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Arbitration Committee

Presentation

In Pro-Research, Teaching and Training of human resources committed to Science. The content of the articles and reviews that appear in each issue are those of the authors and does not necessarily the opinion of the editor in chief.

In Number 1st presented an article *Local and Global productivity and their effects on value added in Mexico, 2015 by* CONTRERAS-ÁLVAREZ, Isaí, RÍOS-NEQUIS, Eric Israel with adscription in the Universidad Politécnica Metropolitana de Hidalgo, in the next section an article *Classification of the inventory according to the type of product in the micro-enterprises of raw materials in Irapuato Gto* by GUTIERREZ-CORTÉS, Martha Gabriela, ALVARADO-DÍAZ, Miguel Ángel, RODRÍGUEZ-CAMPOS, Juan Carlos y CHACÓN-OLIVARES, María del Carmen with adscription in the Instituto Tecnológico Superior de Irapuato, in the next section an article *Exploitment of coffee value chain. Knowledge of new consumer trends in Mexico* by HERNÁNDEZ-AGUILERA, Elisa, LARA-MORALES, Eliana, SÁNCHEZ-OSORIO, Ever y CONTRERAS-MEDINA, David Israel with adscription in the Universidad Tecnológica del Suroeste de Guanajuato and *El Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco,* in the next section an article *The automation of processes and their relation with the competitiveness of the Guanajuatenses MiPyMes* by RUIZ-BARCENAS, Lilia, SALGADO-ORTIZ, Francisco Javier, YAÑEZ-VÁZQUEZ, Alejandra y SERVIN, Joe Luis with adscription in the Instiuto Tecnológico Superior de Salvatierra.

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Local and Global productivity and their effects on value added in Mexico, 2015

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Abstract

This paper analyses the effects originated by global and local productivity of 81 manufacturing sub branches in México for 2015 according to INEGI data base. The article shows the evolution of manufacturing sub branches productivity and their value in international trade

The current work focus on the value of exportations gained in Mexican manufacturing sub branches and current trends indicate that liberalization has tried to improve economic growth trough exportations. Although national manufacturing exportations contains an important percentage of imported inputs.

The obtained results from current research in a cross sectional regression model indicates that whole value added is explained by global manufacturing productivity. In other words, local productivity can't generate significant value added in Mexico.

In the other hand, the complexity of productive chains is remarkable in a context of productive evaluation in the global value chains and high dependence of the national economy on foreign direct investment.

Productivity, exports, value added, competitiveness

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Introduction

In a context of free market and trade openness, economic growth via exports is fundamental to achieve competitive success and economic development. Therefore, it is crucial to analyze the added value that industries can generate in their productivity.

In this scenario, the analysis of global value chains is fundamental to evaluate the economic dimension that can obtain the productive chains in the national industry. In this sense, it is crucial to assess the impact generated by possible decisions made in relation to NAFTA and to explain a possible answer to a situation that is not yet realized but that is latent.

On the other hand, competitiveness is a basic subject in the economic and administrative sciences to explain the degree of success that can have the national industry of a country. In this sense, Porter explains that the economic gains of a country is due to the competitiveness of the industrial sectors. Therefore, it is pertinent to evaluate the value added generated by the local industry in a comparative context with global productivity (global value chains) in order to establish a valid reflection on the subject.

The first section of the article approaches the theorical framework and the explanation of a function that talks about the correlation between exportations and productivity from Kaldor´s perspective. The second section explained the development of manufactunring industry in Mexico. Consequently the article show the econometric analysis to test hypotheses. Finally the conclusions are presented to make a deep refexion abut competitiveness in Mexico.

The research has an objective that is to evaluate the effects generated by global and local manufacturing productivity on value added. In particular, the work will analyze if the amount of productivity represented in a monetary form is positely correlated to added value.

The article pretend to test that value added in manufacturing industrial sector is explained by global manufacturing productivity. By the other hand, local manufacturing productivy can´t generate the same effects as the first one in Mexico. That phenomena es caused by productive chains and global value chains and lack of competitiveness in local manufacturing sectors. In a secundary way, the research pretend to test that the amount of productivity in industrial sub branches is not correlated to value added. In other words, the size of productivity does not depend on value added.

Theoretical framework

The current section approaches two theories to support the idea of evaluate the added value in exports and the latest mentioned as a key factor of competitiveness and productivity.

From the perspective of demand, the link between exports and economic growth is explained by the effect of the first in the components of global demand through two mechanisms, specifically: a) directly, since exports are a component of aggregate demand and. b) indirectly, by the multiplier effect of exports, which allows the expansion of other components of global demand.

Under the same approach, Kaldor (1966) considers that demand is an element capable of boosting economic growth, in such a way that supply-side factors increase as it also does, thus generating the growth of the economy in the long term.

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In this context, CEPAL (1998) notes that manufacturing exports are a source of real growth through the transmission channels of export growth, namely: 1) currency generator, since these are necessary to import the intermediate goods and inputs required in the production process, 2) a greater internal productive chaining of the exporting activities causes two important effects: First, a greater multiplier effect on demand and therefore on production (due to direct and indirect impulse of exports to the product and to other sectors, respectively) and secondly, it generates a substitution process of imports, which in turn causes a decrease of the income elasticity of imports and a decrease in the demand of these as the product grows, 3) the positive externalities generated within an economy due to the character of competitiveness and innovation demanded by the exporting activities.

A key concept for Kaldor is the process of interaction established between demand increases caused by increases in aggregate supply as a result of an increase in demand (Jesús Felipe, 1998). This process is known as the *cumulative circular causation model*, which is the result of the Kaldor's three laws, which are explained below. According to Mc Combie and Thirlwall (1994:164-166), the basic assumptions of the model are as follows: i) the faster the rate of growth of the manufacturing sector, the faster will be the rate of growth of GDP; ii) the faster the rate of growth of manufacturing outpu, the faster will be the rate of growth of labour productivity in manufacturing owing to static and dynamic economies of scale, or increasing returns in the widest sense; iii) The faster the rate of growth of the manufaturing output, the faster the rate of transference of labour from other sectors of the economy where there are either diminishing returns, or where no relationship exists between employment growth and output growth.

iv) As the scope for transfering labour from diminishing returns activities dries up, or as output comes to depend on employment in all sectors of the economy, the degree of overall productivity growth induced by manufacturing growth is likely to diminish, with the overall growth rate correspondingly reduced; v) The growth of manufacturing output is not constrained by labour supply […] but is fundamentally determine by demand from agriculture in the early stages of development and the exports in the larger stages; vi) A fast rate of growth of exports and output will be tend to set up a cumulative process, or virtuous circle of growth, through the link between output grow and productivity growth".

In relation to the presence of growing returns within the manufacturing sector, Kaldor emphasizes the Verdoorn's law, which establishes a statistical relationship between labour productivity and production in terms of manufactures and industry (also includes manufacturing activities, in addition to construction and public services). This law is important because it constitutes the basis of the cumulative circular-cause model of economic growth and then, because it's an important component within the demand-oriented approach to economic growth (Mc Combie and Thirlwall, 1994), and is defined as:

$$p = a + bq; \quad (1)$$

where "p" and "q" are the exponential growth rates of productivity and product, while the slope coefficient "b" is defined as the Verdoorn's coefficient.

However, to develop these ideas, it's necessary to study the Kaldor's three laws of that establish a link with the cumulative circular causation model, as shown below: a) *first law*. It establishes that there's a positive correlation between total GDP growth and manufacturing.

The foregoing is explained by the following reasons, namely: in the face of an expansion in industrial production and the product, there is a transfer in labour resources from sectors characterized by underemployment and unemployment, which ensures that there is no decrease in the product in these and that, at the same time, the industrial sector experiences an increase in productivity. So, as the manufacturing sector grows, the rate of transfer of work from the sectors described above will be faster; b) *second law* (also known as the Verdoorn's law). It refers to the direct relationship between the growth of labour and product productivity in both the manufacturing sector and the industry level; c) *third law*. There's a positive relationship between the growth of total productivity and the growth of employment in the manufacturing sector. While at the microeconomic level, the increase in productivity could be reflected in a displacement of physical capital by human, it is considered that at an aggregate level (macroeconomic perspective), the jobs that are generated are greater with respect to those that are lost (De la Rosa, 2006).

Once the causality is established, at least partially, from the growth of the product to the productivity of the work through the Verdoorn's Law (Thirlwall, 1975), it's necessary to establish that the link between exports and growth is given by the growth of productivity and price competitiveness within an international context (see figure 1).

Starting analysis from exports (x), then it has to be located within a context of competition, manufacturing exports compete for the price side (d_p), so they are based on the relationship of internal/external prices and the income of the rest of the world. In such a way that the lower the domestic price, the greater the volume of exports, thus the growth of these will drive the aggregate demand, which will allow to achieve a certain level of growth, denoted as "$\dot{y}$".

Then, because of the growth of the product, there will be an increase in productivity (δ) through the Verdoorn's law. However, through increased productivity it's possible to improve the domestic price (d_p), which allows a better positioning in the international market, achieving with it a sustained growth of exports. Finally, it should be noted that this system will tend to balance because the expansive effects on exports and products are becoming smaller.

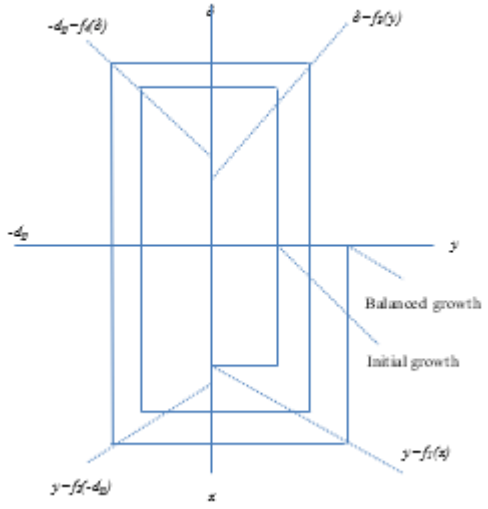

Figure 1 Cumulative circular causation. De la Rosa, Juan Ramiro (2006). Dos enfoques teóricos sobre el proceso de crecimiento con énfasis en las exportaciones manufactureras. Análisis Económico, vol. XXI, núm. 48

The classic theory of international trade explains the success of nations as a natural consequence of the endowment of factors that count: natural resources, labor and capital; Countries specialize in those sectors where they have a more intensive use of some factor. However, for Porter (1999:170) classical theory has been eclipsed in advanced countries and industrial sectors and by the globalization of the competition and technological development.

Porter argues that there are additional elements to national comparative advantages.

These are the competitive advantages, which are generated internally, ie the industrial dynamics and the way it's organized in a country, will determine the degree of technological progress and competitiveness (Buendía, 2013).

As we analized previously, the classical international trade theory explains the success of the nations as natural consequences of the natural factors dotations with each is counted: natural resources, labor and capital; the countries specializes in those sectors where them have an intense use of a factor. However, for Porter (1999:170) the classical theory has been eclipsed in the sectors and advanced countries for the competition globalization and the technological development.

Based on a study realized in ten countries that distinguish in the foreign trade in the 80´s, Michael Porter made a national competitivity theory based in the productivity causes, because this is the only variable that explains the competitivity of a nation, instead of what it explains the classical theory (traditional competitive advantages); there is an important quote from this theory "the national prosperity is not hereditary, it is created by the opportunities that a country gives to their enterprises, because they are the only in charge of creating a competitive advantage through innovation. For this author, once the enterprise achieves the competitive advantage, it can only be maintained by a constant improve, wich it has to renew or die, otherwise, competitors will overtake any enterprise that quits innovation.

What generates competitive advantage? Competitive advantage is created and maintained by a highly located process, even the most developed countries are not competitive in every sector, that´s why nations succed in specific sectors because the national environment is the most progressive, dynamic and stimulating (Porter, 1999:163).

This competitive environment, according to Porter, is reached through four competitive factors that individually and as a system define the competitive environment in wich, enterprises learn and develop their competitiveness, this model known as "Diamond´s Model" (1990), conformed by four awns, defines the next competitive factors: 1) factor´s Conditions: Talks about the specialized factors creation (specialize workforce, infrastructure creation, etc.) needed for making a competitive nation, because the key of the competitiveness is not constituted by the natural factors dotation, it´s the ability of how there are processed for making an efficient production. Aversely as it´s known, providing a wide specialized workforce don´t represent any advantage, because it´s needed a specialized workforce in specific enterprises necessities, as well as counting with investigation centers specialized in innovation, development, assimilation and application of the science and technology knowledge, because this factors are limited and hardly to imitate for the national and foreign competitors, and it´s needed a sustained investment for creating them; 2) demand conditions: we can belive that globalization has been reducing the intern demand importance, that the international competition and the external demand are more important to develop nation`s competitive capabilities but it is not true at all because from Porter`s point of view the composition and character of the internal market often has a disproportionate effect on the way companies perceive, interpret and respond to the needs of buyers. Companies start production close to the observed market, ie the conditions of domestic demand help create competitive advantage when a particular segment of the sector is larger or more visible in the domestic market than in foreign markets (Porter, 1999:182).

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If consumers in an economy are demanding and well informed, the pressure they put on business will be greater and will force them to constantly improve their competitiveness; Companies will benefit from these demanding consumers because they will open their eyes to the new needs of markets; 3) related sectors. The third element of national advantage deals with the availability of nationally competitive national suppliers. Through these related and auxiliary sectors, timely and efficient access to the main inputs is allowed, spatial proximity between suppliers and end users facilitates the exchange of information and promote a continuous exchange of ideas and innovations. Companies have the opportunity to influence the technical efforts of their suppliers and can serve as testing sites for R & D work, accelerating the pace of innovation. Firms benefit to the fullest extent when suppliers are, in turn, competitors worldwide (Porter, 1999:184); 4) strategy, structure and rivalry of companies. The fourth determinant tells us that national conditions strongly influence the way companies are created, organized and managed, as well as internal competition. No management system is universally appropriate (whether Japanese, German, Italian, etc.), these systems are appropriate in different national contexts, the Japanese management system may be very successful, but this is only appropriate in certain industries of one size and hierarchical structure; but isn't appropriate in Italian family enterprises that are not very organized because of their family structure (Porter, 1999:185).

On the other hand for the same author, competition between national rivals encourages the creation and improvement of competitive advantage, as it encourages companies to innovate and improve; this competition between companies forces to reduce costs, improve the quality of products, as well as a new variety and diversification of products. In addition, internal competition helps to nullify the advantages of a certain company simply by being in a given nation (labor cost, market access, etc.) and this forces it to innovate and move beyond these advantage.

It´s important to undsertand that if a firm wants to gain important competitive advantages from the presence in it´s home nation of world class buyers, suppliers and related industries. They provide insight in to future market needs and technological developments. They contribute to a climate for change and improvement, and become partners and allies in the innovation process (Porter, 1990a). The same author mention that having a strong cluster at home unblocks the flows of information and allows deeper and more open contact than is possible when dealing with foreign firms.

For Porter, the governmental policy can influence the acquirement of the competitive advantage being considered as the most important determinant. This is related to the fact that a government can influence the local market by subventions, investments in education, regulating the domestic market, creating a competitive infrastructure for reducing the accessing costs of the factors. The state is also an important buyer for certain industries, such as defence industry, aeronautics, telecommunications (Porter 1990b).

Porter (1990a) emphasises that the diamond is a system and that all four conditions identified in the Diamond framework must hold (be strong) for an industry to be truly internationally competitive.

Countries with the strongest diamonds are therefore supposed to end up with the most competitive firms in that industry.

According to previous source of information. Important is to approach the system of the competitiveness conditions with a coherent governmental action in order to create or improve the national competitive advantages.

For Economic Sciences is important to measure productivity and added value as an indicator that tries to give information between processes involved in whole manufacturing of a product. Productivity is a measure of the rate at which inputs are transformed in to output. Hence productivity provides the technical relationship that exists between inputs and outputs (Diewert, 1992). It measures the relationship between output such as goods and services produced and inputs that include labour, capital, material and other resources (Hill, 1993).

The level of productivity with in an organization depends on labour, capital, and the state of technology. Productivity growth over time will reflect the growth in these factors over time (Velnampy, 2011).

According to previous author, there are predefined methods for measuring the performance of a firm. Measuring all of sales growth, market share, profitability, overall performance and stock holder satisfaction will provide a more accurate view of such firms' performance.

Grunberg (2004) conceptualize the triple P method, which describes productivity as phenomenon. Profitability is also seen as a relationship between output and input, but it is a monetary relationship in which the influences of price factors are included.

Performance is the umbrella term of excellence and includes profitability and productivity as well as other noncost factors such as quality, speed delivery and flexibility.

Some corporate reports include measures of productivity such as sales per employee, value added per employee, profit before tax per employee, labour cost to sales and labour cost to value added, where as engineering federation of employers identified some performance ratios, namely (i) standard hour to actual hour, (ii) value added per rupee of fixed asset, (iii) value added per rupee of material cost of production, (iv) value added per direct labour hour (Velnampy, 2011) but it's difficult to find research related to value added and it's consequences in productivity.

Some of research desingned to evaluate productivity with value added find a positive correlation between value added and profits before taxes and they found other correlation between the labour cost to value added and gross profit (Velnampy, 2011). Others use value added to analyze the performance from a financial perspective and it´s viewed as a useful tool to judge the efficiency and effectiveness of the enterprise as regards sales promotion, utilization of fund, capital productivity, labor productivity (Mandal & Goswami, 2008).

Value Added for Liebermand and Kang (2008) is the difference between the firm's total sales and its purchases of raw materials and contracted services through the efforts of employees and the application of capital, the firm "adds value" to its purchases of raw materials.

Value Added and Global Value Chain

More recently, the concept of Global Value Chains GVCs, which was already very popular among firms, has also become an important tool to analyse the extent of international trade integration of countries. Since different stages in the production process are increasingly located across different economies, more and more intermediate inputs are produced in one country and often exported to others for further inclusion in final products. Consequently, a country's exports increasingly comprise value added by imports (UNCTAD, 2015).

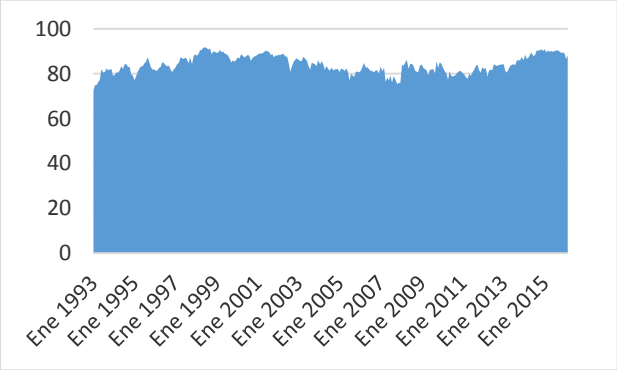
According to the same source of information. A country's exports can be divided into domestically produced value added and foreign value added (imported input that is incorporated in exported goods and services). Thus, GVC participation rate, which is the foreign value added used in a country's exports (upstream perspective) plus the value added supplied to other countries' exports (downstream perspective), divided by total exports indicates the share of a country's exports that's part of multiple processes and is a useful indicator of the level of integration in international production networks.

UNCTAD (2015) make an analysis about the influence of GVCs inside manufacturing processes, where the eight most developed economies whith highest participation rate in Global Value Chains has more equilibrated participation inside manufacturing processes better known as domestic value added (downstream component) than upstream component that is the rate of foreign value in manufacturing processes. For Mexican case is viewed that foreign rate of value added is bigger than domestic. This is the reason to analyze the problem that's going to be explained in the next section of the article.

Manufacturing development, value added, and exports

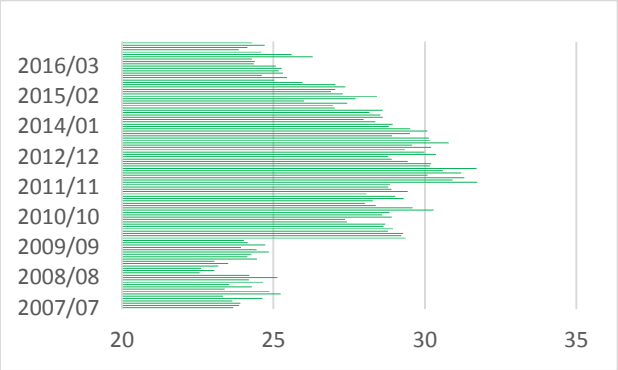
With Mexico's entry into GATT in 1986, trade began a phase of liberalization in which it was intended to integrate the country in a different way in the world market. Then, the economy was oriented towards the foreign with the intention of achieving greater competitiveness through trade, boosted by the dynamics of exports. As can be seen in chart 1, within the total exports, the most dynamic component is the manufacturing exports, which have experienced a huge boom since 1980 and which prevails until today. In particular, these exports experimented some decline in their participation during the period corresponding to the financial crisis of 2008, which originated in the sub-prime mortgage problem.

All mechanisms aimed at the liberalization of trade and capital were part of a policy whose purpose was to boost economic growth through the increase in manufacturing exports. Thus, by increasing exports, aggregate demand would also increase, which would lead to increases in domestic production and employment (Ruíz & Moreno-Brid, 1996).



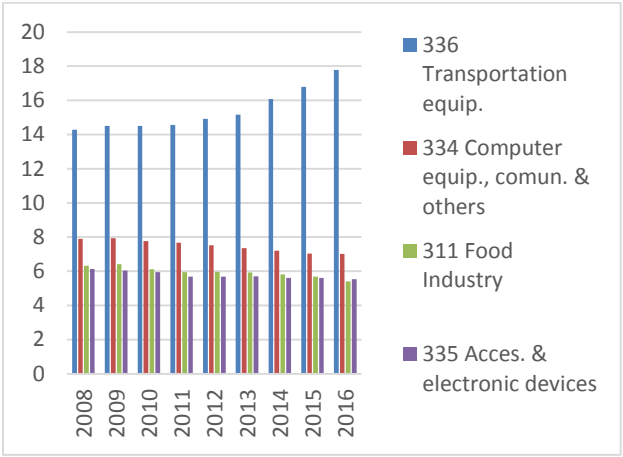
Graphic 1 Share of manufacturing exports with respect to total exports, 1993:01-2016:12. Source: Own elaboration with information from CEFP

During the period of trade liberalisation, manufacturing exports have been characterized by a high content of imported inputs, which is explained, among other things, by the exiguous national production, thus causing local companies to have to resort to external consumption. This trend is corroborated by observing the consumption of national inputs by local manufacturing establishments, which, at best, doesn't exceed 32% of the total (see chart 2).



Graphic 2 Consumption of national inputs in respect of total inputs by manufacturing establishments in Mexico, 2007:01-2017:01. Source: Own elaboration with information from INEGI.

According to chart 3, within the manufacturing establishments in Mexico, subsector 336 (corresponding to manufacturing of transport equipment) has grown progressively from 14 to 18 establishments, followed by subsector 334 (manufacture of electronic components) and food industry (subsector 311) during the period 2008-2016.



Graphic 3 Number of manufacturing establishments in Mexico, 2008:01-2016:12. Source: Own elaboration with information from INEGI.

In particular, the subsectors 334 and 311 are characterize by being highly intensive in technology and therefore, have become important consumers of it, which exacerbates, even more, external dependence.

As a result of the strong tendency to import, the added value that local companies incorporate at the final price of the market is very low. This fact is important as the value added of exports is the percentage of the final value of a product that is explained by processes developed in Mexico, and not by the rest of the countries that were part of the production chain of that product.

As can be seen in chart 4, the main exporting countries of East Asia and South-East Asian are located at the top of the ranking of participation in the GVCs, what is explained because they import a significant portion of their exports, while a significant portion of their exports are intermediate goods used in exports from other countries.

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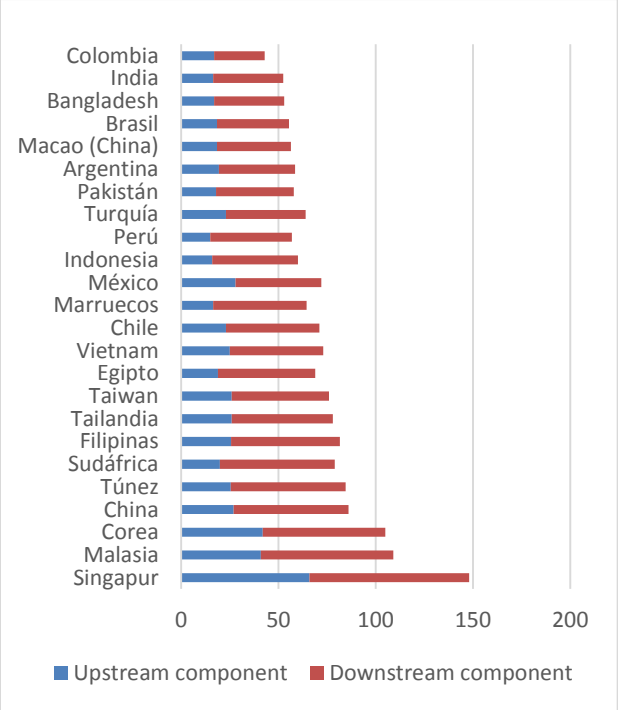
On the other hand, other developing exporting countries, such as India, Brazil, Mexico, Argentina, and Turkey, have a relatively low rate of participation in global value chains, because they have a lower level of 'upstream component' participation due to the nature of their exports. However they also have a low level of participation 'downstream component' because most of their exports are final goods or services that are not used as intermediate goods of exports from other countries.



Graphic 4 GVC Participation per country, 2010. Source: UNCTAD (2013)

As a reflection: while the growth of the manufacturing sector has been highlighted, the truth is that it doesn't have the capacity to transfer its positive effects to the economy as a whole because it's accompanied by a strong increase in the volume of imports (as already mentioned), which implies the existence of a high income elasticity of imports.

As a result of a predominant specialization in the assembly by local manufacturing establishments and the growing tendency to import intermediate inputs, machinery and equipment to carry out this process, the aggregate value generated with respect to global manufacturing production is scarce.

Econometric model and results

Data were collected from INEGI, particularly of National Accounts System (see Global Manufacturing Productivity per sub branches). Also, the study embraces 81 manufacturing subranches for 2015, according available information. The variables used are expressed in logarithms, except for the variable "Top sub branches" which discrimates the production value of sub-branches from average.

The econometric equation used is defined as:

$$ln\ Value\ Added = \beta_0 + \beta_1\ ln\ PMG + \beta_2\ ln\ PM + \beta_3\ Top\ sub\ branches + \varepsilon \quad (2)$$

R-squared	0.9365	Obs	81	Marginal Effects
Variable	Coef	T	p>t	%
Lpmg	0.9096096	28.08	0.000	90.96
Lpm	0.0607997	1.00	0.320	
Top	0.0207938	0.07	0.941	

Table 1 Econometric results. Source: Elaborated by the authors using Stata 12

According table 1, the R-squared indicates that 93.65% of variability of added value is originated by global manufacturing productivity.

The results of marginal effects mention that a 1% of increase in global manufacture productivity, it will cause a growth of 90.96% in value added for mexican manufacturing sub branches. By the other side, local manufacturing productivity can´t have effects on added value and the size of productivity is not correlated to value added. In other words, the size or amount of productivity isn't necessarily a case of high value added production.

The econometric model was tested to have statistical validity. The tests of homoscedasticity, collinearity, specification, linearity were satisfactory except for normality.

Conclusions

The current work concludes that mexican manufacturing productivity has been growing up through exportations. They can be manufactured in a local way or could be part of global value chain.

The relevance of global value chains explain productivity in Mexico but the main problem is related to the importance of value added which is explained by global manufacturing productivity. The result is important to be reconsidered because local production represents an important percentage of total productivity but they are lack of value added.

The phenomena is due to productive chains where national industry is part of a global manufacturing process but mexican apportation of value added in global value chain is not as big as Asian cases. Therefore is important to recognize that value added isn't big comparing to other cases and local manufacturing does not contribute to this item.

The general reflection is about the dependence of an important item, which explain the competitiveness of nations.

For mexican case renegotiation in NAFTA could affect mexican productivity and competitiveness in many ways but principally in value added. According to data recovered from UNCTAD, cases such as China, Singapur and other countries with a high contribution of value in global value chains are economies with bigger dynamism and economic growth than mexican case.

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Appendix

Cameron&Trivedi Test for Heteroskedasticity			
Source	**Chi2**	**df**	**P**
Heterokedasticity	**14.34**	**8**	**0.0733**
Skewness	**15.46**	**3**	**0.0015**
Kurtosis	**1.86**	**1**	**0.1724**
Total	**31.66**	**12**	**0.0016**

Table 2 Test for heteroskedasticity

Source: Elaborated by the authors using Stata 12

Breusch-Pagan Test for heteroskedasticity	
Ho: Constant Variance	
Chi2 (1)	= 348
Prob > chi2	0.0621

Table 2A Test for heterokedasticity

Source: Elaborated by the authors using Stata 12

Variable	VIF	1/VIF
Lpm	1.09	0.915501
Lpmg	1.09	0.915501
Mean VIF	1.09	

Table 3 Test for collineality

Source: Elaborated by the authors using Stata 12

Ramsey test of Specification	
Ho: model has no omitted variables	
F(3.75)	**1.90**
Prob > F	**0.1364**

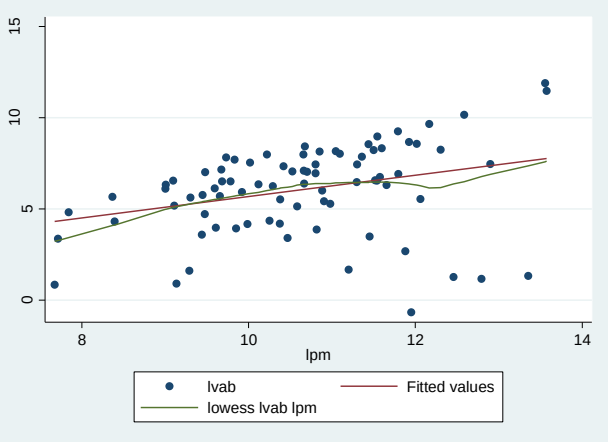
Table 4 Test for Specification

Source: Elaborated by the authors using Stata 12

Shapiro-Wilk w test for normal data					
Variable	obs	w	v	z	P>z
r		.94865	3.561	2.785	0.00268

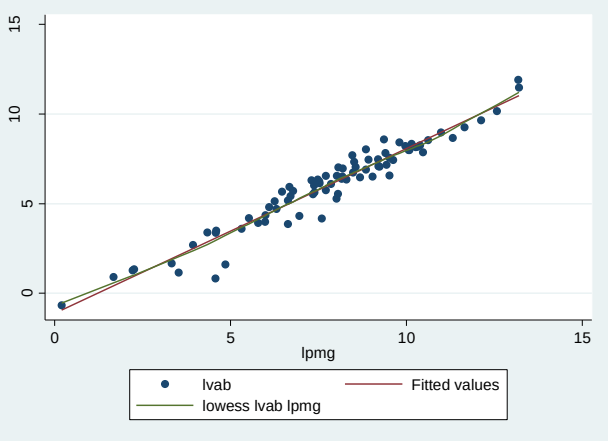
Table 5 Test for Normality

Source: Elaborated by the authors using Stata 12



Graphic 6 Test for linearity: Lvab-Lpm

Source: Elaborated by the authors using Stata 12



Graphic 7 for linearity: Lvab-Lpmg

Source: Elaborated by the authors using Stata 12

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Classification of the inventory according to the type of product in the micro-enterprises of raw materials in Irapuato Gto

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Abstract

Micro-enterprises usually lack a formal structure that gives them access to organizational strategies in all their areas, specifically in the Warehouse.

It was detected lack of organization and classification in the inventory of the warehouse, which estimated at 75% in disorder in relation to the accommodation of the inventory together with the handling of several types of merchantise causing the problem to spread.

The research was done in a descriptive way that provided a vision to establish the causes.
We analyzed two types of methods applied for the improvement of inventory control and reduce the financial impact, which allowed us to establish that the best alternative is the ABC method classification of merchandise by utilization and value reducing to 10% the bad organization in the warehouse, where A represents 20%, B 30%, and C 50%. In reference to the value and rotation of the merchandise.It should be noted that not applying a correct classification and adequate distribution within the warehouse, represents response times, losses in products with slow rotation and increase in maintenance costs.

The purpose of this work is to improve the operation inside the company by organizing the inventory.

Microenterprise, warehouse, inventory, classification

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Introduction

The word warehouse is a very popular term in our language, which has frequent use and is also applied in several contexts.

The location, space or physical place that is intended to house merchandise or in which wholesale products are sold is designated warehouse. For some industries and agents of the economy, the warehouse, turns out to be an elementary space for its satisfactory operation given that without it, it would be difficult to guarantee the sales wheel. In the warehouse you can store the raw materials used in the production process in question as well as semi-finished or fully finished products can be protected to be then destined to the corresponding sales or distribution channel.
In most cases these are really large spaces that have large shelves in which products or raw materials are organized and special machinery that makes the handling and movement of merchandise easier.

The good management of the warehouse facilitates the achievement of potential savings, as well as the increase of profits. Its strategic importance includes the integral participation along with the functions of marketing, sales, purchases, planning, production, etc. An organized warehouse facilitates the task, provides a neater environment and it is easier to find where each element of work is, thus gaining time and work efficiency the better the organization is.

This research is important to take better control over the inventory and avoid possible losses in the products and facilitate their management. On the other hand, it is very helpful for employees to locate the requested products quickly. In addition, when the merchandise is located by categories according to its typology, it facilitates the decision regarding the supply.

The present investigation focuses on the physical arrangement of the inventory within the warehouse, since it is a disadvantage to have messy merchandise causing time to be lost looking for a specific product, money, because sometimes unnecessary orders are made that were in existence but due to the bad location of this one, it is not detected, inventory that, due to not having a frequent exit cycle, is lost due to having a forgotten location inside the warehouse.

Justification

By not applying a correct classification and an adequate distribution within the warehouse, it is difficult to have an inventory control, causing long response times, losses in products with slow rotation and can't effectively manage the merchandise in the microenterprise, and impact on the financial situation by reducing liquidity and increasing obsolescence in raw materials.

Problem

It was detected that due to the bad accommodation and the lack of organization within the warehouse, the microenterprise is affected in the inventory costs because it does not have well-defined control strategies that result in the purchase of goods that are not necessary or due to the negligence of not knowing that they still had stock, and on the other hand, loss of efficiency over time when locating or looking for a product that is currently occupied due to bad organization, poor customer service is caused, causing losses in time and in atention.

If you do not correct these negative factors that the microenterprise has, they will continue to harm the performance and development of the same, so it is necessary to correct immediately the bad organization that is inside the warehouse.

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Objectives

General Objective

Establish a method of inventory classification in the warehouse by categories to facilitate its handling within it, trying to locate the products according to their type and frequency of output.

Specific Objectives

- Identify the type of merchandise according to its nature (plastics, edible products, etc.)
- Determine the appropriate technique for the classification and arrangement of the goods.
- Designate a specific area for each merchandise.

Background

The microenterprise first started with a local only, because it handled very little inventory and therefore did not have a fixed store within the business. With the passage of time, the microenterprise was incorporating more merchandise lines because people made demands for more specific products according to their needs, they began to market a large part of the raw material destined for confectionery and that is where a warehouse was created to supply the orders of the clients.

Currently, there are several types of warehouses according to the need or the circumstances in which the company is, adapting it or designing it according to the inventory that they manage in their disposition.

Warehouses are designed according to their stock, for example, those that keep tools, products in process, raw material.

According to the flow of production as intermediate and finished products, depending on their location, whether it is indoor or outdoor storage, also because of their location that represents a strategic point for companies where they consider it a central or regional warehouse. Companies are aware nowadays that a warehouse the better the organization, cost and execution times, the better the inventory management will be and the improved performance of any company in the market.

Theoretical framework

- **Inventories:** An inventory consists of the stocks of physical products that are conserved in a certain place and at a specific time. Each item other than the inventory, which is located somewhere, is called a stock storage unit.

Inventories exist because, for reasons of physical and economic nature, it is impossible for supply and demand to coincide. (Narasimhan, 2010.)

• **Importance of inventories:** Some inventories are unavoidable. All or at least a part of the manufacturing inventory in process is inevitable. At the time of carrying out the inventory count, part of it will be in the machines, another part will be in the phase of transfer from one machine to another, or in transit from the raw materials warehouse to the production line of the same, finished goods store.

The rest of the inventory that is held in accessories, raw materials, items in process and finished items is simply maintained for a basic reason.

We mainly have inventories because it allows us to perform the functions of purchasing, production and sales at different levels.

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- **Types of inventories:** Claudio Soriano mentions in his book of purchases and inventories that fundamentally, in a company there are the following types of inventories:
  - **Raw materials:** composed of simple and elementary elements that require a certain degree of transformation before it can be considered as a product.
  - **Semi-finished products:** manufactured articles that are incorporated in a larger article to constitute the final product; they are also called components.
  - **Packaging:** items that are used to package the finished products before their sale; It also includes the items that are intended for protective packaging, both to proceed with its sale and to better preserve the materials during the period in which they remain in inventory.
  - **Consumables:** goods that are not incorporated in the finished product, but that, in one way or another, are necessary for its preparation.
  - **Finished products:** complete items, working and ready for sale.

Inventory classification method

- **Method:** According to Fernando Hernández, "method is the way to conduct an investigation, which can include a series of procedures."

ABC method: The ABC method establishes that, when reviewing inventory, a company should "classify items from A to C", basing its classification on the following rules. Articles A are goods whose annual consumption value is "the highest". The main 70-80% of the company's annual consumption value generally represents only between 10 and 20% of the total inventory items.

The articles C are, on the contrary, articles with the lowest consumption value. The lowest 5% of the annual consumption value generally represents 50% of the total inventory items.

Articles B are articles of an intermediate class, with an average consumption value. That 15-25% annual consumption value generally represents 30% of the total inventory items.

Through this categorization, the supply manager can identify key inventory points and separate them from the rest of the items, especially those that are numerous but not profitable.

With this method, the items with the greatest impact on the total cost of inventories can be identified. To observe the cost of inventory, it is convenient to do it according to the articles of group A, determining a careful analysis about the decisions of quantities to be requested, when to request them and thus be able to make forecasts.

There will be more attention in articles of more importance but lesser number (A) and lesser in the less significant ones, although many things may be overlooked.

Different points can be observed to take into account in addition to the costs, some of them are: availability, obsolescence, degree of substitution and urgency to acquire the item.

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The latter is perhaps one of the most important since this can influence the increase in costs, since the rush in the delivery of an order can lead to buy it from any supplier regardless of other factors.

Methodology

Based on the techniques used for the collection of information, such as observation, unstructured interview and survey application, we learned about the conditions and problems in which the microenterprise was present, they made known this information that the warehouse lacked a correct organization of the inventory and that affected the lack of precision in an effective management control in the goods.

With the help of information provided by the person in charge of the supply of goods, the unit costs of the inventory per month and per year were established.

Through the ABC method, and based on the costs obtained, the percentage of use for the products was determined. For type A products, both plastics and foodstuffs, a percentage of 20% was obtained, while class B, 30%, and the rest is 50%, respectively, are class C.

With the percentages obtained through the ABC method, an equitable distribution was proposed for the improvement of inventory management and control.

Suggestions were defined according to the proposal obtained through this research to improve the functioning of its activities such as the storage of materials, inventory management and control, among others.

Type of Research

The present work is of descriptive and explanatory type, which consists of "seeking to specify properties, characteristics and important features of any phenomenon that is analyzed.

Describe trends of a group or population, will establish the causes of events, events or phenomena being studied.

The type of research will be explanatory because it will explain how a phenomenon occurs and under what conditions it occurs.

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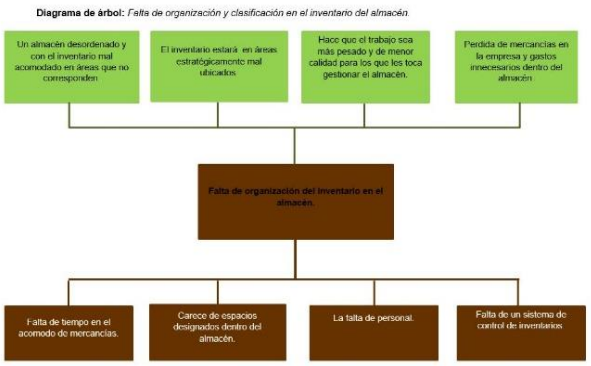

Figure 1 Tree diagram for the determination of the problem.

Results

Obtained from the simulation with Promodel

To obtain the results from the analysis of the simulations that represent the operations in the microenterprise warehouse with the original conditions and to achieve the comparison with the proposal, we considered times of an 8-hour working day in each simulation, in order to obtain comparable and objective results.

An operation was considered for each simulation with respect to a single product type in relation to its original position in the warehouse and to compare the results with the proposed location according to the analysis of the ABC method performed, as shown in Figure 2 y Figura 3

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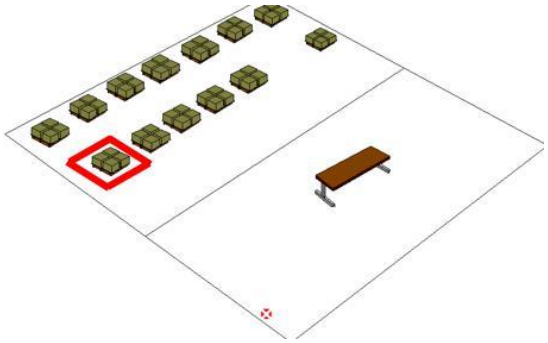

Figure 2 Original position of the product in the warehouse

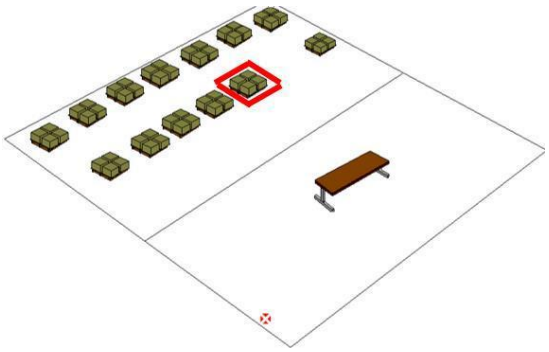

Figura 3 Proposed position of the product in the warehouse

The following tables represent the general results of the simulations performed for the locations that are involved in the process.

That includes from the entry of the client, the order of his merchandise, the search of this in the warehouse and his dispatch to the client.

Below is a description of each column of the tables, as well as their contrast and results obtained.

The first column describes the name of the participating entity in the system which are:

- Raw material Class A, which refers to the space where the raw material object of study is located in the warehouse.
- Counter, which is the place where the order is placed by the customer and the merchandise is dispatched by the employees.
- Entry, refers to the place where system clients enter and leave.

In the second column the working time that has been the object of study is indicated, in this case 8 hours are represented in total, the third column represents the capacity of each of the elements of the system, for this study the capacity was taken of only one product per customer input to the system in each simulation, in order to obtain comparable results.

In the fourth column the total number of entries is represented, it is in this section that the main optimization of times in the location of the products can be noted, since while in the first table that indicates the data of the original operations, one can observe a total of 96 entries, while in the proposed system, due to the reduction of search times for goods and distances in the warehouse according to the location determined by the implementation of the ABC method, a total of 129 entries are obtained, which indicates that it obtains an increase in the capacity of order attention in 33 units, that is, 33 more customers are served.

In the fifth column the average time per entry is shown, that is, per client, where it is possible to observe that there is a decrease in the time the client is served for 3 seconds; as well as a decrease of the time of search of merchandise in the warehouse of 1.38 minutes per product, which gives a total time optimization of 1.41 minutes for each product that the client requires.

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In the sixth column represents the percentage of use of each of the locations of the system, in this case the entry remains with a value of zero because it does not carry out any process of product search or dispatch thereof, but it is possible to notice a decrease in the percentage of use of the area where the merchandise is located, of 13.3% and an increase of 23.3% of use in the dispatch area, the first percentage represents a time saving of searching for merchandise, is therefore, the use of this area decreases, the second percentage represents the increase in the service capacity for a greater number of customers, that is why the increase in this area is registered, corresponding to the dispatch and taking of orders.

Name	Scheduled Time (HR)	Capacity	Total Entries	AVG Time Per Enty (MIN)	% Utilization
Raw material Class A	8.01	1.00	96.00	5.00	99.79
Counter	8.01	1.00	95.00	3.40	67.19
Entry	8.01	1.00	95.00	0.00	0.00

Table 1 Analysis of the original operating situation in the company

Name	Scheduled Time (HR)	Capacity	Total Entries	AVG Time Per Enty (MIN)	% Utilization
Raw material Class A	8.02	1.00	129.00	3.22	86.49
Counter	8.02	1.00	129.00	3.37	90.52
Entry	8.02	1.00	129.00	0.00	0.00

Table 2 Analysis of the operational situation proposed in the company (obtained from the promodel)

Conclusions

The classification method proposed based on the results obtained allows us to:

Determine in a more efficient way the quantities to order of each product and keep a strict control of the demand, and analysis of its variability, in order to maintain the levels of existence of adequate products in the warehouse. (Economic amount of order).

And determination of purchase frequency by product, as part of a control strategy is recommended:

Carry out internal audits in order to detect inconvenient or possible problems in the warehouse in time, and thus, be able to establish measures that counteract these defects on time (monthly) weekly stratified and at random.

Establish and renew annually the ABC control with the purpose of readjusting the changes that the demand may experience according to the products managed by the microenterprise.

Respect the assigned distribution for each merchandise proposed in said investigation. (Warehouse policy.)

Establish a clear and precise control of the goods receipts to the warehouse, reception reports for the goods purchased. The goods will leave the warehouse only if they are backed by clearance notes or requisitions which must be duly authorized to guarantee that they will have the desired destination.

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Exploitment of coffee value chain. Knowledge of new consumer trends in Mexico

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Abstract

The value chain has been understood as a manner to identifying the activities that allow to develop value for the clients, therefore, it has allowed to understand the manner in which the products can accede to market niches more diversified, the coffee that is one of the products more produced and demanded, reflects opportunities to develop by-products that focus on consumers with needs and specific characteristics, owing to that it occupies a privileged place in terms of beverage preference, generating important indicators of growth in consumption during the last 10 years, with an annual average growth of 2.3 percent. Therefore, this research has the objective of identify the dependence of the intrinsic attributes of the coffee in the determination of purchase according to the age of the consumer, to establish possible market niches to which the productive processes can be directed in the search of a maximum exploitment of coffee in Mexico, diversifying the value chains with base in consumer demand.

Value chain, Coffee, Consumer satisfaction

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Introduction

Creating value in a product implies generating a good that provides a solution to consumer requirements (Rural Magazine of the European Union, 2016). The value chain has been understood as a way to identify the activities that allow the development of value for customers, and to achieve their satisfaction. For Porter (1986) this concept allows to know the ways to create benefit for the consumer, with the desire to display competitive advantages (Quintero, Sánchez, 2006).

Any value chain, both short and long, tries to meet the requirements and expectations of demand considering that markets are increasingly heterogeneous in all productive sectors, highlighting food claimants, who are increasingly segmented, which forces to develop diversifications in the value chains, since the consumer is increasingly demanding because it has a higher level of information, in addition to having more possibilities of comparison (Fandos, Flavián, 2011; Britz, Britz, 2012). The agri-food sector, as a generator of food, has stood out as one of the markets that has undergone the most transformations in recent times, the value chain has allowed us to understand the way in which products can access more diversified niches, providing a balance before the series of transformations that have been presented (Aznar, 2012).

The added value can be generated from agricultural use through the transformation of primary products under emerging consumer trends (Rural Magazine of the European Union, 2016), based on this idea and considering one of the most produced and demanded products as coffee, which reflects latent opportunities to develop by-products that focus on niche markets with specific needs, highlighting as a point in favor that global coffee consumption is increasing, maintaining an average annual growth rate equivalent to 2.3% in the cycles that start from 2004 to 2015 (Panorama Agroalimentario, 2015), in addition to the fact that the aromatic is one of the most economically important products in the world, occupying a privileged place within the existing beverage markets (Canet., et al, 2016), positioning itself in second place after oil in international trade figures, creating income greater than $ 15,000 million annually for the exporting countries, providing work to more than 20,000,000 people worldwide and remaining one of the most important sources in the generation of foreign exchange (Canet., et al, 2016; Figueroa, Pérez and Godínez, 2016), it is a priority to make maximum use of this grain by adding added value to the by-products derived from coffee, directing them towards strategic markets that promote this significant sector at a national and international level. According to the Law of Sustainable Rural Development (2012), coffee has been considered as a basic and strategic product within the country, which is why it is necessary to establish strategies that generate high value through the incorporation and / or integration of productive chains that contribute to their competitiveness (National Development Plan, 2013-2018), highlighting that the coffee production chain maintains one of the most important places within the agroindustrial sector in Mexico, due to the economic importance it represents, being the livelihood of more of 3,000,000 families (Consejo Mexicano del Café y SAGARPA, cited in Comprehensive Coffee Promotion Plan in Mexico, 2012).

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That is why it is necessary to generate knowledge that drives the development of new markets within the coffee sector, for a better use of coffee within strategic places that present areas of growth opportunity and that require a boost for economic development.

Therefore, this study aims to identify the dependence of the intrinsic attributes of coffee in the determination of purchase according to the age of the consumer, to establish possible market niches to which the productive processes can be directed in the search of a maximum use of coffee in Mexico, considering that the opening of by-products with added value within the coffee sector is an alternative to promote this sector.

Justification

Starting from the idea that the objective of developing new products is to create goods of greater value for the consumer (Slater and Narver, 2000) it is a priority to establish value strategies along productive chains that produce favorable results for producers of coffee in general, and especially those in poverty, with the purpose of significantly increasing their economic income, adapting their products to consumer requirements (Aragón, Montero, Araque, Gutiérrez, 2013) as these have an influence on the chain of production through purchasing decisions, driven by preferences and lifestyles (Higgins et al., 2010)

The added value can be generated from agricultural exploitation through the transformation of primary products under the emerging consumer trends, this concept has been introduced as a key instrument in the promotion of rural development, based on the idea that the value of a product or service can be increased during the production or distribution phases, adding those elements for which consumers are willing to pay more, justifying in this way, orientation to strategic markets is a key factor that prevents the failure of business, therefore and in accordance with the policy concerning the development of European communities, it is a priority to establish added value in products for the economic development of producers (Rural Magazine of the EU, 2016).

In this sense and because coffee is produced mostly by smallholder farmers, this sector has important traditional knowledge, which if associated with complementary strategies, can lead to the development of new value chains (Helmsing, 1999), focusing on production to less conventional processes (Sepúlveda, Chekmam, Maza and Mancilla, 2016), that obtain added value from the perspective of the consumer, benefiting the members of the productive chain, considering that the absence of value in the products causes a decrease in the market prices compared to those that do (Institutional Program COMCAFE, 2013).

Problem

Coffee is one of the most representative products of Mexico, its manufacture is carried out mainly in the indigenous populations located in the states of Chiapas, Colima, Tabasco, Hidalgo, Jalisco, Veracruz, Puebla, Oaxaca and Guerrero, among others (SAGARPA, 2016). In 2015, a total production of 1,026,251.98 tons of coffee was reported (SIAP, 2015) and a national consumption of 2,354 thousand bags of 60 kg each (OIC, 2017).

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This sector has more than 500 thousand coffee producers, distributed in 486 municipalities, highlighting Oaxaca, Veracruz, Chiapas, Puebla and Guerrero, for having a greater number of spaces with aromatic production (SAGARPA, 2015).

Coffee production has a high degree of importance in the country, generating impacts on the economic, environmental and social aspects, together with being a source of foreign exchange and employment generation (FIRA, 2017). But it has also been characterized by serious recurrent crises that cause, among other effects, minimum wages and salaries that reflect poverty among people who are immersed in this sector, another problem is that only large producers have been integrated into the productive chain while medium and small producers continue to sell grain with no added value, coupled with the problems of low productivity and quality, as well as difficulties in organizing along the production chain (Martínez, Díaz, and Rodríguez, 2014) .

Therefore, it is a priority to generate strategic knowledge that will boost Mexican coffee production, through quality production, with added value to coffee to enhance its competitiveness in the value chain, to develop a coffee product well worked in the field , with the necessary conditions and strategies, that give origin to a grain that satisfies the demands of the consumers (Anacafé, 2011) through the use of coffee attributes, to achieve a strategic positioning in the sale of this product, due to that consumers develop preferences and base their purchasing decisions based on the perception of attributes (Gorgogline, Petruzzelli and Panniello, 2017) and that these have been a key factor in the development of the market of this beverage consumed nationally and internationally (Kwast, 2010 cited in Sepúlveda, Chekmam, Maza, Mancilla, 2016).

Hypothesis

– Null hypothesis:

The preference in the intrinsic attributes of coffee is independent of the age of the consumer.

– Alternative hypothesis:

The preference in the intrinsic attributes of coffee depends on the age of the consumer.

Objectives

General Objective

Identify the dependence of the intrinsic attributes of coffee in the determination of purchase according to the age of the consumer.

Theoretical framework

Next, the definition of the value chain and its relationship with the productive chain is presented, afterwards an analysis is made of the importance of determining the needs of consumers for the development of value added and quality products, in the same way, the intrinsic attributes of coffee are presented, which influence the consumer's purchasing decision.

Value chain

In a productive chain, a competition is generated between the different actors for the optimization of their economic benefits, on the other hand, in the value chain, a systemic optimization is developed, in order to achieve goals that individually would be seriously difficult, the scope of the purposes is achieved through communication, coordination and cooperation (Martínez, 2012).

In this sense, the Food and Agriculture Organization of the United Nations (FAO) makes the difference between the value chain and the productive chain, highlighting the latter as a broader meaning in the description of the interactions produced between the actors that are involved from production to final consumption.

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On the other hand, the value chain is understood as a system that is constituted in a strategic way, which can be informal or formal, between the independent business actors that are working within a productive chain, and that have the purpose of producing goods based on differentiation (Martínez, 2012).

When a company or chain seeks a differentiation strategy by innovating its products or processes, it acquires additional value (Lundy et al., 2004). In this way the productive chain takes a value chain approach.

According to Lundy, Gottret, Cifuentes, Ostertag and Best (2004) a value chain is characterized and is different from a productive chain because of the following:

- The participants of the chain have a long-term strategic vision.
- The members are interdependent and work together to define objectives, share risks, enjoy the benefits and strive to maintain the relationship.
- It is characterized by the orientation in the demand, therefore, the satisfaction of the consumers is sought.
- The participants are committed to the control of the quality and solidity of the products.

In the sense that a value chain is characterized by meeting the needs of the demand, it is a priority to know the preferences of the consumer to develop products with added value from the perspective of the final consumer.

Importance of determining consumer preferences for the development of value-added products.

León Darío Parra mentions that the key to the success of Latin American entrepreneurs is the detection of the needs of consumers, both present and future. This factor is essential to produce goods and services that have an effective market in the medium and long term, which does not depend on economic cycles, but rather on the preferences of consumers towards highly exclusive products in captive market niches (Parra, 2015). In this sense, Bouchereau and Rowlands (2012) mention that the success of a product or service obeys mainly in how it satisfies the needs of the clients, which motivates the companies to invest more effort to obtain the necessary information to determine what the client is looking for.

According to Kotler and Armstrong (2012) customers are the most important participants in the micro-environment of business or companies, the goal of the value-offer system is to serve the target customers and to develop lasting relationships with them, said authors mention that each type of market has specific characteristics, therefore, the seller must study the consumer to offer those products that meet their consumption expectations.

According to the FAO (2015), the main purpose of value chains is to increase profits by eliminating inefficiencies along the chain, at the same time maximizing the income of all the actors in the process which is achieved through the development of products that consumers are willing to acquire in greater quantity and at higher prices.

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In an FAO study on the coffee value chain in Nicaragua, it was concluded that in order to boost the competitiveness of coffee activity in this country, the development of markets is a key strategy, where investment should focus on intensification of national and international niches under a diversification of the consumers and the aggregation of value to the by-products of the coffee, promoting the internal consumption from updated studies of the market, because the economic benefit for the actors in each value chain not only It depends on the margins obtained by each actor, but also on the sales volumes, that is why products must be offered based on consumer preferences (FAO, 2006).

Other research based on the coffee value chain took place in Chanchamayo and Satipo in Peru, a country that, like Mexico, maintains a significant degree of importance in coffee production. This study shared the purpose of identifying opportunities to increase competitive advantages in diversified markets while maintaining the possibilities of adding value to coffee, it was concluded that one way to promote this sector among different types of producers, is through the development of differentiated markets, based on the supply of specialty coffees, which are determined in accordance with consumer preferences (Gómez, 2011).

In Risaralda, Colombia, a study was developed to know the critical factors of the creation and the increase of value in the coffee chain, where it was concluded that one of the strategies for the promotion of the sector, is that the coffee growers of special coffees are leaving behind the culture of concentrating only their interest in the physical characteristics of the aromatic, but also in what the specialists call attributes in cup, which gather a set of desirable characteristics and preferred by the final consumer, a strategy that has been a key point in the momentum in this important sector, placing Colombia as one of the most influential producers in the supply of coffee.

According to the above, it can be concluded that the creation of value of coffee based on the preferences of intrinsic attributes for consumers is a recommended strategy for the promotion of the coffee sector through the diversification of value chains, aimed at niche markets with specific characteristics and needs, directing the processes of delivering value towards consumer satisfaction, a strategy that has driven this sector in countries that are influential in aromatic production, who have changed the conventional forms of production to adjust to trends of consumption and preference of coffee.

Intrinsic attributes of coffee

The color, body, aroma and flavor of the aromatic are attributes that can be perceived during consumption in the cup, and because they are determinants of the degree of quality of the beverage, each stage of the coffee transformation process must be taken care of, avoiding, in this way, that during the consumption, defects are perceived, such as: moisture flavor, sour flavors, earthiness in the mixture, oxidations in the oils of the grains, until the total loss of the body, flavor and even aroma (Profeco, 2001).

Next, each one of the intrinsic attributes of the coffee is explained, which can be perceived in the consumption in cup and that in addition they can get to determine the taste and the preference towards the coffee:

1. - **Aroma:** This attribute refers to the fragrance contained in the drink, so that this denotes the quality of a good coffee must be fine and penetrating. When the packaging is not done correctly, the aroma is affected directly, but also depends on the good storage and the altitude of the coffee plantations (Pichilingue, 1993; Guambi, 2004).

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2. - Color: It is a manifestation of the state of the coffee and a determinant of the quality of the grain, this attribute is related to the altitude, the benefit, the state of maturation, the drying and the sanitary state, when the coffee is of a blue-green shade it is considered to maintain an ideal color (Pichilingue, 1993)

3. - Flavor: It is an organoleptic property of coffee, it is composed of the combination of gustatory and olfactory attributes. When the beans are harvested ahead of time the taste is altered, in the same way when the beans mature in excess and the drying process is not adequate, nor the storage, the beverage has an unpleasant taste (Guambi, 2004).

4. - **Body:** This quality is related to soluble solids at the time of infusion, it can be classified as: Light, Medium, Pronounced and Complete (Anacafé, 2001).

As can be seen, each of the qualities that distinguish the quality of coffee in the cup, are linked to one or more stages of the production process, that is why it is essential that the producer knows your product and the needs of the consumer, with the purpose to develop production processes oriented to their satisfaction (Anacafé, 2011), that gives rise to a specialized and differentiated coffee that can be placed in markets with latent needs, characterized by new consumption trends in terms of coffee preferences.

Methodology

Type of Research

In order to achieve the objective of identifying the dependence of the intrinsic attributes of coffee in the determination of purchase according to the age of the consumer, the type of research is Quantitative, since, through the collection of data, the verification of the established hypotheses, under numerical measurement and statistical analysis (Sampieri, Fernández and Baptista, 2010).

Likewise, the scope of this investigation will be descriptive, under the framework of Sampieri, Fernández and Baptista (2010) who establish that the descriptive studies have the purpose of specifying properties and characteristics, which are considered important in a phenomenon, that is subject to some analysis, they only intend to measure or collect data jointly or independently on the elements of research, helping to describe trends of a population or a proportion of it.

The means of contact is on-line through Survey Monkey, the research instrument is a structured questionnaire, consisting of dichotomous questions and multiple choice, which was validated by two methods: the first was qualitative under the opinion of experts in research, where through qualified voices it was possible to determine that the questionnaire that was developed for the research has content validity and is considered an instrument capable of measuring the variables in question (Sampieri, Fernández, Baptista, 2010), for this first Validation stage was supported by researchers from two research institutions.

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The second validation method was quantitative, through the Statistical Package for the Social Sciences program (SPSS), obtaining as a result a .771 reliability, which shows that the internal structure of the questions is coherent with the research and that the answers are reliable according to Sampieri, Fernández, Baptista (2010) who establish that from 0.75 it is considered acceptable.

Cronbach's Alpha	Number of elements
.777	5

Table 1 Reliability of the questionnaire

Source: Own *Elaboration*

The unit of analysis within this study is made up of coffee consumers within the country. The population of the research is composed of all coffee consumers who live in a state of the Mexican Republic, because there is no exact data on coffee consumers in Mexico, the annual consumption provided was taken as a reference by the International Coffee Organization and the number of consumers was deducted on the basis of national per capita consumption.

To determine the research sample, the formula corresponding to finite populations was used with a confidence level of 93% and an error corresponding to 7.0, with positive and negative variability of 50%, obtaining as a result the application of 167 questionnaires, which were distributed as of the month of February of the current year, through emails, and the diffusion of the link through social networks, through a Facebook page and other communication pages.

The hypothesis testing will be through the square chi method, under the framework of Levin and Rubin (2010).

Results

Results obtained in the research instrument

Next, the results obtained in the research instrument applied to national coffee consumers are described, it should be mentioned that the representative sample was of 167 questionnaires, but the diffusion of the link covered a range of 200 people surveyed via electronic means.

In relation to the questionnaires that were answered, 20 were discarded since the answers were recorded as incomplete within the system, of the 200 links that were opened, a total of 12 consumers did not accept to answer the survey, 8 people from those who accessed answer they answered that they do not drink coffee.

As a result, it was found that 96% of the respondents consume coffee and only 4% do not, which proves that the aromatic has a great influence on the beverage trade in Mexico. There was a reach of 22 states of the Mexican Republic, upon receiving response from 68.7% of the entities in the country, Guanajuato excels with 43% representativeness, Queretaro and Jalisco with 13%. The results were proportional in terms of the gender of the respondents, since there is 50.30% female participation and 49.70% corresponds to male participation. Regarding the ages, the answers were distributed as follows: from 19 years old or less with 5.2%, from 20 to 29 years old with 52%, ages 30 to 39 years old represented 26%, 13.30% corresponded to people aged 40 to 49 years, ages 50 to 59 years had a representativeness of 2.3% and finally the range of 60 years or more with a total of 1.2%.

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According to the results corresponding to the level of studies, the following is known: 48% of the respondents have a level of undergraduate studies, 35.8% correspond to those surveyed with a postgraduate degree, 12.1% have high school and only it has a 2.3% with secondary level, in the section of others, which represented 1.7% it was registered that the respondents have a Higher University Technician level.

It was found that for 92.2% of the members of the study, the intrinsic attributes of coffee are important when buying a coffee either dry or prepared, 3% are indifferent and 1.8% do not know if they are important or not select your coffee. For 2.4% of the respondents there is a different attribute to aroma, flavor, color or texture, to base their purchase decision and only 0.6% answered that they definitely do not take into account the intrinsic attributes for the purchase of dry or prepared coffee.

In the category where it was pointed out that the consumer values more attributes than those presented in the study, it was recorded that 2.4% is distributed among the election based on fresh grain, the beneficiary process and the price, each with a representativeness of 0.80%, which reflects that the consumer is more interested in the intrinsic attributes of coffee for his purchase decision than any other extrinsic attribute.

Results obtained in the operation of variables in the hypothesis test (Chi square)

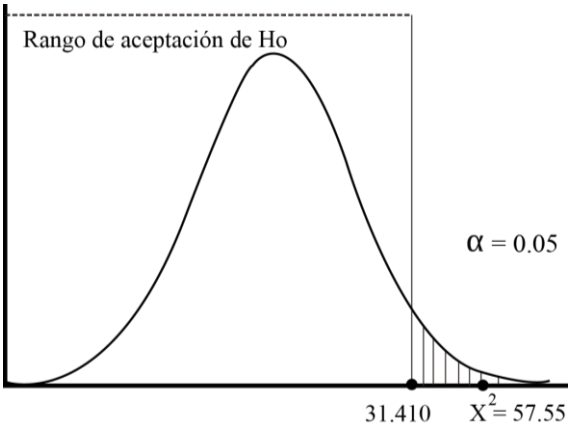
To check Ho and H1 through the application of square Chi, a grouping was made among coffee consumers according to age groups, followed by a count through contingency tables to establish the number of consumers in the groups. categories where the attributes are important for the purchase of coffee, another category where the attributes are not important, are indifferent, a fourth class where the consumer does not identify them, therefore, it does not know if they would be taken into account, and the last option, establishing that there is a more significant attribute. Obtaining as a result Table 2.

	People who drink coffee						
Perspective of the attributes	19 or less	20 to 29	30 to 39	40 to 49	50 to 59	60 or more	Total
Yes	7	82	38	25	3	0	155
No	0	1	0	0	0	0	1
indifferent	0	2	1	0	1	1	5
Don't know	1	1	1	0	0	0	3
Other	0	0	3	0	0	1	4
	8	86	43	25	4	2	168

Table 2 Data of the grouping among coffee consumers according to age groups.

Source: *Own elaboration with reference in Levin and Rubin (2010).*

According to the observed (Fo) and expected (Fe) frequencies there is a result for the square chi statistic of $\mathbf{X^2 = 57.55}$ (See Annex 1**)** and where according to the level of significance equivalent to 0.05 and 20 degrees of freedom there is a range of acceptance of **Ho**= 31.410.



Graphic 1 Representation of the degree of acceptance of Ho. (Own elaboration).

Conclusions

The results that were generated in this research were very favorable, since of 167 questionnaires that had to be answered as part of the representative sample, 43 additional surveys were received, adding a total of 200 responses from consumers in 22 states of Mexico.

As a result, it was found that 96% of the people who agreed to answer the survey are coffee consumers, which shows that the aromatic is one of the most preferred beverages in the country, among the states that were most representative in this study, excel, Guanajuato with 43%, Queretaro and Jalisco with 13% and were 10 states of which no response was generated, among them, Quintana Roo, Chiapas, Colima, Durango, Tamaulipas, Oaxaca, Morelos and Nayarit.

Regarding gender, a proportion was maintained, since 50.30% belonged to women's answers and 49.70% to men's opinion, it was found that there is a minimum difference in coffee consumption between men and women, excelling the male with 49.43% and a total of 48.31% consuming coffee, therefore, it can be estimated that the aromatic is consumed proportionately between both sexes.

It was observed that coffee is consumed by people of all ages, being the range of 20 to 29 years with more consumption with a representativeness of 49.72%, followed by the range of 30 to 39 years with 25.28% of consumers, including some members of the sample stated that they consume the aromatic from their childhood, maintaining their preference for this drink until adulthood.

It is considered that the registered ages, somehow justify that most of the participants have a university degree, since only 14.4% corresponds to people with high school and secondary completed and the 85.6% remaining record that had undergraduate and graduate level. Similarly, it is estimated that people with a bachelor's degree and a graduate degree consume more coffee than people with lower academic levels, with a representativeness of 47.75% and 32.22% respectively.

Regarding the attributes of coffee, it is concluded that the Mexican consumer does take into account the intrinsic properties of the aromatic at the time of making its purchase decision, as for 92% of the respondents attributes such as taste, color, aroma and texture, are important to acquire a coffee either dry or prepared, only 3% of the members of the study said that the attributes are indifferent and 1.8% of people do not know if the attributes are important. On the other hand, 2.4% of consumers expressed that for them there are more important attributes than flavor, color, aroma, and texture to determine their coffee purchase, being distributed equally among 1.6% where grain is more important fresh and the beneficiation process under which the coffee is processed. A single person expressed that the price is an important attribute for the purchase of their coffee, for which it is concluded that the intrinsic attributes have more weight in the consumer's purchasing decisions, than other factors such as extrinsic ones.

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Based on the previous results and on the data obtained in Chi square equivalent to 57.55, being outside the range of acceptance of the Ho which is equivalent to 31,410, the H1 is accepted, emphasizing that the preference in the intrinsic attributes of coffee , depends on the age of the consumer, which reflects an opportunity for the development of coffee by-products based on the preferences of intrinsic attributes of the aromatic, creating segments or market niches according to the age of the consumers.

Therefore, it can be justified that the consumer segment that bases its purchase on the intrinsic attributes of coffee is an opportunity for the development of new value chains within the coffee sector, since one of the trends in the consumption of this product is the purchase based on the intrinsic attributes, which if combined with age can bring favorable results for value-added coffee suppliers to satisfy this niche market.

Gratitude

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The automation of processes and their relation with the competitiveness of the Guanajuatenses MiPyMes

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Abstract

The automation of processes, terms so commonly known today by specialists in the business area, but a challenge for the Guanajuatenses MiPyMes, because the situation inside the organizations is precarious, and in this sense most of them are They find working with artisan processes and applying the administration and the basic business management. Therefore, incorporating information technologies and in general performing the automation in all its processes represents a great challenge.

The purpose of the present investigation was to determine the relationship between the automation of the processes in the MiPyMes established in Guanajuato with the competitiveness, for it was applied an instrument of 20 items, structured according to the Likert scale; The application was made through electronic and personalized means to 379 managers of micro, small and medium enterprises and the results obtained allow to infer that there is evidence that the level of automation, the use of TICS, the age of the responsible And / or manager and their academic training affect the way in which they manage their internal and external processes and infer in their competitiveness.

Automation, processes, competitiveness, MiPyMes

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Introduction

Technological advances in recent decades in the global environment have greatly influenced the functioning of organizations and have generated increased productivity and use of resources, being able to claim that almost 100% of global industrial production is controlled by automatic or semi-automatic control systems. Therefore, currently the automation of processes plays an extremely important role in companies, since the use of ICT, knowledge management, innovation management and technology management increasingly influence the competitive level they have. In the global environment we live, it is more important than ever for organizations to simplify operations so that managers and CEOs can focus more time on activities that generate income. Regardless of whether it is a micro, small, medium-sized company or a large corporation, defining the activities by roles and areas to automate the processes, makes operations more efficient, thus reducing costs and increasing revenues.

Considering the studies conducted in Mexico by Aragón and Rubio (2005) and Bojórquez and Pérez (2011), the internal factors on which the MSMEs should base their competitive advantage are: financial capabilities, technological position, innovation, marketing capabilities, the management and management of human resources, sales, as well as the use of information and communication technologies. Therefore, the identification of internal success factors in micro, small and medium enterprises is crucial, since this type of organizations generate two thirds of employment in Mexico, (Bojórquez and Pérez, 2011), contribute with 52% of the Gross Domestic Product (GDP) and 72% of employment in the country (PROMÉXICO, 2014).

If the importance of the MSMEs is considered for the economic development of the state of Guanajuato and the country itself, and given the strong competition and financial crisis that this business unit is going through, the main objective of this study is to determine the relationship between the automation of the processes and competitiveness, through the analysis of variables such as the use of ICTs, academic preparation and the age of the manager, in order to propose actions that contribute to guarantee their permanence, growth and consolidation.

The importance of the research presented here is relevant, since the MSMEs are of great importance for the development of the rural economy, at the state and therefore national level.

For the design of the instrument, the following variables were considered: competitiveness, the automation of organizational processes through the use of Information Technologies, the level of manager preparation, and items related to the age of those responsible for the MSMEs, time they have in the position, among others, in such a way that they allowed to obtain information regarding the indicators in question.

Considering the information presented in the previous paragraphs, the present investigation aims to present evidence on the importance of the automation of processes in the MSMEs established in Guanajuato and its relationship with competitiveness, considering indicators such as the use of information technologies, age and academic preparation of the manager and additionally obtain information regarding the incorporation of the innovation and the time the manager has in the position.

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The research work presented here was conducted in the state of Guanajuato with a sample of 379 MSMEs during the second semester of 2016 and is structured according to a sequence, which is presented below: the introduction, review of Literature, methodology, analysis and interpretation of results to finally present the conclusions and the contribution to the area of knowledge.

Justification

According to the information provided by INEGI (2015), 3,687 micro, small and medium-sized enterprises open in Guanajuato in two years and have generated 7,978 jobs and a private investment of 482.9 million pesos; The Rapid Business Opening System operates in 36 municipalities. This was achieved through the System of Quick Opening of Companies (SARE in Spanish) that the government of the state of Guanajuato coordinates in 36 municipalities. Meanwhile, on May 6, 2015, Dr. José Manuel Cabrera Sixto, then rector general of the University of Guanajuato, said that according to INEGI data (2015), in Mexico there are just over 4 million companies, which 99% are small and medium, they generate 52% of employment in the country, which makes them the backbone of the state economy. Regarding the same topic, Heredia (2011) mentions that in Mexico, micro, small and medium enterprises constitute 90% of companies, 42% of employment, and contribute with 83% of GDP.

Problem

The use of ICTs, automation of processes, seniority, innovation, product quality and / or service and sales are classified as success factors in the MSMEs according to (Bojórquez and Pérez, 2011).

Therefore, it is possible to infer that the automation of processes is one of the main causes of the economic downturn of micro, small and medium-sized companies established in the State of Guanajuato, which generates internal problems such as poor performance, excessive costs in labor payment, limited growth, little positioning in the market and in general the application of the basic principles of business management.

In the state of Guanajuato, 26,716 MSMEs are located, belonging to the different sectors. This is registered as updated by the Mexican Business Information System as of November 15, 2016, however, in accordance with the studies carried out by the Organization to Cooperation and Economic Development (OECD) indicate that of every 100 new companies, only 10 manage to consolidate in the formal market by the tenth year of operation and this is an indicator that is related to management weaknesses, possibilities of failure and therefore Survival mentioned by Molina, Armenteros, Plascencia, Barquero and Martínez (2014) when announcing that 200 thousand new companies are generated each year in Mexico, 65% disappear before two years, 50% bankruptcy in the first year and 30% in the second year, in addition to studies conducted by the Organization for Economic Cooperation and Development (OECD) indicate that for every 100 new companies, only 10 log to consolidate in the formal market by the tenth year of operation.

Hypothesis

There is a positive correlation between process automation and the use of ICTs with the competitiveness of MSMEs established in the state of Guanajuato.

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Research question

Does the automation of organizational processes involve the use of strategies that contribute to competitiveness and business growth?

Objectives

General Objective

To determine the correlation that exists between process automation and competitiveness in MSMEs in Guanajuato.

Specific Objectives

1. Analyze the existing information on the internal factors that influence the competitiveness of MSMEs.

2. Apply a research instrument in the MSMEs of Guanajuato and analyze the information.

3. Propose strategies that contribute to increase the competitiveness of MSMEs.

Theoretical Framework

Competitiveness of MSMEs

Competitiveness for Sánchez (2007) is defined as the ability of a company to penetrate, consolidate or expand its participation in the market, which is expressed by factors such as skill, administrative action, maximization of installed capacity, optimization of financial, human and material resources, without losing sight of market signals.

Considering the information provided by Saavedra-García, Milla-Toro (2012) competitiveness is a multidimensional element because it evaluates internal aspects of small and medium-sized enterprises such as strategic planning, production, quality, marketing, human resources, accounting, finance, systems of environmental management and information systems; Therefore, competitiveness is a key element for the development, growth and sustainability of the MSMEs. According to the above, the elements or internal aspects that are important to analyze are all the elements that make up the institutional philosophy, among which we can mention: mission, vision, political values, rules, objectives, strategies, organizational structure, strategies of marketing, financing strategies, market analysis, distribution channels, and etc.

Frequently the achievement of objectives in organizations is related to competitiveness and directly with the business philosophy applied by their manager or manager, since the objectives are a purpose that establish possible measurable results and provide strength to the long-term management (León, 2013). Every economic organization has at least three general objectives: survival, growth and profits (Arce, 2010).

Hall (1992) states that a sustained competitive advantage is the result of the possession of relevant differentiated capacities, Handy (1990) suggests that companies should be more like universities and emphasize knowledge and positive information that allows access to a equally positive economic rewards. Itami and Roehl (1987) point out that one characteristic of successful organizations is that they recognize that they have learning processes that go hand-in-hand with all their operations and that these activities will have an impact on the performance of the organization.

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For Gilbreth and Strebel (1986) these attributes of success must include price, quality, aesthetics, functionality, image availability, and so on. Coyne (1986) classifies these attributes into four types of differentiating capacities: functional, positional, cultural and regulatory.

Under these assumptions, Hall (1992: 140) proposes a framework for analyzing intangible resources and differentiating capacities in organizations, classified in those that depend on people who are functional and cultural and those who do not depend on people, as are the positional and regulatory.

Factors that influence the competitiveness of MSMEs

Among the factors that influence competitiveness, it is possible to mention:

Human Capital

The term human capital was used for the first time in the research on Human Capital, which Theodore W. Schultz presented in his article published in 1961 in the American Economic Review. Most authors agree that human capital comprises skills, experiences and knowledge, but the economist Gary Becker (1978) adds personality, appearance and reputation.

According to the author Davenport (2000) the term human capital refers to skilled and educated people.

Innovation

Innovation must be considered as a competitive advantage that has different barriers according to the size of the companies, since innovative organizations are those whose competitiveness is based on the domain they have over an organization, over a certain technology or group of them, this allows them to maintain high innovation rates (Sánchez, 2007).

Effective advertising

Advertising is defined as the art of persuading potential consumers with a message through the media, so that they make the purchase decision. With this resource you can familiarize the consumer with the product or service, its attributes and advantages, aimed at satisfying a constant need of the client and helping to build a brand for a future (Muñoz, 2011).

Process automation

Considering the information provided by Castillo (1998: p.306), what is considered as automation of work processes, helps to understand the recent changes that are taking place in work processes. This author says that "it is considered automated to any company that uses computer services on its own computer, shared or by others, for the execution of one or more functions". On the other hand, Nora and Minc (1992: p.17) affirm that "every technological revolution provokes an intense reorganization of the economy and society and this obviously also occurs in the selected work processes in the productive organizations".

Industrial automation, considered as the management of information in companies for decision making in real time, incorporates computer and automated control for the autonomous and optimal execution of processes designed according to engineering criteria and in line with the plans of the business management (DNP, Colciencias, Strategic Plan of the National Program of Industrial Technological Development and Quality, 2000-2010).

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Therefore, the automation of work processes is associated as one of the antecedents of the so-called Management Information Systems (MIS for its acronym in English, Management System Information), which today are determinants for the performance of the administrative function, in as much, that these have solved a great part of the administrative problems within the productive organizations, although also they have generated new ones (greater unemployment, disqualification of the manpower, new diseases of work, resistances on the part of the workers, bureaucratization of organizational structures, the growth of hiring for a specific period of time, a new division of labor, etc.).

Importance of process automation

According to the information provided by Metal Stamping Services JOM in 2016, the importance of industrial automation derives from the great competitive advantages it offers to the companies that undertake such processes, since it ensures its competitiveness and its survival in the market, since there is an imminent need to maintain excellence in production processes, to ensure certified products, without incurring in risks of work accidents that represent costs for industries that have to face an increasingly rational and demanding customer. Therefore, it is a reality that digital processes suppose a great advantage for companies, since they allow them to carry out their work in a more agile and efficient way, without mentioning the important cost and time saving that they entail. And is that the digital era promises great things, a world in which people, processes and technology combine to do all the work with the least possible human effort.

One of the effects where the importance of automation in organizations is appreciated is in the reduction of the use of unskilled labor, since the management of the operators of "intelligent" machines multiplies the individual productivity, measured in units produced by human activity.

The results of the Xerox Digitalization at Work study reveal that, although companies want a more agile digital future, their present is still burdened by paper, because contrary to what is commonly thought that we live in the digital era, in the labor field paper processes are usually the norm

Methodology

The following describes the process of gathering information to carry out the present investigation.

Kind of investigation

An investigation was carried out with a quantitative approach, of non-experimental and transversal design, with correlational scope and explanatory implications. For the analysis of the information the statistical software SPSS was used, considering the indicators of competitiveness, use of ICTs and automation of the MSMEs, as well as the level of academic training of the managers of this type of companies, their age and the time the manager has in the position.

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Determination of the sample and data collection

In this study, the impact of process automation on the competitiveness of the MSMEs of the State of Guanajuato was analyzed. For the development of this research work, reference was made to the database offered by the Mexican Business Information System (SIEM), in which there are registered in the state of Guanajuato as of November 15, 2016, a total of 26,716 MSMEs, which have from 1 to 250 workers.

Formula Application

$$n = \frac{Z^2 p.\ q.\ N}{Ne^2 + z^2\ p.q} \quad (1)$$

$$n = \frac{(1.96)^2 X\ (.5)\ (1- 0.5) \times 26\ 716}{(26{,}716)\ (.05)^2 + 1.96^2 \times (.5)\ (1 -0.50)}$$

$$n = \frac{25\ 658.0464}{66.79 + .9604} = \frac{25\ 658.0464}{67.7504}$$

n = 379

Compilation of information

A structured instrument with 20 items was used considering the Likert scale that goes from 1 to 5 points, where they refer from totally disagree to fully agree and has a reliability of 0.915 according to the calculation of Cronbach's Alpha coefficient, so that according to Nunally and Bernstein (1994), there is an excellent consistency between the variables. The information obtained refers to the perception / evaluation of the variables of competitiveness, use of ICTs and automation. The application of the instrument was carried out through the electronic means and in a personal way at random to owners / managers of these MSMEs establishments (commercial, services, industrial).

To measure the validity of the instrument, it was submitted to Expert judgment (Delphi Method) and the pilot questionnaire was applied. The sample size was 379 MSMEs, considering a 95% certainty and a sampling error of 5%, therefore, the same number of instruments was applied.

Results

After making the corresponding correlations, the study hypothesis is accepted because there is sufficient evidence to infer that there is a positive correlation between the variables subject to study and that the competitiveness of the MSMEs is related to innovation and process automation. In addition, information was collected showing that scarcely 10% of MSMEs studied have been in operation for more than 10 years, 39.1% have been in existence for 6 to 10 years and 50.9% of companies are under 5 years old.

In the same way it is possible to appreciate that there is a great deficiency of automation in the MSMEs of Guanajuato (82%) and the use of information technologies is very limited (9%). Furthermore, with the information obtained it is possible to infer that the age of the manager has a considerable influence on the automation of the processes and on the use of Information and Communication Technologies (ICTs) within the MSMEs, because when analyzing the information 65.8% of these organizations where the age of the manager is between the 50 to 60 years range are not automated processes and the use of ICT is minimal, in addition to applying a very basic administration.

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From the above, it is possible to mention that the automation of processes is a need that has arisen mainly to satisfy a more demanding and competitive market, because it is important that organizations evolve along with society itself and its demands, because currently customers are increasingly rational, therefore, it is advisable to guide the automation of processes to contribute to having competitive companies, as an automated process means a final product of quality and more competitive due to factors such as the standardization of process and products , production speed, production scheduling, continuous waste reduction and high quality standards, etcetera.

Finally, it was found that the automation of processes, the use of ICTs and competitiveness obtain very high Spearman correlation indexes and that there are other indicators that also affect competitiveness, as shown below in the correlations made:

Competitiveness VS Process automation

Rho = 0.404

Competitiveness VS Use of ICT

Rho = 0.506

Competitiveness VS Manager's Age

Rho = 0.728

Competitiveness VS Academic Degree

Rho = 0.824

Use of information technologies VS Age of manager

Rho = 0.934

Competitiveness VS time the manager has in the position.

Rho = 0.334

Now, after analyzing the information collected, it is possible to mention that the age of the manager does affect the automation of processes and the use of technologies and therefore the competitiveness of MSMEs. In the same way, the academic degree is an indicator that shows the availability of managers to automate their processes and to update themselves regarding the use of technology. Regarding the indicator of time that the manager has in the position also shows a positive correlation, this because contrary to what is expected while the employee spends more time in the same position, the more his vision of innovation is limited according to the results that throws the investigation

Conclusions

Considering the above, if automation is a wonder, a new question arises because the resistance of MSMEs to be automated and the response is very simple, organizations have hundreds, or perhaps thousands of processes, but they have limited resources. That is why it is difficult for them to tackle the entire digital transformation and, at the same time, they need to establish priorities, which implies a slow path and having to wait for the transformation of some processes to give priority to others. However, once the factors that contribute to competitiveness in Guanajuato MSMEs are identified, it is possible to conclude the following points: the automation of processes, the use of ICTs, the age and preparation of the manager are factors that affect the competitiveness of the MSMEs. While Martinez (2010), highlights the importance of innovation and financial resources as key elements for the growth of business competitiveness.

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Currently Marketing has used the marketing approach of "outside inwards", which involves recognizing and meeting the needs of the external customer (the last consumer), that is, it means looking for new ways of procuring value for the consumer, through the improvement of the qualitative aspects of the tangible and intangible product and without a doubt this also requires an automation of the internal organizational processes.

In this regard, the MSMEs and in general any type of company, must consider that their current clients at any time can stop being so, because if these clients are not satisfied and do not trust the product or service, they do not perceive the innovation, or if quality ceased to be a priority, they will not hesitate to change brands (Bojórquez and Pérez, 2011).

Undoubtedly and taking into account the concepts of marketing, companies must commit to ensure complete customer satisfaction and this implies being up-to-date in terms of process innovation and automation is one of these indicators that cannot be ignored. By doing so, the company's objectives (including competitiveness and desired economic performance) will be achieved and consumer loyalty will be created by contributing to the future viability of the company (Stanton, Etzel and Walker, 2001).

Finally, the MSMEs with their artisanal processes and their product-oriented strategies, their processes, organizations based on management based on hunches and good intentions, with ignorance of the importance of the client and market strategies to achieve their needs, require specialized advice, since it stands out that approximately 89% of them are unaware of the importance and application of business management and automation as strategies to increase their competitiveness.

Recommendations

Considering the above information, it is essential to generate strategies based on a thorough analysis of the existing options, in such a way that it is possible to contribute to the competitiveness of the Guanajuato MSMEs and their permanence, based on the automation of processes, innovation and in the use of information technologies, in the same way, propose as an essential strategy the implementation of training for managers, in order to generate a change in business ideology and update in the use of applied technologies in MSMEs management, in the same way, is important to promote the empowerment of human capital through knowledge management and innovation management.

Regarding the factors that measure the quality perceived by the client, it is recommended to promote studies that measure this variable from the perception of the consumer or user in order to be really known if quality products or services are being delivered considering the opinion of the client, because positioning in the market is an important indicator of competitiveness.

As a final recommendation, it is important that the owners / administrators of the MSMEs formally establish the actions to be followed in order to seek improvement actions, but above all, that these actions be communicated to the internal clients to integrate them and engage them (employees), as well as to external clients so that they know that they work thinking about satisfying their needs and desires, in such a way that their welfare is improved. Based on the above, Séto (2004) points out that the true strength of a company is determined by the strength of its relationships with customers, employees, business partners and other collaborators, adding that to achieve this requires the commitment of all participants.

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- Objectives, organization and behavior of the company
- Non-profit organizations and public enterprises
- Politics of defense of the competition
- Regulation and industrial politics
- Sectorial studies: manufactures
- Sectorial studies: primary products and construction
- Sectoral studies: services
- Sectorial studies: transport and basic supplies

Introduction

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General explanation of the subject and explain why it is important.

What is your added value with respect to other techniques?

Clearly focus each of its features

Clearly explain the problem to be solved and the central hypothesis.

Explanation of sections Article.

Development of headings and subheadings of the article with subsequent numbers

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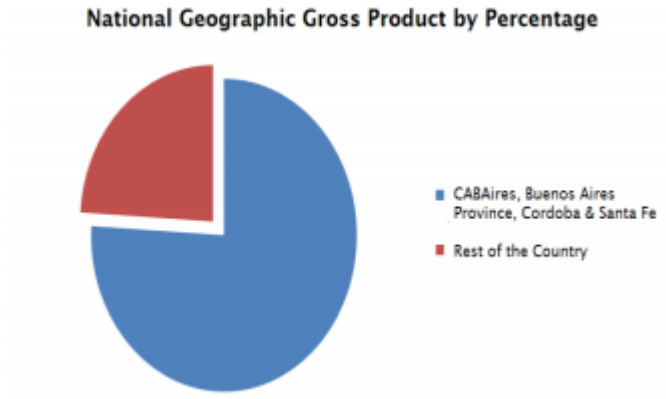

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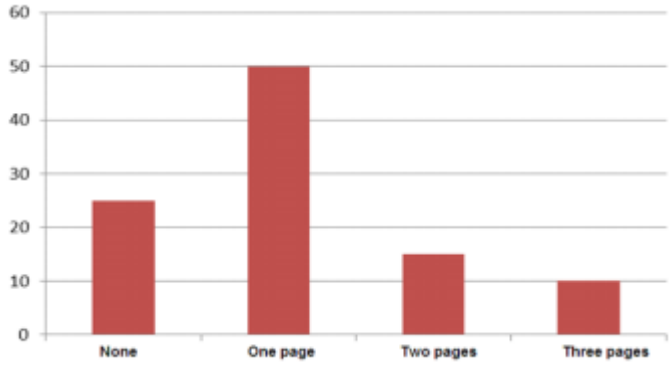

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Develop give the meaning of the variables in linear writing and important is the comparison of the used criteria.

Results

The results shall be by section of the article.

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Tables and adequate sources thanks to indicate if they were funded by any institution, University or company.

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Explain clearly the results and possibilities of improvement.

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