican managerial based on the learning processes.

2 THE TECHNOLOGICAL INNOVATION PROCESS IN MEXICO

The term "innovation" is very extensive at the present moment; the definition commonly accepted is from the Oslo Manual [1], that describes the technological innovation as the product implantation and new processes or the improvement of the existing ones. This implantation is considered effective if it is accepted by the market (product) or used in a productive process.

When observing its evolution in Mexico, it is noted that in the areas of innovation and technological transference is defined in the decade of the forties of century XX when objectives of short term were obtained, and with it, there was obtained opposite results when extending the period of protection to the internal market beyond the recommended limits of the own strategy.

During the four latest decades, that is to say, from the forties to the eighties, important technological and administrative backlogs happened in the majority of the industrial companies where a lack of managerial mentality existed and only a commercial approach existed, with more or less vision of the exportation, fundamentally inside the micro, small and medium enterprises.

In the last decades in Mexico, it is observed through the analysis sector of the SME's of several authors [2] [3] that is in this sector where the basic problems have been generated for the technical and technological development of the country. These analysis made in the dynamic areas such as in the manufacture, the iron and steel industry, the automotive, chemical and petrochemical industry agree by indicating that the specific problematic of the SME's consists in the following difficulties to overcome: a) The administrative deficiencies, b) the lack of qualification of the operative personnel, c) the non-existence opening and the adaptation to the change, d) the little flexibility of the managers and administrators, e) the technological remainder with respect to other producing units of foreign market and to the constant elevation of the quality of products.

3 THE CHALLENGES TO SURPASS FOR THE SMALL AND MEDIUM COMPANIES

A fundamental necessity of the SME's is that, they can obtain true competitive advantages on the competitors and to offer diverse strategies of quality for smaller price due that more of the local consumers and customers are being influenced by the global tendencies all, up to those of the major purchasing power, want the best product and the reliable mark but, all that, undoubtedly, for the smaller price and the best quality.

In reference to this, a model of direction by quality was elaborated in Mexico, a methodology of worldwide class which integrates all the practices of administration of an organization from the perspective of the total quality. Thus, then, through a globalized strategy of business, the industrialist could obtain the best technology possible and to apply it to his products or services.

The governmental financing to the innovation and the lack of accessibility on the credit are perhaps one of the fundamental challenges of the SME's since the development of

the innovation projects and technological development, particularly those of high risk, have less possibility of acceding to the traditional type financings and to count on a definition of the technology areas to which it must be oriented in a selective way the captivated resources.

In the presence of globalization of knowledge and technology, it has been developed a new scientific-technologic paradigm where the knowledge and innovation generated looks to modify structurally forms of production and consumption of the diverse productive chains, as well as the dynamics on the relations between nations [4] the technology in the future depends more of the increase of the social problems, ecological and economic which contribute at the same time to the increasing demand of science and technology of the society and to the determination which will be the adopted basic values for activities of medium and long innovation to terms in the world-wide scope.

The main elements activators of this new process of attitude to the change have been the ideas, the innovation and the technological development of end that has been incorporated recently to different strategic activities within the companies. The fundamental characteristics of these technological innovations are to generate new products and services, besides to increase the traditional product effectiveness and processes, allowing to countries and companies to position in new places of the market [5].

A target of the SME's is to become short-term true companies with vision, in where the qualification and investigation are fundamental for their success. These companies are being supporting increasingly in the I&D Technological Center, with the purpose of facilitating a process of continuous innovation to accede at new levels of efficiency and competitiveness.

4 THE PROJECTION TOWARDS THE FUTURE

In the next decades, the SME's in Mexico continued with the tendency to establish an increasing interconnection with the multinational companies, in form of alliances or fusions to guarantee their survival. This fact is far from being an insuperable difficulty; in fact, it must be faced with the common sense and by its experience to take to the practice competitive strategies. The challenge will be to learn of the own errors of the SME's and with the errors of the others, and even better if these errors in the enterprise scope come from the competitors.

To fasten to the strategies directed exclusively to the local market could mean the disappearance or minimum, a seclusion to the market places which are not of interest for the accessible corporations to them [6]. The opening of the national economies to the international trade is creating new opportunities for the insertion of the local companies in the process of the globalization, as far as these are globally competitive.

The advances in the technology and its effects in strategic activities have forced the companies to make flexible their productive-operative structures on the base of new forms to make the processes, small existing product improvements, product processes, designs of products or technology, which in the long term will be accumulated to produce important changes and to be present in the different markets.

This situation has caused in Mexico a great diversity of spaces of market for the medium and small company supplier of raw materials, intermediate products, terminal manufactures, products and services. This situation is subject to the condition of which those companies operate efficiently and competitively, from a revision of the operation of its technologies of processes, product, design and operations, by means of programs to internally incorporate innovation and technological development generated or in the outside.

5 THE ENTAILMENT OF THE PROCESSES OF LEARNING IN THE INNOVATING CAPACITY

Due to the insufficient innovating propensity of the Mexican SME's, the initial way must be used with alternative forms that may introduce them in the innovation.

We expose three alternative concepts, very interrelated: the design, the qualification and the quality. The three concepts are related with the learning processes to arrive to the innovation, since the successful experiences have demonstrated that first it is imitated and later it is innovated. The most remarkable example is South Korea, whose capacity of learning took it to imitate in the` 60 to innovate in the ' 90. Capacity is reflected in its exports: 40 million dollars in 1960 to 125 billion in 1995. The profits reached by this one and other Asian countries cannot be explained by the accumulation of investments or the availability of natural resources (comparative advantages).

In order to innovate, it is necessary to know which is the border of the art or the knowledge, so that the learning is the bridge that connects the imitation with the innovation. Many models of development have emphasized key aspects, but they did not include the capacity of learning (bases of other capacities to generate and to use the knowledge), nor the institutions that impels the learning, not only through formal means of the education but also from other spaces. The competitions of learning or capacities of assimilation were the main factor of the impressive development of the Asian countries.

The first concept is the design that is a creative process that begins with an idea and finishes with a product or visual material for its manufacture or implementation, the design also is innovation, the moment in which a new object is imagined, conceived and given form, is design; therefore the design is the essence of the product innovation. According to Peter Drucker [7] the innovation is not science or technology, except value which increases when generating or improving an idea. We can affirm then that the innovation is the new ideas that take us to a change to improve.

Its object is to obtain a balance between the external dimensions and characteristics of the product and its use or functional behaviour (security, easy handling and maintenance, possible to manufacture). Its paper is in a midpoint of the innovation process, like an interface between the producer and the user, which has a very important heaviness in the success or failure of the product. It can be an imperative of the market or the chains of sub hiring in which the company is inserted. In both cases, when it stops

being a formal requirement and pierces deep in the culture of the company its innovating effects are immediate.

The second concept is the quality. In order to reflect some tie activities to it, the product homologation or certification can be taken as an indicator: both, as a requirement of the fulfilment of specifications and processes, show the necessity of technical changes in the company. The intangible assets that the quality puts into play do not finish only in product or process innovations, but they are translated in changes of even commercial organization and industrialist. The quality involves a suitable emphasis in the industrial maintenance, in the continuous formation of the workers, in the cooperation with suppliers and distributors, in improvements of the manufacture processes. In competitive terms, the quality generates advantages of two types: a differentiation that deepens the attributes of the product and, contrary which was assumed during a long time, a reduction of costs.

The systems of quality management, as much the associate (voluntarily) to norms ISO, as others of obligatory fulfilment (state homologations), go to the continuous improvement of the processes and the organization of the company. As an innovating phenomenon, it is more monopolist than the own innovation of the product. Many companies that have not made new products are embarked in processes of homologation and certification with important demands as norms ISO 9000 and 14000. In the matter of innovating propensity, the Argentine companies have a deficit in the product innovation, but they are more active in the innovation of processes and organization, necessary for the improvement of quality management.

The qualification is the third concept. It plays a vital role in the genesis and structuring of the learning, mainly when it acts on concrete problematicals of the company. The qualification in this case is a critical input of the productive system and not appendix of the educative system. Therefore the qualification is only an instrument of industrial, policy to stimulate the creation of intangible assets that generate competitiveness and innovation. Techniques and methods of resolution of problems between companies can be promoted, like mechanism of fortification of the learning capacity that shortens the way towards the innovation.

According to Ishikawa [8], this one begins with the qualification and finishes with the qualification. That is to say, that the quality can be seen fortified with a plan of qualification around the solution of problems and to the continuous improvement. This estimates to stimulate the participation of the workers and the formation of work groups. The empirical evidence indicates that the solution of problems is the basic cell of the learning process and this one the spine of the innovation process.

As it is noticed, the innovation industrialist cannot be confined only to the economic thing as together with the science and the technology gravitates on the construction of which it has occurred in calling the economy and the society of the knowledge.

6 CONCLUSIONS

The changes that are generated in the world need that the companies go out of his lethargy since the one that is considered to be satisfied what it is doing at present and does not think about the need for the progress that it continues that it is destined for the defeat. It is for it that if it does not innovate, whereas his competition yes does it trying to satisfy needs and increasing expectations of his clients, inevitably it will lose area on the market. The businessman must have a mentality faced to.

The permanent search of the technological innovation makes possible to the companies to develop an active role in the competition assuring with this his survival in the long term,

The SME's in Mexico has realized an effort to improve his competitive position opposite to his adversaries centring on the acquisition or development of new technological assets, but the new paradigms demand from the companies that they should analyze the progress that they can be introducing in his processes and products. Considering also a clear orientation towards the client and the market.

Also the SME's must pay great attention to those practices that benefit the development from their enterprise capacities as the design, quality and qualification, being based on the human capital and with it allows to manage the organizational knowledge correctly.

REFERENCES

[1] Oslo manual. *The measurement of scientific and technological activities*. (Organisation for Economic Co-operation and Development, European Commission, 2005)

[2] Solleiro. J. and Olmedo. B. Política Industrial, innovación y pequeña y mediana empresa. *Comercio exterior, Banco Nacional de Comercio Exterior*, 1998, 48 (7), 515-527.

[3] Solleiro. J. and Castañon. R. Política industrial y tecnológica para las PYMES en América del Norte. *Comercio Exterior. Banco Nacional de Comercio Exterior*, 1998, 48 (7), 582-594.

[4] Welfens. P. & Audrestsch D. *Technological Competition Employment and Innovation Policies In OECD-Countries*, (Springer, Berlin 1998)

[5] Rodríguez J. *Tecnología e industria: realidades alcanzables. (*ESIC, México, 1997).

[6] Bartlett C. and Sumantra G. *Trasnacional Managment. Text, Cases and Readings in Cross Border Managment* (Mc Graw Hill, Boston, 2000).

[7] Drucker, P. *Innovation and entrepreneurship*. (Butterworth & Heinemann, Oxford UK, 2001).

[8] Ishikawa, K.. *¿Qué es el Control Total de Calidad?. La modalidad japonesa*. (Editorial Norma S.A. Barcelona, 1986).

Alfonso SALAZAR
Department of Engineering Projects
Technical University of Catalonia (UPC)
Varsovia 82bis 4º 2ª 08041 Barcelona. España
salazar2703@gmail.com
+34 6703 11435