Chapter 13 / **Capítulo 13**

Innovation: A Factor in Competitiveness in Manufacturing Companies in the City of Pasto

La innovación, factor de competitividad en las empresas manufactureras de la ciudad de San Juan de Pasto

Sandra Lucía Bolaños-Delgado

Abstract

We find ourselves in an environment that demands increasingly higher levels of competitiveness, which, in turn, requires a large-scale innovation strategy incorporating the entire organization, in order to make it useful for the company and its environment. Accordingly, the aim of this chapter is to identify the degree of innovation in products, markets, machinery, and equipment, and the introduction of technological advances, that companies in the manufacturing sector in the city of Pasto have implemented in the past two years, recognizing innovation as a key factor that becomes a sustainable competitive advantage. This chapter follows a positivist paradigm with a quantitative approach, within the framework of an analytical and empirical method that seeks to describe characteristics related to the concept of innovation.

Although innovation in Colombia, and especially in companies in Pasto's manufacturing sector, is generally in a very incipient stage of development, businesspeople are aware that a path must be found for this process to allow companies to make innovation a determining factor in business growth and development.

Keywords: competitiveness, market development, business development, innovation, new products.

Resumen

Nos encontramos en un entorno que cada vez exige más altos niveles de competitividad, para lo cual se requiere una gran estrategia de innovación que incluya toda la organización, que sea útil para la empresa y para su entorno. Por ello, el objetivo de este capítulo es identificar el grado de innovación en productos, mercados, maquinarias y equipos e introducción en avances tecnológicos, que las empresas del sector manufacturero de la ciudad de San Juan de Pasto han realizado en los últimos dos años, reconociendo que la innovación es un factor clave que se convierte en una ventaja competitiva sostenible. Este capítulo está enmarcado en el paradigma positivista, con un enfoque cuantitativo, enmarcado en el método empírico analítico, que busca describir las características relacionadas con el concepto de innovación.

Aunque la innovación en Colombia, y especialmente en las empresas del sector manufacturero de la ciudad de San Juan de Pasto, se encuentra, en general, en una etapa de desarrollo muy incipiente, los empresario son conscientes de que este proceso necesita un camino que le posibilite a las empresas hacer de la innovación un factor determinante del crecimiento y del desarrollo empresarial.

Palabras clave: competitividad, desarrollo de mercados, desarrollo empresarial, innovación, nuevos productos.

Author profile / Perfil de autor

Sandra Lucía Bolaños-Delgado
Business Administrator. Specialist in Marketing Management and University Teaching. Full-time professor in the Department of Administrative and Accounting Sciences, Institución Universitaria Cesmag. Director of the Management and Competitiveness research group, Institución Universitaria Cesmag - Colombia.
E-mail: sbolanos@iucesmag.edu.co

How to cite this work / ¿Cómo citar?

APA
Bolaños-Delgado, S.L. (2014). Innovation: A Factor in Competitiveness in Manufacturing Companies in the City of Pasto. In Hernández Arteaga, I. & Pemberthy-Gallo, L.S. (Comps.), *University-Company-State: Towards a Culture of Research and Innovation. Second Conference of Business Innovation in Cauca and Nariño* (pp. 211-225). Bogotá: Editorial Universidad Cooperativa de Colombia - Red UREL.

Chicago
Bolaños-Delgado, Sandra Lucia. "Innovation: A Factor in Competitiveness in Manufacturing Companies in the City of Pasto." In *University-Company-State: Towards a Culture of Research and Innovation. Second Conference of Business Innovation in Cauca and Nariño*, comps. Isabel Hernández Arteaga and Luz Stella Pemberthy-Gallo. Bogotá: Editorial Universidad Cooperativa de Colombia - Red UREL, 2014.

MLA
Bolaños-Delgado, Sandra Lucía. "Innovation: A Factor in Competitiveness in Manufacturing Companies in the City of Pasto." *University-Company-State: Towards a Culture of Research and Innovation. Second Conference of Business Innovation in Cauca and Nariño*. Hernández Arteaga, Isabel and Pemberthy-Gallo, Luz Stella. (Comps.). Bogotá: Editorial Universidad Cooperativa de Colombia - Red UREL, 2014, pp. 211-225.

Introduction

A new globalized environment has led companies and countries to undertake actions, define strategies, and change paradigms in line with the new demands placed on them. Among these, innovation, knowledge, and technology are fundamental factors for achieving productivity.

Increasing business potential is a central theme in the design of national policies on socio-economic development. The competitiveness of companies is a concept that refers to their capacity to produce goods and services efficiently, making their products attractive both inside and outside the country. To achieve this, it is vital to achieve high levels of productivity that allow increased profit and income growth.

A prerequisite for this is a stable institutional and macroeconomic environment that breeds confidence and attracts capital and technology, which subsequently allows companies to absorb, transform, and reproduce technology; adapt to changes in the international context; and export products with greater added technology. This prerequisite has characterized the countries that have shown themselves to be the most dynamic in world markets.

Thus, the countries of the world have gradually entered into the dynamic of globalization, productivity, innovation, and competitiveness, factors that concern the private and public sectors, as well as academia. Innovation and competitiveness are closely related: While the first refers to the business strategy or decision associated with the development of new products and processes through the acquisition and adaptation of new technologies, the second refers to the ability to boost productivity to compete successfully both nationally and internationally.

The aim of organizations is therefore to generate innovation focused on permanent learning that sustains the growth of business competitiveness in the long term. This makes innovation the most valuable corporate asset for building the company's competitive advantage, opening spaces for consultation, study, and discussion around the innovation processes within the company.

Accordingly, this chapter presents part of the results of the research study titled "Analysis of Competitiveness in Manufacturing Industries in the City of San Juan de Pasto." The study examines the different ways of interpreting competitiveness and the factors that determine it: management, human talent, innovation, and production. Likewise, these should be conscious of and consistent with the surrounding environment to identify the impact they have: government efficiency, business efficiency, economic performance, and infrastructure.

The aim of this research is to analyze how innovation becomes a key factor in the competitiveness of manufacturing companies. This is achieved by describing

aspects of innovation such as: market development, new products and acquisition, and adaptation of new technologies. The question that the research attempts to answer is: is innovation a key success factor in the competitiveness of manufacturing companies in the city of Pasto?

To answer this question an empirical study was conducted, using the population of companies dedicated to activity in the manufacturing industry registered in the Pasto Chamber of Commerce as a reference. These totaled 929 in 2010, establishing a sample of 364 companies.

The study is structured as follows: First, the principles and theories underpinning the research and the background of the work are examined; second, the methodology is presented including obtaining the sample, data collection, and variable measurement; third, an analysis of the results is presented; and, finally, the conclusions of the research are presented.

As established by Ludvall (1995), the concept of innovation has undergone a change, from a process of evaluating calculations and decision-making, to an interactive and creative process. The notion of innovation has been described and defined in different ways and senses. Schumpeter (1939) defined it as the irreversible historical change in how things are done, such as the change in the role of production. Drucker (1963) identified it as the provision of more and better goods and services, but stated that it is not sufficient for business to produce just any goods and services—they must be better and cheaper. Accordingly, it should innovate in design, the product, commercialization methods, prices, services, the organization, and management techniques. Adair (1992) defines the term innovation as producing or introducing something new: some idea, method, or new instruments.

Innovation therefore has a fundamental meaning for every organization, as it does not appear out of nowhere. According to Drucker (1992), it is the result of arduous and consistent work, which involves systematically taking advantage of opportunities, as well as changes in society, the economy, demography, and technology. Thus, innovation becomes a competitive advantage, as established by Porter (1991), who defines the competitiveness of a country according to the capacity of its economy to innovate and raise the quality of its offerings; countries are successful and gain a competitive advantage in specific sectors insofar as their internal atmosphere is innovative and dynamic, with high levels of competition among companies and appropriate availability of information.

Methodology

The research operates within the positivist paradigm using a quantitative approach, in the framework of an analytical and empirical method. The research is descriptive, because it seeks to identify the characteristics related to innovation and its influence on competitiveness in the manufacturing industries in the city of Pasto.

The research used the population of micro-companies registered with the Pasto Chamber of Commerce, which totaled 929 in 2010. A sample of 364 companies was selected, taking into account that each element of this population had an equal chance of being chosen, and the following parameters were thus established:

N: Elements in the population (929)
n: Sample size for the finite population
E: Standard error or permissible error (0.04)
Z: Confidence coefficient (1.96)
P: Probability of success (50%)
Q: Probability of failure (50%)

Table 13.1 Number of commercial establishments in the Pasto municipality 2010

Economic activity	Micro	(%)	Small	(%)	Medium	(%)	Large	(%)	Total	(%)
Manufacturing industry	886	8.7	41	8.8	1	3.1	1	25,0	929	8.7

Source: Pasto Chamber of Commerce, 2010.

Information was collected for the research using the survey technique, involving a set of questions systematized based on the variables identified for the study. Data collection cards were also designed for collecting secondary data, and these were another source for the research.

In order to determine the reliability of the instrument, a pilot test was conducted on 10% of the sample. The survey was applied to companies registered with the Pasto Chamber of Commerce that undertake activities in the manufacturing industry. Furthermore, the pilot questionnaire and the definitive version of the data collection instrument were assessed by competitiveness experts belonging to the Colombian Association of Micro, Small, and Medium-sized Enterprises (ACOPI) and the Regional Competitiveness Commission.

The research measured and graded the following internal variables: management, production, human talent, and innovation. The results for the innovation variable are presented in this chapter, including elements such as the ability to reach new markets, to introduce new products and processes, to be more productive or to compete on price, and the ability to introduce technological advances. These elements were taken into account in line with the concepts compiled during the review of other work in this area, especially the classification of technological innovation that includes significant innovations in products and processes, undertaken by the Spanish Accounting and Business Administration Association (AECA, 1995).

Results and discussion

The manufacturing industry sector represents a relatively small percentage of the region's economy. According to the industrial survey conducted by the DANE in 2004, 0.80% of the country's establishments are located in the Nariño department. The departments with the greatest proportion of the country's industrial establishments are: Bogotá, with 33.4%, followed by Antioquia (20.6%), Valle del Cauca (14.4%), Atlántico (5.1%), Santander (4.9%), and Cundinamarca (4.1%), with the other departments making up the remaining 16.7%.

As well as the number of establishments, the variables measured were: people involved, creation of added value, and total gross production. The results showed a high degree of concentration in the regional centers of Bogotá D.C. and its area of influence, and also Medellín and its area of influence—together these constituted 43% of gross industrial production (DANE, 2010).

Colombian industry generally shows different levels of productivity and innovation, incorporating new technology, particularly automation. One of the most prominent examples of this is the garment industry, which boasts the latest technology in design and integration strategies for foreign markets. Other sectors include the petrochemical industry, the auto parts and vehicle industry, and the cosmetics and toiletries industry. The innovation and technological development activities undertaken in these sectors include organizational changes, development of new processes and products, industrial safety, waste reduction, and quality assurance programs.

In contrast, analysis of the industrial sector in Nariño is very limited. The little information that exists on this sector refers to statistical studies that limit themselves to determining the number of establishments. In total there are 14,952 establishments registered with the Pasto Chamber of Commerce (2010). In line with the tertiary nature of the regional economy, most establishments are found in this sector, with 13,243 establishments, or 88.6% of the total. Only 6.21% are

related to manufacturing industries, and of these, 95% are micro-companies. The lack of information on the manufacturing industry sector is a fundamental problem for establishing its innovation processes.

According to the classification of industrial companies, the most common activities in which industrialization occurs in Pasto are, in order:

- Production of food products and beverages, with the greatest number of establishments registered in this activity
- Manufacture of clothing items, preparation and dyeing of hides
- Editing, printing, and recording reproduction activities
- Wood processing and manufacture of cork products, except furniture; manufacture of basketry and wickerwork items
- Leather tanning and preparation; manufacture of footwear; manufacture of travel goods including suitcases, handbags, and similar items; saddlery and harness products

This research defined the variable of innovation as the application of new ideas, concepts, products, services, and practices, with the aim of being useful in raising productivity. Innovation demands awareness and balance to transfer ideas from the realm of the imagination or fiction to the field where they are made real and implemented. It includes the ability to reach new markets, introduce new products and processes to be more productive or compete on price, and also the ability to introduce technological advances.

Innovation requires people capable of changing and improving products, processes, methods, and systems to make companies grow. It is the effective impact made by a change to the system with the aim of improving or perfecting some aspect of its structure or functioning; consequently, "it turns ideas into useful, practicable, and commercial products or services" (Adair, 1990, p. 10).

For this study, the innovation variable was determined based on:

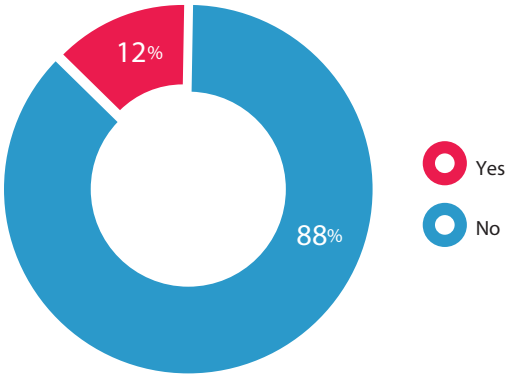
- Opening of new markets in the past two years
- Number of new products introduced into the market in the past two years
- Age of equipment and machinery
- Introduction of technological advances in the past two years

Opening of new markets

The opening of new markets is considered a strategy that allows companies to bring current products to new markets. It is used when demand in existing markets is low and therefore there is no sales growth, or when there are many strong competitors

with a large market share, making them powerful in certain regions. Over the past two years, Pasto's industrial companies have developed this strategy, as shown in Figure 13.1.

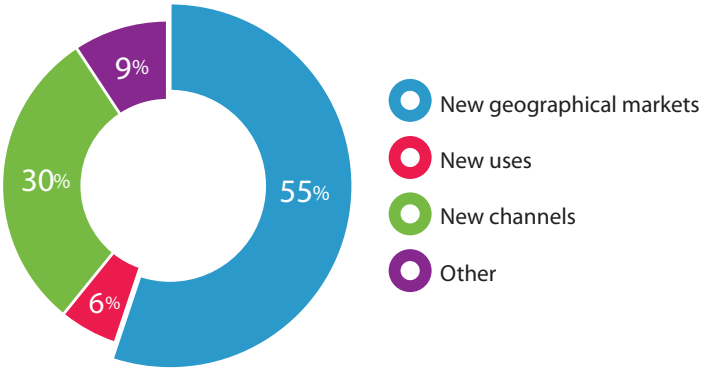
Figure 13.1 Market development in the manufacturing industry



Source: The authors.

The industrial companies in Pasto that have chosen to broaden their markets have done so in the following manner: 55% have established new geographical markets in different municipalities in the department, and have even managed to reach neighboring departments such as Cauca, Valle, and Putumayo; 30% have changed 30% of their marketing channels, allowing them to reach potential customers. A small number of these companies have aimed to find new uses (see Figure 13.2).

Figure 13.2 Market development strategy



Source: The authors.

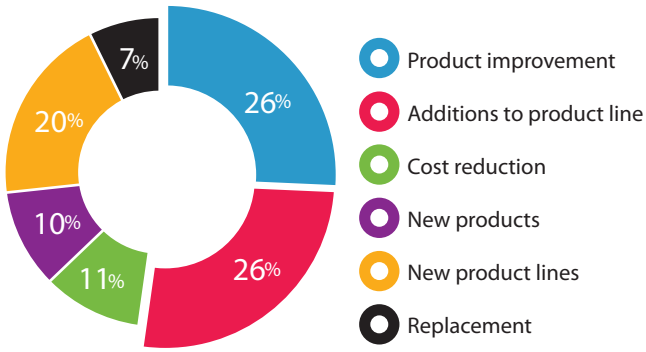
Introduction of new products

Bearing in mind that products have a life cycle, and that change and innovation are the only ways that companies can roll out their product development strategies, it can be said that there are three categories of product development:

- Products that are truly new, in other words, products for which there is an unsatisfied demand and there are no satisfactory substitutes.
- Replacements or improvements, that is, the replacement of existing products involving a significant difference in features. Changes of model and fashion may be included here.
- Imitation products, which are new for the company but not for the market that is familiar with them (Schnarch, 1999).

Based on these classifications, research shows that the majority of companies focus on imitating (see Figure 13.3).

Figure 13.3 Product classification

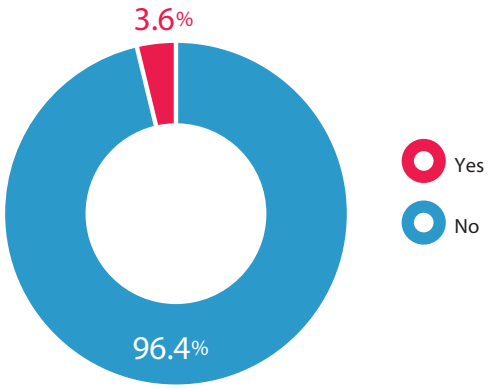


Source: The authors.

The activities of Pasto's industrial companies confirm the situation described above. They focus on developing products considered imitations because these involve a substitution, adjustments, modifications, adaptations, combinations, changes in size, changes in colors, and other uses. Nevertheless, it is one of the strategies most frequently used by companies and is considered an alternative way for them to sustain themselves in an increasingly demanding market.

Figure 13.4 shows that, in order to be competitive, it is almost compulsory for companies to introduce some type of new product, and therefore in the past two years, 96.4% have made changes to their products.

Figure 13.4 Product changes in manufacturing industries

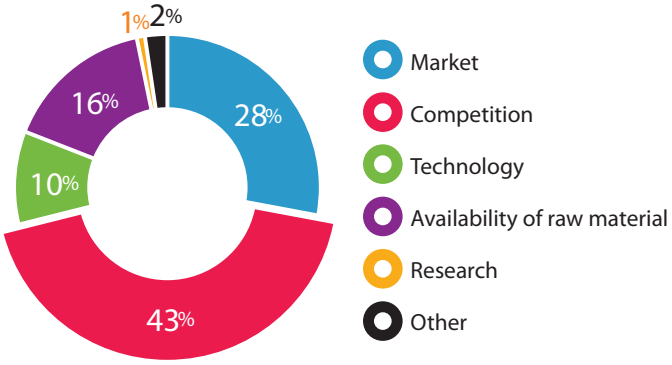


Source: The authors.

The competitive advantage of the product is very important, in terms of its characteristics, benefits, quality, exclusivity, and added value. A key factor of success therefore lies in properly defining and evaluating the product concept before creating it, as well as the market it will be aimed at. Success also depends on the ability to adequately coordinate production, marketing, and execution quality through all stages of developing and introducing the new product.

Nevertheless, many companies in Pasto do not take these reasons into account when developing a new product. For these companies, competition is the major driver; 43% of companies are alert to changes made by the competition and modify their products depending on the changes others make, and for this reason these new products are sometimes not competitive and do not meet the needs of the market. Additionally, and worryingly, there is a clear lack of research in product development: it represents a mere 1% (see Figure 13.5).

Figure 13.5 Reasons for introducing a new product

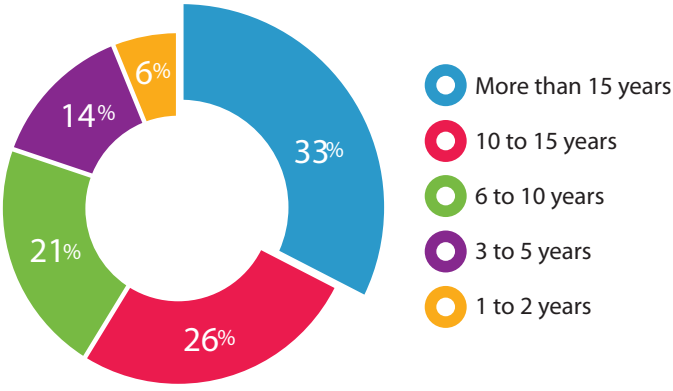


Source: The authors.

Age of equipment and machinery

Bearing in mind that the useful life of machinery or equipment is five years, it is unfortunate to note that the equipment in the city's companies exceeds this age. Although this is an important parameter for determining progress, only 5.8% of companies surveyed have current machinery, and only 14.3% have current equipment. The remaining equipment is depreciated (see Figure 13.6).

Figure 13.6 Age of machinery and equipment



Source: The authors.

Updating machinery and equipment

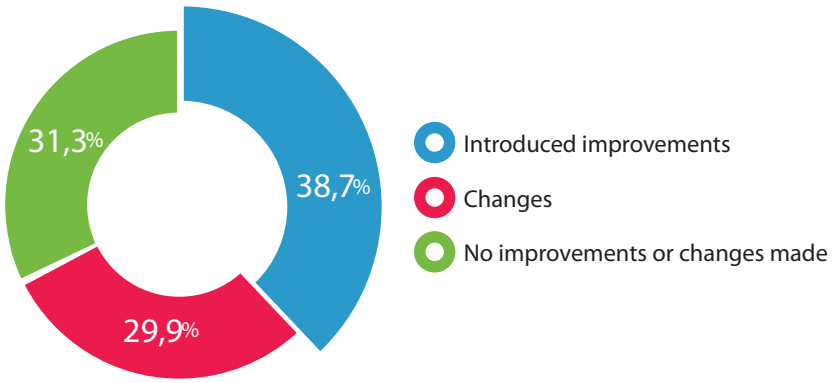
Technology has evolved significantly in recent years, meaning that companies must develop strategies that allow them to incorporate these changes. This, in turn, involves introducing, modifying, or changing their machinery and equipment.

Companies in Pasto have been able to improve their equipment and machinery, as seen in the advances made in production processes and products, and 38.8% have attempted to optimize their use of resources; however, almost the same proportion of companies in the survey has found it impossible to conduct processes of improvement, and has therefore kept the same equipment and machinery. Of the companies surveyed, 31.3% are in this situation, and only 29.9% have focused their attention on technological development in their organizations, as shown in Figure 13.7.

Grading competitive factors of innovation

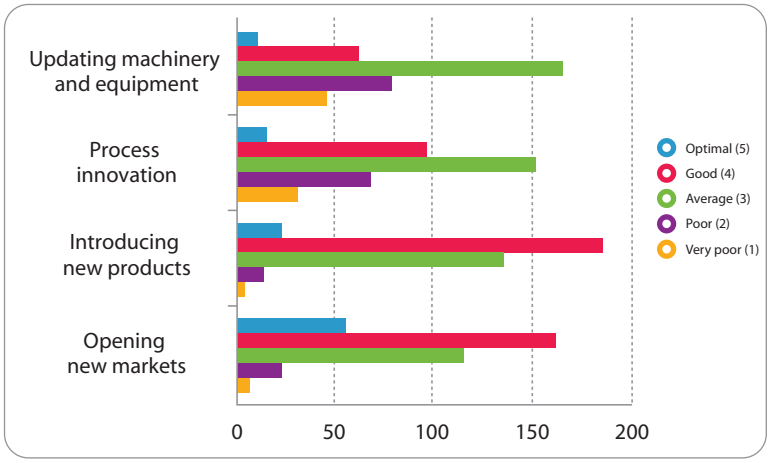
As well as evaluating each innovation item, businesspeople graded each variable on a scale of 1 (very poor) to 5 (optimal), as shown in Figure 13.8.

Figure 13.7 Updating machinery and equipment



Source: The author.

Figure 13.8 Evaluation, a competitive factor in innovation



Source: The author.

Increased productivity allows society to attain and maintain high living standards in the long term, and innovation makes it possible to permanently improve productivity. Consequently, a company's competitiveness depends to a large extent on its ability to innovate.

Although the assessment showed that manufacturing companies had a low factor of innovation, if that factor is disregarded, the opening of markets and introduction of new products receive grades of good.

Businesspeople are aware that they must be pioneers in developing new products and markets; however, they are hesitant when it comes to changing or modifying products. For them, product innovation is no guarantee of success. Developing products and markets involves identifying opportunities in the market, and to do this, the company must prepare itself. The need to use new technologies is imminent, but businesspeople perceive that there are few opportunities to acquire and incorporate them.

Accordingly, process innovation and the updating of machinery and equipment, graded as average, require greater investment from companies. But in many cases, it is an investment that small companies are not willing to make, and they are even less willing to take the risks involved in developing new technology.

Conclusions

Innovation in Colombia, and especially in companies in Pasto's manufacturing sector, are generally in a very incipient stage of development. Thus, they face a long road to make innovation a determining factor in business growth and development.

The development of a region is not solely measured by the abundance of natural resources. Prosperity depends on the productivity and competitiveness levels of its companies. Bearing in mind that comparative advantages are easily copied and improved on by competitors, competitive advantage is determined by the ability of a company, or group of companies, to innovate and continuously improve its products and services.

Innovative companies grow over and above the market, and this is supported by empirical evidence; thus, innovation is the key factor that, more than any other, separates companies that develop from those that do not. Nevertheless, although there is awareness of the value of innovation, the people who run the city's manufacturing companies lack knowledge about how to actually innovate.

The companies in Pasto's manufacturing sector limit themselves to developing new products and new markets, strategies they implement without a clear policy of innovation. This is simply obeying the requirements of the market, because if they do not implement these strategies, the competition will.

The companies do not know about the public instruments offered to help drive processes of innovation; moreover, the businesspeople find the procedures for accessing the innovation-related support that is offered by institutions to be difficult and cumbersome. As a result, they have developed innovative ventures without any support or relevant studies that would minimize risks and uncertainty.

Organizations must focus on continuous learning that supports the growth of business competitiveness. From this focus, innovation becomes the most valuable corporate asset for creating competitive advantages.

In order for Nariño to advance in the area of competitiveness, it must have institutions that advocate the design, monitoring, and coordination of innovation policies. It is thus important that there be processes of coordination in the institutional environment.

References

Adair, J. (1992). *El reto gerencial de la innovación*. Bogotá: Legis.

Asociación Española de Contabilidad y Administración de Empresa (AECA). (1995). *La innovación en la empresa factor, de supervivencia. Principios de organización y sistemas*. Madrid: AECA.

Cámara de Comercio de Pasto. (2010). *Anuario estadístico. Movimiento del registro público 2010*. San Juan de Pasto: Cámara de Comercio.

Departamento Administrativo Nacional de Estadística (DANE). (2010). *Encuesta Anual Manufacturera EAM*. Retrieved from http://www.dane.gov.co/files/investigaciones/boletines/eam/bolet_eam_2010.pdf

Drucker, P. (1963). *Drucker, su visión sobre: la administración, la organización basada en la información, la economía, la sociedad*. Bogotá: Norma.

Drucker, P. (1992). *Gerencia para el futuro, el decenio de los noventas y más allá*. Bogotá: Norma.

Ludvall, B. (1995). *National Systems of Innovation*. Retrieved from http://www.scielo.org.co/scielo.php?pid=S0121-50512010000300006&script=sci_arttext

Porter, M. (1991). *La ventaja competitiva de las naciones*. Argentina: Vergara.

Schnarch Kirberg, A. (1999). *Nuevo producto. Creatividad, innovación y marketing*. Bogotá: McGraw-Hill.

Schumpeter, J. A. (1939). *Teoría del desenvolvimiento económico: una investigación sobre lucros, capital, crédito y ciclo económico*. Brazil: Abril Cultural.