

STRATEGIC DESIGN INFORMATION SYSTEMS FOR INCREASING COMPETITIVENESS OF SMALL MEXICAN BUSINESS: VISION BASED ON THE THEORY OF THE FIRM AND RESOURCES

by

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ABSTRACT

In Mexico, the use and implementation of strategies related to information systems have not been consistently addressed a claim that can be applied to small, medium and even large companies. However, these firms and multinational companies also have achieved competitive advantage by their heavy investment in business intelligence systems. This study aims to inform the SME business sector resources that can be used as a basis for the development and creation of strategies to increase their competitiveness. The high costs of implementing such systems can lessen with the use of existing information technologies. This paper will present the alternatives that small and medium producers can use to break into the culture of decision making based on information resources as well as inputs for the development of capacities for the development of strategies.

KEYWORDS

Capacities, Competitiveness, Resource Information System, Value, Competitive Advantage, Strategy

INTRODUCTION

In Mexico, According to the National Survey of Employment, Wages and Training in the Trade Sector (Encuesta Nacional de Empleo, Salarios y Capacitación en el Sector Comercio), (ENESCOM, 2005), about 95% of establishments engaged in trade did not have systems for planning and decision making, or simply did not know them. 91% of business has no system to identify or create a customer portfolio and base and 88% do not have systems to identify their suppliers. This reflects one of the main issues which characterize most Mexican companies "sail on a sea of uncertainty" added to the market imperfections (monopoly or oligopoly), the incorporation of global markets and the inefficiency of Mexican institutions and others factors in which it was not enriched, as it will focus on the point of the lack of culture of information in decision-making by the companies.

Good management of this resource could provide companies sustainable competitive advantage to meet the dynamic market changes. In this vein it can be formulated the following question What effects would be achieved in terms of competitiveness for SMEs if they seize and exploit low cost alternative information resources making them inexpensive business intelligence systems? It is noteworthy that these resources are from public sources and have had a strong but insufficient diffusion in academic and business sectors. So while the development of an entrepreneurial culture on the use of such intangible resources could provide further impetus to the development of entrepreneurial skills in addition to promoting competitiveness.

Importantly, the application and usefulness of this resource will be linked to economic activity and the enterprise carries to give treatment that achieves to create value, in other words, the development of strategies for competitive advantage depends on the skills and capabilities firms have to use.

THEORETICAL BACKGROUND AND LITERATURE REVIEW

Mexico has been influenced by the changes caused trade liberalization and integration of global markets implicitly ringing advances in science and technology, which changes the environment in which companies operate in the production structure of our country. This means that each of these production units has to analyze in detail its position in the market, and in particular the obligation to take advantage of the large body of information technologies to realize it. According to Torres (2000) strategy formulation leads companies to thoroughly review its environment and its competitive scheme so they can define a competitive strategy.

Nelson and Winter (1982) consider the promise and the problems that bring the evolution of the economic changes generated by globalization. They argue that economic analysis with the use of resources of a company engaged in the business strengthens its decision making, but more importantly highlights that companies should focus on a better understanding of technological change and the dynamics of competitive process.

In this context, the SME and overall Mexican company must constantly analyze their marketing and organizational plans to address these changes resulting from globalization. For most of the SMEs, globalization means a constant threat. However, there are companies with their capabilities, features and trade liberalization has meant making profits because they can export their products or import profitable products as the technology for commercialization. Unfortunately, most companies intend production to the domestic market of the country which makes it a threat.

Foreign direct investment and the entry of products have represented the extinction of many companies to take over the majority of the market. This reflects that growth and sustainability in the market is the major challenge faced by companies in this millennium. According to (Peng, 2006) the strategies that a company should propose, should be based primarily on a combination of planned and deliberate action on those activities that are not emerging, but the basic premise is to design strategies that SMEs can know themselves and know their opponents with an assessment of their forces (F) and weaknesses (D), as well as the opportunities (O) and threats (a) in the environment around them.

Be knowledgeable, capacity development, the use of equity by companies and government support represent some of the alternatives to address this challenge. Strategies to perform must consider social, political and governance factors. It is noteworthy that the regulation for market concentration by Mexican institutions has been poor, their lack of ethics and a high level of corruption in their structures has allowed national and multinational companies exploit these flaws as competitive advantages generating unfair practices. A recent example is the case WALMART occurred in April this year.

In this vein, to analyze the environment should lead to a result that defines what are the strengths and weaknesses of the company in relation to its current and future competitors, to make these sources of dynamic competitive advantage. Companies are different among them; their behavior is described in the theories of the firm on how to compete (Peng, 2006). There are three leading perspectives in which companies have to build and develop strategies to achieve competitive advantage known as the tripod strategy. The first is a vision based on the industry where it is suggested that a company should review first the forces driving competition in the sectors of economic activity with which it interacts.

Companies face competitors and prevail in a rivalry with them. These potential competitors are considered as a threat for its possible entry into the sector, displayed bargaining power of suppliers, the bargaining power of customers and the constant threat of the entry of substitute products (Porter, 1985). The second view is focused on the resources and capabilities of a company. The binding constraint on the rate of growth of a company is provided by the current management capabilities (Penrose, 1959).

It is therefore important to note that companies should have the ability to identify competitive forces and generic strategies through a model that highlights specific business activities in which they can better implement competitive strategies. If a small producer in the food sector develops its skills could add value to their product but with more emphasis on marketing activities using information on marketing and commercialization that could identify its clients in a certain area and more. Surely an information system for the producer will have a strategic impact.

The value chain considers a company as a series of activities where each margin adds special value to the products or services of a company (Porter, 1985). The skills and abilities of the entrepreneur or business managers are a key part of the strategic design to provide them with sustainable competitive advantages, but there are different capabilities in all human beings that can limit maximum utilization of resources bounded rationality (Simon, 1947).

The present information is an essential element for survival in a competitive environment. Its evolution has been in recent years "explosive" under the technological revolution that has become an affordable, everyday and indispensable tool because without it the permanence of a company in the market would be virtually impossible. According to Laundon (2008) an information system is a tool with which a company can process information and can be defined as a set of interrelated components that capture, process, store and distribute information to support decision-making and control an organization.

Firms need to emphasize work with intangible assets such as a particular technology, the intellectual and information resources. The latter are often invisible in a company and can be a real source of unique competitive advantage that can be sustained with time as set by Itami and Roehl (1987)

RESEARCH METHODS

To support the above assumptions it was used and analytical and exploratory method as well as the fieldwork. According to the data observed in the ENESCOM (2005), a random search was conducted in the National Directory of Economic Units (Directorio Nacional de Unidades Económicas, DENUE) in the municipality of Zapopan in order to find a small or medium enterprise (SME). The high probability of finding a company with the required characteristics facilitated finding the candidate: PNEUMAX as the company selected for the experiment; lacks an information system that allows you to develop strategies to position themselves in the market. It was proposed to address the implementation of an information system.

To achieve this, it was examined and determined which the possessed information needs were and the proposal was based on the value added, that when using a geographic information system (GIS) as a tool for commercialization and generating marketing strategies in order to improve decision-making and achieve efficient resource management and reduce uncertainty that the company had on market characteristics. The implementation of this system required the organization and systematization of statistical and geographical data available.

Structured information in the proposed geographic information system (GIS), allowing administer, manage, analyze and model situations present in the geographical areas where there are launched the company strategies, which potentiates its use as a support tool in planning activities and decision making.

The resources used to implement the system are the following:

- IRIS GIS Software 4.2, Google Earth or Arc Map 10.
- Digital geographic products: Digital urban maps, business directory geo-referenced DENUE 2011, national geo-statistical frameworks with a projection and a datum CCL ITRF92 reference. The cost was representative only, the following table shows:

Proposal	
Urban mapping work zone	0
Google earth	0
Business directory 2012	1,667
Training	12,000
Total	13,667

Source: Own elaboration

CASE: DISTRIBUIDORA PNEUMAX OF MEXICO

PNEUMAX is a marketer and distributor of pneumatic equipment: cylinders, valves, solenoid valves, hoses, pistons, drivers, etc. It also offers specialized services automation machinery. Currently the firm has two places in the country: the matrix, located in the city of Guadalajara and one in the State of Mexico.

This case study presents the results obtained by the company PNEUMAX of Mexico to implement a geographic information system that allowed it to develop properly and timely marketing strategy to position its product portfolio in

the market. Also the system implemented by PNEUMAX was aimed to expand its market in other regions and gain greater market share.

- Location: Volcano Popocatepetl 1844 Colony The Urban Colli, Zapopan, Jalisco. C.P. 45070. Phone: 36 20 35 99.
- Activity: Wholesale of other machinery and equipment for general use, 435,419.
- Economic unit size: 15 employees.
- Mission: To be a leader in the domestic market of pneumatic elements offering customers products and services that meet their needs in price, quality and service.
- Vision: The Company has a very important purpose, the continually expanding in order to be the best company of pneumatic equipment, with criteria of competitiveness, quality products and services.

The recommendations to the company PNEUMAX are based on the following assumptions:

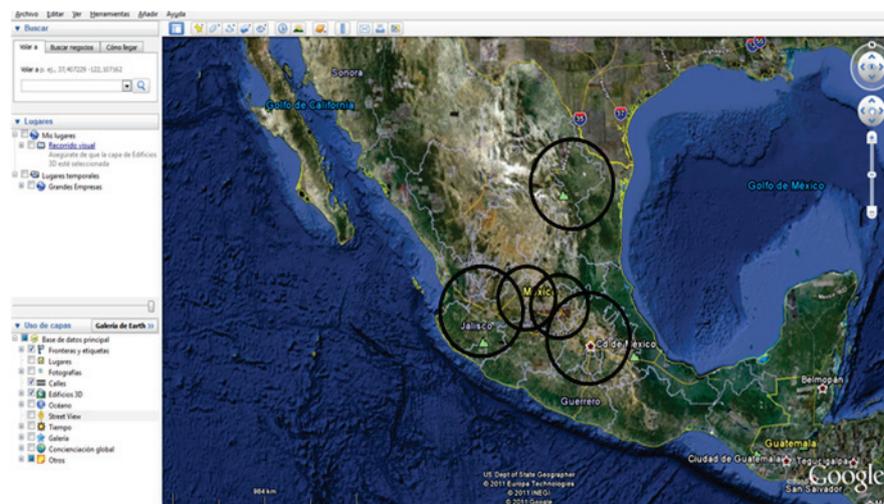
- To identify the information needs of the company.
- A training program for sales management, on management of GIS.
- Consult and acquiring banks geo-referenced information requirements (business directory).
- Lower network GIS software Google Earth.
- Hardware for processing and output of information according to business needs: computer and printer.

The recommendation is centered on the implementation of a geographic information system (GIS) as it seeks to strengthen the marketing strategies for PNEUMAX more productive and therefore more competitive in the market.

MARKETING PLAN

For the definition of the working area began by identifying the geographic coverage in order to define the areas of sales, as shown in the Figure 1 below.

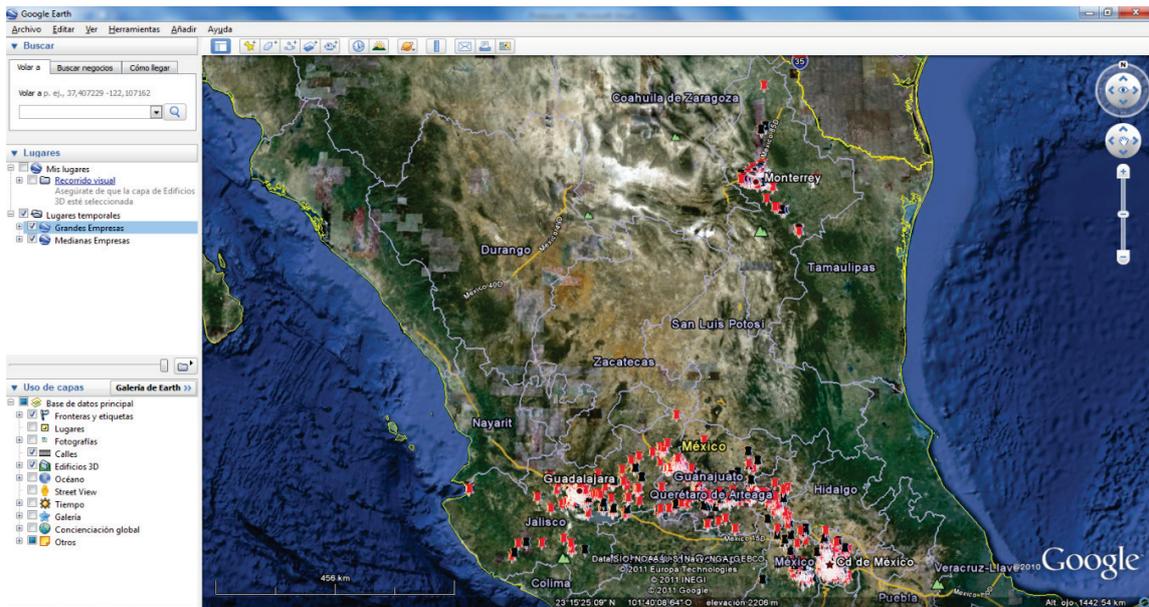
FIGURE 1
PNEUMAX – AREA SALES IN THE NORTH, NORTH CENTRAL,
SOUTH CENTRAL AND WEST REGIONS



Source: Google Earth

Geo-referencing the establishments' directory by mapping to determine the distribution and concentration of more than 3035 companies in each State selected. This allows, from a spatial perspective, to observe the composition of the market and to determine the areas of sales, to establish clusters and get the database to develop the marketing plan. The map 2 below shows the geographical distribution in the space market.

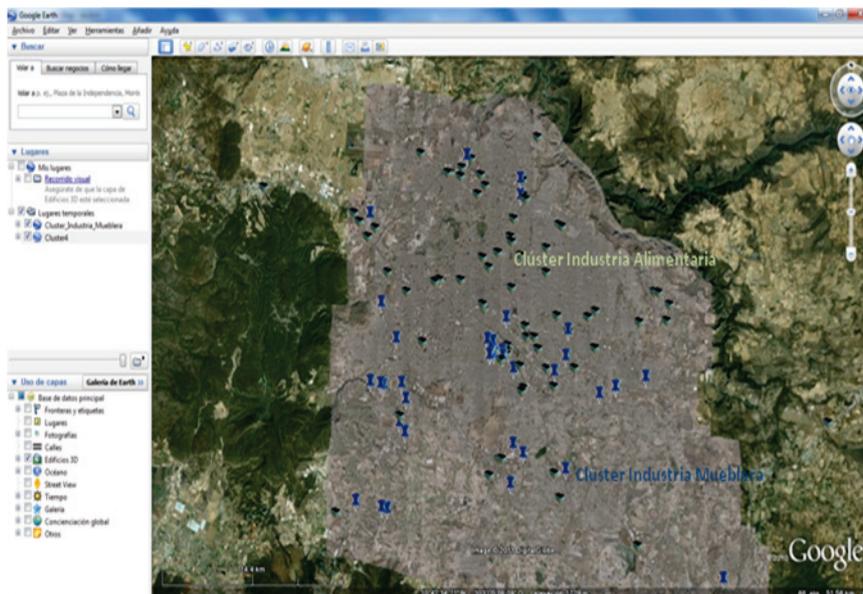
FIGURE 2
PNEUMAX –SPATIAL DISTRIBUTION OF CLIENTS



Sources: Google Earth and own elaboration with information data from INEGI

The black dots represent large corporations and the red dots the medium-sized business. Once known the geographic distribution on the map, it begins to generate the cluster according to the activities and occupation. PNEUMAX handles profiles of services and products according to the characteristics of firms, depending on their activities and spin. This classification allows the firm to determine the needed profiles to be able to offer their products and services packages. So, the next step is to classify firms by size, but especially for their activities. The following Figure 3 is an example.

FIGURE 3
PNEUMAX – ALLOCATION OF CLUSTER



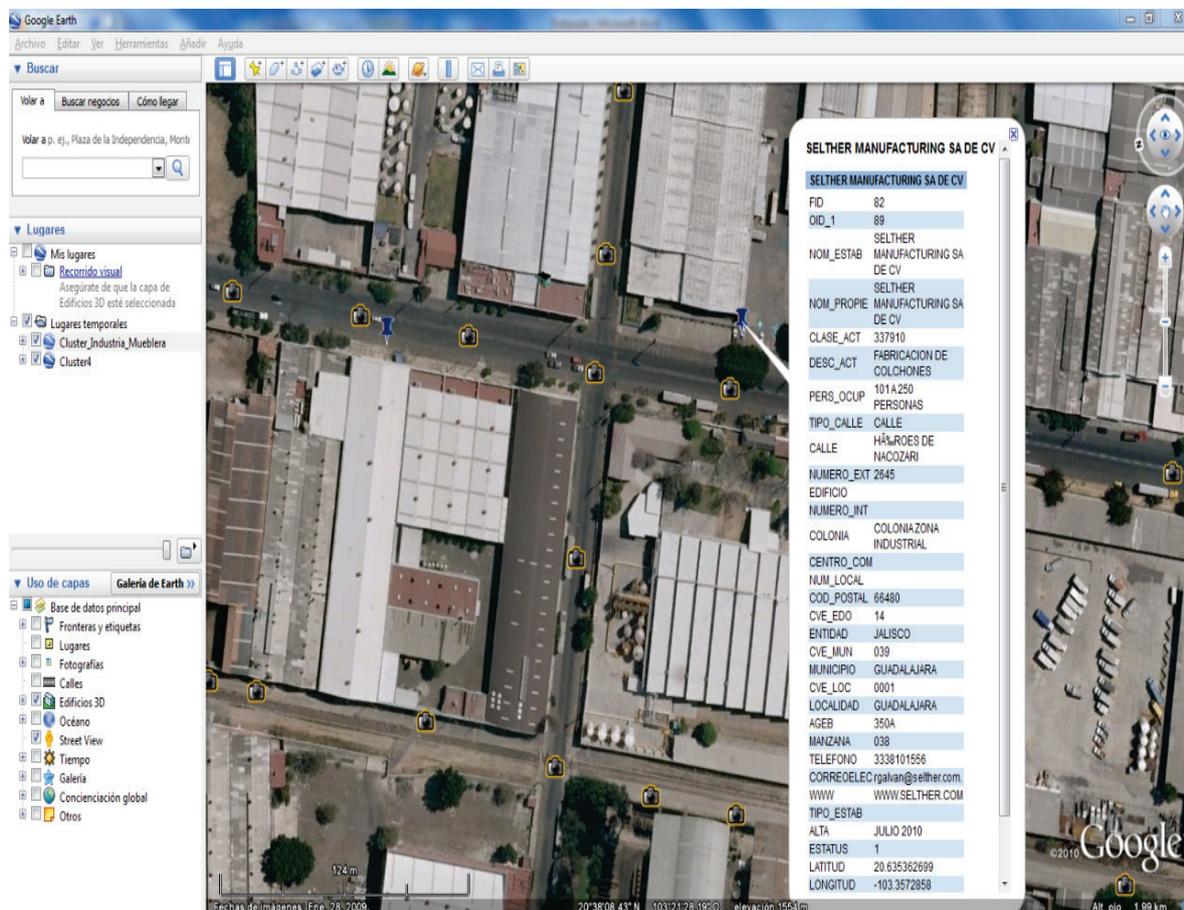
Source: Own elaboration with data information from INEGI

This procedure used spatial analysis tools of GIS support called ARC MAP, in order to structure and define the cluster. Note that this system will be good enough to convert formats .shape to formats .kml, extensions that the system recognizes in Google Earth interface.

As seen in the maps above, the determination of cluster or clusters was based especially in the activities of the company. For example, it can be seen the concentration in the city of Guadalajara of companies engaged in furniture category with a blue pin and those involved in the food industry with a pin in the form of a factory.

The specificity of this information has more added value, as each geographical object representing a firm on a map is associated directly with a database that identifies and determines specific characteristics of each of the companies, such as its name and social registered name, address, email address and the name of its legal representative.

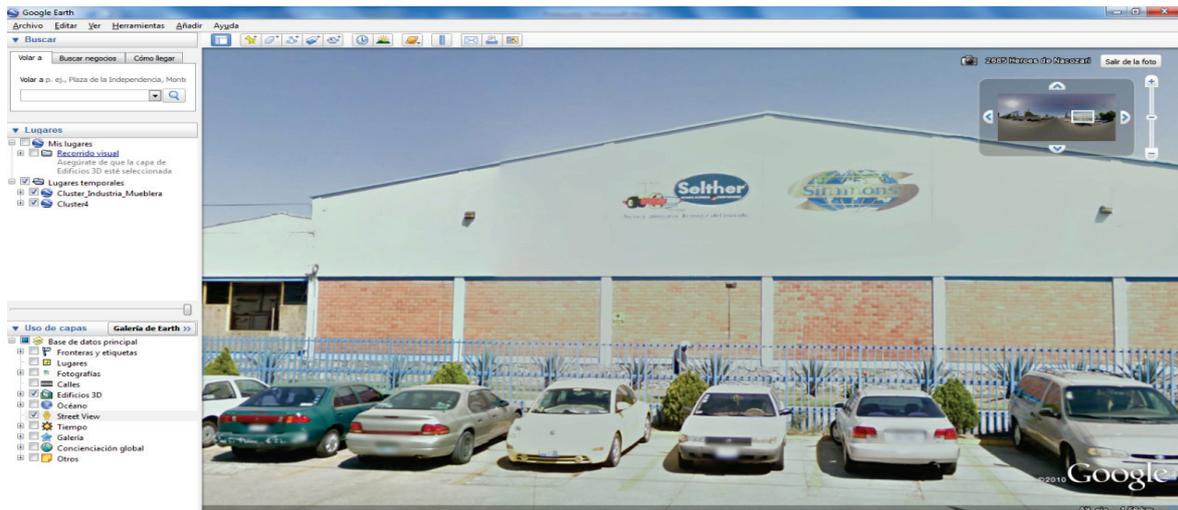
FIGURE 4
PNEUMAX – DATABASE RELATED COMPANIES' DIRECTORY



Source: Based on information from INEGI

The system also features three-dimensional pictures of the streets of the cities of the country, giving them a concrete picture of companies to visit (See map 5).

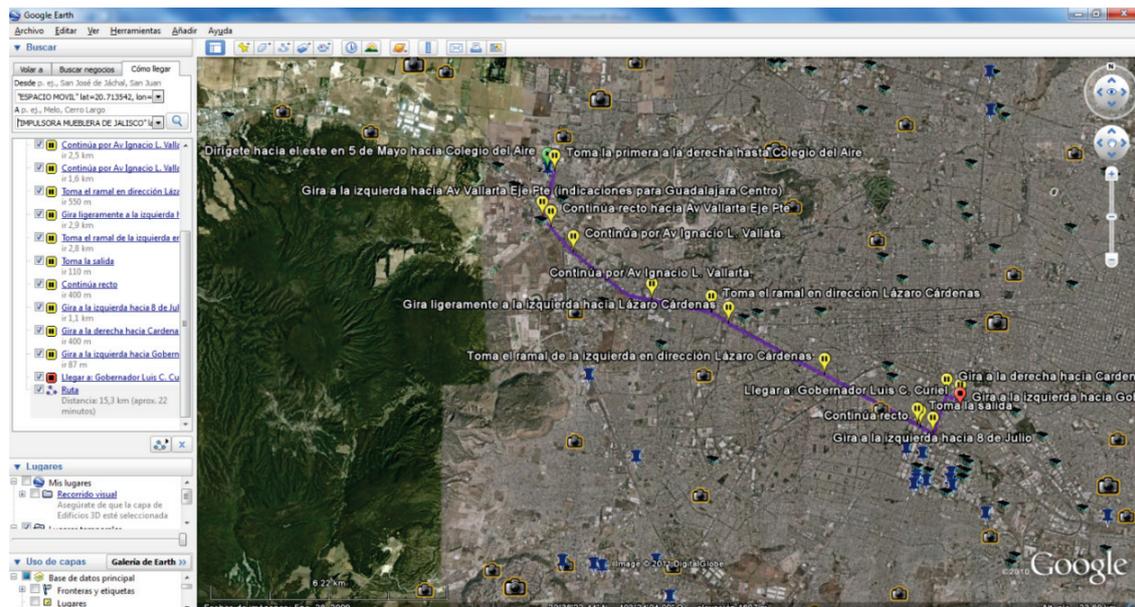
**FIGURE 5
PNEUMAX – STREET VIEW TO DISPLAY COMPANIES**



Source: Based on information from INEGI and Google

Another important thing to mention is that the company can trace routes and visit sequences and determine which direction to take to get from one point to another.

**FIGURE 6
PNEUMAX – TRACING ROUTE AND GUIDE TOURS**



Source: Based on information from INEGI and Google

Based on this information, management takes appropriate decisions to determine which vendors will cover the new market. Moreover, according to this analysis of the information obtained, it may be a need to hire new vendors that meet and attend the new outlets and sales points.

Now PNEUMAX geo-referenced has a directory that allows it to implement effective marketing strategies which can steer the company to achieve its objectives and to boost productivity and become a competitive company in the field of its product distribution

RESULTS AND CONCLUSION

The results are reflected primarily in the planning and organization functions: setting goals and the appropriate course of action to achieve them. By implementing a geographic information system, it has helped to define strategies to positioning in the market portfolio of products offered, the design of a strategic plan for marketing based on a detailed analysis of the composition of potential customers in the metropolitan area of Guadalajara, Monterrey, Mexico City, Queretaro and Guanajuato.

The creation and implementation of an efficient logistics aims to set the procedure for promotion, sale and distribution of products. Moreover, the geographic information system allowed the organization to define the direction of human resources effectively, to implement strategies designed in order to achieve the goals: customer acquisition and increased volume of daily sales.

The information system allowed the company to have a control to ensure that activities conform to planned activities by management.

In short a good implementation of an information system can provide:

- Increased accuracy and effectiveness in the strategies developed.
- Reduced risks and uncertainty in decision making.
- Physical assessment of the current market.
- Physical assessment of the potential market.
- Placing a product in a chosen segment.
- Optimization vendors, outlets and sales routes.
- Exploration of new markets.

Now regarding the implementation costs are reduced significantly, the use of public information packets and software can be reduced from 70% to 90%.

PNEUMAX SA de CV	Price(pesos)
Commercial proposal	
Urban mapping work zone	50,000
Arc Map 10	38,626
Directory of firms 2010	1,700
Training on ARC MAP by persons	12,180
Total	102,506
Alternative proposal	
Urban mapping work zone	0
Google earth	0
Directory of business 2012	1,667
Training	12,000
Total	13,667

Sources: ESRI, INEGI

Now it can be assumed that the high costs of implementation and access to information can be more limiting for companies who cannot have information systems. However it is observed that with affordable substitute products, costs can be used by companies as a strong business intelligence tools.

The importance of being able to develop a culture of information use and management, use of information technologies and systems focused on the business of small and medium entrepreneurs will have a direct impact on the competitiveness of SMEs

Increased government intervention mechanisms developed by institutions such as INEGI, Secretary for Economic Development, Chambers of Commerce and industry among others would be essential for the specialization of SMEs in development strategies.

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