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# COMPETITIVENESS DEVELOPMENT IN REGIONS, SECTORS AND INSTITUTIONS

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JOSÉ SÁNCHEZ-GUTIÉRREZ  
TANIA ELENA GONZÁLEZ-ALVARADO  
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COORDINATORS



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# Prologue

*Competitiveness development in regions, sectors and institutions* is an excellent book for experts, students and entrepreneurs. In their pages, we can discover different topics about the competitive factors like Knowledge Management, Service Quality, Management leadership, Innovation, Production Value, and so on.

In ten chapters, experts explain the situation of the organization, institutions and regions according to the competitiveness development. Every part of this book was based on empirical and real evidence from enterprises, universities, governments and institutions. All of these studied organizations are part of the competitive environment that involves the market. The writers believe in economic progress across of the innovation, the entrepreneurship and the international cooperation between regions, countries and corporations.

The authors are from Mexico and Spain. Everyone is an expert in Economic and Business Sciences. The universities that participate in this project are: Universidad Complutense de Madrid, Universidad de Guadalajara, Universidad Michoacana de San Nicolás de Hidalgo and Instituto Politécnico Nacional.

This publication was created under the best practices of scientific edition. Turnitin was applied in favor of originality. The editorial team

carefully analyzed the quality and originality of the contents. Every chapter was selected, evaluated, and modified with the support of international peers.

Editors and authors hope that this book contributes for publishers, researchers and academics to the advancement of theoretical and practical knowledge.

Dr. José Sánchez Gutiérrez



# Chapter ONE



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## **Knowledge Management and Strategic Vision in Guayaquil Institutions**

*Manuel Alfredo Ortiz-Barrera, José Sánchez-Gutiérrez and  
Guillermo Vázquez-Ávila*



# Knowledge Management and Strategic Vision in Guayaquil Institutions

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## INTRODUCTION

South America is a geographic macro region that compresses the continental mass that extends from Cape Tiburon, Panama in the north and Cape Horn, Chile, in the south. This is a Hispanic culture that in most of the continental nations, makes this area a zone with high opportunities to realize the exchange of knowledge between nations, since in all of them has common idiosyncrasy. Likewise, the region's educational systems share interesting traits through which it is possible to obtain knowledge that may be homogeneous.

Higher education institutions in Ecuador, like many others in Latin America, have many important growing challenges. The internal administrative and academic models struggle to adapt to the latest days that quality is measured not only in terms of teaching students but also with the participation and the existing representation of the university in various fields of universal knowledge and the impact they have. However, the development of inefficient administrative systems, which they have an impact on, means that the vision is limited in its totality, so it is necessary to

develop an internal strategic vision that provides a clear competitive advantage in the organization and therefore establishing processes that can adequately feedback, that is why it is required that intangible assets such as knowledge.

This research shows how these cognitive relationships can be used to improve the strategic vision of the organization in order to increase a competitive advantage in institutions such as the educational institutions in Guayaquil, Republic of Ecuador. Most of the organization were chosen because of a model of knowledge management that is not so easy to recognize, at the same time, they are the universities that have a better projection outside their territory because this city is considered the Economic capital of Ecuador and therefore the contact existing with other nations of both America and the rest of the world, require the local administration to focus on the development of a strategic vision that can put them at the forefront in South America.

## **THEORETICAL FRAMEWORK**

The role of a strategic vision focus on obtaining a great performance and a big organizational success (Kantabutra, 2008) is a clear leadership. It provides an effective vision since it is the one that will be in charge of disseminating the achievements in all the areas of the organization (Ireland & Hitt, 1999). Dowling & Moran (2012) understand that very different factors can give a higher reputation that is reflected in the employees and that strengthens the support of the stakeholders towards the internal processes.

The objectives and methods, as well as the practical actions of the organization, give a shape to the strategic vision (Pascu, 2015), but their nature must be found in the consolidation of processes of internal innovation of the general administration (Dragomir & Panzaru, 2014), this is a proof of a resource that must be found and can be renewed as quickly as it may be needed (Miner, 2002), it is in this way a very logical solution that is found in Knowledge Management.

The administrative models proposed that in the organizations generally are attached to limiting visualizations proposed by the managers of the organizations (de Oliveira, Filon, Dalfovo & Urbanavicius, 2013), although the theoretical approach of this kind of problems delimits that for the creation of Better models, attached to reality, it is necessary to find differences between the resources, the faculties and the existing competencies both internally and externally (Devece, 2013), this is called non-standardized information. (Luiza & Daniela, 2013).

It usually becomes a part of the enriched processes (Grundspenkis, 2007) through which it is a smart strategy that can be generated by management (Tomášková & Kopfová, 2010). In its moment, it contributes to developing and it improves the competitive advantage of the organizations where it is developed. Therefore, it has the ability to trigger new elements that provide better organizations; Generating in this way a new vision on which it is possible to build a new concept that provides international recognition to the organization in question.

For higher education institutions, the environment is extremely competitive (Mount & Belanger, 2004), the heterogeneity of education grows according to the complexity that is based on its competence (Maringe, 2005), however, it is required that University activities are focused on the same mission: to have cognitive elements to develop an integral strategic vision (Alhakimi and Qasem, 2014), which brings together the general opinions of the members of the organization and its stakeholders.

It is important to understand that there is a great diversity of higher education institutions, where these differences do not stop only in the understanding of the educational concepts, but in the approach of the programs and systems focused on the administration (Meek, Goedegebuure, Kivinen & Rinne, 1996), which in turn has a direct impact on academic orientation, access to certain educational levels, quality and social relevance (Lang, 2003), which has the capacity to support the generation of sustainable competitive advantages Through an adequate internal and external strategic vision (Windiputera, De Witte, Groot & Van Den Brink, 2017).

According to Blank (2012), last paragraph capabilities demonstrate that resource characterization is generally based on tangible assets, however, based on an epistemological view, knowledge must be the factor that the organization's members create, store and transfer (Centobelli, Cerchione And Esposito, 2017), based on this scenario, the establishment of processes based on so-called knowledge management has the capacity to improve

administrative performance that positively influences decision-making cycles (Nonaka, 1994).

It requires a careful analysis of the experience that is going on in the organization comes from tacit knowledge or explicit knowledge; That is, that the contextual dimension evaluates the experience of both decision-makers and those who participate in the external elements of the organization (Nonaka & Takeuchi, 1997), in case of the higher education institutions, if internal managers take the appropriate knowledge, or in the internal case, ie the most explicit part, is properly used to create visions appropriate to the environment that are lived and that can encourage the creation of competitive advantage.

One of the main advantages of knowledge management is that it can be adapted to practically any sector or any discipline, including public or private organizations (Tarnekar, 2017), which means that many organizations implement this model to be efficient in their processes and become more competitive (Tanty, Spits & Suroto, 2017), the process of teaching and the administrative process (Akbar, Setiawan & Basuki, 2015), in the case of higher education institutions, the knowledge management process must take two fronts: that means that it must permeate an absolute integration of the processes that take a place on the day to day.

However, in the denomination was based knowledge, based on good systems, but capitalize knowledge in a way that can function as a resource similar to economic and can be tested according to competitive needs (Brahma and Mishra, 2015).

The paradigm that is lived with the administrative process requires that knowledge functions as part of the strategic organizational vision. That means that both explicit knowledge and tacit knowledge contribute to the development of a cross and strategic administration (Brajer-Marczak, 2016). According to Mikula (2007), the creation of cognitive systems are an obligatory part of the continuous understanding of information, so that to develop an integral vision in higher education institutions, required an interdisciplinary approach is where the human resource is Finance and technology (Jashapara, 2006), increasing, according to Davenport & Prusak (1998), efficiency, effectiveness and internal productivity, making them a competitive advantage for organizations that apply it.

The action is an addition of cognitive processes to the main structures of the organization and it must create above all some more value (Lee and Choi, 2003), in this way it is possible to observe a real change in the strategic vision of organizations.

## **METHODOLOGY**

This research aims to understand how knowledge management can act as a growth factor of strategic vision in the higher education institutions of Guayaquil; Focusing directly on the environment, both external and internal, as well as the processes that are generated by this model (Ahmed, 2010), so it can be analyzed in depth which are the facts that make a bigger impact and could be used directly in the creation of an appropriate strategic model for these organizations.



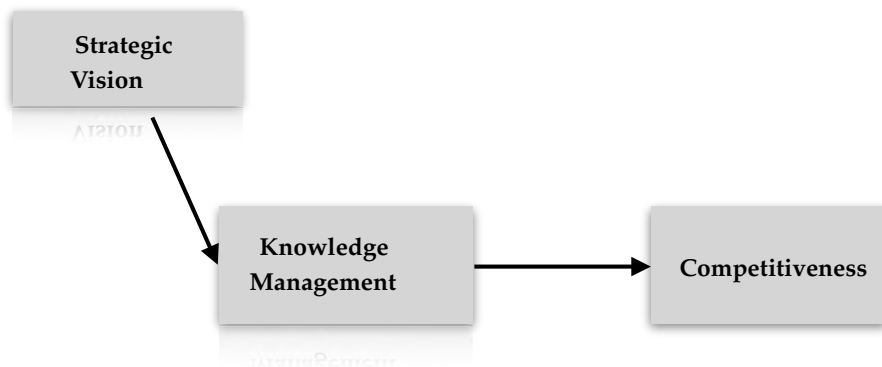
In order to carry out the research, a sample of 75 managers and middle managers were taken, all related to the educational system of several universities in Guayaquil. The sample was taken for convenience, and at the same time it was considered that those involved in the process of data collection also had the ability to make direct decisions about events of the same institution to which they belong, as well as that, could be propellers of a strategic vision.

Sampling was calculated based on an estimated error of 11%, taking into account the formula of infinite samples, because the number of people available could be very broad given the educational offer, however, the questionnaires were also controlled to only develop them in institutions already consolidated and recognized in the region.

A measurement instrument was developed, gathering 18 items based on the Likert scale of five elements. At the same time, to theoretically support the instrument, we proceeded to review the theoretical framework of the work and in this way to obtain an adequate theoretical condition; at the same time, each of the data presented must be directly related to the process of knowledge management and the strategic vision that is sought.

From the results were reviewed the most relevant categorized variables, offering an interpretation of the data and also the focus on the impact on the competitive advantage existing in the studied institutions, so that it is possible to comply with the factors that our construction provides.

## Graph 1. Theoretical and Methodological Construct



Source: Own elaboration with theoretical framework design.

The proposed construct, as simple as it seems, contains a complex general idea, in which it can be seen how a strategic vision based on a correct knowledge management has the power to influence directly in the creation of competitiveness.

To observe the relationships between these two schemes it is important to use quantitative tools, which, according to Pierce (2013), brings establish to the correct relations between **the** independent variable and the dependent variable, measuring directly as it influences one in the other, at the same time it is required for a solid statistical technique, so that Analysis of Variance (ANOVA) was chosen as the highest level of the process, since even when it is a correlational technique, it allows to observe clearly how these relations between items are established.

## RESULTS

The data collection was based on a probabilistic trial, that is, only members of organizations whose knowledge level was sufficient to answer the questionnaire were selected, as well as having the capacity to make decisions. As already mentioned, the sampling formula considered 7% error and 91% confidence in infinite terms, this was due to the location of managers in the various institutions of higher education in the city of Guayaquil.

To start the analysis, we proceeded to test the reliability of the sample taken, based on the questions called the Cronbach Alpha statistic, which measures the internal consistency of the variables through a simple test, which measures the unidimensionality and homogeneity of each of the studied variables in a range of 0 to 1 (Tavakol & Dennick, 2011), where the value between the closest to the unit is much more representative, in such a way that the coefficient was transformed into percentage terms by validating how the variables behave.

**Table 1. Cronbach's Alpha – Questionnaire Items.**

Alfa	Elementos
0.871	18

Source: Own elaboration with questionnaire data.

According to the Cronbach statistic, the value of the crossing of the variables expressed through the 18 items indicates that the variables have a consistency of 87.1%, which means that the results are adequate to work with these variables in more elements complexes or crosses of variables by means of several complementary quantitative techniques.

It is in this way that a validation is carried out through a general factorial analysis with the Kaiser-Meyer-Olkin statistic and Bartlett's Sphericity Test, which is an identity matrix where it is possible to observe if the variables turn out to be correlated with a value of significance close to zero (Montoya, 2007), the results of the test showed the following data

**Table 2. KMO and Bartlett's Test of Sphericity.**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.898
Bartlett's Test of Sphericity	Approx. Chi-Square	6.2583
	df	2628
	Sig.	0

Source: Own elaboration with questionnaire data.

The results present after the analysis show that in the Bartlett's Sphericity test it is significant, since the value is close to .000, which is an indicator of data consistency, so that it can be said that the data were collected from randomly, while the degrees of freedom of 2628 speak of a wide dispersion of responses, as well as a Chi square of 6.2583, which indicates that the variables provide relatively efficient information at the time of crossing them; On the other hand, the KMO statistic shows that the consistency of correlation, that is to say, the proximity of the variables between the groups is 0.898, or 89.8%.

The importance of the results presented at the tables lies in the possibility of obtaining better results for the verification of the hypotheses supported in the work from its observation through the multivariate method of analysis of variance; To do this, three groups will be taken, in which the events that generate leadership in the organization will be measured in a separate way, on the other hand how the decision-making is contemplated and finally which of these two schemes contributes most to knowledge management.

Next, we proceed to carry out the crossings of variables related to the hypotheses raised; in order to clearly answer the correlation, the variables will be analyzed through the one-way ANOVA technique.

### *Hypothesis 1 quantitative analysis*

The first assumption focuses in terms of the variable Knowledge Management and its item Strategic Vision, generating the following statement:

H<sub>1</sub>. Greater knowledge management in higher education institutions, greater strategic vision.

**Table 3. One-way ANOVA of Hypothesis 1**

		Squa re Sum	DF	Cuadrati c Mean	F	Sig .
Tacit Knowledg e	Between Groups	194.021	59	3.288	4.081	0
	Intergroup s	48.345	60	0.806		
	Total	242.367	119			
Explicit Knowledg e	Between Groups	194.155	59	3.291	2.769	0
	Intergroup s	71.312	60	1.189		
	Total	265.467	119			
	Total	321.592	119			

**Source:** Own elaboration with data analysis of the survey.

It is observed that Explicit Knowledge (table 3) is the one that contains a much more relevant value in the quadratic mean between groups, with a value of 3.291 which indicates that the availability of the same is adequate in the institutions of higher education, this may also indicate that the Hypothesis is confirmed since the explicit and the tacit knowledge are very close and are highly representative in both cases, since also tacit knowledge, ie that which is not visible in its totality has the capacity to intervene correctly in the creation of an adequate value for the strategic vision.

It can be said that the hypothesis is confirmed and that in the first place the higher education institutions of Guayaquil have a significant and

representative amount of knowledge to be applied, however the strategic vision depends on the appropriate use of the information.

**Table 4. One-way ANOVA of Hypothesis 2**

		Square Sum	DF	Quadratic Mean	F	Sig.
Technology Competitiveness	Between Groups	195.205	44	4.436	4.223	.0
	Intergroups	78.787	75	1.05		
	Total	273.992	119			
Financial Competitiveness	Between Groups	154.094	44	3.502	2.923	.0
	Intergroups	89.873	75	1.198		
	Total	243.967	119			
	Total	195.205	44	4.436	4.223	.0

**Source:** Own elaboration with data analysis of the survey.

### *Hypothesis 2 quantitative analysis*

Hypothesis 2 measures the relationship between knowledge management through a strategic vision and the generation of competitiveness in higher education organizations in Guayaquil, Ecuador.

H<sub>2</sub>.- The strategic vision of higher education institutions based on a Knowledge Management model promotes a direct increase in the competitiveness of the sector.

It is observed that in both cases the quadratic average is found in normal levels, however in the case of the technological competitiveness variable the quadratic value between groups is the highest, which means that the hypothesis is accepted, However, it is necessary to work an integral vision through which all items grow, since there is a visible disparity in intergroups, which is not normal.

## CONCLUSIONS

Knowledge management is undoubtedly one of the tools that can most contribute to the continuous improvement of higher education institutions, however, its implementation, mainly in those studied in Guayaquil, is still far from a common denominator.

As one can observe in the investigation one of the main problems is that even in the universities of Guayaquil the model is based mainly on obtaining advantages from the existing tangibles, but it does not make adequate decisions based on personal expectations and experiences Both the students and the Faculty members, this through the general observations that are made of the tables developed for the hypotheses, at the same time it can be observed that a model of strategic vision can be fulfilled naturally, nevertheless requires a special attention in the collection of cognitive processes, because they are being left aside the main intangible assets are tacit or explicit experiences.



This is how research understands that universities should bet more to generate advantages from knowledge, leadership and above all from conscious decision making.

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# Chapter TWO



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## **Service Quality Granted by a Marketing Company**

*Antonio de Jesús Vizcaíno, Luis Fernando Tñiguez-Charles,  
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## Service Quality Granted by a Marketing Company

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### INTRODUCTION

The consumption habits of people and companies have changed over the years as a result of globalization and the competitiveness boost among service companies. The current study is a practical application of evaluation of the service quality in a marketing company, when managing the satisfaction knowledge obtained from the service granted by such organization. It should be noted that the service is a benefit that allows the differentiation of the client between the competition as well as being according to (Lara, 2002) the set of benefits that the customer expects, the product or the basic service, as a consequence of the price, image and reputation. The overall objective of service quality is: to maintain customers, retain them and develop new clients, expressed in terms of attitudes as they are; courtesy, integrity, reliability, willingness to help, efficiency, concern and considerations for others, friendship, availability and knowledge (Tschohl & Franzmeier, 1994).

The research problem is focused on considering the fact that in a world characterized by rapid, paradoxical and complex changes, consumers and customers have become more demanding when choosing products and services (Martínez & Martínez, 2009), so that organizations currently need to improve the quality and competitiveness of their service from the customer satisfaction perspective. These study analyzes the perception that the client has regarding the service quality granted by a marketing company.

## **THE TOPICS DEVELOPMENT**

As part of the background of the study, some publications found where the quality of service in companies dedicated to the commercialization of products are evaluated and/or measured, such as the study of customer service as a competitive advantage in groceries marketing companies in the municipality of Retalhuleu, prepared by Celada (2014). He reveals how the improvement of customer service can add a competitive advantage and differentiation regarding its competitors, by achieving the preference and customers loyalty. The main findings indicate that the customer service can be an element that used by grocery companies to achieve a competitive advantage. In addition, the lack of tools that help to build long-term relationships with customers conclude that it is important to offer a good quality service, where total consumer satisfaction can be seen as a priority. Another study, related to the retail commercial distribution through the SERVPERF model: the cases of Mercadona and DIA by Vigo (2015) aimed to make a comparison between these two companies, finding that there is a large discrepancy in most of the valued dimensions, reaching a higher Mercadona score. Only in the price dimension, the scores were similar. In Communication, DIA managed to add more points, due to the excellent use



of the media to transmit their messages to their customers. Mercadona is a company where employees are recognized as a fundamental part for achieving the company's objectives. Therefore, they receive better training, which is reflected in the results of the study. Both studies reflect in their results the relevance implied by the preparation of the personnel to develop the necessary skills that make it possible to recognize customers needs.

## **KNOWLEDGE MANAGEMENT AND SERVICE SATISFACTION**

Knowledge management (KM) has become a fundamental tool for the organizational and social development of any organization, assuming that knowledge is a strategic resource for shaping a new social order (Flores, 2010). Knowledge, as a resource, is needed by the organization of a general framework and specific processes that contribute to organizational performance. Nowadays, knowledge is based on a factor that differentiates productivity, creation of wealth and it is investing its intellectual capital in competitive processes (Topete, Busto & Bustillos, 2012).

When the term KM is heard, it can be linked to information technologies. However, technology is only a means. What matters in organizations is the quality of the content that is to be promoted and the sponsorship of a learning culture, which are factors associated with human capital (Castañeda, 2002). Therefore, it is important to understand what the basic cycle of knowledge management should be, in order to develop a dynamic process of generating knowledge flows and carrying out new knowledge, but related to its strategy and knowledge. Knowing the inside of the organization, what the client thinks of the service he actually received is a fundamental resource from which strategies can be created to guarantee

quality and competitiveness. It must be clear that it implies trust and cooperation of the people who are involved in the organization, people who share a business vision and who develop an environment that promotes organizational learning with the conversion of tacit to explicit knowledge. The KM term has had different meanings such as:

- a) A function. The KM can be understood as a function that plans, coordinates and controls the knowledge flows that are created in the organization according to their activities and their environment, with the aim of creating essential competencies.
- b) A practice. By organizing, storing and sharing vital information, so that everyone can benefit from its use. That is, it is seen as a set of techniques and tools involved in the process of storing, distributing, sharing and communicating data and information, in order to improve communications and knowledge, among employees of a company (De Freitas & Yáber, 2014).
- c) Actions inherent in human activity. Due to its characteristics, it is a process that can be studied, organized, structured and applied creatively in an organization (Estrada, 2006).
- d) As a new business culture. By placing human resources as the main asset and sustaining its power of competitiveness in the ability to share information, experiences and individual and collective knowledge.
- e) New approach to organizational management. Given the rise of new technologies and the growing importance of human resources in the

organization, it also involves new information and communication technologies, management methods and culture.

What prevails is the fact that it implies a management with the purpose of using it the accumulated knowledge and experience of the organization, so that the reach of the employee is improved to obtain competitive advantages.

The KM is based on four pillars: people, processes, content and information and communication technologies. Each pillar contemplates aspects that can influence the effectiveness of the knowledge management practices of the organizations (Gómez & Garcia, 2015). The new knowledge begins with the individual and later becomes knowledge of the organization, thus acquires value for the entire organization. Regarding knowledge, the important thing is not the quantity that is possessed but its productivity. This productivity requires increasing the performance of what is known by the individual or by the group. Hence, knowledge must be connected with the results and more in the case of evaluation of services, where strategic decisions can be made, to innovate, better manage resources, take advantage of the opportunities offered by the market and provide the services demanded by the market's performance and comply with specific learning processes (Pérez & Cousin, 2005).

Despite the difficulty of giving a uniform definition to an intangible such as knowledge, the importance it has for companies has not been limited. Davenport (1996) provided a meaning to the KM considering it a systematic process that consists of finding, selecting, organizing, extracting and presenting the company's information, in order to improve the

understanding of a specific area of interest for the company's members the organization, or even the contributions that have been granted (González, Castro & Roncallo, 2004). Then, we state that KM implies the planning, coordination and control of the activities that lead to the creation, capture and transmission of knowledge in an effective way.

In a globalized world, Small and Medium Enterprise that use the optimization of information and knowledge, constitute a weapon to face competition with large companies. On the one hand, according to Maldonado, Martínez and Pérez (2010), these organizations have various levels of obtaining knowledge, both within the company and abroad, unlike large companies. On the other hand (Pillania, 2008), it considers that the KM studies focus mainly on large companies, encouraging these small and medium organizations to face their competitors with tools that help them to defend themselves from this dynamic oriented to mass consumption, giving information and communication technologies a preponderant role when it comes to acquiring, processing, managing and sharing knowledge. Over time, the role of knowledge and intangible resources has been demonstrated to create organizational value in SMEs, since it is not only about how many sales a company has or what tangible resources has, but that goes beyond becomes more complicated to measure. Managing knowledge and intellectual capital in the right way can generate competitive advantages, including satisfying wants and needs for the parties involved, and developing new strategies that create organizational value (Schiuma, 2014).

The KM is a shield for SMEs, it makes sense to "include all processes related to the identification, sharing and creation of knowledge" (Serradell

& Pérez, 2003). In this sense, KM is continually processed with a series of activities to acquire, create, store, share, use and evaluate knowledge for the reuse of knowledge, especially in the fulfillment of missions and the improvement of the management of the organization (Suravee & Beyerlein, 2015).

It can be considered that knowledge management is a business strategy that ensures that the right knowledge goes to the right person at the right time and, in addition, helps you to share and use the information so that the company can improve its organizational action and this process takes place within the interaction community of the company. Nowadays, organizations have realized that knowledge, its effective use, the rapid acquisition and use of new knowledge, represent the only source of sustainable competitive advantages. In fact, efficient exploitation and management of knowledge resources are the basis for the development of those capacities that underpin the organization's capacity to deliver value proposals that are successfully managed (Carlucci, Lerro & Schiuma 2012). The complexity of KM is affected by the influence of four factors such as leadership, organizational culture, organizational control and work style.

The results of the study conducted by Magnier-Watanabe and Benton, (2013) showed that a single model of knowledge management should not be applied to all organizations, but should be adapted to each stage of maturity of the KM. By involving all these factors, the management of information and knowledge are considered as supports for strategic decision making since knowledge management and decision making have a close relationship at the socio-anthropological level as two complex forms of survival and adaptation. Therefore, when making strategic decisions it is

necessary to harmonize these two aspects to achieve competitive success in the environment, (Batista, Velázquez, Díaz & Ronda, 2015). Due to the considerable increase of companies dedicated to the same business, the service represents the decisive factor to attract consumers; this is where the importance of offering a quality service lies. Miranda, Chamorro and Rubio (2007) sustain the importance that as a company defines its own quality standards, "based on the expectations of customers, their degree of satisfaction, the offer, the processes, systems that a company possesses and the efficiency in its execution, are fundamental parts for the client to perceive the service granted as excellent. Hence, the relationship of managing the knowledge to evaluate the service, turn out to allow strategic decisions for the organization.

When managing the knowledge to evaluate the quality of the service provided by the marketing company, the SERVPERF (SERVICE PERFORMANCE) model proposed by Cronin and Taylor (1992) was used, which focuses on the measurement of service performance leaving a side-in part-customer expectations. The empirical evidence obtained by Cronin and Taylor suggest that the perception of performance alone can predict -at least- the behavior of individuals, as well as the conjunction of the perception of dimensions with the importance attributed to them (Morales & Medina, 2015).

The dimensions of the SERVPERF model that were used in the study based on Parasuraman and others (1988) and Setó (2004) were: Reliability (Confidence deposited by the client in the service provider (s) with the assurance that the service will perform correctly), Responsiveness (willingness to respond to the doubts and requests of the clients, as well as

the ability to solve problems that may arise during the process effectively and efficiently), Security (Skills and knowledge that gather employees to resolve conflicts and questions from users, which in turn inspire confidence and security in these), Empathy (Quality that allows knowing the consumer in order to offer personalized attention) and tangible elements (Appearance of the facilities: cleaning and accommodation, equipment and materials that the organization has for the provision of the service).

The reason why organizations seek to direct their efforts in offering a quality service through the implementation of different tools and / or strategies focuses on the relevance that consumer satisfaction has, with the intention of building customer loyalty, making them feel comfortable, safe and happy when buying. Kotler (2002) expresses customer satisfaction as "the sensations of pleasure or disappointment that a person has when comparing the perceived performance of a product with their expectations".

## METHODOLOGY

In order to carry out the objectives of the study, a research was carried out through a quantitative approach, based on the application of a survey by means of which the data of the marketing company's customers were collected and then the hypotheses were tested. The present study contains numerical measurement and statistical analysis (Hernández, Fernández & Baptista, 2010). The study was descriptive in order to interpret the nature and composition of the phenomenon or phenomena that intervene in the processes of the current operation of the company (Tamayo, 2004). It was also a cross-sectional study with the aim of observing and analyzing the effects of performance on a final result at a cut-off point in time (Gras,

1996), whose information was collected from a sample of elements within a population only once (Malhotra, 2004) and finally correlational, performing analysis of variance between the dimensions of the study.

**Table 1. Elements that make each evaluated dimension**

Ítem	Coding	Indicator
1	Tangible1	The sales executives have a presentable
2	Tangible2	The website is easy to access.
3	Tangible3	The informative materials (catalogs,
4	C. Answer1	The staff is available to provide
5	C. Answer2	The quotes are in established times.
6	C. Answer3	Executives resolve doubts at the time of
7	C. Answer 4	The executives effectively solve any
8	C. Answer 5	Executives are able to guide the
9	C. Answer 6	The driver resolves doubts at the time of
10	Security1	The attention of the staff transmits
11	Security2	The guarantee that is offered goes
12	Empathy1	Executives are interested in knowing the
13	Empathy2	The customer is paramount for the
14	Reliability1	The delivery of the order adapts to the
15	Reliability2	The products are delivered in good
16	Reliability3	The after-sales service is done in a short

Source: Own elaboration with questionnaire data.

The research technique was the survey that according to Grasso (2006), allows to make a "detailed record of the data when studying a population through samples with representatively guarantees" and who also describes Festinger (1993) as a method that requires the systematic collection of data from populations or from population samples. For the collection of data it



was decided to design the survey in both formats, printed and on the Survio digital platform, using a probabilistic sample for convenience, with data from 17 consumers of the marketer, representing 23% of a total of 73 clients that make the total universe. This was due to the need of employing individuals from the population who were easily available for the study (Ochoa, 2015).

The design of the instrument was evaluated through a pilot test in a small sample of respondents in order to improve it and identify or eliminate potential problems of its construction (Malhotra, 2004). The initial reliability test was applied to 10 respondents considering 16 items (table 1). For the Cronbach's Alpha and the internal consistency of the designed instrument, the coefficients proposed by Frías (2014) were considered according to Table 2 presented below.

**Table 2. Scales of coefficients for the reliability of a research instrument**

Alpha coefficient > .9 is excellent
Alpha coefficient > .8 is good
Alpha coefficient > .7 is acceptable
Alpha coefficient > .6 is questionable
Alpha coefficient > .5 is poor
Alpha coefficient < .5 is unacceptable

Source: Frías (2014).

The value of Cronbach's alpha in the first stage considering 16 items yielded .886 which indicated that the instrument was reliable according to the scales shown in table 3, however, in the second test result as shown in

the same table, it depicted .900 in 15 elements that more accurately measure the variables of the study.

**Table 3. Reliability Statistics**

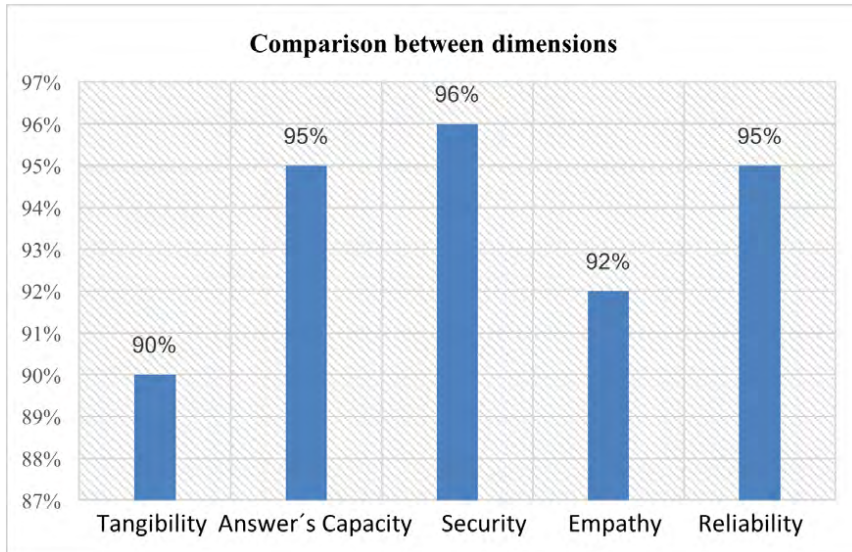
Second result reliability test	
Cronbach's Alpha	No. Of elements
900	15
First result reliability test	
Cronbach's Alpha	No. Of elements
886	16

Source: Self elaboration with questionnaire data.

According to Bojórquez and others (2013), the correlation matrix is a square matrix that indicates the relationship of each question with the others, where the Pearson correlation coefficient ( $r$ ) scale of -1 to close to 0 indicates little association, close to 1 indicates a direct association and close to -1 indicates an inverse association, where one of the items by its results is a variable that cannot be calculated. That is why it is excluded from the instrument. Therefore, when performing a second reliability test, item 15 was excluded, which improves the Cronbach's Alpha from .886 to .900 (table 3), which makes the questionnaire an excellent instrument according to the scales of table 3 shown above. The information gathered with the survey is presented in tables and graphs obtained when processed in the SPSS version 24 program for better understanding and analyzing each

dimension that the study contemplated and based on the established hypotheses.

**Graph 1. Comparison between dimensions**



Source: Own elaboration based on the data collected and processed in the statistical program SPSS, v 24.

## RESULTS

The general hypothesis was that: the customers of the marketer are 100% satisfied with the service provided in each of the dimensions. The results obtained for the evaluation of the information are shown in graph 1. The results show the level of importance in percentages on the perception that customers have in relation to the five dimensions received during the service, for which in security it obtained 96%, response capacity 95%,

reliability 95%, empathy 92% and 90% tangible elements, for which the hypothesis is rejected.

As shown in the graph, the percentages obtained for each dimension range from 90 to 96 percent, which indicates that the marketer is at a good level. However, the null hypothesis was rejected because it did not reach the maximum percentage in each dimension as it was initially proposed, however there are great opportunities in each of the dimensions to consider improvements in the service, in order to create new opportunities for growth and positioning in the preference of the clients.

After the treatment of the descriptive data, analysis of variance between the dimensions was carried out in order to make the crossings between them. The results by dimension shown in table 4, express the average obtained for each of the items of the five dimensions. The tangible dimension is the best considered by the clients, being the number 1 affirmation that belongs to the presentation of the executives with an average of 4.94 and the lowest is the access of the website with an average of 4.06. In the dimension of responsiveness that is represented by items 4 to 9 the items that represent the staff are available. The executives resolve doubts and the executives resolve effectively have obtained the average of 4.88 equally the three, this being the score higher, while item 5 that represents the quotes in established times only reached an average of 4.41 followed by executives guide the client with an average of 4.59. In the security dimension, the highest average of 4.82 belongs to item 10, the personnel transmits security, followed by the guarantees offered according to the client's needs with 4.76. Dimension of empathy the item that says that the customer is essential with an average of 4.71 and the interest to know the needs of the client with

4.53. The last dimension corresponds to reliability and it is the dimension where the highest average obtained in all the dimensions that belong to item 15 is found (the products are delivered in good condition) with an average of 5, obtaining in its entirety the maximum and minimum of 5, descending is followed by item 14 with an average of 4.71 and 4.47 for item 16.

**Table 4. Descriptive statistics of the 16 items corresponding to each dimension**

Dimension	Items		N	Minimum	Maximum	Half	Standard
Tangible	1	The sales	17	4	5	4,94	243
	2	The website is	17	1	5	4,06	1,197
	3	The informative	17	1	5	4,47	1,068
Answer's Capacity	4	The staff is	17	4	5	4,88	1,068
	5	Quotes are in	17	1	5	4,41	1,176
	6	The executives	17	3	5	4,88	485
	7	The executives	17	4	5	4,88	332
	8	Executives guide	17	3	5	4,59	712
	9	The driver	17	3	5	4,76	562
Security	10	Staff transmits	17	4	5	4,82	393
	11	The guarantee	17	3	5	4,76	562
Empathy	12	Interest in	17	2	5	4,53	943
	13	Customer is	17	3	5	4,71	588
Reliability	14	The delivery of	17	3	5	4,71	588
	15	The products are	17	5	5	5,00	0
	16	The after-sales	17	3	5	4,47	800
		N valid (per list)	17				

Source: Own elaboration based on the data collected and processed in the statistical program SPSS, v 24.

### Analysis of variances by dimensions

An analysis of variance was carried out for each dimension in order to answer the hypotheses raised by each one, using as a variable the factor that "the customer is paramount for the company", for the evaluation of the average in each of the corresponding factors by dimension.

**Table 5. Anova tangible dimension. Items 1, 2 and 3**

		Sum of squares	gl	Quadratic means	F	Sig.
The sales executives have a presentable image	Between Groups	0.018	3	0.006	0.085	0.967
	Within Groups	0.923	13	0.071		
	Total	0.941	16			
The website is easily accesible	Between Groups	9.210	3	3.070	2.907	0.075
	Within Groups	13.731	13	1.056		
	Total	22.941	16			
The informative materials (catalogs, samples, etc.) provide necessary help for the provision of the service	Between Groups	13.928	3	4.643	14.011	0.000
	Within Groups	4.308	13	0.331		
	Total	18.235	16			

Source: Own elaboration based on the data collected and processed in the statistical program SPSS, v 24.

#### a) Tangible dimension.

A variance was created (table 5) that evaluates the tangible dimension in order to evaluate the hypothesis "The website is accessible". As can be seen in table 6, the hypothesis is rejected when having a significance value greater than .05, which indicates that the data are not relevant. However,

the informative materials (catalogs, sample, etc.) provide help being relevant for the investigation with significance of .000 and a quadratic mean of 4.643.

**Table 6. Anova dimension responsiveness. Items 4 to 9**

		Sum of squares	gl	Quadratic Means	F	Sig.
The staff is available	Between Groups	1.765	3	0.588	.	.
	Within Groups	0.000	13	0.000		
	Total	1.765	16			
Quotes are in stablished times	Between Groups	18.425	3	6.142	21.624	0.000
	Within Groups	3.692	13	0.284		
	Total	22.118	16			
The executives resolve doubts at the time of quotations	Between Groups	1.765	3	0.588	3.824	0.037
	Within Groups	2.000	13	0.154		
	Total	3.765	16			
The executives resolve effectively	Between Groups	1.765	3	0.588	.	.
	Within Groups	0.000	13	0.000		
	Total	1.765	16			
Executives guide the client	Between Groups	5.925	3	1.975	11.712	0.001
	Within Groups	2.192	13	0.169		
	Total	8.118	16			
The driver resolves doubts at the time of delivery	Between Groups	5.059	3	1.686	.	.
	Within Groups	0.000	13	0.000		
	Total	5.059	16			

Source: Own elaboration based on the data collected and processed in the statistical program SPSS, v 24.

b) Dimension responsiveness. This dimension is made up of six items, of which the contributions are at established times in relation to the factor of

interest that the client has on the part of the company, which accepts the hypothesis "Quotes are delivered in a punctual "since it shows to be relevant for clients with a quadratic mean of 6,142, followed by customer orientation in their purchases with a quadratic mean of 1,975 and significance close to zero, see table 6.

### c) Security dimension

For the security dimension, two items were generated to evaluate this section. The hypothesis "Guarantees are always fulfilled in an adequate manner" was established. This hypothesis is refuted because the item that responds to this assertion shows a level of significance of .470. For the client it is more relevant that the personnel transmit security since it shows a significance of .004. (Table 7)

**Table 7. Anova security dimension. Items 10 and 11**

		Sum of Squares	gl	Quadratic Means	F	Sig.
Staff transmits security	Between Groups	1.548	3	0.516	7.265	0.004
	Within Groups	0.923	13	0.071		
	Total	2.471	16			
The guarantee that is offered goes according to your need	Between Groups	0.867	3	0.289	0.896	0.470
	Within Groups	4.192	13	0.322		
	Total	5.059	16			

Source: Own elaboration based on the data collected and processed in the statistical program SPSS, v 24.



#### d) Empathy dimension

An assumption was generated to evaluate this dimension, being "The customer is paramount for the company". The hypothesis is accepted when registering a level of significance of .000 and a quadratic mean of 1.535 which makes it relevant for the investigation, see table 8.

**Table 8. Anova reliability dimension. Items the Customer is paramount**

	Sum of Squares	gl	Quadratic Mean	F	Sig.
Between Groups	4.606	3	1.535	21.624	0.000
Within Groups	0.923	13	0.071		
Total	5.529	16			

Source: Own elaboration based on the data collected and processed in the statistical program SPSS, v 24.

e) Reliability dimension For this dimension three assertions were created that integrate it, of which the item that says, the product is delivered in good conditions, is the one that responds to the hypothesis which throws scant information through the Anova, because the quadratic mean is of .000 (Table 9). The hypothesis is accepted by the value of the mean that, as can be seen in the descriptive table of table 11, is the item with the highest value of 5 in the mean, which makes it the most valued by the clients. A relevant item for the client is that the delivery of the orders is adapted to the customer's times with a level of significance of .000 and a half-square of 1.369.

Table 9. Anova reliability dimension. Items 14,15 and 16.

	Sum of Squares	gl	Quadratic Mean	F	Sig.
Between Groups	4.606	3	1.535	21.624	0.000
Within Groups	0.923	13	0.071		
Total	5.529	16			

Source: Own elaboration based on the data collected and processed in the statistical program SPSS, v 24.

## CONCLUSION

The security dimension is the best valued by customers, with an average of 4.79. Which means that the user feels calm and safe with the service provider (Setó, 2004). On the other hand, the tangible dimension obtained the lowest score (4.49), due to the lack of knowledge on the part of the clients of the existence of the web page.

Within the items of tangibility, the appearance and presentation of the sales executives achieved a good score; however the material resources (catalogs, magazines, etc.) as well as the website did not prove to be profitable for the user's experience of the marketer lacking updating and promotion of these resources. Therefore, it is recommended to put emphasis on electronic media, because nowadays it is a valuable link for an organization.

The results reflect that sales executives have the knowledge to answer questions about orders and quotes, as well as having the attitude and availability to do so. However, it is necessary to improve the delivery times of the quotes when the clients request them.

Despite being a company with a reduced client base, users did not rate the empathy dimension as excellent; as they consider that they are not given the necessary attention by staff to efficiently meet their needs.

Empathy requires an interest in knowing the needs of the client (Cottle, 1991); however, lacking means to facilitate the approach of customers with the company, user-provider communication is weak for the marketer.

The knowledge to resolve possible conflicts and doubts as well as the attitude of the personnel is adequate; in spite of this, it is necessary to consider the instruction and preparation of the personnel to offer the client the necessary attention to promote long-term relationships.

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# Chapter Three



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## Sustained Competitiveness through Intangible Assets

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# **Sustained Competitiveness through Intangible Assets**

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## **INTRODUCTION**

There is now a natural upsurge of interest in finding knowledge in the field of competitiveness management of production, services, firms, and industries among economists, businessmen, and managers of various levels. The analyses of development process of scientific and technological progress in the planned system of economy, creation, and implementation of innovative technologies in the market relations within an appreciable length of time clearly demonstrated that the above mentioned processes are governed by human beings and their mentality (Chursin & Makarov, 2015). Today's business environment is more competitive and hostile. Therefore, each company's competitive advantage is rapidly eroding and is overtaken, by the rapid pace of competition (Grimm, Lee, & Smith, 2006). The markets are in a constant state of flux and imbalance. The current business environment is far from stable and predictable.

Mexico is the main producer, exporter and consumer of avocado in the world, with a production that exceeds million tons per year and produces 42% of the avocado grown worldwide. According to Info-hass, at least five million tons of avocado are produced worldwide, Americans consume

almost two million each year out of that amount, said Hass Avocado Board. Likewise Mexico has a stake in the North American market that goes up to 79%, Chile 18% and Peru 3%. Table 1 shows the production and export of Michoacán avocado over time. Therefore, it is important for Michoacán producers to maintain and find better competitive strategies (Info-Hass, 2017).

**Table 1. Production Timeline and Michoacán Exports of Avocado to the United States**

Year	Production (Tons)	Exportation (Tons)
2016-17	902,989	764,838
2015-16	981,690	859,539
2014-15	793,667	689,535
2013-14	608,603	512,573
2012-13	629,005	517,993
2011-12	453,923	361,384
2010-11	361,524	281,082

Source: Info-Hass (26 de septiembre de 2017).

The development of the avocado industry in México in recent years has increased significantly and with great development opportunities especially with the diversification of markets and final product presentation. However, a great opportunity arises for Michoacán avocado exporters since.

The global demand for avocados continues to grow. In Europe, the United States and Australia, the avocado has shed its image of "exotic" and has become a rather common product. In the European market prices have been high, but not only because of the growing demand, but also because

of the delay in shipments. In the United States, consumption is high, but the area under cultivation is decreasing. California producers face water shortages and the gap between supply and demand is being filled with imports from neighboring Mexico (FreshPlaza, 2017).

## **LITERATURE REVIEW**

Increased uncertainty and complexity due to price volatility, resource scarcity, and climate change are fast-spreading challenges faced by smallholder farmers in their attempt to innovate and participate in value chain relations (Pascucci, Dries, Karantininis, & Martino, 2015).

In the search for external competitiveness a company or organization must achieve internal competitiveness through all the links of its value chain, in this exploration there are many factors or variables that intervene. Therefore, it is vital to identify them in order to determine the competitive entry market strategy. Similarly, Porter (1985) is favor to scanning the value chain to understand competitiveness. He calls this the “value chain analysis” where only a systematic way of examining the various existing “value” activities in the chain of the firm that can turn into right results (Porter, 1985).

The concept of "value chain" is relatively new in the global food industry, perhaps the most recent and illustrative examples of value chain training as a competitive strategy, come from Holland, with the formation of the Foundation Chain Competition Agrifood in 1995. However, a forecast of the importance of value chains will have to improve the competitive advantages of agribusiness companies in the short term is that conducted by Dr. David Bell Director of agribusiness program at Harvard University

and which states the following. "The future will not be a farmer competing against another farmer, or a distributor competing with another distributor, or a retailer competing against another retailer or a value chain will be competing with other value chain" (Bell, 2004).

The analysis of the value chain is a method used to break the chain into each activity that form, and that looks for activities that add value to the final product. The focus of the value chain analyzes the characteristics between the different links that compose and aims to understand the factors that are affecting the competitive advantages, assessing their relative impact, in order to define priorities and strategies of concerted action between different actors. It is therefore, very important to consider the identification of the bases regarding the competitive advantages in the avocado value chain to facilitate performance of different economic agents. Not enough for a link in the chain reaches the desired competitiveness, since it requires that the entire chain or system will achieve (Venegas & Loredó, 2008). Put another way, the analysis of the value chain is essentially a system of creating value, is an analytical tool that facilitates the identification and evaluation of strategic alternatives (Walters & Rainbird, 2007). The value chain is an important unit of analysis to understand the competitive advantages of the company. Image 2, shows the agents that make up the avocado value chain.

**Fig. 1. Avocado Value Chain**



Source: Compilation, based on fieldwork

## THE CONCEPT OF COMPETITIVE ADVANTAGE

In the field of competitiveness of organizations there are two positions, the competitiveness that can be fostered and the induced competitiveness. The first is when the organization in a particular way plans, organizes, directs and controls its actions, that is, invests, investigates everything to be better in order to be competitive on its own. On the other hand, the position that some organizations adopt is the induced competitiveness, this is when an organization waits to observe what the market leaders do and thus do something similar, the actions of the market leaders induces to react to these organizations to look for be competitive based on what other organizations do.

The concept of competitive advantage has taken center stage in discussions of business strategy. The competitive advantage that some companies have achieved through the adoption of the strategy, has its beginnings in the basic concept of the late 1930's, called "competitive adaptation", in which, and intellectual activities supplier relationships are the main sources of competitive advantage. This is one of the early literature on competition, in which the author claimed that a fundamental aspect of competitive adaptation is the specialization of suppliers to meet the change in demand of the buyer.

Competitive advantage is "sustained profitability above normal." (Peteraf, 1993). Therefore, the competitive advantage is not something you have, but enough, not just something that makes us different from the competition, but get a higher return than the counterpart. The competitive advantage

can be created in many ways, for example, by company size, location, access to resources (Ghemawat, 1986).

Understanding the sources of sustained competitive advantage for firms has become the largest area of research in the field of strategic management (Porter, 1985). That is the reason why sustained competitive advantage organizations seek and try to develop it. Similarly, Barney, (2001) conceptualized as "the prolonged benefit of implementing some unique strategies for creating value not simultaneously implemented by any current or potential competitor and the inability to duplicate the benefits of this strategy". Additionally, they must possess four attributes: rareness, value, inability to be imitated, and inability to be replaced.

The resources of the company include all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc., which allow the organization to implement strategies to make it more efficient (Daft, 1983). However, not all resources have the potential to create a sustained competitive advantage. The dynamic nature, of the business environment, especially in relation to the influence of competitors, customers, regulation, technology and

Some uncertain elements of the environment do not act in the same direction over strategic resources, competitive advantage and organizational performance (O'Shannassy, 2008). Maintaining competitive advantage over time and the unknown is complicated, especially in the digital age and changing consumer behavior.



The school of the dominant strategy until the 1980's was the Industrial Organization Economics (IOE) (Hoskinsson, Hitt, Wan, & Yiu, 1999). It is a field of economics that deals with the structure of markets, corporate behavior, and social benefits and costs associated with the various forms of market structure and the behavior of the firm (Tirole, 2003).

A company with an attractive market position can exercise market power (Teece, 1984) and the monopoly profits. Monopoly profits resulting from the deliberate restriction of production (Peteraf, 1993) so that the sustainability of earnings is closely linked to the structure of the industry, which changes relatively slowly. In order to gain market power over its rivals, competing companies can form cartels (Noguera & Pecchechino, 2007), or enter into agreements collusion, both could be considered as forms of cooperation between companies, within the framework OIE.

The company is a set of activities, the central tenet of the resource-based theory is that a company is a set of idiosyncratic resources and capabilities (Wernerfelt, 1984; Peteraf, 1993). The resource-based theories have a theoretical framework that encompasses several broad currents of thought, which should suit the traditional theories, the theory based on knowledge, and the theory of dynamic capabilities.

The competitive advantage of a company is mainly based on the valuable, rare, imperfectly imitable and non-substitutable resources. Possessing the attributes of some of the factors of production, in this case, resources are more efficient than other ones, and endowed with these resources companies are able to produce more economic to better meet customer needs and to obtain higher profits (Spanos & Lioukas, 2001). The remedies

provided by this approach are the company's assets, knowledge, skills, processes and attributes that enable the organization to develop and implement their strategies more effectively and efficiently (Wernerfelt, 1995).

## **THE KNOWLEDGE THEORY**

Knowledge can be classified as: popular knowledge, common sense, knowledge acquired through extensive experience, scholarly education or knowledge based on research (Tilak, 2002). Definitely, knowledge is today, the basic input that allows organizations to be preserved in a process of continuous innovation, improving their processes, products and services. This resource is hosted by the members of the organization, and to the extent that organizations are able to manage it correctly, they can have the sustained competitive advantage (Tohá, 2006)

In this era of knowledge economy, which decides a country's comparative advantage and competitive advantage, competitiveness is knowledge, which refers to the ability to achieve sustained economic growth, based on the production, dissemination and application knowledge, innovation through knowledge and innovation (Zeng, 2009). Therefore, the competitive advantage of a country will inevitably be reflected in the advantage of knowledge. The expansion and complexity of knowledge on the dynamics of the competitive environment, have made it increasingly difficult for a single company and capitalize contain all relevant knowledge (Pateli, 2009). So companies specialize and use business relationships and networking to complement their knowledge (Das & Kumar, 2010). Learning should be reciprocal, where the goal is to develop new knowledge and innovation. Knowledge "is a dynamic human process of

justifying personal belief in search of the truth." And states that the information is material means necessary to extract and build knowledge (Nonaka & Takeuchi, 1999). Companies can get knowledge by observing other companies and trying to learn from their experiences. (Haveman, 1993). And so, knowledge can be classified as a strategic resource, which should be actively managed if you will provide companies with a sustainable competitive advantage. Unlike other resources, the value increases with the persistence to share and exchange knowledge (Henard & McFadyen, 2006).

## **THE INNOVATION THEORY**

As it is known, innovation is a constant search and exploration process that leads to new products, processes, marketing, organization and innovative design. Innovation is often the most important driving factor in the creation of economic value, the most innovative and most successful companies have adapted their approach to innovation management due to changes in the external environment, in an attempt to protect or promote their competitive advantage (Ortt & Smits, 2006). There is also a consensus among academics, who are advising companies to focus their attention on innovation in order to create and maintain sustained competitive advantages. Similarly, Porter posits that the innovation process cannot be separated from the context of the company's competitive strategy.

Technological changes and competitive pressures increase the need for businesses to adapt to improve and innovate. Companies that generate most successful innovations will respond to changes in the environment and develop new skills for better performance

The National Innovation Initiative in the United States (NII) defines innovation as "The intersection of invention and insight led to the creation of economic and social value" (NII, 2007). Innovation plays a crucial role in today's global competition, and is the main source of competitiveness of a country. It actually means that it has become a major differentiator within the competitive race (Roberts, 2007), and innovative companies have learned to sustain themselves for long periods of time. At the same time, one of the sources of innovation is knowledge, which is widely recognized as a strategic asset that enables companies to maintain distinctive competencies and uncover innovation opportunities (Chen & Lin, 2004).

It is clear that organizations learn and create innovations by sharing and combining knowledge (Kogut & Zander, 1992). Hence, sharing knowledge contributes to innovation because it creates collective knowledge and generates synergies charities, which improves the stock of knowledge available in the Company (Nonaka & Takeuchi, 1995). Additionally, successful innovation requires a combination and association of recent knowledge and existing knowledge. Innovation is a social process where strategic choices are not simple as it involves the exercise of control of the communication of knowledge (Scarbrough, 1995). In such a way, that the knowledge gained will allow individuals time to respond to environmental demands with innovative new performance (Wang, Wang, & Horng, 2010).

## **PROBLEM STATEMENT**

There is currently an increasing competition for the North American avocado market, although, México is still the leading exporter to the United States, other countries such as Chile and Perú and Colombia have increased the quantity and quality of avocado exported to the United States, which

represents a direct competition for Michoacán avocado growers. According to Bonales and Sánchez (2003), the avocado industry is characterized by poor organization, which is one of its main weaknesses, and it is clear that some comparative advantages translated into competitive advantages of avocado producers and exporters have been emulated and sometimes improved by some producing countries and competitors in international markets avocado (Sánchez, 2007), for example, according to the industry producing avocado Israel and according to the information presented at the World Congress held in Viña del Mar, Chile on 13 November 2007, this producer has planned to achieve yields of around 20 tonnes per hectare in 2010 (Naamani, 2007), while in Michoacán avocado producers just manage to pass the ten tons per hectare. Furthermore, when analyzed in detail the successful export performance of this product are discovered weaknesses against other foreign competitors, especially in the U.S. market, among which are most noticeable mainly in terms of technological development and modernization of production.

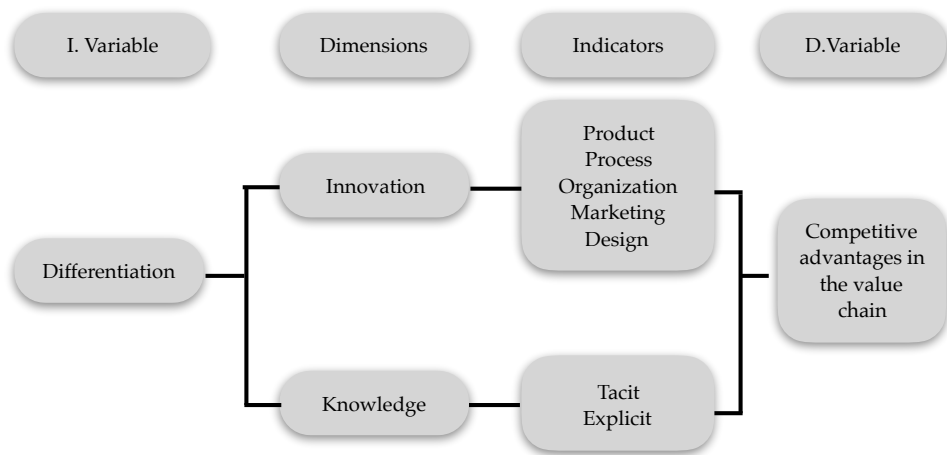
An example of this is the inspection conducted by the Department of Agriculture of the United States of America (USDA) certified avocado orchards for export located in Uruapan Michoacán. We found the presence of screwworm in 1800 hectares (Arellano, 2008), representing violations of breach of safety standards governing good agricultural practices (GAP) agreed by both governments and what resulted that the same amount hectares are phased export program by viewers or inspectors from the Ministries of Agriculture of the United States and Mexico. This represents a decrease in the export of fruit and result in a reduction in foreign exchange earnings for the population. Another factor affecting exports Michoacán were internal conflicts between producers and packers mainly due to the

lack of agreement about the price of avocado and by the change of administration in APEAM.

MATERIALS AND METHODS

The article is generated from scientific research and has a descriptive-correlational design because, describes the subject matter and because it determines the correlation of the independent variables with the dependent variable competitive advantages in the value chain of export companies located in Uruapan Michoacán avocado. The figure 2, shows the model variables used in the current research as well as the dimensions and indicators. The application of the questionnaire was personally at four traders (growers, producers, packers, and shippers) to obtain the information pursued in this investigation.

Figure 2. Model Variables



Source: Compilation, based on fieldwork

## **Hypothesis**

Innovation and knowledge are the main variables that affect the competitive advantage of the links in the value chain avocado exporting companies located in Uruapan, Michoacán.

## **Population**

The study population consists of the links in the value chain, farmers, growers, packers and shippers, represented by the owners, managers, administrators or production manager avocado exporting companies located in Uruapan, Michoacán. Once identified the population representative sample was selected, which was established a confidence level of 95% and an error level of 5%.

## **Sampling**

There is a climate of insecurity in the region avocado, because of this distrust and barriers existed to implement measurement tools in order to study. So, the sample size was: Nurserymen 51, 354 Producers, Packers 29 and Transporters 8.

## **Materials**

The measuring instrument used was the Likert Scale. Added a supplementary question to the questionnaire (Table 2).

**Table 2. Likert Scale measuring**

<b>1</b> Lower	<b>2</b> Low	<b>3</b> Medium	<b>4</b> High	<b>5</b> Upper
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Source: Compilation, based on fieldwork

### Reliability

The following aspects of the development of the questionnaire are measuring the reliability and validity. A questionnaire is reliable when measured with the same precision, gives the same results, in subsequent applications made in similar situations (Santillana, 1998). The reliability of the measurement instrument is 0.932, and measures of the reliability of the variables studied are: innovation and knowledge 0.942, 0.920 (Table 3).

**Table 3. Reability**

Variable	Questionnaire applied	innovation	knowledge
Cronbach's Alpha	0.962	0.942	0.920

Source: Compilation, based on fieldwork

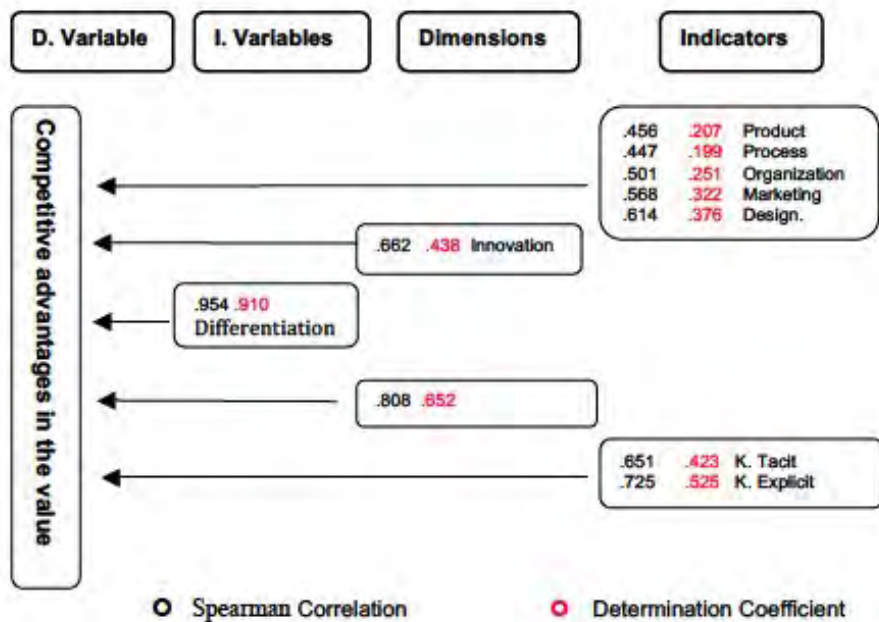
## RESULTS AND DISCUSSION

### Correlation index

The figure 3 shows the Spearman Correlation and determination Coefficient of model variables. While taking measurements, we see the origin of the results; this allows decisions with greater certainty.



Fig. 3. Spearman Correlation and determination Coefficient of model variables.



Source: Compilation, based on fieldwork

## CONCLUSION

Organizations face massive competition avocado producing internal and external and compete for a better position in the market and to survive, employing known techniques, routines are time-honored customs based on experience. The decision making process is based on previous experience that gives the work, trust and instinct. As regards the innovation, there is a substantial body of knowledge. Innovation and knowledge are considered in the current literature as the only source of sustained competitive advantage.

It is important that businesses in the avocado value chain understand that knowledge and innovation must be managed successfully, currently, these strategies are required to survive and compete.

It is clear that companies have different abilities to manage knowledge and create innovations, which are transformed in the delivery of benefits to customers. It is important that companies understand that when you innovate a product or service, it is required to have a clear understanding of what the customer wants and is interested and what you expect, so that they derive mutual benefit.

It is important that businesses in the avocado value chain understand that knowledge and innovation must be managed successfully, in these times in which these strategies are required to survive and compete. Activities aimed at the poor and sporadic innovation are therefore agents must consider these activities as priorities to be more competitive.

An important aspect that brings this research is that measurement of the independent variables, dependent, dimensions and indicators, this allows knowing the origin of the investigated phenomenon results as measuring the impact of the indicators on the dimensions and those in the independent variables clearly shows their level of influence.

It is worth to stand out the fact that there is a strong relationship between knowledge and innovation generated, because the creation and sharing of knowledge are drivers of innovation in the organization.

As it has already been mentioned, avocado exporting companies have comparative advantages based on natural resources where this fruit is grown, such as climate, terrain, water, wind are factors that allow in that region have up to two blooms per year, it has avocados all year, unlike other countries such as Chile and the United States has only avocado over a period per season. However, with the constant threat of new competitors on the international scene as well as national, is necessary to continue the search for sustained competitive advantage.

If we analyze the natural resources of the strip avocado, some meet with some of the features that should have the resources to create a sustained competitive advantage, such as, valuable, rare, imperfectly imitable and non-substitutable resources it possesses. The double flowering each season is unique in the world, volcanic terrain, the weather, the huge amount of water, etc., they provide a competitive advantage to those producers. However you need to convert them into sustainable competitive advantage. Therefore, it is necessary to change the level of analysis to

achieve the stated objective, which is to achieve a sustained competitive advantage.

Avocado quality depends on a lot of factors, but mainly those related to climate, soil and water. Then we can infer that most of the components of avocado come from these factors. Furthermore, natural resources avocado producing countries, competitors Michoacán producers are very different (Chile, Israel, California, Peru, Dominican Republic etc.). Therefore, could produce different avocados to local in relation to certain components of the fruit.

Based on the abovementioned, it is proposed to conduct a study of the components of Michoacán avocado and compare with avocado grown in Chile, Israel and California.

If we start from the principle that the resources where they grow avocados are special, these resources may transmit any component in the physiology of avocado and also may have beneficial properties for human health or beauty etc., and obviously, the other fruits grown in other countries do not have. Therefore, by an advertising campaign that difference would be promoted, resulting in the establishment of a sustained competitive advantage for Michoacán avocado, which could never be imitated or matched, which are part of the features that the theory based on reference resources, and under those conditions would promote the establishment of the designation of origin, and also the creation of a distinctive mark, in order to make a real difference to others avocados from México and other countries. Likewise, implement an advertising campaign in the United

States which would revolve around Michoacán avocado differentiating factor.

The technical name of this proposal, is a Bromatological study, in which components are determined at the molecular complex fruit and flavor qualities, fat level, color which are shaped by the weather. It is also necessary to emphasize that this comparative study could be replicated in a lot of fruit.

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# Chapter Four



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## Management Leadership and Organizational Change in Commercial SMEs

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# Management Leadership and Organizational Change in Commercial SMEs

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## INTRODUCTION

Management is essential in the operation of any company, being its work of great importance specially when there is a process of organizational change. The change appears perpetually, and for this reason it is an essential aspect that must take into account in an adequate managerial work, because such changes are more frequently.

The current business environment is increasingly competed and unstable, which causes that companies have to adjust to such changes, and anticipate to them. That is why the change in every area worldwide has been present at all times, and therefore, there is number of factors that encourage business firms to react in an increasingly dizzying way to continue operating. The relevance of the study of the organizational change is supported by the commonly accepted notion that companies must be in constant transformation, and for this reason, it is essential to understand the way that organizations change over time, as well as the reasons for

those changes to be done or not. It is extremely useful to know the factors that intervene in a process of organizational change, such as the environment of uncertainty that exists in the business world, as well as the characteristic resistance to change that repeatedly occurs among employees when the company carries out an organizational change.

Leaders of the board of directors of all kind of organizations have a fundamental role in the process of implementing an organizational change, since every managerial leader must be able to get that her followers and supporters accept and collaborate in the process of change. It is imperative that management possess a genuine leadership, so that they not only hold the authority that gives them their position, they also have the moral authority, trust and loyalty of their employees so that they can cooperate in the process of implementing the change in the organization and so that this change can be successfully made. In this way, the managerial leaders, in getting their employees to cooperate with the change process, favors the proper execution of this change, since they have that support from their staff.

This research attempts to find which factors influence an organizational change process. At the same time, the propose is to study the effect that managerial leaders have on an organizational change; as well as knowing which factors related to the role of these managerial leaders intervene in an organizational change in companies of the commercial sector, either facilitating it or making it difficult.

## ORGANIZATIONAL CHANGE AND LEADERSHIP

Directors must be managerial leaders who have followers in their organization, and who also gather all the staff to work in coordination to adapt to the changes that occur in the environment surrounding the company. Therefore, managerial leaders must know how to manage human relations so that this helps them control the work done by their workers and communicate all information in a timely, reliable and clear manner. A managerial leader must possess certain characteristics and abilities, such as: having a vision to the future and being efficient strategists.

In order to analyze this topic in depth, several intellectuals analyze the organizational change, taking management leadership as perspective in their research work (Bandow & Self, 2016; Stojanović, Stanisavljević & Bošković, 2016; Duck, 1993; Chen, Zheng, Yang & Bai, 2016; Ming-Chu & Meng-Hsiu, 2015; Teal, 1996; Simoes & Esposito, 2014; Eklinder-Frick, Eriksson, & Hallén, 2014; Hirsh & Kang, 2015; Islam, Rehman & Ahmed, 2013; Kotter, 2001; Lindquist & Marcy, 2016; Ceptureanu, 2015).

Managerial leaders need to deepen the way their company works, since no managerial leader away from the march of his or her company can change or sustain such institutional ideology; because the culture of a company reflects the culture that its managerial leaders have. For Bandow and Self (2016), the current environment of close competition and constant changes requires leadership throughout the organization, not just its leaders.

Some managers believe that an employee's work is a kind of "privilege" that can eliminate whenever they want, or an employee may consider their work as a "right". As a consequence, all this can hinder the employment

relationship and obstruct the process of organizational culture change. Since leadership promotes culture, and culture encourages behavior, any change must bring about changes in leader behavior. On the other hand, basing a leadership program on the book on business management at the moment is not convenient, because it is not organized according to the strategic objectives of the company; and because it can be taken as a transient trend. Leadership is not learned just by going to training sessions; it is useless if workers perceive it as a waste of time. If this happens, it will be believed that no development program will be useful.

Castañeda and others (2012), point out that there are certain dimensions about the capacity to generate change, such as: values, collaboration, resources, skills, critical reflection and leadership. Since change is normal in every company, to be able to achieve prosperity, it is essential to be able to face effectively the uncertainty. Managerial leaders have to dedicate enough time and resources to help staff deal with such uncertainty (Bordia *et al.*, 2014).

Therefore, the control of uncertainty is a fundamental challenge of leadership in organizations (Clampitt, DeKoch & Williams, 2002). A requirement to help workers face uncertainty is to have a greater discernment of the psychological nature and the response to uncertainty. In this regard, Hirsh and Kang (2015), indicate that anxiety, uncertainty and behavioral conflicts cannot be distinguished.

Quinn (2004) says that, for expert leaders, the recognition of competitive values and the understanding of changes in the environment and uncertainty, as companies move from one state to another, are the first steps

to prepare companies to face the pressures and paradoxes of the critical value.

Managerial leaders must have a positive attitude and a new way of thinking so that the company works better and that the changes are carried out (Formby & Dave, 2016; Banuelas & Anthony, 2002; Desai *et al.*, 2012; Ismyrlis & Moschidis, 2013; Zhang *et al.*, 2012). Kalyani (2011) mentions that major changes in the business environment demand a rapid evolution in the structure of a company.

Resistance is part of a change, so it is expected. Some sources of resistance to change by workers are: organizational culture, fear of the unknown, risks of change, different appreciation of change and lack of leadership (Ceptureanu, 2015). Managerial leaders, when projecting the process of implementing organizational culture change, should consider some issues that influence resistance to change, such as: risk, proximity, reciprocity, commitment and empathy (Simoës & Esposito, 2014). Therefore, in a process of organizational change, the decision-making skills of managerial leaders and a good system can reduce this resistance to change (Ming-Chu & Meng-Hsiu, 2015).

As a result of their research, Appelbaum, St-Pierre and Glavas (1998), consider strategic organizational change as an integrating process of organizational elements such as: human resources, technologies and systems; and these factors have to be considered to achieve successful changes. Their analysis suggest that it is the leaders' job to form a flexible and adaptable infrastructure that guides companies to optimal levels of performance, taking into account the pressures of the external environment

and the critical vision of the companies. In this way, technological changes and work procedures are not the greatest difficulty to achieve change, but the changes that involve people. To achieve this performance, the links between the environment, the company's vision, its leadership and the learning processes are essential. So the interaction of the change process with organizational leadership and learning is presented with the final impact on individual and organizational performance.

There is the possibility that companies fail in their efforts to change much of the time (Nohira & Beer, 2011), being the impossibility to adapt to change one of the main reasons why leaders fail (Ray, 1991). The involvement and participation of the managerial leaders is essential to achieve true changes in a company. (López-Fernández & Serrano-Bedia, 2007).

Leadership and managing are different, but complementary. Leadership is the impulse for a successful change. The management controls the employees guiding them by the appropriate way; meanwhile, the leadership motivates them, satisfying their needs. Management seeks stability and leaders fight for change. More changes, needs more leadership (Kotter, 2001).

Leadership can be defined as a process in which the relationship between leaders and followers is the focal point (Northouse, 2008). For Stojanović, Stanisavljević and Bošković (2016), leadership is a process in which a person has an impact on a group, trying in this way to reach a common goal. The leadership process has two elementary dimensions: a leader and a follower.



Leaders influence followers, so leadership is an interactive process in both directions. It's a manner in which leaders develop innovative thoughts, formulating a shared visualization that is akin to the beliefs, incentives and appreciations of the followers (House, 1996, Islam, Rehman & Ahmed, 2013).

Leadership involves the capability to inspire the followers, with the intention of fulfilling the tasks of the company, for which the leader uses appropriate motivation tactics, based on the expertise (Islam *et al.*, 2013), for what the followers understand the acts of the leaders in diverse manners. So the way a leader acts determines the behavior of his followers (Casimir & Kerth, 2010).

For Kaplan and Norton (1992), managers have to get involved, and in turn involve the company's employees; while Dillard and Tinker (1996), mention that the leaders need to have a prior knowledge of what is quality, and a great capacity for change. Real leadership is realized when the leaders and the followers form matured interactions of association and obtain common benefit as a result of these relationships (Graen Uhl & Bein, 1995).

Various theories assume that staff will obtain better results if there is a good relation among leaders and the followers, and when leaders relate to followers in the same way (Islam *et al.*, 2013). Leaders need to be aware of what their followers expect from them in order to adjust their way of acting and their leadership style; as well as to be able to propose to the followers a deal what they cannot reject (Schyns *et al.*, 2008). While, Lawler (1992),

indicates that the participation of the personnel is fundamental, since a complete system of involvement is needed as much of workers as of the managerial leaders.

For House (1971), there are four styles of leadership: directive, supportive, participatory and results-oriented. Each can be used in different combinations, with different followers and in different environments and situations (Polston-Murdoch, 2013).

There are two dimensions of leadership (transactional and transformational) that express the effect that managerial leaders have on the process of change. The transformational leadership considers that technological change requires a combination of technical aspects and human relations.

Therefore, managers must translate the vision of senior management using skills of guidance (direction), problem solving and implementation to make technological change (Beatty *et al.*, 1992). While Quinn (2004) and Martin (2007), establish that transforming leaders face paradoxes, contradictions or apparent advantages and, working with colleagues, embrace difficulties and uncertainty to discover new equilibria and diverse tactics, reconfiguring the defy, including innovative technologies.

Martín (2007) calls it "integrative thinking"; while Quinn (2004) also points out that the managers who lead this change have often had a personal transformation. Thus, transformational leadership (TFL) is an essential predictor for organizational innovation (Mumford *et al.*, 2002).

Byrne and Bradley (2007) analyze how organizational culture intervenes in the effectiveness of leaders' actions. While other scholars of the subject assume that the organizational culture and the situation of the company do not actually influence the skills of leadership (Yavas, 1995).

Leadership, social capital and strategic management combine to pose and experience a new viewpoint on how transformational leadership impacts innovation. Although social capital is essential in the improvement of innovation (Eklinder-Frick *et al.*, 2014), both the study of leadership and social capital have forgotten to study how transformational leaders take advantage of social capital to stimulate innovation.

On the other hand, Chen and others (2016), conducted a research, that adds a new perspective that examines an important leverage point but largely neglected by the leadership in seeking innovation; social capital, with regard to organizational behavior and strategic management. In this way, a significant resource of human capital that influences organizational development is leadership (Wright *et al.*, 2001), which is not presented alone, but is immersed in the relational context. (Bono & Anderson, 2005; Zhen & Peterson, 2011).

Due to its importance, most companies try to promote leadership by providing training in leadership skills. (Vohra, Shatdal & Bhatnagar, 2011). For Bednarz (2012), the distinctive skills of successful managerial leaders can make a company change, which helps the company do the right things, and not only decrease costs. While Nixon (1992), proposes to start an environment of encouragement and support, establishing relationships based on trust and honesty, and being a "leader of leaders". To achieve this,

it is necessary to develop an organizational culture where workers have the initiative, and see themselves as apprentices who embrace change.

Duck (1993) and Kotter (2001), believe that companies should have a group to lead change efforts, Duck (1993) calls it “Transition Management Team (TMT)”; that is a group of managerial leaders, responsible for making the change. Meanwhile, for Lindquist and Marcy (2016), it is necessary to develop key professional skills, such as: assess the orientation of the managerial leaders and specific units, and the adjustment between the present and future needs of the company. It is important to check that the leadership teams are balanced and if they have to go in a certain direction due to their mission.

Leaders should be encouraged to consider their colleagues on essential issues and recognize different individual dispositions, as well as program and unit cultures, which in turn involve different notions of what is important, and what is considered effective and good performance. The effects of changes in leadership must also be examined to modify priorities and expectations regarding the operation and consequences for the re-balancing and reorientation of executive teams when promoting new types of leaders and capacity for long-term construction.

Leadership is needed to innovative companies, in order to change principles and norms; and socialize with the staff. Especially because of the unpredictability of the environment, which produces uncertainty; and when there are internal disputes and fragility in the organizational culture.

## **METHODOLOGY**

This study has two phases: first the theoretical one that investigates the state of art; and second, the empirical study. To gather the information of this research, a questionnaire of structured questions was elaborated as an instrument, which included the answer alternatives to each question.

### **Unit of analysis**

For this research, the analyzed organizations must be: 1) micro, small and medium enterprises (1 to 250 employees); 2) commercial sector; and 3) located in the Metropolitan Zone of Guadalajara -ZMG- (Guadalajara, Zapopan, Tlaquepaque and Tonalá).

### **Sample**

As part of this study work, a non-probabilistic sampling was used and a questionnaire was applied to 78 people who work in 78 micro, small and medium commercial enterprises of the ZMG, and who went through an organizational change. Among the people interviewed we consider: owners, presidents, directors, deputy directors, managers, administrators, supervisors, managers, coordinators, delegates, engineers, employees, accountants, assistants, payroll, cashier; who work in commercial firms such as: stores, hardware stores, furniture stores, pharmacies, restaurants, drinks, clothing, publishing houses; located in the ZMG, whose companies underwent a process of organizational culture change.

To know if the company had an organizational change, the respondents were asked if the company went through an organizational change process; the questionnaire was applied only to workers of companies that did have an organizational change, and that the respondents have experienced this

process of change. According to the SIEM, in Mexico, 69% of the companies belong to the commercial sector, 21% are part of the services sector, 7% are from the industrial manufacturing sector, and only 1% is part of the agricultural and mining sector.

### **Operationalization of variables**

As for the current research, the variables were operationalized using Likert Scale questions. This scale is formed with affirmations that indicate an attitude, either favorable or unfavorable in relation to the subject analyzed. Interviewees were asked to indicate their degree of agreement, disagreement, or frequency, with related to each statement, giving a numerical scale to each answer to establish if their attitude is favorable or unfavorable in relation to each idea, which is object of study. (McDaniel Jr. & Gates, 2016).

### **Problem Statement**

Managerial leaders influence the implementation of an organizational change in commercial SMEs located in Guadalajara Metropolitan (ZMG), having an impact on the progress of such companies.

The chapter aim is to identify the factors and effects that managerial leaders play in a process of organizational change in commercial SMEs located in ZMG, whether they facilitate or hinder it. The following research questions were postulated:

- In which way do managerial leaders influence a process of organizational culture change in companies in commercial SMEs located in the ZMG, either facilitating or obstructing it?

- Which is the relationship between the promotion of leadership, and its consequences, in an organizational change in commercial SMEs, located in the ZMG?

### **Research objectives**

#### *General objective*

The objective of the current study is: to identify which factors concerning to managerial leadership intervenes in an organizational change in commercial SMEs located in ZMG.

#### *Specific objectives*

Another objective is to establish the effect of promoting leadership in an organizational culture change in commercial SMEs located in ZMG, whether they facilitate or obstruct it.

### **Hypothesis**

These hypotheses were formulated:

H1: The presence of managerial leaders favors the implementation of an organizational change in commercial SMEs located in ZMG.

H2: Commercial SMEs located in ZMG carry out actions to promote leadership, which favors the implementation of an organizational culture change.

### **Collection and processing of information**

The research instrument applied, was a questionnaire based on the theoretical framework, which aims to find the factors related to managerial leaders, who intervene in a process of organizational culture change in commercial SMEs located in ZMG. Therefore, a questionnaire of closed questions was made, which would help identify these factors. Once the

information was collected, the results of the investigation were analyzed and classified.

The analysis of variance (ANOVA) was used to establish the degree of significance of the analyzed variables. The ANOVA procedure generates a variance analysis of a factor for a quantitative dependent variable with respect to a single factor variable (the independent variable). The analysis of variance is used to test the hypothesis that several means are equal. This technique is an extension of the "t test" for two samples. The dependent variable is the one in which the groups are to be compared, while the factor variable is the independent variable, which defines the groups that are to be compared.

The use of variance analysis considered to test the Null Hypothesis that the means of K populations ( $K > 2$ ) are equal, as opposed to the alternative hypothesis that at least one of the populations differs from the others in terms of their value expected. This contrast is essential in the analysis of experimental results, in which the investigation tries to compare the results of K "factors" with respect to the dependent variable.

The ANOVA must meet the following assumptions: The populations must be normal. The K samples on which the treatments are applied must be independent. All populations must have the same variance. If the level of significance (sig.) Intraclass is less than, or equal to 0.05, it is that there is a significant relationship between the groups.

As part of the empirical analysis of the current research that has as purpose to know the influence of the managerial leaders in a process of



organizational culture change; the degree of significance was sought in an analysis of variance (ANOVA), relating the variables associated to the role played by managerial leaders, on the one hand, and on the other, with the effects that managerial leaders may have in a process of organizational culture change, as well as with certain factors that may favor or obstruct the implementation of an organizational culture change.

## RESULTS AND DISCUSSION

As for the current research, which is related to the study of organizational change, certain questions were asked, to establish how managerial leaders were key factors that contributed to the process of implementing an organizational culture change, revealing how often those factors presented, and how they influenced the organizational change.

**Table 1. Were there leaders in commercial SMEs located in ZMG that helped to make the organizational culture change?**

ANOVAS	SIG.
Positive attitude of Management	0.039
Adaptation	0.047
Team learning	0.013
Employee's Education	0.006
Management Involvement	0.004
Was management willing to change?	0.019
Did organizational structure, favor the organizational culture change?	0.023
The staff's reaction to change was favorable?	0.040
Feedback	0.033
The employees performance was acknowledged and rewarded	0.036
Shared vision	0.026

Source: Own elaboration.

In the used research instrument, certain questions and hypotheses were included. They take into account the issue of the effect that managerial leaders have on an organizational culture change (table 1).

The results of the study according with Katzenbach (1996), who mentions that a leader must be coordinated with his employees, finding simple words that calm their concern, inculcating courage, and maintaining their confidence to achieve an enduring change. While, Lindquist and Marcy (2016), point out that after going through a complete cycle of change, leaders develop a sense, and a vision that helps them to know what management strategies will be effective and in what situations, what leads to the domain and to a greater discernment of the leadership. As for Kanter and other (1992), managerial leaders play a transcendental role in the implementation of a clear vision: institute a sense of urgency, create enabling structures, communicate, involve staff, be honest, strengthen and institutionalize change.

The Management involvement is a crucial factor for success in the implementation of an organizational change; as well as different methods of organizational management, leading this to an improvement in the performance of organizations. (Ogbeide & Harrington, 2011; Olivella, Cuatrecasas & Gavilan, 2008; Richardson *et al.*, 2010; Zu, Robbins, & Fredendall, 2010).

In this study, it was discovered that the managerial leaders contributed to carry out the organizational change. Since it can be seen that there is a significant relationship between: Were there leaders in the company that helped to make the organizational culture change?, with several factors and questions such as: Management Involvement, positive attitude of management, was management willing to change, shared vision, feedback, employees performance was recognized and rewarded, employee's education, staff's reaction to change was favorable, team learning, did organizational structure, favored organizational culture change?, and adaptation.

**Table 2. Activities are carried out to promote leadership**

ANOVAS	SIG.
Actions are taken to develop an openness attitude to change in the personnel	0.000
A measurement of the organizational culture change results is made	0.001
Teamwork	0.008
Adequate information is available?	0.013
Does the staff have access to all the information they need to carry out their work within the organizational change?	0.014
Coordination of activities	0.017
Employee's Education	0.020
Adaptation	0.021
Create planned and controlled crisis and conflicts	0.024
The employees performance was acknowledged and rewarded	0.027

Source: Own elaboration.

Additionally, this study also found out that carrying out activities to promote leadership significantly favors the process of organizational culture change. The results coincide with the points made by Shelton and Darling (2001), which reveal that employees want to be guided, not managed; so the leaders have to encourage and develop leadership skills. In relation to this, Ready and Peebles (2015), mention the need to have a business ideology to form the next generation of managerial leaders. Managerial leaders have to aim to get employees to cooperate in decision making. The relationship with workers must be based on respect, rectitude and openness.

The results of the study indicate that activities to promote leadership in an organization have a role of great importance in an organizational culture change, since it was found that there is a significant relationship between: activities are carried out to promote leadership and the employees performance was acknowledged and rewarded, actions are taken to develop an openness attitude to change in the personnel.

Does the staff have access to all the information they need to carry out their work within the organizational change? teamwork, and a measurement of the results of the organizational culture change is made, which reveals that it is a factor that considerably favors the organizational change process. Other factors that likewise intervene favorably in an organizational change are: coordination of activities, employee's education, and adequate information is available, create planned and controlled crisis and conflicts, and adaptation.

**Table 3. Management Involvement**

ANOVAS	SIG.
Positive attitude of management	0.000
Coordination of activities	0.000
Shared vision	0.000
Feedback	0.036
The implementation of the culture change has made the company more competitive	0.008
Competitively the company is working better after the change than before	0.001
Adequate information is available?	0.000
As a result of the change, staff developed new skills and abilities	0.002
Good human resources	0.010
Anticipate the future and its changes	0.039
Team learning	0.014

Source: Own elaboration.

Additionally, this research project also found out that Management Involvement also significantly favors the organizational change process. The results indicate that one of the success factors in the operation of a company, and that helps to achieve a successful organizational change, is the Management Involvement, so that in this way the employees also support the organizational change process (Basu, 2004; Banuelas & Anthony, 2002; Jeyaraman & Teo, 2010; Laureani & Jiju, 2012; Swami & Prasad, 2011; Brun, 2011; Desai *et al.*, 2012; Ismyrlis & Moschidis, 2013; Sharma & Chetiya, 2012; Zhang *et al.*, 2012).

For Kotter (2001), the leadership that has the management is the primary force for a successful change. He also mentions that leaders influence the personnel, taking them in the right direction; so the Management Involvement stimulates employees, satisfying their essential human needs.

Therefore, and in accordance with the results obtained in the present investigation, both hypotheses are accepted (tables 1,2,3): a) the presence of managerial leaders favors the implementation of an organizational change in commercial SMEs located in ZMG; b) commercial SMEs located in ZMG carry out actions to promote leadership, which favors the implementation of an organizational culture change.

## CONCLUSIONS

The incessant changes that occur in the business environment show how unpredictable markets are. Companies should be alert to what happens in their environment, since they cannot be static, because if they do so, they will be left behind by the competition. Successful organizations do not wait for changes, they provoke them to preserve their leadership and to force their competition, so that their competitors will have to adapt to such changes.

The managerial leaders involvement in any kind of organization is essential to be able to transform the companies, since the managerial leaders, contribute to the workers accepting the changes through their involvement and positive attitude and that in turn these employees are compromised in the process of organizational culture change. Having said that, greater impact when the company is in an unpredictable and full of uncertainty environment, causes insecurity and fear among the staff.

Therefore, companies must adapt to market's uncertainty, so they have to make changes in their organization, their manufacturing processes and their organizational culture. All this to continue operating in the business world, and seeking to be more effective and efficient. Managerial leaders

play an essential role, although it is also necessary for all staff to be involved and to coordinate all the functions of the organization, where the managerial leaders point out the direction that the company should take.

Therefore, managerial leaders must have a vision for the future and be capable planners. For which the managerial leaders have to get involved in the operations of the business unit, because no leader isolated from the operation of their company, can achieve the organizational change, or sustain their culture, because the culture of a company is the culture that their managerial leaders establish.

Managerial leaders should inspire a business vision in which all staff participates; favoring the development of a working environment in which all employees can carry out their work with safety and dedication, the leader must have good communication with all the staff. The managerial leaders involved in the administration and operation of their company try to make things better and better. Without this business ethic that exists when there is a committed manager and with leadership in charge of the company, that company can decay and no longer be competitive.

The influence of a managerial leader in the direction of their company helps to modify the attitude of employees, creating a vision and concrete plans that help to determine the course the organization will follow. The commitment of managerial leaders will bring a change in the mindset of the workers, promoting them leadership skills and getting involved in the operation of the company, and with the process of implementing the organizational culture change.

In a process of an organizational culture change, the managerial leaders want the employees to understand what motivate the change, and give them all their support, for which they must have: vision, delegate authority, courage, cunning, tenacity, ethics, integrity, and effective teaching methods; on the other hand, they have to assimilate certain complex teachings by themselves.

According to the results of this research, the factors that promote an organizational culture change are the following: the involvement and positive attitude of management, having a shared vision, feedback, team learning, and coordination of activities. On the other hand, the effects of organizational change on corporate firms were: the staff's reaction to change was favorable; the employees performance was acknowledged and rewarded, a measurement of the organizational culture change results is made, actions are taken to develop an openness attitude to change in the personnel, the staff has access to all the information they need to perform their change work, crises and planned and controlled conflicts are created. As shown, the organizational change brought beneficial effects on the functioning of the organizations analyzed.

As indicated by the results of this study, managerial leaders have a fundamental role in the functioning of any company, since their involvement and positive attitude are fundamental factors to be able to carry out their work within the organizational change, due to the fact that an involved manager, with leadership, will try to promote and provoke changes instead of waiting for such changes to appear in the markets, for this reason, this type of managerial leaders are characterized as being



people with vision in the future, also, they do not fear to their competitors, or to changes.

Through an appropriate training by their managerial leaders and the organizations themselves and their staff, they will be able to successfully face the challenges of the future. A company can be complex and large, but at the same time it will be able to adapt to the incessant changes.

This work has as limitations that it is a study that only considers the organizational change in commercial firms located in the ZMG, so the results cannot be projected to companies located in other locations, or to companies of other line business. For future research projects it is proposed to do case studies in companies that are going through an organizational change process. It is also suggested to carry out studies like this one in organizations of other line business, such as the service, or the industrial sectors; likewise, it would be useful to do this type of research in organizations at the national level.

Currently, making an organizational change is a maneuver used by companies to continue working in the business world; since it has to be done to operate successfully in an unpredictable environment like the one that prevails in the business world. Therefore, firms need managerial leaders to carry out a successful organizational culture change; since by getting involved in the performance of their company, they will seek to move forward and make the change, instead of waiting for it to happen and having to react to that change; because of his vision and entrepreneurial spirit.

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# Chapter Five



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## **Key Factors for Port Competitiveness in Mexican Container Terminals**

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# Key Factors for Port Competitiveness in Mexican Container Terminals

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## INTRODUCTION

Throughout the last century, international maritime transport has had a really vertiginous evolution that essentially turned into a revolution, due to the development and implementation of new technologies (Reig, 2016). Maritime transport is essential to the world's economy as over 80% of the world's trade, which is carried out by sea, according to information and statistics of the United Nations on Trade and Development Conference (UNCTAD, 2015). In the case of developing countries the percentage of trade carried out by this means of transportation is about 90%, which is why politicians and shipping companies have a special concern and interest in knowing and understanding what the determinants of international shipping costs are.

In previous years, Rosas and Sanchez (2004) established that transportation was essential for the economic growth of a country due to the implications that it has on infrastructure and the communications.

In fact, according to the UNCTAD's report of marine transport (2015), developing countries -specifically those of Africa and the Australian Continent- pay overpriced average costs for their imports (between 40 and 70%) compared to the international transportation costs paid by developed countries. This situation is due to regional economic imbalances and to the pending reforms of their port systems to generate a greater commercial flow, as well as to the lack of enough marine transport connectivity in these geographic zones. For Nijkamp (1998), peripheral geographic zones must face higher transport costs altogether with the enormous challenge of reaching the status of scale economies and density.

On the one hand, for Wilmsmeier and Monios (2014), the peripheral denomination in terms of marine commerce is not due to the geographic distance, but rather to economic issues mainly related to connectivity and market structures. Currently, seaports must overcome economic, environmental and social challenges, such as the increased traffic volume and concentration, because of the ever-growing size of ships. On the other hand, adaptation costs and existing infrastructure in their zone of influence also affect seaports, as a result of the constant and fast evolution of their market.

According Doerr (2009), during the 1990s and beginning of the 21<sup>st</sup> century, global commerce experimented a constant and sustained growth, including the Asia-Pacific and Latin America and the Caribbean regions. The evolution of containers transported by sea during this period forced ports to adapt the available infrastructure and to incorporate specialized equipment in order to properly serve a growing number of larger container ships.

Martner (2010) also indicates that the marine industry has registered fundamental changes such as: container ship gigantism and the concentration of on-carrier operators with the purpose of reaching scale economies. This way, the intensive use of containers has forced to modify drastically the structure and the design of seaport facilities around the world.

For Guasch (2011), the growth of most of the Latin American countries nowadays is based on the development of their exports. Therefore, these countries must count on effective and efficient logistics, with the required quality infrastructure to transport merchandise, and the ability to properly manage such infrastructure and related services.

In Mexico, the operation of seaports arose great interest in 1993, with the creation of a new Port Law that took the country into the globalization process. Therefore, the process of reorganization and harbor privatization in the 1990s generated the emergence of new port operators and a realignment of existing regular lines and maritime routes that would transform the country's port geography (Romero, 2008).

However, the accelerated growth of maritime cargo transport caused an uneven effect in Mexican ports. At the end 1990s, an important concentration of container flows in the Gulf of Mexico and the Caribbean could be observed in only two ports: Veracruz and Altamira. The former moved 61,4% of the container tonnage and the latter 28%. Altogether, these two ports concentrated almost 90% of this type of load in the Gulf coastal line. The rest of the ports in that coast, excepting the port of Progreso in

Yucatan, stagnated and lost presence as development nodes in the region and as generators of productive chains (Martner, 2010).

Due to its location, Mexico has the third worldwide longest coastline, with 22 main ports, 50% of which are located on the Pacific and the rest on the Atlantic coasts of the Gulf of Mexico and the Caribbean. Maritime transport constitutes a fundamental element of the foreign trade for Mexico, and it allows connection to the continental territory. In 2009, the country managed to be within the 15 most important exporters worldwide, and the main one in Latin America. In that year, over 80% of the country's exporting goods carried by sea and handled by seaports worldwide.

The Ministry of Transport and Communications in Mexico (Secretaría de Comunicaciones y Transportes, SCT) has reported that the load mobilized in containers presented the most dynamic flow in most recent years, identifying three main groups of ports: a) the first one is conformed by the greatest impact ports: Veracruz, Manzanillo and Lázaro Cárdenas, with an operation level of over 80% according to SCT data (2010); b) the second group had an operation of approximately of 17%, and it is made up of Ensenada and Altamira ports; c) lastly, the third group is integrated by smaller ports: Mazatlán, Salina Cruz, Tampico, Puerto Morelos and others, which altogether reported only 3% of operations out of the total mobilized cargo.

In this research the authors seek to determine the maritime port infrastructure variables that mainly affect the competitiveness of container terminals in Mexico.

## **PROBLEMATIC DESCRIPTION**

Nowadays, international transport costs are very important part of a country's global transport costs and of its economic development. According to the results of recent research conducted in Asia and the Pacific, transport costs, maritime connectivity and the required procedures have a greater impact on trade costs than customs rights (ESCAP, 2015).

In the recent years, port and maritime terminal performance has become an outstanding aspect which affects a country's commercial competitiveness. Because of this, labor relations, the amount and the type of required equipment for handling cargo, quality of the transfer yard, channels to access a port, land access, customs efficiency, and possible concessions to international operators of terminals are key elements to improve performance of ports and their terminals (UNCTAD, 2015).

Camarero and González (2007) mention that it was in the 70's when seaports worldwide began to build port terminals of containers. And due to the intensive use of containers, merchandise transport increased its volume in the international trade giving birth to a new era in transporting of all kinds of merchandise by means of the container. This is how doing international commerce between countries was revolutionized, as well as commerce among continents and even among certain geographic zones of the world. Therefore, the seaports became a gate to international trade (Díaz-Bautista, 2009).

According to numbers and rankings of indicators of logistic performance and foreign trade elaborated by the World Bank, countries in Latin America and the Caribbean (ALC) still face structural problems that cause that this

geographic region has lower performance than the world average. Even the most developed countries of the region are far from the standards of the Organization for the Economic Cooperation and Development (OECD) and from the main world economies (SELA, 2015).

The ports in the ALC countries face a process that involves the necessity of a greater investment and infrastructure modernization. It is also required that governments work to update their respective legislations and policies so they can face global tendencies and demands. This way, ALC might be able to increase their throughput and reduce demurrages, so that transport costs can be reduced, increasing ports competitiveness (Durán, 2017). For Ojeda (2011), total use of the capacity of the load handling has not yet been obtained in Mexican seaports and container terminals.

Currently, competitiveness of a seaport is measured by evaluating its capacity to berth, to concentrate, to handle and to distribute containers throughout the world; by its connectivity with other ports and storage and goods distribution centers; and by its local, regional or global influence area, whether this is maritime or land (Vázquez & Ruiz, 2014).

According to SCT (2008), tendencies and requirements of international the marine-harbor industry exhibits a set of weaknesses and improvement areas that Mexico must take care of and use in its own favor. These weaknesses and areas of opportunity are: a strong concentration of the maritime transport in a reduced number of shipping line, an accelerated search of greater efficiency and lower costs by shipping companies and ports, the design of new connecting and logistics systems, and the accelerated process of containerization of cargo; the larger capacity and



dimension of vessels and the demand of ports with greater capacity and more sophisticated services.

During the last presidential periods, Mexico has improved its port infrastructure, nevertheless, the rate of economic growth of the country, as well as the growth of the public and private investments in ports has not been enough to satisfy the transport and communications needs of the population, not to mention to reach competitive international standards (Diaz-Bautista, 2009).

Mexico has 117 ports and terminals along 11,122 km coastline. 102 are ports and the remaining 15 are terminals located out of a port. Out of the 117 ports and terminals, 58 are in Pacific and 59 in the Gulf of Mexico and the Caribbean. The Mexican port organization is integrated by three organisms: the federal government, Integral Port Administrations (APIs) and the private sector. Currently, 71 ports and terminals they are granted to 25 APIs. Out of those 25 APIs, 16 are in charge of the SCT, 2 in charge of FONATUR, 6 belong to the state and 1 is private. As far as the maritime authority there are 103 harbor captaincies. There are four strategic cargo ports: Altamira, Veracruz, Manzanillo y Lázaro Cárdenas. (SCT, 2013)

Mexico has maritime connections with 131 countries and more than 491 destinies from all the continents through 91 shipping companies that arrive at Mexican ports and offer services on a continuous way to America, Asia and Europe. Out of the 91 shipping companies, 76 arrive at 10 ports on the Gulf of Mexico and 40 berth in 8 ports on the Pacific Ocean. The main ports of each coast are: Veracruz on the Gulf of Mexico with a registry of 37 shipping lines and 4-daily services average, whereas, on the Pacific Ocean,

Manzanillo outstands with 32 shipping lines and the same number of daily services as Veracruz (SCT, 2014).

The number of containers mobilized in the 90's in Mexico was about 15,7 million TEUs (Twenty-foot Equivalent Unit), whereas for the period 2000-2010, twenty-five million TEUs were mobilized (SCT, 2010).

Recently, Mexican and Latin American ports overcame a process of reforms that set a new era in the history of the ports. Ports were improved thanks to a deregulation process followed by a privatization stage, by means of the concession of the port administration, and to private investment (Maldonado, 2008). However, for Diaz-Bautista (2009), port specialists do recognize Mexican ports are more efficient and safer than in previous years, but by no means can Mexican ports be compared to the most important ports in the world, such as Amsterdam, New York, Los Angeles-Long Beach, Hong Kong and Singapur.

According to SELA (2015) the Mexican Port System is beginning to have the great protagonism, not only taking care of its main role as a Gateway, but also because it is becoming a crucial option for the shipping lines whose vessels berth at the ports located on the west coast of North America, which have constant labor problems due to its high congestión and work stoppages. Nevertheless, the Atlantic Mexican coast has not developed yet to a competitive port offer that can challenge the Caribbean ports or the ones located south of the United States. Even container terminals in Mexico have a limited degree of independence because port authorities restrict the degree of flexibility in their operations and because of their relationship with the community.

Furthermore, there is an increasing demand for new ports and terminals with enough infrastructure, with a greater supply of integrated logistic services, lower cost and which are better connected to their influence zones to give service to the last generation vessels.

**Table 1. Movements of containerized cargo in Mexican ports during 2010-2015**

<b>PUERTOS</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
<b>Total</b>	<b>3,691,374</b>	<b>4,223,631</b>	<b>4,878,097</b>	<b>4,874,981</b>	<b>5,058,635</b>	<b>5,506,488</b>
<b>Pacífico</b>	<b>2,477,486</b>	<b>2,877,967</b>	<b>3,422,170</b>	<b>3,337,708</b>	<b>3,535,512</b>	<b>3,837,605</b>
Manzanillo, Col.	1,511,378	1,762,508	1,992,176	2,118,186	2,355,149	2,541,140
Lázaro Cárdenas, Mich.	796,023	953,497	1,242,777	1,051,183	996,654	1,058,747
Ensenada, B.C.	135,364	132,727	140,468	131,054	139,938	193,420
Mazatlán, Sin	25,795	22,746	39,263	28,094	33,977	35,906
Guaymas, Son	4	7	4,412	8,370	9,745	8,392
Otros	8,922	6,482	3,074	821	49	0
<b>Golfo y Caribe</b>	<b>1,213,888</b>	<b>1,345,664</b>	<b>1,455,927</b>	<b>1,537,273</b>	<b>1,523,123</b>	<b>1,668,883</b>
Veracruz, Ver.	662,537	729,622	806,047	866,966	847,370	931,812
Altamira, Tamps.	488,013	547,612	578,685	597,760	599,357	647,369
Progreso, Yuc	56,434	61,925	64,229	64,928	65,583	67,653
Puerto Morelos, Q. Roo	4,657	5,897	6,476	7,613	9,898	10,548
Coatzacoalcas, Ver.	0	0	0	0	689	11,339
Otros	2,247	608	490	6	226	162

Source: SCT (2016).

As table 1 depicts, the port of Manzanillo, Colima, registered the most movements in the country. The other three main ports in the cargo handling service are: Lázaro Cárdenas, Michoacán, the port of Veracruz, Veracruz and the port of Altamira, Tamaulipas. The remaining ports do not mobilize great amounts of containers, which is why it is possible to

corroborate that cargo handling in Mexico is concentrated in only four seaports.

Once problematic of Mexican seaports and container terminals has been revised, it is evident that there is a real need to improve the competitiveness of Mexican ports and container terminal. All of this at the rate of the great potential for operating at its most the existing infrastructure in order to install different types of terminals in each one of the ports of the country in both coastlines, to take advantage of the country's geographic location and of the current commercial relationships, to increase Mexico's commercial exchange with the rest of the world.

## **IMPORTANCE OF THE SEAPORTS**

Seaports are the main facilitators for international trade. Nevertheless, a well-functioning port has to be properly managed. In the past, a port's strategic resources were its natural surrounding and conditions, as well as the geographic location (Infantes, 2006).

However, seaports nowadays are unique organizations with their own technical, social and structured characteristics. Ports can be considered as open systems since they interact with their turbulent surroundings and are affected by changes in the logistics and supply chain of the transport industry (Cetin & Cerit, 2010).

For Rúa (2006), ports are multifunctional, commercial and industrial areas where cargo is not only are in transit, but that it is also manipulated, manufactured and distributed. Therefore, ports must be fully integrated in the global logistic chain for them to be able to work properly, since an

efficient port requires infrastructure, superstructure and suitable equipment, but also good communications and specially, a dedicated and qualified management team, and the help of a motivated and well-trained labor worker.

To sum up, seaports can only grow as a result of their importing and exporting activities and taking advantage of the industry located in its own zone of land influence (Estrada, 2007). In addition, ports can be considered competitive as long as they are able to offer, fast, flexible and safe services to the international trade and to shipping companies (Díaz-Bautista, 2009).

## **DEFINITIONS OF COMPETITIVENESS**

Competitiveness is defined as the paradigm that helps us to prevail in the globalized market. By itself, the idea of competitiveness is old, since it can be found in the discussions of classic economy authors: Adam Smith and David Ricardo, when they analyzed the subject of competition, forming a fundamental concept of the economic theory. Competing is not an exclusive action performed by people, since organizations also compete when they are located in a context that forces them to struggle for positions. So, the term can be conceived as an aptitude or capacity to prevail on others, or as a competitive state (Peñaloza, 2005).

For Morales and Pech (2000), competitiveness is applied to a company or firm, to an economic sector or to a nation. And although it can be asserted that the general definition of the concept is similar among the authors of this subject, there is no absolute agreement as far as its definition and conception are concerned. Sobrino (2002) sets up by stating that

competitiveness occurs at different levels, which has an important influence on the factors that determine it, since the limiting surroundings and determinants can get to be very different depending if the concept is applied to a country, a firm or a person. Competition and competitiveness are related concepts, but not synonyms, being the latter a consequence of the former. The term competitiveness is part of the contemporary foundations of international trade theories, as a result of the increasing relevance of the globalization process.

Müller (1995) on the other hand, defines competitiveness as the “accumulation of the necessary abilities and conditions to carry out a competition”. Nevertheless, for Morales and Pech (2000) it is necessary to emphasize that such set of factors or abilities will have to favor a superior performance over other competitors. Thus, competitiveness must result on a competitive organization superior to other organizations.

For other author, competitiveness is simply defined as “the capacity of a firm to access the domestic or the exporting market”. This is at the same time a relative measurement that compares the economic performance of some analysis unit to the remaining units that make up the study universe; it cannot be directly measured, which is why one or several variables must be selected as competitiveness indicators (Sobrino, 2002).

According Lee, Ryoo and Shin (2010), competitiveness consists of having the necessary capacity to keep up the leading position in the competition against the competitors of a specific activity. That is, competitiveness can be defined as the capacity to produce high quality goods and services and to be able to distribute them to national or international customer (Newall,

1992). Finally, the World Economic Forum (WEF) defines competitiveness as the set of institutions, policies and factors that determine the level of productivity of a country.

All in all, when defining competitiveness it is precise to clarify what context the term will be used in: companies, industries, regions or countries, which can be classified in a structure of hierarchized concentric levels of competitiveness (Romo & Abdel, 2005). For this research, the authors refer to the industry competitiveness level, since the discussion falls within the maritime transport industry, specifically that of containers terminal in Mexican the ports. The systemic competitiveness identifies four different levels for competitiveness, which are: micro-, meso-, maso-, and meta-competitiveness (Jessop, 2003).

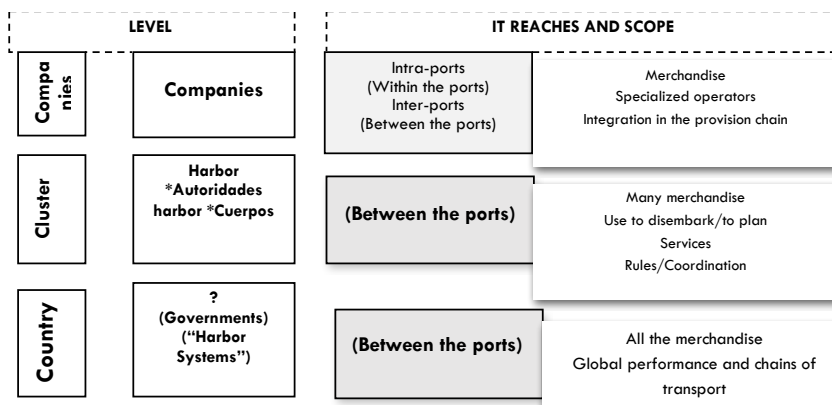
For this research, the level to which the competitiveness is analyzed is the at the micro level. In this way, Bevilacqua (2008) considers that the level micro refers to the increase of the capacities of the companies as a consequence of the globalization of the competition, that generates the sprouting of new competitors, the demand differentiation, the reduction in production cycles, as well as radical innovations and new management methods, among others.

## **COMPETITION *VERSUS* PORT COMPETITIVENESS**

According to Voorde and Winkelmans (2002), competition container ports is developed in three different levels. In the first level, the competition is within the port, where different terminal operators are located within the same area. In the second level, terminal operators must present the competition that represent the operators of terminals located in other ports.

This interharbor competition, can occur at national and/or regional level. Finally, the competition level upper happens between the operators of terminals located in different ranks from seaports. A rank of ports of containers consists of an area geographically defined with certain amount of ports that have superposed inner zones widely and, therefore, take care of such clients mainly.

**Figure 1. Harbor competition: level, actors, scope and categories of traffics**



Source: Musso (2005), Ports: competition and competitiveness, University of Antwerp ITMMA - for Institute Transport and Maritime Management Antwerp.

On the other hand, Winkelmanns (2008), considers that the competitiveness reflects capacity and ability: this determines the power to compete and it simultaneously is based on the impact of the own forces and weaknesses associated, that are alert of the opportunities and threats that are arising, whereas the competition points at the action and the result. Of way the



harbor competition is defined as “the objective to attract the commerce in specific categories with the harbor operators and their terminals, as well as with the main actors involved in this activity, and with the harbor authority like the organization of support and support that provide opportunities and impose regulations to fulfill. According to Musso (2005), the harbor competition has different levels, actors, scopes and categories of traffics, as it is appraised in figure 1.

Is important to stand out that formerly the ports were strongly isolated of the competitive forces, each one serving its own captive hinterland. Since without mattering if the seaport were efficient or no, the ships only focused in arriving at their destiny. The great majority of the ports worked of inadequate, disorganized, bureaucratic, ineffective and expensive form. But the incident of Ramu is different than those. Now the ports examine different strategies from continuous form to move away to their competitors. Giving like result that the ports compete locally not only, but that also they do it at global level, even to great distances, serving to the same commercial zones (Cerbán, 2009).

In synthesis, the competitiveness and the competition are different things, since from one it leaves the other. In addition to which we cannot affirm that all the beings that compete they are competitive or that stops to be able to compete we must be necessarily very competitive. Although we must recognize that to be able successfully to compete in any market or social or economic surroundings we must prepare to us and acquire the competitive advantages that allow us to be successful in the activity which we made.

## **INFLUENCE IN THE COMPETITIVENESS OF A SEAPORT**

The competitive position of a port of containers is determined by its competitiveness in the supply that it has of carrier companies, logistic and shipping lines for the specific commercial routes, the different geographic regions and for the ports with which connection is had. Nevertheless, in one more a ampler dimension, the competitiveness of a port of containers is defined by the range of competitive advantages that the port acquires or creates throughout the time (Haezendonck & Notteboom, 2002).

For Fleming and Baird (1999), the factors that influence mainly in the competitiveness of the seaports are the following: the harbor tradition and the organization, the harbor accessibility, the state support, the harbor productivity, the preferences of the carriers and the shippers in the selection of ports and the comparative advantage in the location. Nevertheless, the productivity is the result of numerous factors, such as the level of technology used in the manipulation of the load, the experience of the manual labor, the amount of ground available for the storage, the length of the wharves for the dockage of the ships, the movements and times of the cranes, etc.

On the other hand, for Yanbing and Zhongzhen (2005), the capacity of competition of a port depends on the level of its own service. And according to their experience, the most important factors that they affect the capacity of competition of a port with terminals of containers are: magnitude or scale of the port, conditions of operation and operation, conditions of the facilities, the quality of the service and the level of management.

According Tongzon and Heng (2005), the determinants of the competitiveness of a seaport are: the level of efficiency of the operation of port (terminal), positions by the manipulation of the load of the port, the reliability, the preferences of selection of the port of the shippers and carriers, the depth of the ship canal, the capacity from adaptation to the changing surroundings of the market, the accessibility of the terrestrial side and the product differentiation.

**Table 2. Factors selected as determinants for port competitiveness**

a. 1.	The availability of dockage for the ship to the arrival to the port	10	Harbor accessibility
a. 2.	Expenses related to the ship and the load that enters	11	Congestión of the port
a. 3.	Deviation of the main routes trunk	12	The size and activity of zone of free commerce in hinterland or area of influence of the port
a. 4.	Efficiency of the network of terrestrial transport to the interior of the port	13	Sophistication of the level of information of the port and its scope of application
a. 5.	Free time of permanence free in the terminal	14	Stability of the manual labor of the port
a. 6.	Efficiency of the network of terrestrial transport to the interior of the port	15	Volume of total load of containers
a. 7.	The distance to the Earth and the connectivity to the main consignadores (exporter)	16	Depth of the water in the channel of access and the wharf.
a. 8.	Professionals and experts in workings in harbor operation	17	Time zero of delay of the services
a. 9.	Quick Reply	18	The service operates 24 hours a day, seven days a week.

Source: Yeo, Roe and Dinwoodie (2008).

On the other hand, Durán (2017) considers that the harbor competitiveness is determined by the cost, the speed and the efficiency of each one of the factors and processes used by the commerce in the logistic runner who participates the seaport.

Nevertheless, Yeo, Roe and Dinwoodie (2008), considered that the analysis of the harbor competitiveness had been concentrated mainly on the criterion of selection of a port. Thus, they formulated its model of harbor competitiveness from the selected factors that are in table 2.

This model of harbor competitiveness proposed by Yeo, Roe and Dinwoodie (2008), is integrated by seven variables: the harbor service, condition of hinterland or area of influence, availability of dockage, convenience (depth of the water in the channel of access and the wharf), cost of the logistics, regional center and the connectivity. These variables conform the model and they are disturbed as well in some elements that form the base of the eighteen variables that were selected and studied by these authors.

Also, Yeo (2010), establishes that the competitive capacity of a seaport is affected mainly by its infrastructure, size, location, level on watch, the development of the networks of inner transport between several others.

As far as it goes to Yoon, Lee and Dinwoodie (2015), the level of harbor competitiveness of the terminals of containers this based on its human resources, harbor facilities, the quality of its services, their direction to the client, its reputation and the policy of governmental support of the harbor authority.

On the other hand, Musso (2005) considers that the elements that influence and determine the competitive advantage of a port, are: the geographic position, the infrastructure within the port, the infrastructure outside the port, the quality of the services (organization of the port), the quality of the services (regulations), the quality of the services (I connect/transport services), the costs within the port and outside the port and the opportunities to finalize the theoretical revision is necessary to review the proposal of Infants (2006), that identifies two main groups like determinants of the harbor competitiveness: quantitative factors and qualitative factors.

Among the quantitative factors, this author identifies the following elements: a) factors that involve the superstructure of the port and the terminal, b) factors that involve the harbor infrastructure and its accessibility, c) factors that involve the performance of the terminal (time) and d) factors that involve the costs of the terminal.

On the other hand within the qualitative factors Infants (2006), proposes the following elements: a) performance of the Customs, b) connectivity of the Hinterland, c) trustworthiness of the service (human performance), d) reputation of the port, e) traceability (more efficient use of the TIC to provide information), f) security, g) speed of answer to problems and finally h) ecological image of the port.

Finally, for Moreno (2012), the fundamental property of a harbor terminal is its operational capacity, since this one must allow that three basic functions are made with efficiency: 1) the load and unloads of the merchandise of the

boats; 2) to provide spaces adapted for the temporary storage; and 3) to have sufficient terrestrial connections for the movement of loads from and towards the port.

Therefore, for the suitable evaluation of the capacity of a harbor marine terminal is due to consider, essentially, the processes of load-unloading, storage, evacuation and transport of origin and destiny of the load. Since to obtain that the terminal this in balance with the logistic chain of provision, is essential to count on the infrastructure and the equipment adapted in each one of the operations that make daily.

In fact, in agreement with the UNCTAD (2015), the operation of the ports is fundamental for the efficiency and effectiveness of the network of marine transport. Therefore, the characteristics of the ports and their harbor infrastructure (number of cranes, the maximum openwork and the surface of storage in the destiny and origin ports), as well as the interaction of these variables are crucial for the diminution of the transport costs.

This way, the physical, institutional and organizational factors are those that influence more in their level of productivity. And within the physical factors, those that excel more are the surface, the state and the development of the terminal, the lack of cranes, the insufficiency of the surface, the deficient design of the patios for containers, the inadequate positions of anchorage, the inadequate services in the doors and the difficulties of access by highway.

## PORT CONTAINERS TERMINAL

Ports are terminal of marine lines that are composed as well by several terminals of merchandise of diverse typology. The harbor terminal is the reason of being of the port, the other facilities only act as to facilitate the development of the terminals of safe and efficient form (Camarero & González, 2007).

A terminal of containers is an industrial company where a complex diversity of activities and great machines that move in all directions, equipment raising and moving loads, ships and vehicles take place at the same time that arrive or leave, that is loaded or they unload.

The terminal of containers plays a central role in the international transport of merchandise the being the main link of the transport chain. The efficiency and productivity with which it carries out his function to it have a direct influence on the speed, serenity and cost of the load transport from the exporter to the importer (OIT, 1999).

The general structure of a harbor terminal is made up mainly by the naval infrastructure, the terrestrial infrastructure and facilities, the equipment of manipulation of the merchandise and finally of the human resources.

For this research, a hypothesis on the infrastructure variables that are considered to mainly affect the competitiveness of the harbor terminals of containers located in Mexico. This hypothesis is:

*H<sub>0</sub>: The competitiveness of the terminals of containers of the Mexican seaports can be increased through the extension of its surface, the length of wharves, the*

*openwork of such, the increase of the number of gantry cranes with which they make the load and unloads of the containers and the increase of its static and dynamic capacity.*

**Table 3. Variables**

Variable Type	Definition	Justification	Unit of measure
Dependent variable			
Competitiveness	Number containers or full and empty TEU's handled by a terminal in a year.	This is the most commonly used indicator to measure a terminal's port performance is the number of TEU's mobilized annually.	TEU's
Independent variables			
Terminal surface	The sum of all terminal areas where cargo is handled.	Surface terminal determines to a great extent the length of the quays as well as the static capacity.	Hectares
Quay length	It is the sum of length of all quays where ships berth in a container terminal.	Quay length restricts the number and type of cargo ships that can berth simultaneously.	Meters
Draft	The depth of a ship while in the water.	Draft determines the type of vessels that can berth at a terminal.	Meters
Number of gantry cranes	The total amount of gantry cranes located at a dock to load and unload vessels.	They are essential to minimize the service time and to increase the productivity and efficiency of container terminals.	Number of gantry cranes
Static capacity	Storage capacity of the container terminal obtained by multiplying of the number of slots by the number of stacking.	Static capacity depends on the adopted system and is related to the available surface and the stack height of containers.	TEU's
Dynamic capacity	Terminal's storage capacity of TEU's calculated on the basis of the static capacity and average time each container is set within the terminal.	Dynamic capacity defines average rotation of containers stored in the terminal. That is to say, how fast stored containers are given an output.	TEU's

Source: own elaboration.



## MODEL OF VARIABLES

Once reviewed the models on harbor competitiveness, the infrastructure variables of a terminal were selected that agree more within the different investigations and that they are considered are fundamental to elevate the competitiveness of a terminal of containers. As follows in table 3 broken down for each of the following variables.

## METHODOLOGY

A multiple linear regression model of the independent and the dependent variables was elaborated in order to carry out the verification of the hypothesis of this research. This model represents a uniequational statistical relationship in which a dependent variable is expressed as a function of one or several independent variables, plus a term of random error. Any given linear regression model can be expressed as:

$$Y_i = \beta_1 + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + \varepsilon_i$$

Where:

$$i = 1, 2, 3, \dots, n$$

$Y_i$ : is the i-th observation of the dependent variable Y.

$X_{2i}, \dots, X_{ki}$ : are the i-th observations of the explanatory variables  $X_2, \dots, X_k$ , usually referred to as independent variables.

$\beta_1$ : is the constant term.

$\beta_2, \dots, \beta_k$ : is the parameters associated to the explanatory variables, denominated regression coefficients.

$\varepsilon_i$ : is the term of random error, also called random disturbance, associated to the i-th observation,

**n**: is the number of observations, and **k** is the number of parameters.

Once the dependent and the independent variables have been selected and defined, the proposed linear regression would be:

$$\text{Port competitiveness} = \alpha + \beta_1 \text{surface} + \beta_2 \text{length} + \beta_3 \text{draft} + \beta_4 \text{cranes} + \beta_5 \text{cstatic} + \beta_6 \text{cdynamic} + \beta_6 + \varepsilon_t$$

Therefore, the hypothesis to verify will be the following:

$H_0$ : The infrastructure variables that most affect the competitiveness of a port terminal are surface, quay length and draft, number of gantry cranes for loading and unloading containers, as well as static and dynamic capacity of storage.

### **Sample selected for the linear regression model**

Nine active terminals operating from 2005 to 2010 were selected to carry out this research. Thus, the sample of container terminals was integrated by:

- a. Altamira Terminal Portuaria ATP
- b. Infraestructura Portuaria Mexicana
- c. Ensenada International Terminal
- d. Lázaro Cárdenas Terminal Portuaria de Contenedores (LCTPC)
- e. SSA México S.A. de C.V.
- f. Terminal Internacional de Manzanillo S.A. de C.V.
- g. Operadora de la Cuenca Pacífico
- h. Internacional de Contenedores Asociados de Veracruz (ICAVE)

For each of the above mentioned terminals the following information was obtained: surface, quay length and draft, number of operating gantry cranes, static and dynamic capacity and finally, the average number of mobilized TEU's during the period 2005-2010.

### E-VIEWS multiple linear regression model

A linear regression model was elaborated using the collected data, the least squares method and the statistical software E-VIEWS 9,0 with the following results (table 4):

**Table 4. First linear regression model**

Multicollinearity test				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
SURFACE	-7077.250	3398.218	-2.082636	0.2850
QUAY LENGTH	261.4761	293.0018	0.892404	0.5362
QUAY LENGTH	13031.74	32166.38	0.405135	0.7549
NUMBER OF GANTRY CRANES	28456.13	70047.07	0.406243	0.7543
STATIC CAPACITY	17.97122	23.74573	0.756819	0.5876
DYNAMIC CAPACITY	0.197929	0.456113	0.433947	0.7394
C	-420121.4	272337.7	-1.542649	0.3661
R-squared	0.992268			

Source: own elaboration.

Clearly, the initial model shows strong evidence to multicollinearity, with an explanatory power of  $r^2 = 99,22\%$ . However, all the independent variables were nonsignificant. To compensate for this, adjusted  $r^2$  was corrected for the number of independent variables in the model.

Apparently, there is a linear relationship among some of the considered independent variables. In order to correct this multimulticollinearity problem, the least significant independent variables that showed a greater degree of correlation among them were eliminated. As a result, the following variables were excluded: quay length, quay draft and dynamic capacity of the port terminal. Thus, the results of the new multiple linear regression model are shown in table 5.

**Table 5. Results of the final linear regression model**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SURFACE	-5297.603	1519.957	-3.485364	0.0252
NUMBER OF GANTRY CRANES	83568.98	12100.75	6.906100	0.0023
STATIC CAPACITY	26.32704	3.298551	7.981394	0.0013
C	-367891.8	62015.80	-5.932227	0.0040
R-squared	0.984665	Prob (F-statistic)	0.000439	

Source: own elaboration.

On the other hand, Chi square value of 66,76% for the Breusch-Pagan-Godfrey test indicates that the heteroskedasticity problem in the residual of the multiple linear regression model does not exist. On the other hand, the White test results of Chi square was 70,58%, indicating that the heteroskedasticity problem in the residual of the multiple linear regression model does not exist. That is to say, the variance of the residuals is not heteroskedastic (table 6).

**Table 6. Final linear regression model: Breusch- Pagan-Godfrey test results**

F-statistic	0.323935	Prob. F (3,4)	0.8093
Obs*R-squared	1.563704	Prob. Chi-Square (3)	0.6676
Heteroskedasticity Test: White			
F-statistic	0.282572	Prob. F (3,4)	0.8364
Obs*R-squared	1.398952	Prob. Chi-Square (3)	0.7058

Source: own elaboration.

### Normality test

A normality test was conducted to determine whether the data distribution approaches a normal distribution.

Ho: $\epsilon_t$ approaches the normal distribution	<b>Decision rule: Jarque Bera <math>&lt; \chi^2(5\%, 2) = 5.99</math></b>
H1: $\epsilon_t$ does not approach the normal distribution	* If JB is lower than 5.99, Ho is not rejected.

Once the heteroscedasticity test was surpassed, a normality test was performed on the proposed linear regression model. The obtained value for JB was 1.64, lower than 5.99. 1.64 JB, therefore, Ho is not rejected. Furthermore, the probability for the residuals to have a normal distribution was 43,90%. Therefore, the final linear regression model proposed also surpasses the normality test.

## **Analysis of the Results of the Multiple Linear Regression Model**

The final linear regression model shows that at a confidence level of 95%, the main variables that individually or globally affect the competitiveness of container terminals in Mexico are: terminal surface, static capacity and the number of operating gantry cranes affecting the competitiveness of a seaport are the containers terminal's surface, its static capacity and the number of operating gantry cranes.

We can say then, that the results agree with Cullinane and Song (2003), who stated that ports often require a great amount of investment in the surface of their terminals, in equipment for handling cargo (gantry or quay cranes, rubber-tired gantry cranes) and in the internal infrastructure of the port (quay length, berth allocations). Also, Hung, Lu and Wang (2010) used the variable quay equipment to measure the efficiency of a terminal. Likewise Wu, Yan and Liu (2010) defined quay equipment capacity as a determining infrastructure variable for the performance of container terminals.

Nevertheless, the regression model coefficients indicate that, while the surface of the terminals affects in a negative way its competitive performance, the number of gantry cranes and static capacity affect performance on a positive form. That is, the coefficient of the variable surface indicates that apparently, the greater the surface of a container, the lower the number of TEU's mobilized annually. In this same sense, the coefficients of the variables number of gantry cranes and static capacity lead to the conclusion that if the number of cranes and the static capacity is increased, those actions will significantly improve the competitiveness of

the terminal. These results might be influenced by the operative efficiency of the terminals with the greatest surfaces.

Strikingly, the variables quay length and quay draft did not turn out to be significant variables, even though in other research papers, such as the one from Wang and Cullinane (2006), establish that quay draft is one of the main variable to define seaports accessibility. As for Tongzon (2003) the depth of the marine access is determining in the performance of the terminal, and additionally, it allows for bigger vessels in to berth.

However, according to the results of the regression model, for the case of container terminals located in Mexico it is not fundamental to increase the length of the quays or their draft, but rather to increase its investment in the purchase and installation of more gantry cranes. As for as the explanatory power or  $R^2$  of the final model, the obtained value was 98.46%, which indicates a high degree of explanation of the competitiveness of the terminals analyzed based on the the most significant variables.

## CONCLUSIONS

Findings in previous studies, such as Yeo's (2010), had already reported that port facilities (quay length, berth allocations, total terminal area), container yard area, and cargo handling equipment (cranes for containers, floating cranes, quay cranes, mobile cranes, among others) are positively bound to the performance and level of traffic of a port.

Likewise, Yoon, Lee and Dinwoodie (2015) confirmed that human resources, port facilities, customer-oriented quality services, as well of the

reputation have all positive effects and are significant to the competitiveness of container terminals. Similarly, Yan, Sun and Liu (2009) confirm that the loading and unloading equipment, terminal infrastructure and storage facilities are very important indicators that to increase the volume of containers handled by port operators.

As for the current study, the final results of the model regarding linear regression show that competitiveness of container terminal ports in Mexico is affected mainly by the following infrastructure and port equipment variables: terminal surface, number of gantry cranes and static capacity. Therefore, the null hypothesis presented at the beginning of this paper is rejected.

However, the explanatory power or  $R^2$  of the final model was 98.46%, which indicates a high degree of explanation of competitiveness of the terminals analyzed based on the the most significant variables. Therefore, our results suggest that in order to increase the performance competitiveness level of a container terminal ports, improvements to the their internal infrastructure must be done. This means that the number of cranes is due to increase soft porch or cranes on which they are counted for the load and unloading of containers and also is needed to increase the capacity static of the terminal that is based on the system of storage that is adopted, of the surface available and the height of rammer of the containers.

Therefore, a larger terminal surface (expressed in hectares) is not by itself a variable that can be directly translated into more TEU's mobilized. In order to increase a port's container throughput, the container terminal must operate with suitable and efficient cargo handling equipment.



Nevertheless, the authors consider it necessary to go on with research including container terminals of similar characteristics to the ones located in Mexico with the purpose of determining in a more definitive way if quay length and draft are variables that do not have a crucial effect on the competitiveness of container terminals.

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# Chapter Six



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## **Innovation in Distribution: New Strategies from Large Commercial Companies**

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# **Innovation in Distribution: New Strategies from Large Commercial Companies**

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## **INTRODUCTION**

The food system can be defined as a network of interactions among different agents, the major players being producers, the agro-industry (which transforms raw materials into food), distributors (wholesalers and retailers) and consumers (Aragrande & Farolfi, 1997; Schejtman, 2006; Carrasco, 2007; Rastoin & Ghersi, 2010). Up until the end of the 20th century, the protagonists of this network worked under two distribution patterns: a) The Dendritic Pattern, where distribution is carried out by a regional center or market; and, b) The Solar Pattern, where the producers distribute their food directly to a central market (Torres, 2011; Torres & Rojas, 2016).

However, as of the 1990s, food distribution in Mexico underwent a major reconfiguration as a result of two factors: structural adjustment policies (González & Macías, 2007) on one hand, and the dawn of new business models from technological and organizational perspectives (Gasca & Torres, 2014) on the other. This became especially evident following the arrival of Wal-Mart Stores Inc. to the country (Gasca & Torres, 2014;

Moreno, 2012), which brought about one of the primary innovations of the sector: the rise of Distribution Centers (Cedis), with all the expected inherent technological changes (Álvarez & Tilly, 2006; Castillo *et al.*, 2014; Gasca & Torres, 2014; Harner, 2007; Minei & Matusitz, 2013; Schwentesius & Gómez, 2006).

Formerly, self-service stores enjoyed a certain degree of autonomy with regard to its inventory volume and delivery times (Álvarez & Tilly, 2006). However, under this new operating model, inventory management is overseen by a Cedis, which has helped generate economies of scale within the supply chain (Bocanegra & Vázquez, 2015; Gasca & Torres, 2014; Harner, 2007, 2010; Minei & Matusitz, 2013; Schwentesius & Gómez, 2006) by eliminating intermediaries and lowering costs (Castillo *et al.*, 2014, Gasca & Torres, 2014; Gereffi & Christian, 2009; Guerrero, 2012; Lugo, 2013; Schwentesius & Gómez, 2006; Torres, 2011).

Although these changes generated a third distribution pattern, their characteristics have not yet been explored (Castillo *et al.*, 2014). At best, academic literatures on Cedis generally focus on the impact they have on the distribution chain and producers. Hence, the objective of this paper is to analyse the processes and strategies implemented by Cedis, from the perspective of logistics network organization, cargo transportation and internal processes.

Our analysis is qualitative and is based on information from secondary sources that specialise in the field, annual operations reports provided by certain companies and direct observations and informal interviews that we

have conducted over the past five years with some of the main players responsible for distribution centers in Mexico.

It is from this perspective that, in addition to the introduction and general conclusions, this document is divided into three major sections. First, we analyse some concepts related to food distribution in Mexico and the corresponding role of Distribution Centers (Cedis). Afterwards, we delve into the procedures and methodological resources used during the development of this research paper. The third section examines the main strategies implemented in the Cedis, which are approached from 3 standpoints: the organization of the logistics network, cargo transportation and the organization of internal processes behind said cargo transportation.

## **NEW PATTERNS IN FOOD DISTRIBUTION IN MEXICO**

Analysing the food supply chain requires a juxtaposition of different scientific domains (Aragrande, 1997) given the complexity of the multiple phases through which food passes from the producer to the end consumer. The concept of the food system is defined as a network of interactions between diverse groups of agents where the producers, the agroindustry (that transforms the raw materials in food), distributors (wholesalers and retailers) and consumers feature as principal elements (Aragrande & Farolfi, 1997; Schejtman, 2006; Carrasco, 2007; Rastoin & Ghersi, 2010).

Upon examining the distributors, five main channels by which the products reach the final consumers are identified: public markets, mobile markets (tianguis), groceries or corner stores, large chain establishments and convenience stores (Rodríguez, 2010). Particularly because of the logistical, organizational and technological innovations that are particular

to them, the two latter distribution channels are usually called modern trade while the rest constitute the so-called traditional trade (Castillo *et al.*, 2014).

On the other hand, if one were to consider the way in which food distribution was carried out up until the 1990s, from farmers onwards, two patterns would be evident: the Dendritic Pattern, where a regional center or market collects the products and transports them to major wholesale centers in cities that in turn take them to secondary markets or to retail stores; and the Solar Pattern, where the producers/farmers take their produce directly to a central market; ergo, there is no regional market presence in this pattern (Torres, 2011, Torres & Rojas, 2016).

However, food distribution in the country came to face major changes starting in the 1990s due to structural adjustment policies (González & Macías, 2007) on one hand, and new business schemes from technological and organizational perspectives on the other (Gasca & Torres, 2014).

The gradual withdrawal of State participation from traditional production activities was an important structural change. This led to a series of governmental mechanisms which, in addition to directly or indirectly participating in primary production, established the axis for food collection and retail distribution at local and regional levels in order to guarantee supply to the masses. (Lozano & Aguilar, 2010).

These mechanisms, together with the opening up of trade and the deregulation of direct foreign investment, fomented extraordinary conditions for the privatization of the different sectors which had

previously been recipients of State participation. This was particularly highlighted by the fusion of large companies from the global food sphere through alliances, mergers and acquisitions with local companies. Furthermore, the new logistical, organizational and technological innovations, in contrast to traditional methods, afforded wider territorial expansion and more control over the relationship between primary and agroindustrial production and food distribution networks. To differentiate them from traditional small businesses, these companies are known as modern trade or large distribution because their supply chain is long and complex. They also consolidated their logistics systems and centralised supply to a small number of large groups and agro-food companies rather than a range of small producers (González & Macías, 2007; Brand, 2012, 2015; Gasca & Torres, 2014).

Under this structure, the incorporation of Wal-Mart Stores Inc. in México in particular stands out, first through a Joint Venture with Grupo Cifra (Aurrerá stores) in 1991, later acquiring Cifra in 1997 (Gasca & Torres, 2014; Moreno, 2012). Among the various implications for the sector as a result of these mergers are technological and organizational improvements (Álvarez & Tilly, 2006; Durand, 2007; Gasca & Torres, 2014; Minei & Matusitz, 2013), the use of the Wal-Mart's global supplier network (Álvarez & Tilly, 2006; Durand, 2007; Minei & Matusitz, 2013) and financing for the Mexican subsidiary: Walmart de México (Moreno, 2012).

As a result, food distribution patterns within modern trade have changed substantially. As expected, while each of the stores pertaining to Grupo Cifra had some degree of autonomy with regarding to its inventory volumes and delivery times (Álvarez & Tilly, 2006) one of the main

innovations that took place upon the arrival of the US retail giant in the national market was the installation of Distribution Centers (Cedis) (Álvarez & Tilly, 2006, Castillo *et al.*, 2014; Gasca & Torres, 2014; Harner, 2007; Minei & Matusitz, 2013; Schwentesius & Gómez, 2006).

The start-up of these highly technological Cedis directly affected the stores' inventory management, by applying "a sort of 'just-in-time' to trade" (Álvarez & Tilly, 2006, p. 947), which in turn helped generate economies of scale in the supply chain (Gasca & Torres, 2014; Harner, 2007, 2010; Minei & Matusitz, 2013; Schwentesius & Gómez, 2006).

This new distribution pattern, in which Cedis serve as a collection center for self-service stores, seeks to eliminate intermediaries and network directly with suppliers in their places of origin in order to lower costs (Castillo *et al.*, 2014; Gasca & Torres, 2014; Gereffi & Christian, 2009; Guerrero, 2012; Lugo, 2013; Schwentesius & Gómez, 2006; Torres, 2011), which is a change from Dendritic and Solar patterns<sup>1</sup>. Hence, upon the establishment of the Cedis, "the supply and distribution of food is transitioning from the typical pattern of open economies and globalized markets, controlled by competitive schemes between international and local firms" (Torres, 2011, p. 67).

As it has been mentioned before, a relatively paradoxical aspect of this new scheme is that in some cases the large retailers are supplied by regional

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<sup>1</sup> Although still in the baby stages, some evidence has recently emerged that lend support to the development of a new pattern of food distribution linked to electronic commerce. This new technologically based mechanism tends to simplify the supply chain even more with regard to the number of intermediaries that are required for the products to reach the final consumer. Even with high expectations of growth in Mexico, there is still the question as to whether the large retail chains can ever feature as major players in the future (Torres y Rojas, 2016).

markets or agro-produce packers, especially in the face of high demand (Harner, 2010; Lugo, 2013; Schwentesius & Gómez, 2006). This would revert the self-service stores in some cases to one of the two classic already mentioned patterns.

Thus, under this new pattern and due to the purchasing capacity acquired by the retail chains as a result of centralizing their operations into one or several Cedis, the producers, regional merchants or agro-produce packers and supply centers become subject to quality-price conditions imposed by the buyers (Bocanegra, 2016; González, 2016; Sánchez & Peralta, 2016), "establishing an unilateral and subordinate relationship" (Torres & Vicente, 2008, p. 123).<sup>2</sup>

This implies that they are obligated to accept general conditions of delivery (maintain quality and volume and accept packaging, refrigeration, transportation and delivery time requirements) and economic-contractual conditions (spending during the negotiation process, set prices with reduced margins and grant discounts, receive deferred payments, accept return policies, sponsor sales and product demonstrations, as well as adopt formal accounting and billing practices) (Álvarez & Tilly, 2008; Castillo *et al.*, 2014; Durand, 2007; Gereffi & Christian, 2009; Harner, 2007; Iacovone *et al.*, 2015; Lugo, 2013; Minei & Matusitz, 2013; Schwentesius & Gómez, 2006; Torres & Vicente, 2008; Torres, 2012; Yurkievich & Sánchez, 2016). Yet the greatest danger is the total exclusion of self-service retailers from the

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<sup>2</sup> According to Durand and others (2007), transnational companies such as Wal-Mart have much to gain by distributing their positions of power in the market or asymmetric information structures at the expense of local actors.

distribution system if they cannot meet all the requirements (Álvarez & Tilly, 2008; Minei & Matusitz, 2013).

However, there are also several associated benefits: some suppliers -mainly those with only local presence- are now able to reach customers they were previously unable to through traditional methods (Iacovone *et al.*, 2015); relationships are built with communities through the Cedis' supplier development initiatives<sup>3</sup> (Camacho & Pérez, 2013, Iacovone *et al.*, 2015); innovation is encouraged and given precedence (Camacho & Pérez, 2013, Minei & Matusitz, 2013; Torres, 2012); value is added by requiring the packaging of products and reducing waste (Castillo *et al.*, 2014); processes are simplified for the supplier (Wal-Mart, 2017c).

## METHODOLOGY

While our interest in the processes and strategies of modern trade derives from the broader topic of the food phenomenon in Mexico, the analysis of the strategies carried out by major retail chains' Cedis was first based on a review of secondary sources, particularly those that the companies in question make public as their annual results reports.

Since the beginning of 2015 we began to conduct a series of confidential interviews, most of them informal and outside the Cedis, with protagonists from various spectrums. The participation of operational and transport personnel from middle and upper middle management was essential for this paper. The initial objective was to interact with at least ten employees

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<sup>3</sup> Torres and Vicente (2008) point out that some suppliers in Michoacán see their brand and image as a benefit of their relationship with Wal-Mart, as well as advertising.



from various Cedis and departments, although in some cases it was possible to access a larger number of staff.

The number and location of the different Cedis that were analysed was based on publicly available information (table 2). Their main locations are the metropolitan areas of Guadalajara, Monterrey and Mexico City. As a result, the present paper focuses on facilities in these locations. Once the above was concluded, categories were inductively developed for the different topic areas. The claims issued in this paper are a result of the data extracted from our investigations.

### **DISTRIBUTION CENTERS: MODERN TRADE'S STRATEGIC FOCUS**

One of the essential characteristics of the Cedis lies in the ownership and operation of warehouses. In general, three types can be distinguished: a) warehouses owned and operated by self-service chains b) warehouses leased by a third party and operated by the self-service chain; and c) warehouse leased and operated by a third party or 3PL (Three Part Logistic).

In the first two cases, permits, distribution operations and facility maintenance fall under the responsibility of the retail company. The only difference lies in the ownership of the property and, in some aspects, that the industrial park is subcontracted, in the third case, everything aforementioned -permits, operation and maintenance- is outsourced to a company who would inevitably have access to the computer systems of the retail chain and there is only one supervisor hired by the retailer to monitor the integrity of the procedures. Therefore, the operation of a Cedis can even be outsourced.

The second distinction is the type of merchandise that is handled: dry or perishable. The difference between one and the other is not the expiration date but the temperature control required for handling. In the case of perishable items, it is important to control the temperature by means of refrigeration, whereas dry goods do not have any temperature restrictions. Perishable goods under the following subtypes are stored under the certain temperatures: a) fruits and vegetables: approximately 12 ° C; b) refrigerated goods: 4 ° C - 0 ° C; c) frozen goods: -18 ° C and -26 ° C.

The Cedis which handle dry and/or perishable, and perishable merchandise, ordinarily, although not necessarily, manage all three temperatures. Consequently, it is possible that a store can receive stock daily from four Cedis: one dry and three perishables that can even be located in different locations. A third distinction is the origin of the merchandise: national or imported.

The imported merchandise may arrive in three ways: a) maritime: arrival by ship and container and the merchandise passes through customs mainly in the ports of Veracruz, Manzanillo and Lázaro Cárdenas, to be later transferred to the Cedis by train, trailer or a combination of these; b) land: arrival by trailer and enters the country mainly through Laredo and Tijuana; and c) air: arrival mainly to Mexico City and is transported by trailer to Cedis. Although these three distinctions (Table 1) are fundamental to the operability of a Cedis, in practice they are usually distinguished only

by their dry or perishable nature<sup>4</sup>. The current number of Cedis owned by major retail chains can be seen in table 1.

**Table 1. Types of Cedis based on operational strategies**

<ul style="list-style-type: none"> <li>• Retailer owned and operated warehouse</li> <li>• Leased warehouse and Retailer operated</li> <li>• 3PL</li> </ul>	<ul style="list-style-type: none"> <li>• Dry</li> <li>• perishable: fruits and vegetables</li> <li>• refrigerated and frozen</li> </ul>	<ul style="list-style-type: none"> <li>• National</li> <li>• Imported</li> </ul>
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Source: own elaboration.

The companies with the highest number of Cedis are Femsa with 19<sup>5</sup>, Soriana with 14 and Wal-Mart with 13. However, to better understand these numbers it is important to consider the following:

- In some cases the logistics operation can be very centralized or there are Cedis of very different sizes, which can help in understanding how Oxxo has 17 Cedis for 15,160 stores, Farmacias Guadalajara has two Cedis for 1,685 branches, or Wal-Mart has 13 for 2,291 stores.
- The Cedis which handle dry and perishable goods are listed, although there are times when both types share the same industrial park or warehouse, such as Soriana in Guadalajara (Soriana, 2017) or Wal-Mart in San Martín Obispo (BMV, 2017).
- There are also cases in which one Cedis is counted along with another Cedis, as is the case of Wal-Mart in Aguascalientes (perishables) which

<sup>4</sup> Occasionally, other classifications exist, such as the imports Cedis managed by Comercial Mexicana in Tijuana (La Comer, S / A-b). However, it remains classified as dry goods as long as no refrigeration is required

<sup>5</sup> This includes 17 from Oxxo and 2 from its pharmaceutical chains, among which are: YZA Pharmacies, Modern Pharmacies, Farmacon Pharmacies and Generix Pharmacies (BMV, 2017).

is not listed in the annual reports (See the information contained in Wal-Mart, 2017a). This Cedis is housed along with the Guadalajara Cedis (perishable) because of the location of the operation headquarters of both facilities.

- d) Sometimes a Cedis does not classify both types of goods; such is the Wal-Mart Chalco case (considered dry goods only), although it has an area for perishable merchandise. (see also the information contained in Wal-Mart, 2017a).

**Table 2. Distribution centers of the main retail chains at the end of 2016**

Company	Dry	Perishable	Total
Wal-Mart	8	5	13
Soriana	6	8	14
Comercial Mexicana	2	1	3
Gigante	5	0	5
Chedraui	5	5	10
Femsa (Oxxo/Farmacias)	17/2	0	19
Farmacias Benavides	1	0	1
Farmacias Guadalajara	2	0	2

Source: own elaboration based on the reports sent by these companies to the Mexican Stock Exchange (BMV, 2017). Note: Farmacia Benavides' data is up to the end of 2015.

### **Transportation Strategies for Transfer of Merchandise**

In order to understand the processes related to the transfer of merchandise, it is necessary to analyse some particularities of the logistics network related to freight transport.

The first distinction is whether or not the retailer hires or owns the means to transport merchandise to stores. There are three types of logistics: a)

payment per trip: consisting of hiring a truck from a transportation company; b) exclusive charters: a fixed monthly rent is paid to a transportation company for equipment, whether trailers and/or crates (necessarily more crates than trailers)<sup>6</sup>, and a variable fee that is based on the kilometers travelled; under this scheme, transport costs are lower since there is exclusivity in the use of leased equipment and is the more popular option<sup>7</sup>; and, c) the owned transport: implies that the retail chain has its own trucks and trailers. This entails heavy investment and the acquisition of the appropriate permits from SCT that are needed in order to operate.

A second aspect is the type of cargo transport that a supplier uses to deliver goods to the Cedis. This can be done either through the supplier's own or chartered transportation, or using the Cedis' own or chartered transport, which a process that is called Backhaul (BHKL). BHKL entails the picking up of merchandise at the supplier's facilities, delivery date processing at the Cedis and offloading paperwork, all handled by Cedis personnel<sup>8</sup>.

Among the advantages for the Cedis is the increased use of chartered or owned transportation since in the BHKL scheme a small detour can be made from a store-after making the corresponding delivery-to the

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<sup>6</sup> More crates than trailers are required so that they do not stop circulating and work 24 hours if possible. During the loading and unloading processes the crates remain stationary

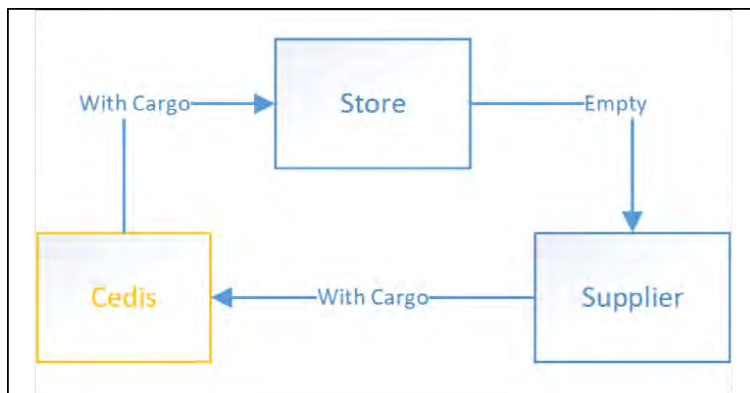
<sup>7</sup> In order to be a transport provider for retail companies, there are certain requirements, including the following: compliance with the regulations of SCT (Secretaría de Comunicaciones y Transportes) on the matter, both of the units and of the driver's license (SCT, 2017); have a minimum of late-model equipment and with certain security features, among which are: operators with trusted certificates (R-Control, Capital of Excellence or Opal), periodic antidoping tests and training, units with satellite tracking, engine braking and speed control, in addition to constant monitoring and authorized stops (Wal-Mart, 2017a).

<sup>8</sup> Process of reception-offloading to be looked at in a later section.

supplier's facilities for the collection of the goods that will be delivered to the Cedis (figure 1).

The benefit for the supplier resides in the cost of freight, which turns out to be quite compared to the regular cost (if the supplier has its own transportation, it will surely be more convenient for him to use it), in addition to using less personnel to manage offloading. In this scheme, the consideration for the BHKL service is made through a discount on the payment of the delivered products (Wal-Mart, 2017a).

**Figure 1. Backhaul process diagram**

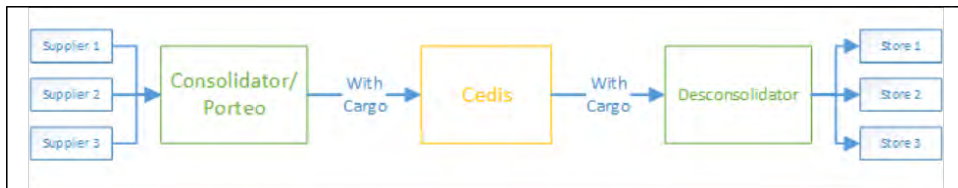


Source: own elaboration.

It has been noted that the BHKL process led Wal-Mart and Unilever to win the 2016 National Logistics Award "Tameme Award" in the Business category (Tameme, 2017a) and was part of the reason why the same award was given to Soriana in 2015 (Soriana, 2016; Tameme, 2017b) and Wal-Mart in 2014 (Tameme, 2017b; Wal-Mart, 2014).

An important aspect of the logistics network is cargo transport occupation<sup>9</sup> which seeks to avoid inefficient freight or high percentages of empty volume. That is why a third aspect to consider is the existence of two auxiliary processes for the movement of goods: consolidator or Porteo<sup>10</sup>, and deconsolidator (figure 2).

**Figure 2. Position of auxiliary consolidation and deconsolidation processes in the logistics chain**



Source: own elaboration.

### *Consolidation or Porteo*

In this process the receipt of the goods is carried out in a consolidator (the warehouse of a third party) or in an area within a Cedis called Porteo, where the merchandise passes through a warehouse prior to arriving at the Cedis, that will send the products to the store. The difference between direct delivery to a Cedis consolidator or a Cedis with Porteo lies mainly in the volume of the purchase order: when a trailer is filled for a Cedis, the

<sup>9</sup> Cargo occupation in transport means the number of crates per trailer (crates / trailer) or the number of pallets per trailer (pallets / trailer) as the case may be. This is a key indicator since it helps to make the shipping more efficient within the logistics network (it helps control spending). The Cedis have well-defined objectives for this.

<sup>10</sup> When the consolidation process takes place in the same Cedis, it is called Porteo. In addition, when a provider uses this service, an additional fee is incurred. (Wal-Mart, 2017b). It is highly probable that these processes -consolidation and deconsolidation- are outsourced.

supplier will transport the merchandise to the corresponding one; if the sum of the deliveries to all the Cedis fits into only one trailer, it is better processed under Porteo and is delivered to the Cedis that is closest to the suppliers' facilities; if none of the above options is possible, it is likely that it will deliver to the closest consolidator (or Cedis if the distance to the consolidator is not optimal)<sup>11</sup>. Therefore, this process helps to increase the reach of small suppliers, on the one hand, and on the other one, it helps to avoid the saturation of Cedis since it decreases the number of suppliers received daily.

### *Deconsolidation*

Deconsolidation is a similar process which only takes place in a warehouse located between the Cedis and the stores. The merchandise for several stores is sent from the Cedis in a maximum capacity transport (for example, Full) followed by smaller shipments by truck, for example.

Another important indicator is the rotation of cargo transportation<sup>12</sup>, that is, the need for equipment to be in constant use. This leads to a fourth aspect to consider, being that there are two routes<sup>13</sup> for dispatched trailers (Figure 3): a) directly to the store: trailers follow an established route

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<sup>11</sup> It should be noted that imports may undergo a porteo-type process since not all the Cedis necessarily receive imported goods

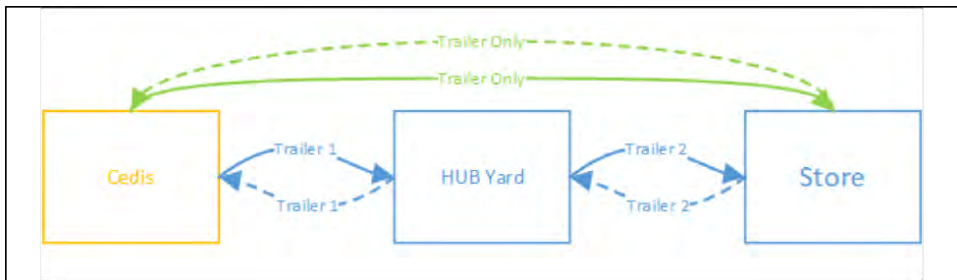
<sup>12</sup> Rotation in cargo transport is understood by the number of trips a truck and / or a trailer makes in a certain period of time, generally in one day (trips / day). This indicator helps chartered or owned transportation to avoid equipment under-utilization and determines the need to hire or discontinue logistics network equipment. It also makes for more efficient transportation and controlled spending

<sup>13</sup> A third destination is a deconsolidator, as mentioned.



between the Cedis and the stores, b) stop-over in a Hub yard<sup>14</sup>: the first trailer brings a container to the Hub yard; once at the yard, the container remains there for several days until the arrival of a second trailer, which then transports it to the retail store. This second trailer will return to the hub yard with a different container from the retail store, which will be in turn returned to the Cedis, either with empty containers or using reverse logistics, when applicable.

**Figure 3. Position of trailer dispatch schemes in the logistics chain**



Source: own elaboration.

In general, the difference between both types of cargo transport rotation is in the layover location of the trailers: in the first one, direct shipment, the layover is at the same Cedis and the second one is at a Hub yard near a certain number of stores. This strategy affects, therefore, the number of

<sup>14</sup> A Hub yard is a corral close to a certain number of stores, usually located in a different location from the Cedis. To operate one of these yards, in addition to the requirements of licenses and permits, certain security aspects will surely be taken into account, such as: perimeter fence, security cameras, lighting and 24-hour surveillance. A Hub yard is likely to be outsourced.

daily dispatches that are made (to and) from a Cedis<sup>15</sup>. However, this number will not match the number of trailers received at the store since there may be a stopover- the Hub yard-with a possible long-term stay. This is risky regarding the supply and sale of merchandise, and requires effective model management.

The ways in which goods reach stores are the following: a) direct from the supplier: this happens on few occasions because not many suppliers have an extensive logistics network<sup>16</sup>; b) through a Cedis: direct from the supplier, with a stopover in the Hub yard, or in deconsolidation, which is the common method in the modern distribution pattern; and c) from another store: it is possible that a store receives inventory transfers from another store, the so-called Tienda Madre/Mother Store and smaller retailers. Either this may occur because of surplus merchandise or because the Mother Stores supply other smaller ones who have smaller infrastructure, as might be the case of bakeries. This is important since it adds greater complexity to the logistics network.

From the supplier's perspective on the other hand, deliveries can generally be separated into three categories: 1) directly to the store; 2) to a consolidator or through the Cedis Porteo process; and 3) directly to Cedis. However, there exists another alternative: merchandise is sent from the same facility where the supplier manufactures the products to any of the

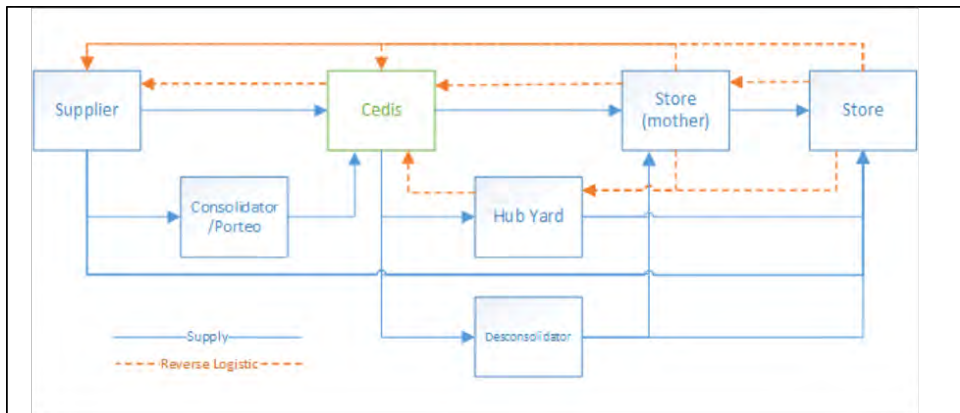
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<sup>15</sup> Ordinarily, after the merchandise is loaded and the container is closed, it remains at the Cedis in order to regulate the shipments to the store. This is done for two reasons: it is not efficient to have one trailer per container since the trailer would be out of circulation during loading and unloading; the needs of the store, and necessary personnel for offloading, and the volume of merchandise on the platform or at the warehouse must also be taken into consideration

<sup>16</sup> Some examples of these suppliers are: Bimbo, Coca Cola, Pepsi Cola, Nestlé, Red Seal Milk, Sabritas, Cervecería Cuauhtémoc Moctezuma, etc. (Castillo and Ayala, 2014).

previous alternatives, a kind of Porteo at the supplier's facilities. This method consists of processing a virtual delivery of goods (without physical merchandise) at the Cedis prior to the physical reception, labelling and offloading of the merchandise at the supplier's facilities. This type of delivery rarely occurs as it requires the presence of Cedis personnel off premise and an additional cost is incurred to the manufacturer (Wal-Mart, 2017b). Figure 4 summarises the various processes / strategies that have been mentioned so far: the consolidator / Porteo, Hub yard, deconsolidation and the use of a Mother store. You can also see the reverse logistics route.

**Figure 4. Configuration of the modern trade logistics network**



Source: own elaboration.

### Internal Processes Strategies for Merchandise Transfer

The internal processes of a Cedis are its core business and reason for being. Distribution quality (reception of product which corresponds to each store,

no shortages and/or surplus<sup>17</sup>) and productivity (movement of crates or pallets are done in a certain time<sup>18</sup>) are the base indicators. Thus, the capacity of a Cedis depends on its internal macro processes, which are: reception of goods, processing and shipment (which together constitute the cross dock or crosswalk), the stock staple (SSTK or reservation), reverse logistics and secondary processes (figure 5).

However, before analyzing these macroprocesses, it would be more convenient to outline how a national producer becomes a supplier for retail companies. In general terms, the producer must meet certain basic requirements such as: bar code assignation<sup>19</sup> to merchandise<sup>20</sup>, compliance with the Official Mexican Standards (NOM) applicable to types of merchandise, proper shelf packaging and registration with SHCP (Secretaría de Hacienda y Crédito Público) and issue of invoices (La Comer, S/Aa; Soriana, 2017; Wal-Mart, 2017c). If the supplier meets the above

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<sup>17</sup> In case of missing and/or surplus goods, the Cedis is responsible for investigating and locating the merchandise. Once this process is completed a store is charged or credited, where appropriate. Theoretically, the shortages must be equal to the surpluses reported. However, this is not always the case, either because the stores do not report them all or because of theft, mainly during transport.

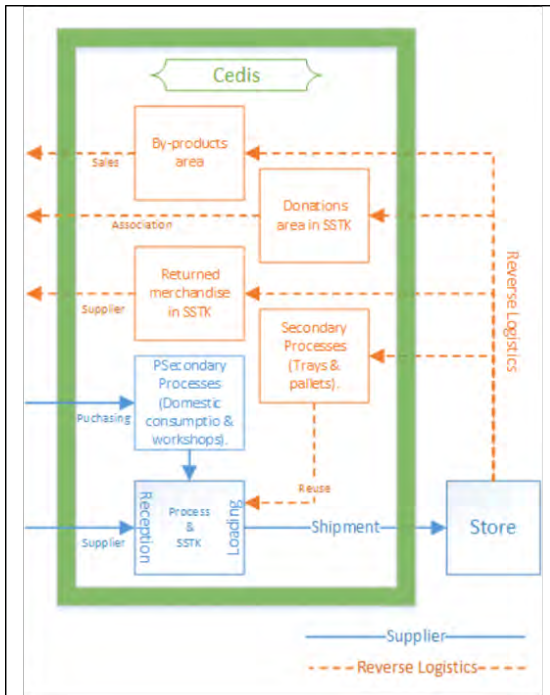
<sup>18</sup> Crate capacity during the reception, processing, shipment or SSTK is a function of the sum of the productivities per stage. As the stores require merchandise, this capacity, as well as hiring and training of personnel, will increase (or decrease), or infrastructure will be expanded (building or renting new warehouses or implementation of technological systems that increase said productivity).

<sup>19</sup> The main standard used in the retail and manufacturing is that of GS1 Mexico. Several retailers have met this standard, among which are: Diconsa, Konsumo, Superkompas and Oxxo, which demands the Bar Code GS1 for trade deals; Chedraui, Comercial Mexicana, Diconsa, La Gran Bodega, H-E-B, Sahuayo, Supercompras, Oxxo, and Wal-Mart also require their suppliers to have their products in the Electronic Catalog Syncfónia Master.

<sup>20</sup> This does not exempt companies from requesting additional certifications based on their own standards or that may be even higher than the norm, as is the case of Wal-Mart's Food Safety Certification (Wal-Mart, 2017c).

requirements, it is registered in the retailer's supplier catalog and a commercial agreement is agreed upon<sup>21</sup>.

**Figure 5. Position of a Cedis within macroprocesses**



Source: own elaboration

Eventually, packaging is checked by Cedis personnel along with the calculation of logistic factors and the cost of the Porteo, if required. Use of the logistics network involves the payment of a fee, the logistics factor,

<sup>21</sup> The commercial contract specifies, among other things, the supplier's standards, guarantees, discounts, purchase prices, penalties, terms and means of payment, delivery conditions, the privacy, use and exchange of information, etc. (Wal-Mart, 2017c).

which is a discount to the supplier derived from the value of the merchandise received for distribution. This is calculated based on the type of merchandise, packaging and offloading (La Comer, S/A-a, Wal-Mart, 2017b, 2017c)<sup>22</sup>. Once the above is determined, the first purchase order will be issued, which contains information such as the type and quantity of the product, the deadline for delivery and the place of delivery<sup>23</sup>. If the delivery is in the Cedis, then the first macroprocess is generated by the following six processes.

1. Reception of Product: this process defines the entry of merchandise both to the Cedis and to the accounting department of the retail company. Reception capacity is measured according to the number of boxes or pallets received per hour. Based on this, the appointments are set for delivery. All providers must arrive at least two hours before their scheduled appointment<sup>24</sup>, report to a control panel so that a waiting (storage) area

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<sup>22</sup> The logistic agreements entail the terms and conditions for merchandise delivery (independent of the Porteo payment), for example: packaging quality, quantity of plastic wrap, dimensions, weight and type of pallet or crate, as well as if the offloading will be handled by Cedis personnel or the supplier. Failure to meet the requirements can lead to fines such as: 2 days of SMGM of the DF for delivering without plastic wrap or with insufficient plastic wrap, 60 days of SMGM of the DF for lack of personnel to handle bulk merchandise, 15 days of SMGM of DF for lack of personnel to handle merchandise in pallets, 6 and 9 days of SMGM of DF for damaged wrapped pallets (Wal-Mart, 2017c). Another example is where Soriana charges 18% of the value of the product at sale price for not meeting the product and / or packaging and / or loading specifications or for the delivery of unsolicited merchandise (surplus) (Soriana, 2017).

<sup>23</sup> Ordinarily a purchase order has an expiration date, which is the duration given to the supplier to deliver the goods to a Cedis. If the purchase order expires, the supplier may be liable to a fine that is in function to its Fill Rate or compliance percentage upon delivery, the level of service. For examples, Wal-Mart penalizes by charging 5% of the value of the logistics factor multiplied by the difference between the purchase order and what is actually delivered, if the compliance percentage is greater than or equal to 90% and less than 95% (Wal-Mart, 2017c).

<sup>24</sup> The appointment is made by telephone or other means of communication. Not making the appointment on time or cancelling it within less than 24 hours may incur a penalty to the supplier, for example, 15 days of SMGM of the D.F. (Wal-Mart, 2017c).

with a ramp is assigned for the start of the offloading process in accordance with the logistics agreement. All merchandise is counted and entered into the system with the support of a scanner or voice recognition technology<sup>25</sup>, after which, it is labeled and transferred to the corresponding distribution process or SSTK. At the end of the merchandise reception, if no incidents occurred<sup>26</sup>, the supplier will be given a document (POD, Proof of Delivery) as acknowledgment of receipt which also serves as a money-back guarantee.

2. Processing: consists of separating and grouping the merchandise according to its final destination (another Cedis or a store), for which different manual and automated mechanisms are employed. The process is usually measured by boxes distributed per hour. Since the target stay-time of the products is around 24 hours, it is essential to have a tracking team that tracks delayed merchandise<sup>27</sup>.

3. Loading: once the merchandise's destination has been determined, it proceeds to the loading area where it is grouped in pallets and/or crates

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<sup>25</sup> There are cases where merchandise is not counted for quicker processing. There are two ways to do this: the trust receipt, such as the one Wal-Mart has with Herdez (GS1 México, 2017b); and the use of radiofrequency identification (RFID technology is applied), as is the case of Liverpool (GS1 México, 2017a). However, these are not very common, at least in Mexico.

<sup>26</sup> There are several reasons for merchandise rejection, such as poor merchandise and / or packaging quality, merchandise not ordered or invoiced, expired merchandise, among others. There are also penalties in these cases, for example: 60 days of SMGM from the D.F. for rejection due to poor quality and 3 days of SMGM from D.F. plus the cost of the TIF certificate for rejection of TIF merchandise, in addition to only having 7 calendar days for pick up(Wal-Mart, 2017c).

<sup>27</sup> Merchandise tracking tracking is extremely important since the merchandise would not reach the stores and therefore sales would be affected. In addition, in the case of seasonal merchandise (for example, for national holidays), it is likely that the value would diminish over time, incurring a loss for the business.

that will be loaded into their corresponding trailers. When these are filled to capacity, the finalisation occurs in two phases: a) physical closure, which includes the placement of the label or seal and the entry into the logbook; and, b) the system closure, which includes billing and integration of the documentation for the trip. Productivity in this area is measured in pallets per hour.

4. The staple stock (SSTK): in this process the goods are stored (up to months) in racks. To disburse articles from this area, a list is issued on a daily basis that has a double origin: a) sales information from the stores; and, b) buyer specific criteria such as the need for televisions for the Buen Fin or fans in the spring. Productivity in this area is measured in boxes per hour or shift and, once selected, the items are either directly loaded to a trailer for shipment or are processed to be consolidated with other merchandise and then sent to shipment. Determining if an article is for cross docking (*cruce de anden*) or SSTK turns out to be kind of a complicated task. Given that the main objective is not storage but distribution, most of the products that pass through a Cedis are for cross docking. However, there are categories<sup>28</sup> such as domestic consumption and pharmaceuticals which will always be SSTK; this is due to the need to constantly have them in stores and / or the current regulations (in the case of pharmaceuticals, Cofepris requires that the merchandise be stored). On the other hand, there are other categories that employ both crosswalk and SSTK processes (for example, tablets, cell phones, televisions and certain groceries products and chemicals). In general, everything depends on the

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<sup>28</sup> A category is a group of articles that share similar characteristics, such as meats, fruits, vegetables, bicycles, sauces, pharmacy, tablets, laptops, internal consumptions, etc.



store format and the type, origin and category of the merchandise or the sales that are going to be launched<sup>29</sup>.

5. Reverse logistics: the process by which the company benefits from the return of empty trailers where: a) byproducts such as cardboard and waste material from remodeling (for example, iron and copper) are collected, packaged and sold to recycling companies<sup>30</sup>; b) plastic containers or trays and pallets go through a secondary process; and c) returned merchandise<sup>31</sup> and donations will go to storage (probably in SSTK) where they will wait to be picked up by a supplier or taken to a company authorized to do so, respectively. Part of why Wal-Mart won the Tameme award in 2014 was for its reverse logistics program (Tameme, 2017b, Wal-Mart, 2014).

6. Secondary processes: include tray washing<sup>32</sup>, pallet repair at carpentry workshops, domestic consumption storage and maintenance and / or repair -mechanical workshops (for tractors, trailers, computer equipment and forklifts, among others). It is worth mentioning that some of these secondary processes are outsourced.

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<sup>29</sup> An example of this is the Buen Fin merchandise that is stored in the Cedis in SSTK so as not to saturate the stores and is distributed closer to key dates.

<sup>30</sup> This sale can be significant given the volume handled.

<sup>31</sup> There are cases in which the products must be returned to the supplier from a store, some of the reasons being: problems with product packaging, quality and/or expiration and consignment merchandise. According to the logistic agreements there may be penalties for this. For example, the supplier must absorb the cost of transporting the returned goods (Wal-Mart, 2017b), in addition to only having 90 days to collect it from the Cedis designated for returned goods (Wal-Mart, 2017c). Another example is where Comercial Mexicana charges 10% of the value of the returned goods at cost price for storage and freight (La Comer, S/A-a).

<sup>32</sup> In some Cedis the delivery of perishables (fruits and vegetables) has to be done in special plastic trays (with certain dimensions). These trays are leased to the supplier, and when delivered they must be cleaned at designated washing stations. Their dimensions are important for storage requirements in the SSTK as well as for exhibition in the stores.

In order to better understand the internal processes of a Cedis, it is necessary to recognise the technology that is used in them to stock (sort) the merchandise:

- a) Manual sorting by voice (Vocollet): the use of a device (headset) that interfaces with the user by means of voice commands. The system gives the number of items for a certain retailer and the person will confirm that these were placed in the indicated quantity and position (pallet or crate)<sup>33</sup>.
- b) Manual sorting by Scanner: similar to manual assortment by voice. The scanner reads the bar code of the product and the location where it will be placed/placement.
- c) Automated sorting (Sorter): a series of conveyor belts, sensors and infrared cameras are used to automatically move goods to their respective locations. The only manual part is the transferal of the merchandise to the conveyor belts (in some cases, this can be done even as the trailer is being offloaded) and the stacking of the pallet or crate with orders for the retailer<sup>34</sup>.

Finally, with regard to security and theft, there are two specific processes: 1) special storage or supervision (high value or easily stolen merchandise) and 2) without special security measures (general merchandise with low theft probability). The first applies to the majority of the products, while the second is for high-value and easy-to-steal merchandise, whether it be

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<sup>33</sup> The company Netlogistik considers the use of Vocollet a success case for its customers Comercial Mexicana and Farmacias del Ahorro, companies where productivity has increased (up to 70%) and staff turnover and training time has decreased (Netlogistik, 2017).

<sup>34</sup> Virtually all large retail companies already use this type of technology, some examples being: Wal-Mart (Wal-Mart, 2011a, 2011b) and Soriana (Grupo Reforma, 2015).

on cross dock or SSTK. The high value process (commonly referred to as a high value cage) consists of the use of a restricted area (supervised by security personnel) for safeguarding and sorting (by voice or scanner) items such as tablets, laptops, cell phones, printers, ink cartridges, USBs and video games. Once sorted, a black plastic wrap is used (so content is not visible) to wrap the merchandise. Special controls are also used for receiving and loading merchandise, so a chain of custody is maintained over these items until closure (when the tag is placed) of the trailer.

## CONCLUSIONS

In Mexico, food distribution was typically organized in two patterns (Dendritic and Solar) with regional markets as the common ground (Torres, 2011, Torres & Rojas, 2016). However, over the last few decades, these underwent important reconfigurations, especially as a result of the arrival of Wal-Mart in the country (Gasca & Torres, 2014, Moreno, 2012). This new operating model generated a third pattern of distribution where Cedis have a preponderant role. However, the characteristics of Cedis have not been studied in detail (Castillo *et al.*, 2014), so the main strategies implemented by the Cedis were analysed under this context.

On one hand, the findings of this paper show that Cedis are an important new element within the supply chain which is in keeping with what Gasca and Torres (2014), Harner (2007), Minei and Matusitz (2013) and Schwentesius and Gómez (2006) mention; various technologies used in the management of freight transport contribute substantially to the generation of economies of scale within the supply chain. However, despite the relevance of the use of back-haul, deconsolidators, consolidators, hub yards and reverse logistics, that is, the use of different strategies in cargo

transport, no mention has been made as to how the chain of distribution benefitted from them in connection to the Cedis, so it is important to highlight this as a result of the investigation for this document.

In addition, a relevant aspect that was discovered as a result of our investigation and not mentioned in existing literature on the subject is the versatility that Cedis promote in the supply chain. Through logistics network organization strategies, schemes have been implemented which facilitate rapid human resource and infrastructural growth (renting warehouses and using 3PL's). This expands installed capacity for relatively short periods of time, which allows efficient management of spikes in merchandise distribution (such as the Christmas season) and ambitious expansion plans (store openings).

On the other hand, it is confirmed that within this new pattern of distribution, suppliers come to accept the quality-price conditions imposed by the retail chains according to González (2016) and Torres and Vicente (2008). The different delivery rules that are established in the contracts as well as the corresponding penalties have been clearly outlined.

Furthermore, it is possible to clearly see in this paper the benefits that are related to the reach that suppliers come to experience (Iacovone *et al.*, 2015) which is achieved through the use of processes such as the consolidator and/or Porteo, and those related to the incentives given to said suppliers (Camacho & Pérez, 2013; Minei & Matusitz, 2013; Torres, 2012).

Finally, it is important to mention future lines of research that are derived from the findings of this paper. For now, the impact of the Cedis only refers

to suppliers. However, it is possible to see from this research paper that these indicators can also affect economic agents that one would be hardpressed to find in literature on the subject: those of logistic services (leasing and operation of industrial buildings), cargo transport, distribution technology and recycling are some of them. A complementary activity would be to prolong the study and analyze the impacts on them. In addition to this, security strategies for the protection of merchandise in the Cedis are evident (high value custody being one of them). It is also considered pertinent to focus on the transfer of this type of merchandise to stores, a response to the insecurity in the country. All this will consequently contribute developing a complete frame of reference for the generation of integral proposals that will contribute solutions to food and nutritional security.

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# Chapter Seven



Masada. Photo by Bob.Bys on Unsplash

## **The measurement of Regional Competitiveness in Mexico in comparison with International Level**

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## **The measurement of Regional Competitiveness in Mexico in comparison with International Level**

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### **INTRODUCTION**

In recent years, the controversy over the differences regarding the importance and validity at the national and business level on the measurement of competitiveness (Krugman, 1994) has prompted the emergence of the study on the role of regional competitiveness. In the case of Porter's proposal, an additional element of regional competitiveness is the concept of cluster as "geographical concentrations of companies and institutions interconnected in a particular field and linked by similarities and complementarities". Thus, establishing that in its limits it is possible to cover from one city or state to a country or even a group of neighboring countries (Porter, 1998; Porter, 2000), it has been considered that competition at this level is an important source of national economic development and base for the corresponding organizations (Huggins, *et al.*, 2014; Szymańska, 2014; Malecki, 2007; Boschma, 2004).

The analysis of other authors on regional competitiveness considering the conditions that allow companies to compete in markets and capture the value generated within a region. Its definition is considered as the capacity of an area to attract and maintain companies with stable or increasing

market shares in an activity, maintaining stable or increasing the standard of living of those who participate in it (Storper, 1997 cited by Huggins, Izusu, & Thompson, 2013; Martin R., 2003; Fagerberg & Srholec, 2017).

## **REGIONAL COMPETITIVENESS DETERMINANTS**

In the case of regional competitiveness, Porter (1998) gave impetus to the concept that by pointing out that the lasting competitive advantage in a global economy is often very local, derived from a concentration of skills and highly specialized expertise, institutions, and related customers in a particular region business. In this framework he highlighted the existence of clusters composed of geographically concentrated and interconnected companies with specialized suppliers, service providers operating in similar industries and cooperating with institutions, such as universities, various agencies and trade associations; implying that not only the competition but also the cooperation between them.

Lundvall and Borrás (2005), Braczyk, Cook, and Heinderinch (1998) coincided when pointing out, meanwhile, regional competitiveness it is important to the extent in which a company even with technological capabilities also depends on the capabilities of its consumers, suppliers and other firms and organizations that the company has regular contact with regional or national level that is immersed in.

Whereas for Lall (1992), technological capacity requires sufficient and efficiently used financial resources, not only educational skills but also administrative and technical expertise and resources from research and development, in a context that encourages entrepreneurial activity coming from policy decisions as well as from solid institutions.

Recently in the measurement of regional competitiveness has taken a relevant place knowledge, innovation, science and technology as the center of competitiveness. (Stern, Porter & Furman, 2000; Malecki, 2007; Dosi, 2008; Marengo & Pasquali, 2008) develops its proposal opposing a destructive competitiveness based on the exclusive search for cost reduction focused on wages and raw materials and subsidies, constructive competitiveness focused on achieving efficiency improvements and innovations, through innovation, entrepreneurship, networks and knowledge institutions, as well as education and skill development. Within this current is the innovation strategy of the European Union (Commission of the European Communities, 2009) which focuses on the potential of research, the level of human and social capital -according to the needs of the region-, the innovation of companies in the region and the development of the business environment understood as the set of institutions that support innovation (incubators, technology parks, technology transfer centers and networks that unite them, among others).

A further element in the analysis of regional competitiveness is provided by the stream of civic engagement that gives relevance to the degree of identification of citizens with the interests of their community, integrated by the predominant citizen virtues focused on the public interest, where the trust turns out to be the central element (Fukuyama, 1995).

Considering this contribution, it is understood that it has been privileged in practice the use of factor analysis to explain and measure the performance of the regional competitiveness and that such approaches focus interest in a

wide range of indicators that respond to capabilities generated in the locality.

This type of analysis enables the reduction of all information, facilitating design and aggregation of variables, which facilitates the understanding of the structure that supports the measurement of the concept of regional competitiveness, to limit it to a small number of aggregate variables (Montoya, 2007; WEF, 2017).

Thus, in this paper the four indexes analysis measuring regional competitiveness by grouping the variables that conform the selected theoretical an approach is presented. Two indexes are included in which the unit of analysis is a set of countries and two where the locations of two nations are, which from the perspective of Porter allows to cover from a city or state to a country or even a group of countries neighbors.

## **REGIONAL COMPETITIVENESS SURVEY, EMPIRICAL EVIDENCE**

Theoretical approaches used by institutions presented in this work are varied, while according to the statement by Porter (1998) measuring levels ranging geographical areas of the region as a country or group of countries to regions that are geopolitically of a nation defined portion are covered.

The first case refers to the World Competitiveness Index of Regions (WCIR) which analyzes the regional behavior globally defining it as

"the difference in the rate of economic development in all regions and the capacity and potential of the regions to achieve future economic growth in relation to other regions in a similar stage of economic development" (Huggins, Izushi, Prokop, & Thompson, 2014).



This index measures the performance of 546 regions from 51 countries, both member states of the European Union, and the Asia Pacific region, the Middle East, North America and South America. Produced by the Center for International Competitiveness (CIC) founded in 2007 that conducts research on competitiveness at the national, regional and business levels (table 1).

**Table 1. Regions of the World Competitiveness Index of Regions.**

Great regions	Nations	N. of locations
European Union	31 Germany, Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Slovakia, Slovenia, Spain, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russia, Sweden, Switzerland and the United Kingdom	137
North America	2 USA and Canada	112
Pacific Asia	10 Australia, Japan, South Korea, China, India, Kazakstan, Taiwan, Singapore, New Zealand and Asian Russia	164
Middle East	6 Israel, Qatar, Kuwait, Saudi Arabia, United Arab Emirates and Turkey	67
Sud América	2 Brazil and Colombia	49
Total	51	546

Source: Huggins, Izushi, Prokop, & Thompson (2014).

Bases its measurement approach on "endogenous growth theory with knowledge and human capital in the center of their analysis" (Huggins, Izushi, Prokop, & Thompson, 2014) consists of four components:

1. 5th wave knowledge capital,

2. Knowledge capital of the 4th wave
3. Products/consequences
4. Sustainability of knowledge

Which are integrated in turn with a total of 19 indicators, corresponding four to the first component: i) employees in IT and computer manufacturing industries for every 1000 employees, ii) employees in biotechnology and chemicals for every 1000 employees, iii) employees in high technology services per 1000 inhabitants and iv) private investment in capital per capita.

Seven to the capital of knowledge: i) employees in mechanical engineering and automotive for every 100 employees, ii) employees in instrumental and electrical machinery for every 1000 employees, iii) growth rate of economic activity, iv) number of managers for every 1000 employees, v) government expenditure per capita in R & D, vi) per capita expenditure of private companies in R & D and vii) number of registered patents per million inhabitants.

In the case of the third, three indicators are integrated: i) labor productivity, ii) monthly gross average income, iii) unemployment rates, and Four i) public expenditure per capita in primary and secondary education, ii) public expenditure per capita in higher education, iii) secure servers (of computers) per million inhabitants, iv) Internet servers per 1000 inhabitants and v) broadband access per 1000 inhabitants.

The result of this Index for 2014 shows the 5 most competitive regions worldwide: 1st San José-Sunnyvale-Santa Clara CA, USA (Silicon Valley),

2nd Region of Brussels, Capital in Belgium, 3rd Tokyo, Japan, 4th Washington-Arlington-Alexandria, DC-VA-MD-WV, USA, 5th Ulsan, Korea. At the other extreme, the 5 least competitive regions are 546° Nariño, Colombia, 545° Bihar, India, 544° Uttar Pradesh, India, 543° Jammu and Kashmir, India and 542° Assam, India (Huggins, Izushi, Prokop, & Thompson, 2014).

The European Union is the area that more studies registered on this issue partly due to the wide availability of quantitative information derived to the existence of the Directorate General for Regional and Urban Policy performing assessments on the level of regional competitiveness of its members (JRC European Commission, 2013). As for the clear policy of economic integration that places competitiveness as the first of the “five priority areas to guide the work of the EU during the next 5 years” (European Council, 2014).

The Regional Competitiveness Index of the European Union (Annoni, Dijkstra, & Gargano, 2017) includes 262 regions corresponding to the NUTS 2 classification, from 28 Member States Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Greece, Croatia, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia and the United Kingdom (Table 2).

Its methodology is aligned with that adopted by the WEF (2015), which maintains Porter's contributions in its theoretical framework. (JRC European Commission, 2013) It is integrated into three large groups of categories: a) Basics; b) Efficient; and, c) Innovation.

**Table 2. Regions of the EU Regional Competitiveness Index 2016**

Member States	No of Regions	member states	No of Regions
Austria	9	Ireland	2
Belgium	11	Italy	19
Bulgaria	6	Lithuania	1
Cyprus	1	Luxembourg	1
Czech Republic	8	Latvia	1
Germany	33	Malt	1
Denmark	5	Netherlands	12
Estonia	2	Poland	16
Spain	19	Portugal	7
Finland	5	Romania	8
France	24	Sweden	8
Greece	13	Slovenia	2
Croatia	2	Slovakia	4
Hungary	7	United Kingdom	35

Source: (Annoni, Dijkstra, & Gargano, 2017).

Each of them, composed by pillars in the Basics, that includes the following 5 pillars: 1) institutions; 2) macroeconomic stability; 3) infrastructures; 4) health; and, 5) quality of primary and secondary education, considers two basic drivers of any type of economy and the most important for the less developed regions.

Those recognized as efficient reflect a higher level of development in which regions that have better skills in their workforce and greater efficiency in their labor market, composed by the following pillars: 6) higher education, training and apprenticeship throughout life; 7) efficiency of the labor

market; and, 8) size of the market. The most developed regions are those that stand out in the pillars that make up the Innovation: 9) technological readiness, business.

### *Complexity and Innovation.*

The results show the 5 most competitive regions of the EU measured on a scale of 0 to 100 located in the Innovation and Basic group we got Utrecht; London area (Inner London, Outer London, Bedfordshire, Hertfordshire and Essex); Berkshire, Buckinghamshire and Oxfordshire and the Region of Stockholm. The regions with the least competitive performance are: Bulgaria in the Severozapaden region, Greece in the Notio Aigaio region, and two regions in the south of Romania, the Southeast region and the Southwest Oltenia (Annoni, Dijkstra, & Gargano, 2017).

The third index developed by the Center for International Competitiveness (table 3), already mentioned, has also achieved the UK Competitiveness Index (UKCI) that assesses the performance of 379 locations in the 11 Regions that make up the United Kingdom: East Midlands, East of England, London, North East, North West, Scotland, South East, South West, Wales, West Midlands, and Yorkshire & Humber (Huggins & Thompson, 2016).

The index integrates both the development and sustainability of business and the individual's welfare. Its methodology considers the competitiveness of localities and competitiveness of enterprises are interdependent, so the competitiveness of regions cannot be reduced to notions of GDP and productivity. Establishes a measure composed by the

interaction of three factors: 1) inputs; 2) products; and, 3) results or consequences.

**Table 3. Localities of the UK Competitiveness Index 2016**

Regions	N. of localities	Regions	N. of localities
East Midlands	40	Scotland	32
East of England	47	South East	67
London	33	South West	36
North East	12	Wales	22
North West	39	West Midlands	30
		Yorkshire & Humber	21

Source: Huggins & Thompson, UK Competitiveness Index 2016 (2016).

Input components refer to Economic activity growth rate, Startup rate per 1000 inhabitants, Number of companies per 1000 inhabitants, Proportion of population of working age with NVQ Level 4 certification or higher, Proportion of technology-based companies. When it comes down to products, Gross Value Added per capita is measured at current prices, Productivity-Product per hour worked and Employment rate and in the results Gross weekly payment and Unemployment rate.

The nine most competitive places in Great Britain in 2016 are headed by the city of London, followed by Westminster, Camden, and Islington. The only non-London location that appears in the top ten is the nearby town of Windsor and Maidenhead. There has been a fall in the City of London between 2013 and 2016 of 20.4 points, even so, the city of London, with its dominant financial sector, is still far above the other locations.

The results of the period 2013-2016 the top five places in terms of competitiveness are all from the London area, City of London, Westminster, Camden, Islington and Hammersmith & Fulham. And the five with the worst performance Ceredigion, Merthyr Tydfil, Blackpool, Boston and Blaenau Gwent; far from the London region to the north, northwest and east of the United Kingdom (Huggins & Thompson, 2016).

In the case of Mexico, IMCO (Instituto Mexicano para la Competitividad), it is the non-Governmental Organization that has achieved more temporality calculating the regional competitiveness through State Competitiveness Index which includes the 32 states that make up the Mexican Republic with annual data and different periodicity.

This indicator defines competitiveness "as the ability to attract and retain talent and investment" and consists of 10 sub-indexes: 1. Reliable and objective law system, 2. Sustainable management of the environment, 3. Inclusive, prepared and healthy society , 4. Stable and functional political system, 5. Effective and efficient governments, 6. Labor market, 7. Stable economy, 8. Precursor sectors, 9. Take advantage of international relations and 10. Innovation of economic sectors, broken down in different amounts with a total of 99 indicators (IMCO, 2016)

According to the results obtained in 2014, the five states with the best performance turned out to be: Mexico City, Aguascalientes, Nuevo León, Colima and Querétaro. While among the lowest performing were (in ascending order) Guerrero, Oaxaca, Chiapas, Michoacán and Veracruz.

## **METHODOLOGY**

The development of this qualitative research with descriptive scope considers the analysis of theoretical approaches of four indexes that measure the regional competitiveness in an attempt to identify the factors that are taken into account in assessing regional competitive success.

Two cases of regional competitiveness at the global level and two at the national level have been considered for this. The international indexes correspond to the World Competitiveness Index of Regions (WCIR) and the European Union Regional Competitiveness Index (EURCI), while the national cases refer to the United Kingdom Competitiveness Index (UKCI) and the State Competitiveness Index of the IMCO of Mexico.

The analyzed information corresponds to the available data in the most recent year of each Index corresponding to the international indexes for 2013 and 2014 as well as the national ones for 2016 for the United Kingdom and 2014 for the case of Mexico.

A theoretical guide was elaborated on the different elements that have integrated the conceptualization of the regional competitiveness to locate the theoretical current preferred according to each index, comparing the theoretical structures of the four indexes and their relevance in the measurement of the regional competitiveness.

## **RESULTS**

According to what was previously stated by the authors who conceptualize regional competitiveness, there are two fundamental issues: the ability to attract companies and achieve a stable environment with increasing levels



of life of the population. Out of these approaches, table 4 shows the categories that can be identified for each of them.

**Table 4. Regional competitiveness issues**

Author	Ability to attract and maintain companies with stable or increasing market shares	Keeping stable and improving the standard of living
Porter	Clusters, cooperation with universities, agencies and other institutions	
Lundvall Braczyk	Technological capacities, capabilities of its consumers, suppliers, other firms and organizations	
Lall	Technological capacity, financial resources, educational skills and administrative and technical expertise, research and development	Environment favorable to entrepreneurial activity
Malecki European Union	Knowledge and research, innovation and innovative capacity, entrepreneurship, networks and institutions of knowledge, education and skills development, institutions that support innovation	Improvements in the standard of living
Fukuyama	Trust	Identification of citizens with the interests of the community, civic virtues focused on the public interest

Source: own elaboration.

It is observed the tendency to cease using economic variables as the most important in promoting competitiveness and a major influence of the new paradigm of endogenous growth is seen. According to its postulates, it considers that growth is derived from elements that are within the economic model, whether they are decisions coming from the social, political, cultural or human behavior and are not exclusive of financial accumulation.

The theory of endogenous growth centers its proposal on the incorporation of technology as an endogenous variable and the consequent role of the accumulation of knowledge as generators of increasing returns, with the role of innovation being the key point to achieve increasing returns through

the creation of new products and new processes (Schumpeter, 1942; Arrow, 1962; Romer, 1994).

The second contribution focuses on the importance of human capital as a source of capital accumulation as important as physical capital. Derived from workers with more and better qualifications that tend to be more productive and innovative. Under this scheme, education at higher levels and specialization, as well as learning at work, are basic for obtaining competitive advantages. (Arrow, 1962; Romer, 1986; Lucas, 1988)

A little built-in growth theories element is the institutions understood as formal rules, informal constraints as the case of market rules, property rights and intellectual property among others North (1995) are the institutions that in the endogenous theory they propitiate the basic structure that gives order and reduces the uncertainty to the economic activity. As a result, we can derive that these three groups of elements are found in most of the previously described indexes, with the distinctive feature of establishing greater weight in some of them depending on the index.

The economic indicators reflect on the other hand the conception of the classic economy of attributing to the behavior of the investment in physical capital the exogenous impulse to the growth that although it is necessary is not the only determinant. Therefore, according to the presentation of the previously made indexes and of their theoretical proposals, it is possible to observe that theoretical guide leads the measurement of regional competitiveness in them. As observed in Table 5.

**Table 5. Theoretical Basis in Regional Competitiveness Indexes**

Index	N. of Indicators	% participation	Theoretical Component
World Competitiveness of the Regions Index	6	31.6	Technology
	9	47.4	Human capital
	1	5.3	Institutions
	3	15.7	Non-endogenous
Regional Competitiveness Index of the European Union	3	27.2	Technology
	2	18.2	Human capital
	4	36.4	Institutions
	2	18.2	Non-endogenous
Competitiveness Index of the United Kingdom	2	20	Technology
	2	20	Human capital
	3	30	Institutions
	3	30	Non-endogenous
State Competitiveness Index (Mexico)	10	10.1	Technology
	11	11.1	Human capital
	41	41.4	Institutions
	37	37.4	Non-endogenous

Source: own elaboration.

The index further considers the endogenous approach, which is the World Competitiveness Index of the Regions (WCIR), a significant number of factors 16 within 19 derived from this theoretical approach that is 84.3% with an emphasis on human capital and the technological advance (79%). In the case of institutions, the weight contributed by 5.3% is very low and indicators associated with exogenous ideas they represent 15.7%.

According to the above mentioned rankings, it turns out that the three regions with the best performance are the Silicon Valley region, Brussels

and Tokyo, three areas of great technological development and where many personnel with high levels of education and specialization.

In the case of the Regional Competitiveness Index of the European Union (RCI) out of the eleven pillars nine are the proposal endogenous growth (81.8%) and only two to exogenous growth (18.2%). The most important components are institutions (36.4%) and technology (27.2%). The results place the three regions with the best performance in Utrecht, the Netherlands; London, UK and Berkshire, Buckinghamshire and Oxfordshire, UK. These regions of the United Kingdom are financial and service centers surrounded by large universities, while the Utrecht region corresponds to one of the countries with great development in services, especially foreign trade with higher education institutions of high quality, particularly business.

The Competitiveness Index UK (UKCI) has ten indicators that shows that out of these, seven come from the endogenous approach (70%) and three from exogenous (30%). This index presents a very clear structure with respect related to its conformation from the endogenous perspective since technology and human capital contribute to the measurement 20% each, while institutions and those corresponding to traditional measurement contribute 30% each. The localities that head the index are the City of London, the most important financial center in Europe, Westminster that is part of the financial settlement and the governmental facilities of the United Kingdom and Camden which is also located near the City and by this is influenced by the important service sector.

These three cases have similarities associated with a methodology mostly based mostly on the endogenous growth approach for the construction of regional competitiveness, which results in a measurement that can provide references to some extent comparable to each other.

As far as it goes to IMCO 62 out of 99 are related to the endogenous approach (62.3% of the total), being the lowest percentage that is in the four indexes and 37 with the exogenous growth. The great difference with respect to the previous three is that its composition gives great importance to the indicators that measure the performance of Institution's performance, 41.4%.

There is a marked interest in issues related to the level of strength present in the application of the law (property rights, rule of law, legal systems, peace environments), so most of the 99 indicators highlight the index level is inequality and growth related to health care, the level of accidents on land routes, the participation of women, and sustainable development relative aspects.

The issue of safety is measured by two sub-indices through 16 indicators that highlight indicators of insecurity and weak rule of law also the functioning of government institutions is measured in terms of their efficiency both indicators that measure the ease conduct business as the perception about corruption levels.

It is worth to stand out the fact that IMCO maintains a 37.4% of indicators that measure, under the exogenous approach, eminently economic

variables that lend themselves more to measuring economic growth than to regional competitiveness.

In contrast, the indicators related to technology (10.1%) and human capital (11.1%) weigh just over 20% of the total, which makes it impossible to establish points of comparison with the performance of the regions registered in the three international indexes.

The states of the Republic with the best performance are Mexico City, Aguascalientes and Nuevo León, reflecting the heterogeneity of the construction of the index by incorporating a megalopolis with one of the smallest entities and another with an industrial development influenced by its proximity to the United States.

## CONCLUSIONS

The study depicts that the measurements of three international competitiveness indexes are mainly influenced by the endogenous current of growth, with emphasis on the elements derived from the influence of technological progress and highly specialized human capital formation, which in clear results leaves the presence in the top of regions with important breakthrough of innovation.

When it comes down to México there is no clear the presence of endogenous approach since, although aspects of science and technology and human capital are included, their participation is only 21.2% in the measurement.

There is a marked influence by giving great weight to the institutional aspects framed by the absence of good legislative practices, insecurity and violence, although are aspects important to competitiveness development, and the Mexican case is a reality, and affects all aspects of the nation life, for the purposes of establish support policies for competitiveness, they are not enough to promote it on their own.

Achieving a balance in the conformation of the indicators that measure regional competitiveness in Mexico would contribute to elements of judgment in the construction of policies of encouragement to innovation. Considering that it is the element that can reverse the current stagnation of global growth and the foundation to overcome the economic and social shortcomings of emerging countries. So, identifying more precisely the role of important spending on science and technology, made in higher education and the creation of research centers allow comparisons with regions that have achieved superior performance, illuminating the field of financing needs and private and public actions to boost competitiveness and wellbeing of regions.

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# Chapter Eight



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**Agricultural Competitiveness under a weighted  
perspective of the Production Value. Case of Michoacán**

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## **Agricultural Competitiveness under a weighted perspective of the Production Value. Case of Michoacán**

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### **INTRODUCTION**

The Global Environmental Change (GEC) as a result of the general interaction of different elements to global scale, has had implications in: food security, the provision of ecosystem services and social welfare in general (Ericksen, 2008). Rural production has transformed in processes, interactions and paradigms. This situation has led the rural sector to face challenges such as climate change, changes in commercial and productive policies, changes in consumption patterns and price instability, trends that will continue in the coming years.

The GEC has transformed the society, most deeply some in some sectors, such as food systems, which means, challenge will be supplying a growing demand due to the world population is expected to reach the figure of 9,100 million of people to 2050, and agriculture requires continuing to increase the yield. In this context, agricultural competitiveness is a matter of global and regional challenges because: 1) 75% of the populations from rural areas depend on the agricultural sector (Torres *et al.*, 2011); and, 2) approximately 500 million families' farmers are highly vulnerable (FAO,

2013) to external threats; such as, those that can represent the GEC, like change in trade policies, climate change, uncertainty, increasing speculation, etc.

The global importance of field production currently is that 47% of world population live in rural zones (Banco Mundial, 2014), in this sense, a third of employments are generated by primary sector. From continental scale, Africa has 58% of population in this sector, while North American has only 2%. Despite of the importance of rural zones, the competitiveness conditions between, agricultural producers, are contrasting in global, national and regional scale. However, in sites when the agriculture is relevant for employment, income and participation in local economy, there is not a information about the local competitiveness differences between regions and municipalities. In this sense, it is meaningful to measure and to analyze the determinants of competitiveness and promote improvements by each component of it.

The economy of Michoacán has a strong dependence of primary sector; the agriculture is the main activity on this sector (more 60%). The leading products are: avocado (84% of Mexican production), corn, sorghum, sugar cane, bean and wheat.

Additionally, Michoacán exports melon, watermelon, strawberry, blackberry and lemon. The farmers are facing the challenge to be competitiveness in trade and productivity areas. Why is the municipal competitiveness in Michoacán using a weighted perspective of the Production Value? Having as an objective to design a methodology to know the competitiveness of municipal agricultural, by means of a

competitiveness index as weighted of production value. The hypothesis is that the municipality agriculture value position shifts using the weighted competitiveness index, called Municipality Agriculture Competitiveness Index (MACI).

The document considers five sections, the first describes the Michoacán economy and the importance of agriculture, and the second section shows some background studies on agricultural competitiveness. The third section presents the methodological design for the construction of the agricultural competitiveness index. The fourth part presents the results of the competitiveness index and its relation to the value of agricultural production and discussion of results. Finally, the conclusions are exposed.

## **ECONOMY AND AGRICULTURE IN MICHOCÁN**

The Michoacán economy is based on external impulses; the growth in exports and sales to the rest of the country has a multiplier effect over sectors with direct and indirect suppliers, increasing production and employment. The Michoacán productive sectors of acquire most of their inputs from outside the territory. The activities that present an acceptable level of internal integration are: food and beverage industries, the furniture and wood industries, which require significant volumes of inputs to the agricultural sector and forestry from inside of territory. The links with the rest of the region are very limited, since their main input requirements are concentrated in the state of Jalisco (Callicó, 2000).

Michoacán has comparative advantages as climate diversity, water availability and fertile soils (for high yield agricultural production), which provides an agricultural aptitude with highly development potential. Since

2006, Michoacán has increased significantly its agricultural participation in the Mexican GDP (9% on average) (INEGI, 2008-2016). Meanwhile, the agriculture as a predominant activity in Michoacán, is yet in a development phase with a degree of backwardness respecting to the country. "... agriculture in a country is the first phase of its development; and industrialization is a very important indicator in the progress of a developing country and development strategies are those that allow us to move from agriculture to industry ... " (FAO, 2008).

The agricultural sector enhances the development determined to their levels of competitiveness being limited due to the fact that more than 60% of crops depended of rain in Michoacán (SIAP, 2016). However, the agriculture has significant multiplier effects on a regional scale. The relevant example is the avocado crop, which generates important multipliers effects of regional economy.

The avocado competitiveness was possible due to two fundamental factors: 1) modification of the laws for foreign investment (which allowed the main brokers for exporting were stablished) and, 2) promotion programs, which has encouraged the expansion of the avocado market in the United States (Carman, 2009).

Michoacán contributes above the national average to the GDP of the primary sector. Standing out with the avocado (first national place), the corn in grain (fifth national place) and the blackberry (first national place). The avocado represents the most important commercial crop for Michoacan, with 37% of agricultural production value and 10% of agricultural territory. In the same sense, corn crop participates with 17% of



the value of state production and covers 44% of the area sown and harvested. Out of these, 79% practice temporary activity generating 59% of the value; while 20% have irrigation and participate with the remaining 40% of the value. Michoacán contributes 8% of the national corn, located in fourth place behind Sinaloa, Jalisco and Estado de Mexico, which together contribute 38% of national production value. In this way Michoacán.

## **BACKGROUND STUDIES ON AGRICULTURAL COMPETITIVENESS**

Competitiveness can be conceived as the ability of companies to design, develop, produce and sell their products in the international market and competition with companies from several countries (Alic, 1987). The evolution of the concept of competitiveness, emphasizes the importance of the production process as a determinant element (Porter, 1993). While other authors focus on the ability to respond favorably in international markets (Urrutia, 1994) with the incorporation of strategies that seek adaptation and remain on markets (Cabrera *et al.*, 2011).

Competitiveness as a process of dynamic integration of countries and products into international markets, depending on the conditions of supply and demand (Grant, 1999; Kaplinsky, 2000), this process is the ability to increase the productivity steadily, and Farms have can insert successfully over national and international markets, overall the people living standard, inside the country, tends to improve.

The agricultural sector in Latin America bases its agricultural competitiveness on comparative advantages and absolute occasions, that is, on the use of its natural resources. Being competitive in the farmland implies having elements that positively impact the farmer's economic

performance in the farmland and their surroundings. The systemic competitiveness approach shows a greater richness for the different analysis of the different dimensions interacting to reach better standards. The inclusion of the meso and meta levels, the systemic conception and the weighting conditions which under the companies operate has been an important advance in the understanding of competitiveness in a broader frame of reference (Esser *et al.*, 1996).

Agricultural competitiveness consists of the development of internal capacities and strengths, which help to adapt to new circumstances improving the achievement, sales growth and the value's contribution of the economic entities themselves and regionality.

Competitiveness in agriculture has at least two scales: 1) production, which positively affects the performance per hectare; and, 2) commercialization, improves the position to obtain better prices and the products' placement in the market, with lower risks. The competitive capacity evaluating this document concerns the first one mentioned above, focusing on the factors that impact production, starting from the assumption that it is in this precisely stage where the greatest agro-meteorological risks or those related to climate change.

## **IMPLICATIONS OF GLOBAL ENVIRONMENTAL CHANGE ON AGRICULTURAL COMPETITIVENESS**

In the Júcar Basin (Spain), they have implemented adjustment measurements to what they perceive as vulnerability in the area; proposing modern irrigation, water control, use of new diversity and incentives for lower water consumption crops. Through the implementation of a

participatory methodology, the agricultural producers expressed their disagreement over the establishment for the water markets, demanded a more transparent and participatory management not consider the price policies. (Ortega, 2017).

Some studies that have analyzed agricultural vulnerability among the climate change scenarios with the use of a regional climate model for 2080. In the Paperiana region of Argentina, they found an average yield reduction of 4% in wheat, 9% in corn and 14% in soy. At the same time, for another scenario, the average reduction would be wheat (3%) and corn (6%), and in soybean increases of 3%, Travasso and others (2009). In Latin America, studies about the impact of climate change on the agricultural sector, example: El Salvador and in Costa Rica.

In El Salvador, they found a high vulnerability to climatic effects, evidence of this is the increasement of number and intensity of hydrometeorological phenomena that have culminated in disasters in the recent years. In the future, it is expected that these phenomena will intensify, while the average temperature will increase and rainfall will decrease. Towards the year 2100 they project that in that region the climate will increase between 2° C and 5° C and that the precipitation will diminish between 18 % and 40 % (Ordaz, *et al.*, 2009).

As Costa Rica, changes in agricultural production and economic gains would be affected as well. The economic impacts of climate change on agricultural production in relation to GDP in 2007 are estimated to be lost between 1% and 2% of GDP by 2050, at a discount rate of 4%. While referring to the tourism sector, their models found an increasing on

temperature will reduce the demand for leasing, reaching a decrease of 1.2% in income from the property leasing (Ordaz *et al.*, 2010).

In Mexico, some studies about the climate change impact on the agricultural sector at national and local scale are highlighted (Flores *et al.*, 1995; Ferrer *et al.*, 1995; Conde *et al.*, 2006; Gay, 2000). It is emphasized that agricultural activity under the conditions of the climate change requires precise scenarios, due to the vulnerability to changes in the climate of this sector and its dependence on rainfall regimes, especially seasonal areas and their relationship with the food crops and self-consumption. It is clear that agriculture is one of the most vulnerable areas to possible climate changes in the different localities, as well as possible hydro-meteorological disasters that could impact them. (Conde *et al.*, 2004).

Meanwhile the effect of climate change in the potential distribution of corn in the state of Jalisco, two models of climate change for the period 2041-2060 has been used, under scenario A2. Results show an increase in the unsuitable surface for the corn crop in 63.6% for the GFDL climate change model and in 90.8% for the Hadley model. The Central, North and East regions of Jalisco register the largest changes. The soil moisture availability is the main component limiting factor for the development of the corn crop (Tinoco *et al.*, 2011).

In Toluca, Estado de México, the possible alterations that climate change could bring to the production of seasonal maize were analyzed. The Hadley Climate Change model was applied and the results obtained showed that the temperature and precipitation variables will have negative outcomes in the phenological development of corn. The flowering that

would have direct implications in accentuated production reduction will be affected. The most likely climatic change is the rise in air temperature on average of 2 °C; in terms of rainfall, the alteration is greater, in some cases a decrease of 40% is staged; however, it is to be expected that there are some regions where precipitation will increase (Granados & Sarabia, 2013).

Agriculture in Mexico is a leading activity, and especially in states such as Michoacan, its economic and social importance is referred in weight within the national and state GDP, as well as the number of jobs opportunities and population dependent on this primary activity. On the other hand, three models are used to determine the impacts of climate change in agriculture, these models are: production function, a model of the "Ricardian" type; the models agree with the existence of agriculture impacts related to the climate change, although they differ in their magnitude.

The main conclusions about agriculture are: 1) an increase in CO<sub>2</sub> positively impacts the performance of the agricultural sector; 2) a increment in temperature with varied impacts and changes in precipitation patterns have a significant impact on production, which generates uncertainty; and, 3) changes in temperature are more important than those associated with rain (Galindo, 2009).

In the aspects related to agricultural competitiveness, some studies use the following variables: price, quality, distribution channels, logistics and competitive advantages (Bonales & Sánchez, 2003; Chávez, 2004), which describe the importance of each variable contributing to the sectoral competitiveness as a whole for avocado and strawberry crops in particular.

In the case of Michoacán, agriculture has fundamental importance, because 21% of the population is directly employed in the primary sector, it is a state with a predominantly agricultural and forestry productive land of business (Ortiz *et al.*, 2010). The contribution to the GDP of the primary sector in Mexico represents 10% of the national total, fourth in importance due to the value of its production and the first in terms of its agricultural production (SAGARPA, 2011). The main agricultural crops in which Michoacán stands out are: the avocado (first national place), the corn in grain (fifth national place) and the blackberry (first national place).

The most competitive agriculture producers in Michoacán are those classified as mixed; regional and national sale; and as exporters; sale intended for export, as defined by Ortiz and others (2010). In this regard, the productive infrastructure in Michoacán at the regional level is concentrated in few producers, who have greater competitiveness, showing that one of the great challenges of the field is innovation (Escobar *et al.*, 1996).

Due to the importance of the agricultural sector in Michoacán, the effects of climate change can be catastrophic due to the dependence of agriculture. Considering climate change as a threat to the agricultural sector, it is important to know the competitive capacities, which in the opposite direction are also related to the degree of regional agricultural vulnerability; greater competitive capacities lead to lower agricultural vulnerability and vice versa.

## MATERIALS AND METHODS

Faced with a list of threats, partly due to global environmental change. Competitiveness is vital for the systems of agricultural production in function of the particular characteristics likewise: rural population, facilities and agricultural facilities, agricultural activities, environment and ecosystems. Given this and based on the information available, a proposal is presented based on variables, indicators and indices, to quantify the competitiveness of agricultural producers and the regional economy.

### The calculation of the competitiveness of agricultural producers MAC

To calculate the Municipal Agricultural Competitiveness Index (MAC), five variables were used: 1) technology, 2) infrastructure and facilities, 3) traction, 4) surface quality and 5) access to financing; with 20 dimensions and the same number of indicators. The indicators were grouped into six indices, which were the result of the standardized summation, as can be seen in the equation1.

$$MAC = \sum_{i=1}^n (Tec + IeI + Ri - Cs + Tr + Af) \quad (\text{Eq. 1}).$$

The MACI measurement was carried out through information on the agricultural Farm of Michoacán in the Ejidal Census of the National Institute of Statistics, Geography and Informatics (INEGI), 2007. Twenty indicators were used (they are described in Table 1). For each indicator, the type of impact was first identified; direct or inverse (+ or -). Subsequently, the information was standardized, based on the quotient of the difference between the data of the municipality and the state average for each of the items (Equation 2, Table 1).

**Table 1. Variables to measure the MAC by rural farms**

Variable	Dimension	Indicator	Index	Measurement of the variable after normalization *	Type of impact
Tecnology	Chemical fertilizers (Fq); Improved seed (Sm); Natural fertilizers (An); Chemical herbicides (Hq); chemical insecticides (Iq); organic insecticides (Io); controlled burning (Qc) and other technology (Ott)	Rural production Farm that use: Fq, Sm, An, Hq, Iq, Io, Qc and Ott.	% of Rural Production Farm that use: Fq, Sm, An, Hq, Iq, Io, Qc and Ott.	$Tec = \sum (Fq + Sm + An + Hq + Iq + Io + Qc + Ott)$	( + )
Infrastructure and facilities	Risk (Rs)	Rural Production Farm that use irrigation (Rs).	% of Rural Production Farm that use irrigation.	$Rs = \sum R s$	( + )
	Facilities (I): Beneficiary (Be), Dehydrator (Ds), Packing machine (Em), Sorting machine (Se), Shredder (Of) And Other) Instalations (Oi)	Rural Production Farm that employ: Be, Ds, Em, Se, De and Oi.	% of Rural Production Farm that use: Be, Ds, Em, Se, De and Oi.	$IeI = \sum (Be + Ds + Em + Se + De + Oi)$	( + )
Traction	Mechanical Traction (Tme)	Rural Production Farm that use mechanical traction.	% of Rural Production Farm that use mechanical traction.	$Tr = \sum Me$	( + )
Surface quality	Salted surface and eroded surface.	Farm of Rural Production with surface Er and/or In	% of Rural Production Farm with area Er and/or In	$CS = \sum (Er + En)$	( - )
Access to financing	Access to insurance (Se) and access to credits (Cr)	Farm of Rural Production with Se and/or Cr	% of Rural Production Farm with Se and/or Cr	$Af = \sum (Seg + Cr)$	( + )

Source: Own elaboration.

\* For the normalization of the information we used the equation 1.  $Vx1 = [(x1 - xm) / \sigma x]$  (Equation 2). Where: Vx1: normalized value of x1; x1: value of the indicator; xm: average of the series x and  $\sigma x$ : standard deviation of the series x



Finally, to the sum of the standardization by item, it is grouped by variable and a final sum is made. The values are transformed into a normalization so that the MACI is presented with values between 0 and 1, in this way, the municipalities and regions of Michoacán are compared.

The most competitive municipalities will be those with MACI close to 1, but that at the same time maintain a high economic value of agricultural production. What is achieved by obtaining the product of agricultural economic value multiplied by MACI. The study assumes that competitiveness must combine the capabilities of MACI with the value of the wealth generated by the production Farm.

**Table 2. Matrix of correlation and contribution of dimensions to MACI**

Dimensions	Tecnicality	Risk	Infraestructure and facilities	Traction	Surface Quality	Financing
Technicality	1	-0.068	0.496	0.517	0.078	-0.232
Risk	-0.068	1	-0.062	-0.055	-0.004	0.006
Infraestructure		1	0.362	0.337	-0.130	
Traction			1	0.181	-0.087	
Surface quality				1	-0.089	
Financing					1	
Average Input MACI variable	41.2%	28.0%	3.3%	9.0%	-0.4%	18.9%

Source: Own elaboration

## RESULTS

According to the variables that explain the competitive capacities for the integration of MACI, a statistical analysis shows the negative correlation (table 2), for irrigation and financing, with respect to other variables. It can be seen that the technicality or the use of technologies, is significantly

related to traction and facilities. As for the variable surface quality, it does not show correlation with the other dimensions. Table 2 also depicts the average contribution of each of the variables to the MACI integration.

On the other hand, Table 3 shows the MACI and in the first column the most competitive municipalities are appreciated, to mention a few: Buenavista, Puruandiro, Huetamo, Salvador E., Uruapan, Venustiano C. and Vista Hermosa. The average variable has the most impact on agricultural competitiveness is technicality, followed by water availability and access to financing. There is also a relationship between those municipalities that have low and very low competitiveness with municipalities with, predominantly, maintenance and low-yield agriculture, as shown Ortiz and others (2010).

**Table 3. Classification of municipal competitiveness in Michoacan**

Very high (18) MACI (0.74 a 1.0)	High (31) MACI (0.56 a 0.73)	Low (41) MACI (0.46 a 0.55)	Very low (23) MACI (0.36 a 0.44)
Buenavista, Puruándiro, Huetamo, Salvador E., Uruapan, Venustiano C., Vista Hermosa, Ario, Tarímbaro, Tancitaro Zitácuaro, Tacámbaro, Zinapécuaro, José Sixto V., Angamacitiro, Yurécuaro, Múgica and Gabriel Z.	La Huacana, Zacapu, Tanhuato, Maravatío, Pajacuarán, Penjamillo, Contepec, Alvaro O., Jiménez, Zamora, La Piedad, Villamar, Zináparo, Acuitzio, Los Reyes, Tuzantla, Jacona, Apatzingán, Turicato, Morelia, Tingambato, Carácuaro, San Lucas, Panindícuaro, Tepalcatepec, Tiquicheo, Ecuandureo, Parácuaro, Epitacio H. y Numarán and Paracho	Nahuatzen, Jungapeo, Cotija, Ocampo, Chavinda, Churintzio, Erongarícuaro, Lázaro C., Tingüindín, Jiquilpan, Irimbo, Tocombo, Coalcomán, Queréndaro, Indaparapeo, Peribán, Taretan, Aguililla, Tangancícuaro, Cuitzeo, Ziracuaretiro, Tlalpujahuá, Nuevo Urecho, Ixtlán, Susupuato, Anganguero, Coeneo, Sahuayo, Lagunillas, Tangamandapio, Santa A. M., Quiroga, Nuevo P., Aporo, Marcos C., Charo, Briseñas, Arteaga, Copándaro, Hidalgo and Huaniqueo	Purépero, Senguio, Tuxpan, Cherán, Pátzcuaro, Charapan, Churumuco, Cojumatlán, Huandacareo, Tumbiscatío, Aquila, Tzitzio, Morelos, Tlazazalca, Chilchota, Chucándiro, Juárez, Coahuayana, Tzintzuntzan, Huiramba, Madero, Nocupétaro and Chinicuila

Source: Own elaboration (INEGI, 2007).

The competitiveness for this study is related to the producers' internal training, this is a crucial aspect in adaptation. Competitiveness, in addition to internal training, considers external competition and the way to confront it. Such as prices, markets organization, quality and penetration strategies, consolidation and expansion of demand market niches.

### **Competitiveness and Value of Agricultural Production**

The effect of competitiveness would be reflected in the production, the production value, the quality, as well as the access to the markets that have the most competitive producers (Porter, 1993). A relation between the Value of Agricultural Production (VAP) and competitiveness is presented. Simple regression analysis corroborates the expected relationship and its significance.

The most notable limitations would be: 1) the value of production keeps the slant of the market prices; 2) there is no differentiation between the types of cultivation; and 3) the information corresponds to different years, MACI from 2007, while the value of production is 2012.

As the parameters are shown, they show statistical significance, thus cross-section information, the correlation of 0.58 indicates a relationship, which shows to be significant according to the statistical parameters observed in Table 4. In the same sense, it is appreciated that the expected sign indicates a positive relationship because the MACI has an elasticity factor, in terms of three impact Farm from the value of production.

**Table 4. Statistics from VAP and MACI (VAP = 20.03+3.018\*MACI)**

Source	Value	Standard error	t	Pr >  t	R = 0.584	R <sup>2</sup> adjust = 0.335
Interception	20.024	0.256	78.118	< 0.0001	Equation: VAP = 20.03+3.018 *MACI	
MACI	3.018	0.398	7.580	< 0.0001		
Source	GL	S. squares	Middle Squares	F	Pr > F	
Model	1	60.461	60.461	57.455	< 0.0001	
Error	111	116.807	1.052	DW	2.228	
Total, corrected	112	177.268				
Calculated with model Y=Media(Y)						

Source: information calculated from MACI (SIAP, 2016).

In this sense, if it is assumed that competitiveness is related to the value of production, MACI is used as a relative index to re-order competitiveness, through the product MACI \* VAP. There are movements in the positions of the municipalities and their competitiveness in terms of value and capacities quantified by MACI.

**Table 5. Competitiveness between MACI y VAP**

P*	MACI	P*	MACI*VAP	P*	MACI	P*	MACI*VAP
1	Buenavista	1	Uruapan	57	Lázaro Cárdenas	57	Indaparapeo
2	Puruándiro	2	Tancítaro	58	Tingüindín	58	Taretan
3	Huetamo	3	Tacámbaro	59	Jiquilpan	59	Lázaro C.
4	Salvador E.	4	Ario	60	Irimbo	60	Briseñas
5	Uruapan	5	Salvador E.	61	Tocumbo	61	Jiménez
6	Venustiano C.	6	Peribán	62	Coalcomán	62	Epitacio Huerta
7	Vista H.	7	Los Reyes	63	Queréndaro	63	Aquila
8	Ario	8	Buenavista	64	Indaparapeo	64	Jiquilpan

9	Tarímbaro	9	Nuevo P.	65	Peribán	65	Nuevo Urecho
10	Tancítaro	10	Zamora	66	Taretan	66	Carácuaro
11	Zitácuaro	11	Tingüindín	67	Aguililla	67	Sahuayo
12	Tacámbaro	12	Puruándiro	68	Tangancícuaro	68	Tangamandapio
13	Zinapécuaro	13	Yurécuaro	69	Cuitzeo	69	Santa Ana M.
14	José Sixto V.	14	Tangancícuaro	70	Ziracuaretiro	70	Charo
15	Angamacutiro	15	Apatzingán	71	Tlalpujagua	71	Coalcomán
16	Yurécuaro	16	Vista Hermosa	72	Nuevo Urecho	72	Numarán
17	Múgica	17	Huetamo	73	Ixtlán	73	Acuitzio
18	Hidalgo	18	Zitácuaro	74	Susupuato	74	Nahuatzen
19	Huacana, La	19	Parácuaro	75	Angangueo	75	Tzitzio
20	Zacapu	20	Jungapeo	76	Coeneo	76	Senguio
21	Tanhuato	21	José Sixto V.	77	Sahuayo	77	Susupuato
22	Maravatío	22	Maravatío	78	Lagunillas	78	Madero
23	Pajacuarán	23	Ecuandureo	79	Tangamandapio	79	Queréndaro
24	Penjamillo	24	Tanhuato	80	Santa Ana M.	80	Copándaro
25	Contepec	25	Jacona	81	Quiroga	81	Chilchota
26	Alvaro O.	26	Villamar	82	Nuevo P.	82	Chinicuila
27	Jiménez	27	Venustiano C.	83	Aporo	83	Erongarícuaro
28	Zamora	28	Tarímbaro	84	Marcos C.	84	Cojumatlán de R.
29	La Piedad	29	Tingambato	85	Charo	85	Coeneo
30	Villamar	30	La Huacana	86	Briseñas	86	Irimbo
31	Zináparo	31	Alvaro Obregón	87	Arteaga	87	Purépero
32	Acuitzio	32	Tepalcatepec	88	Copándaro	88	Tlalpujagua
33	Reyes, Los	33	Pajacuarán	89	Gabriel Zamora	89	Zináparo
34	Tuzantla	34	Múgica	90	Huaniqueo	90	Cuitzeo
35	Jacona	35	Contepec	91	Purépero	91	Paracho
36	Apatzingán	36	Penjamillo	92	Senguio	92	Pátzcuaro
37	Turicato	37	Angamacutiro	93	Tuxpan	93	Tiquicheo
38	Morelia	38	Turicato	94	Cherán	94	Churintzio
39	Tingambato	39	Zinapécuaro	95	Pátzcuaro	95	Charapan
40	Carácuaro	40	Aguililla	96	Charapan	96	Ocampo

41 San Lucas	41 Tlaxiaco	97 Churumuco	97 Quiroga
42 Panindícuaro	42 Coahuayana	98 Cojumatlán de R.	98 Churumuco
43 Tepalcatepec	43 Tuxpan	99 Huandacareo	99 Tlazazalca
44 Tiquicheo	44 Gabriel Zamora	100 Tumbiscatío	100 Morelos
45 Ecuandureo	45 Ixtlán	101 Aguila	101 Huaniqueo
46 Parácuaro	46 Ziracuaretiro	102 Tzitzio	102 Nocupétaro
47 Epitacio H.	47 Tuzantla	103 Morelos	103 Tumbiscatío
48 Numarán	48 Hidalgo	104 Tlazazalca	104 Cherán
49 Paracho	49 Chavinda	105 Chilchota	105 Marcos C.
50 Nahuatzen	50 Zacapu	106 Chucándiro	106 Tzintzuntzan
51 Jungapeo	51 Cotija	107 Juárez	107 Huandacareo
52 Cotija	52 San Lucas	108 Coahuayana	108 Arteaga
53 Ocampo	53 Panindícuaro	109 Tzintzuntzan	109 Aporo
54 Chavinda	54 Morelia	110 Huiramba	110 Huiramba
55 Churintzio	55 Juárez	111 Madero	111 Lagunillas
56 Erongarícuaro	56 La Piedad	112 Nocupétaro	112 Angangueo
		113 Chinicuila	113 Chucándiro

P\*= Posición en el ranking estatal.

Source: Own elaboration.

## CONCLUSIONS

The CAG has different aspects and it is a complex issue. It can be highlighted that the environmental, climate, global agricultural policies, competitiveness, prices, governability and uncertainty are present elements and constitute a challenge for agricultural producers. In the case of Michoacán, agriculture supports an important part of its economy and generates important effects at the municipal and regional levels. It is therefore important to evaluate the competitive capabilities of agricultural producers with the information available at first and explore alternative approaches in subsequent studies after.

The objective of the study was to evaluate the municipal agricultural competitiveness of Michoacan, through the use of an index. This objective was achieved; and strengthened by linking the municipal agricultural competitiveness index with the value of agricultural production.

The results show that Michoacan has competitive diversity in agricultural matters. In the classification of municipalities of four ranks, 49 municipalities with high and very high competitiveness were placed. While the remaining 64 have an incipient competitiveness; low or very low.

This study is only first approximation for the analysis of municipal competitiveness, it is important to consider other variables such as the type of crop, meteorological conditions, distribution networks, cooperation, innovation and public safety; some of these conditions are internal to the producers, and others would be located at the meso or meta level, (Esser *et al.*, 1996).

It is appreciated that when weighting the municipal VAP with the MACI, positions are lost by some municipalities and earned in other cases. The thought part from that maximum competitiveness, that is; the unit maintains the generated value at 100% and decreases when the levels of competitiveness are reduced. However, it is only a weighting to observe the effect of MACI, which has been found to have a significant relationship with the value of production; therefore, competitiveness quantified and classified from the MACI, provides valuable information to determine the degree of municipal competitiveness, in relation to the internal capacities of agricultural producers.

In the same way, the study, according to MACI results, at least 23 municipalities were identified that require immediate attention to be strengthened in their internal competitive capacities, mainly in facilities, irrigation and financing, which were: Chinicuila, Nocupétaro, Madero, Huiramba, Tzintzuntzan, Coahuayana, Juárez, Chucándiro, Chilchota, Tlazazalca, Morelos, Tzitzio, Aguila, Tumbiscatío, Huandacareo, Cojumatlán, Churumuco, Charapan, Pátzcuaro, Cherán, Tuxpan and Senguio

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# Chapter Nine



Photo by Raymond Hui on Unsplash

**A test of the performance of Type 4 SIEFORES: Do these  
pay a better return than all the less risky ones?**

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## **A test of the performance of type 4 SIEFORES: Do these pay a better return than all the less risky ones?**

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### **INTRODUCTION**

The Mexican pension fund system was a defined benefit one until the decades of 1980 and 1990, when the Mexican Government had financial pressures from three main sources: first from the age composition among active and retired workers, second the liability of pension payments that increased from a 40% of the minimum wage to 100% in 1995 and a small contribution from the workers of 8.5% compared to the 23.3% needed<sup>1</sup>, third, the suggestions made by the IMF and World Bank in order to have financial aid during the 1994 Mexican financial crisis.

In order to solve this pressure, the Mexican government changed the pension system. With this reform and since 1997, the Mexican pension fund system and its investment policy has been supervised by the regulatory authority: the CONSAR<sup>2</sup>.

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<sup>1</sup> For a more detailed review for the causes that lead to pension system reform, please refer to Sales and others (1998).

<sup>2</sup> Acronym of “Comisión Nacional del Sistema del Ahorro para el Retiro” o “National Pension Savings Comossion”

At March 2008 the CONSAR allowed the SIEFORES to work in a “life cycle” scheme where 5 type of SIEFORES were managed with investment policy that allow to invest in Mexican and foreign securities, such as equities, real estate investment trusts and commodities. Finally, in 2013 the five types of SIEFORES were reduced to 4 with the investment policy given in table 1.

**Table 1. The investment policy allowed by CONSAR**

Asset type investment levels (min/max)	Type 1 SIEFORE (SB1)	Type 2 SIEFORE (SB2)	Type 3 SIEFORE (SB3)	Type 4 SIEFORE (SB4)
Mexican Government Fixed Income securities	(51% / 100%)	(0% / 100%)	(0% / 100%)	(0% / 100%)
Mexican corporate securities	(0% / 100%)	(0% / 100%)	(0% / 100%)	(0% / 100%)
Mexican equity market	(0% / 5%)	(0% / 25%)	(0% / 30%)	(0% / 40%)
Sovereign and corporate global bonds (including Mexican UMS)	(0% / 100%)	(0% / 100%)	(0% / 100%)	(0% / 100%)
Global equity markets	(0% / 5%)	(0% / 25%)	(0% / 30%)	(0% / 40%)
Commodities	0%	(0% / 5%)	(0% / 10%)	(0% / 10%)
Foreign securities investment levels	(0% / 20%)	(0% / 20%)	(0% / 20%)	(0% / 20%)

Source: CONSAR (2017).

As noted, the investment policy (since the beginning of the reform in 1997) suggested the presence or induction of a sort of “homogeneity” in the performance of the SIEFORES that could translate into a lack of competitiveness. Since the inception of this new pension system in Mexico,



several studies have been carried out in order to test the historical origins of the aforementioned reform and also to test the improvements that could be made to enhance the economic impact and welfare of pension savers. Among all these that will be mentioned in detail in the literature review section, we want to note the aforementioned one of Calderon and others (2009) who found, as previously told, that the pension investment decision (i.e. the SIEFORE selection) is noisy and uninformed, leading to fund demand inelasticity that is the key concept that motivates this paper. With such results and tests, they observe that Mexican pension savers decide to invest in a pension fund (SIEFORE) due to the fact that it is among the best performers (in a return or risk-return profile); but by the influence of big marketing efforts or “institutional issues” like the fact that the selected SIEFORE is part of a big financial institution or an insurance company (suggesting “back to back” practices).

This last result is the one that inspires the current research along with the one of Guillen (2011). Here we want to check if there are SIEFOREs type 4 that outperform the other ones in the market by paying positive and statistically significant alpha against their investment style peers or against all the SIEFOREs in the market. If we do not find evidence of positive alphas, there would be proofs that the SIEFORES have homogeneous performance and therefore, there are no incentives to change of SIEFORE (i.e. an inelastic demand).

Once that we have presented our main research aim, we structured the paper as follows: in the next section we present a non-exhaustive literature review of the studies related to the Mexican pension fund system and some other related studies to the present one. After this, the third section

describes the data selection and processing and also presents our main findings. Finally, we continue with our conclusions and main suggestions for further research in the subject.

## **LITERATURE REVIEW**

As one of the first studies in Mexico Sales and others (1998) made a review of the Mexican pension reforms and suggested the strongest causes that lead to it. Once these reforms were made, Albo and others (2007) did their mathematical projections (with actuarial models) and studied the replacement rate. Their analysis led them to suggest six key actions in order to enhance the financial stability of the Mexican pension system:

1. To create a universal pension system that includes the studied IMSS one and also the private ones, the ones given by public universities, the army and so forth.
2. To increase the contributions to the pension plan in two ways: first with a higher contribution from the base salary and, second, by extending the coverage to other non-formal workers (workers in businesses that do not pay taxes and social security) and also to independent entrepreneurs such as merchants, doctors, business owners and alike.
3. To strengthen the participation of workers in the IMSS pensions system by reducing the 1,250 week to have a guaranteed or defined pension to 900. This with care of the financial health of the pension plan by guaranteeing a 50% pension if the worker has 900 weeks.
4. To make a solidarity extra contribution from the Mexican State to the retirement account i.e. The Mexican state must contribute *vís a* *vís* the retirement amount with the worker in her pension savings account (today

it happens only with some of the social security ex-pension savings contributions).

5. To increase the performance i.e. the return paid by SIEFORES by allowing a more flexible investment policy (one that allows proper but more flexible risk limits).

6. To increase a financial culture among pension savers, leading to a higher contribution from them and a more informed investment decision of their proceedings.

Among these, the last two are the ones of interest for us due to the fact that a higher degree of competitiveness among SIEFORES (due a proper informational efficiency between SIEFORES and savers) could guarantee a better performance, better return for pension savers and, as a final result, more stability to the financial and economic stability of Mexico.

Following Albo and others (2007), we found the work of Calderon and others (2009) that, as previously stated in the introduction section, is the one that motivates the present one. As we stated previously, these authors found evidence of a lack of demand elasticity, given a noisy and uninformed investment decision made by pension savers and also a lack of performance incentive. This last result motivates our paper by the fact that we want to find evidence of homogeneous performance (lack of alpha) between all the SIEFORES as proof of the lack of competitiveness among funds.

With this brief literature review, we want to test whether there is homogeneity in Mexican pension funds' performance and to signal this as a possible cause of a lack of competitiveness. With this in mind we will

review the performance of the SIEFOREs type 4 by the fact that they have the most diversified and risky investment parameters of all. A situation that should lead to a clear heterogeneity.

## METHODOLOGY

In order to test if there is homogeneity in the performance and also a cause of noisy investment decision in the Mexican pension funds, we will use the historical data of the price of the stocks of the SIEFOREs type 4. By the fact that some of the SIEFOREs have merged with another ones we will use the historical daily price of the SIEFOREs shown in table 2 from February, 24 2005 to November, 30 2016 in order to avoid survivor bias and time series with heterogeneous length.

**Table 2. List of SIEFOREs in the Sample**

Azteca	Inbursa	Principal	XXI Banorte
Banamex	Invercap	Profuturo GNP	
Coppel	Metlife	SURA	

Source: CONSAR (2016).

Following this, we found in CONSAR (CONSAR, 2016) the historical value of the performance index of each SIEFORE calculated given the net asset value of the existing SIEFOREs in each type of SIEFOREs and a performance benchmark of the net asset value of all the SIEFOREs. For the benchmarks of each SIEFORE type we denoted the specific SIEFORE type 4 benchmark as SB4. For the benchmark of all the SIEFOREs we simply labeled it as the “all” benchmark in our analysis. We decide to use these benchmarks, in contrast to De la Torre et.al. (2015 a; 2015 b) who used the minimum variance, the Max Sharpe or the target position portfolios. Our

decision is based on the fact that these net-asset value benchmarks measures the net performance of the SIEFORES and not the theoretical portfolio. As previously stated, our first aim is to test the homogeneity in the observed results among SIEFORES instead of testing the performance of each against a theoretical portfolio.

We also tested, in a second factor model, the performance of each SIEFORE of each type against “all” SIEFORES (by using the “all” SIEFORES benchmark) because this last benchmark incorporates the performance of all the pension funds in the system. We perform this last test because we want pursued to go in line with Martínez and Venegas (2014) who found underperformance of the type 2 SIEFORES if they incorporate skewness and ARCH effects in the volatility. Finally we wanted to test, in a third model, each SIEFORE against both benchmarks (the SIEFORE type and the all one) to see if there is alpha generation by taking into account the homogeneity given by the investment policy of each SIEFORE and to check if there is alpha generation, given the potential homogeneity between SIEFORES in each type and in all the system.

In order to process the data we used the historical stock-market prices of the SIEFORES and the historical values of the benchmarks. With this data, we calculated their continuous-time price variation at time  $t$  with the next expression:

$$\Delta\% (P_{it}) = \log (P_{it}) - \log(P_{it-1}) \quad (1)$$

Once that we calculated these return values, we ran the three aforementioned factor models. The first one that explains the relation and

influence of the SIEFORE type benchmark, the second one with the all benchmark and a third one with both benchmarks as stated in the next functional forms:

$$\Delta\% (P_{i,t})= \alpha+\beta \Delta\%(SB1_t + SB2_t + SB3_t + SB4_t)+\varepsilon_{i,t} \quad (2)$$

$$\Delta\% (P_{i,t})= \alpha+\beta \Delta\%(All_t)+\varepsilon_{i,t} \quad (3)$$

$$\Delta\% (P_{i,t})= \alpha+\beta_1\Delta\% (SB4_t)+\beta_2 \Delta\%(All_t)+\varepsilon_{i,t} \quad (4)$$

In the previous expressions  $\Delta\%(SB4_t)$ , is the continuous-time return of the SIEFORE type benchmark,  $\Delta\%(All_t)$  is the continuous-time return of the “all” SIEFOREs benchmark,  $\beta_1$  and  $\beta_2$  their corresponding sensitivities or systemic risk indicators<sup>3</sup> and  $\varepsilon_{i,t}$  is the residual or continuous-time variation attributed to unexplained factors in (2), (3) or (4)<sup>4</sup>.

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<sup>3</sup> This definition is consistent with the multifactor models that are an extension of the classical (mono-factor or hole market factor) CAPM models (please refer to Merton (1987 ) or Bodie and others (2014)).  $\beta_1$  measures the specific type SIEFORE systemic risk for the market of the specific SIEFOREs (such as type 4 SIEFOREs) and  $\beta_2$  measures the performance of all the SIEFOREs of all the types in the market of SIEFOREs. That’s why we say that  $\beta_1$  and  $\beta_2$  are systemic risk factors. The first measures the systemic risk corresponding to the SIEFORE type subset and the second one the all system risk (of all the subsets or types together).

<sup>4</sup> It is important to mention that  $\varepsilon_{i,t}$  is different in equations (2) to (4) despite the fact that they are the term for the residual or the stochastic part of the equation. A simple and light review of these equations denotes that  $\varepsilon_{i,t}$  in (4) has a more “clean” or white noise behavior because the residual is due to external factors and it incorporate the influence of the all SIEFORE system influence and the one of the specific type (or specific SIEFORE type investment policy). In (2) or (3)  $\varepsilon_{i,t}$  is also the residual but it includes either  $\Delta\%(All_t)$  or  $\Delta\%(SB1_t/SB2_t/SB3_t/SB4_t)$  respectively. Therefore the values of  $\varepsilon_{i,t}$  in (2) to (4) are different by the fact that (2) and (3) are specific cases of (4).

## DATA ANALYSIS

In table 3 we present the results of the factor models made with (1) to (3). In panel a) of that table we show the values of  $\alpha$ ,  $\beta_1$  and  $\beta_2$ , along with their respective probabilities. As noted, only two SIEFORES (Invercap and Metlife) had a significant but negative  $\alpha$ . Also Inbursa shows a significant and positive value but, in general its historic performance has been low as figure 1 suggests. As noted in that figure, the performance of Inbursa suggest a behavior of a “fixed income” instrument with very low volatility, given a low beta (only 0.1807) and a possible lack of competitiveness in this specific case, given a low attachment to the investment policy as the R-squared value suggest (0.1551 against a mean value of 0.7172 of all this type of SIEFORES).

Therefore, with the exception of Inbursa that had a different performance than all the studied SIEFORES and also a lower volatility (as the box plot of figure 1 shows), practically all the SIEFORES had a similar performance, suggesting a factual homogeneity in their behavior and a lack of alpha generation. This result shows that there is practically a similar performance in all the SIEFORES even if, in the short term, some present over-performance (please compare the performance of this SIEFORE type benchmark –black dotted line- against the SIEFORES and also against the “all” system benchmark).

This sort of homogeneity can be advised in the  $\beta_1$  values i.e. the  $\beta$  values of each SIEFORE against their competitors. The mean value is 1.4477 with significant values surrounding 1. So, if we find homogeneous values, we attribute this finding to a lack of incentive to enhance performance. So, the SIEFORES in this case are no competitive and the selection by investors is

not made by means of a good performance but due to other external and different factors than the return paid. A potential cause could be the investment policy allowed by CONSAR.

**Table 3. Performance results of the type 4 SIEFOREs in the three factor models.**

SIEFORE type 4 benchmark factor model								
SIEFORE				p(a) %	p(b1) %	p(b2) %	s(e)	Adj. R-Squared
Azteca	(0.0455)	1.1774		32.6707	0.0000		0.0458	0.8528
Banamex	(0.1945)	1.6133		12.0988	0.0000		0.1942	0.7840
Inbursa	0.3999	0.1807		0.0000	0.4601		0.3987	0.1551
Invercap	(0.5337)	2.1308		1.6189	0.0000		0.5324	0.7393
Metlife	(0.2411)	1.6089		1.3242	0.0000		0.2406	0.8266
Principal	(0.1651)	1.4448		<u>5.0843</u>	0.0000		0.1648	0.8427
Profuturo GNP	(0.1772)	1.6657		16.4490	0.0000		0.1771	0.7761
SURA	(0.1981)	1.6663		13.4837	0.0000		0.1979	0.7694
XXI Banorte	(0.1971)	1.5114		1.8672	0.0000		0.1967	0.8440
Mean values	(0.1634)	1.4777		6.4907	0.0575		0.2628	0.7172
"All" SIEFOREs benchmark factor model								
SIEFORE				p(a) %	p(b1) %	p(b2) %	s(e)	Adj. R-Squared
Azteca	0.0806		0.8500	7.1175		0.0000	0.0805	0.9249
Banamex	(0.0659)		1.2403	16.0453		0.0000	0.0659	0.9642
Inbursa	0.3916		0.1777	0.0000		0.0004	0.3904	0.3122
Invercap	(0.3589)		1.6296	0.5899		0.0000	0.3580	0.8998
Metlife	(0.0916)		1.2005	<u>5.0438</u>		0.0000	0.0914	0.9576
Principal	(0.0258)		1.0694	31.8632		0.0000	0.0260	0.9607
Profuturo GNP	(0.0404)		1.2735	32.0690		0.0000	0.0407	0.9441
SURA	(0.0719)		1.2923	16.0212		0.0000	0.0718	0.9630



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XXI Banorte	(0.0544)		1.1238	13.9353		0.0000	0.0544	0.9710
Mean values	(0.0397)		1.1259	14.4460		0.0000	0.1373	0.8716
SIEFORE type 4 benchmark and "All" SIEFORES benchmark factor model								
SIEFORE				p(a) %	p(b1) %	p(b2) %	s(e)	Adj. R-Squared
Azteca	0.0473	0.2191	0.7086	24.3740	8.8252	0.0000	0.0474	0.9286
Banamex	0.0104	(0.5025)	1.5645	38.1223	0.0001	0.0000	0.0110	0.9738
Inbursa	0.4627	(0.4681)	0.4798	0.0000	0.0029	0.0000	0.4614	0.4438
Invercap	(0.2719)	(0.5728)	1.9992	0.6053	3.7722	0.0000	0.2713	0.9065
Metlife	(0.0742)	(0.1144)	1.2743	10.9208	23.6140	0.0000	0.0741	0.9581
Principal	(0.0241)	(0.0108)	1.0763	35.1677	39.6618	0.0000	0.0244	0.9607
Profuturo GNP	0.0271	(0.4439)	1.5600	36.4497	0.2867	0.0000	0.0275	0.9511
SURA	0.0251	(0.6383)	1.7041	30.2339	0.0000	0.0000	0.0253	0.9772
XXI Banorte	(0.0444)	(0.0661)	1.1665	18.9344	33.0275	0.0000	0.0444	0.9712
Mean values	0.0176	(0.2886)	1.2815	21.6453	12.1323	0.0000	0.1096	0.8968

Source: Own elaboration.

Finally, when we reviewed the performance of the type 4 SIEFORES against "all" the SIEFORES in the market independently of their type we noted a notable result that will motivate our conclusions presented next: the mean value of  $\beta_2$  i.e. the influence of a systemic behavior in the individual performance has an average value of 1.2815. This situation suggests us that the performance of the studied type 4 SIEFORES is due to factors different from the riskier investment policy. More specifically is due more to market momentum and performance homogeneity than to manager skills or riskier investment restrictions.

With this observed result and with the study presented here, we found evidence that suggest “homogeneity” in the performance of SIEFOREs type 4 in Mexico. One of the potential counter-arguments to our review is that the alpha generation should be expressed in terms of the observed return or turnover in the SIEFORE ( $r_1$ ) related with the  $\beta$  of that SIEFORE and the observed, turnover or return in the SIEFORE type benchmark or the “all” benchmark by following this expression:

$$\alpha_{\text{expost}} = r_1 - (\beta_1 * [\Delta\% (SB4_t) / \Delta\% (All_t)]) \quad (5)$$

**Table 4. Corollary of b results and ex-post alpha generation**

Type 4 SIEFOREs expost attribution analysis with the SIEFORE type benchmark and "all" benchmark							
SIEFORE	Turnover	Type 4 benchmark turnover	"all" benchmark turnover	$\beta_1$	$\beta_2$	Type 1 benchmark expost a	"all" benchmark expost a
Azteca	126.0571	138.5144	128.3094	1.1774	0.8500	(37.0237)	16.9996
Banamex	153.1748	138.5144	128.3094	1.6133	1.2403	(70.2846)	(5.9619)
Inbursa	101.2904	138.5144	128.3094	0.1807	0.1777	76.2547	78.4840
Invercap	131.7815	138.5144	128.3094	2.1308	1.6296	(163.3661)	(77.3098)
Metlife	136.9233	138.5144	128.3094	1.6089	1.2005	(85.9369)	(17.1123)
Principal	133.2287	138.5144	128.3094	1.4448	1.0694	(66.9015)	(3.9848)
Profuturo GNP	170.4031	138.5144	128.3094	1.6657	1.2735	(60.3213)	6.9977
SURA	162.6161	138.5144	128.3094	1.6663	1.2923	(68.1882)	(3.1933)
XXI Banorte	134.3184	138.5144	128.3094	1.5114	1.1238	(75.0360)	(9.8817)
Mean values	138.8660			1.4444	1.0952	(61.2004)	(1.6625)

Source: Data from our analysis and SIEFOREs' prices from CONSAR (2016).

In order to give answer to this issue, we present the results of the alpha generated by each SIEFORE given (5) in table 4. The last two columns

show, respectively, the alpha generation in each SIEFORE against the turnover of the type benchmark and the “all” benchmark. As expected, the generation of alpha (ex-post alpha) is negative in almost all the SIEFORES for the type 1 group and starts to increase in type 4 SIEFORES i.e. even though the SIEFORES paid a higher nominal turnover, their theoretical expected value given the  $\beta_1$  is higher than the observed one.

## CONCLUSIONS

The competitiveness of public pension funds, especially those who fit in the “Defined benefit” plan classification, is a very important issue that must be taken into account nowadays. The main reason of it is the fact that a higher return paid to investors will lead to a better pension at retirement. A better income for retired people will lead to a sustainable consumption and GDP creation, given the changing population conditions and the increase of the mean dead age in almost all the countries. In order to give more guidelines of the necessary tasks needed to enhance pension plans (specifically in the Mexican case), we have followed the line opened by Calderón and others (2009) who study the informational efficiency in the pension fund selection (the former) and the competitiveness of these to generate value to investors (the latter). We made a performance attribution test in order to detect if there is a connection between the performance and the decision making process that is “noisy and uniformed”.

One of the first places that we suggest as a potential cause is the investment policy by the homogeneity in the performance that we found in all the SIEFORES. We suspect that the investment policy generates homogeneity in the performance not only in the SIEFORES of similar risk-return profiles and target age profiles (i.e. in the same type of SIEFORE) but also between

SIEFORES of different groups (The Mexican public pension funds or SIEFORES are public funds that work as life-cycle mutual funds). Our rationale (to be tested in future research) is that if there is no heterogeneity between SIEFORES of the same type and among SIEFORES of different groups or types, there is no real competition between funds and the investment decision is made by external factors such as the ones suggested by Calderón and others (2009).

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# Chapter TEN

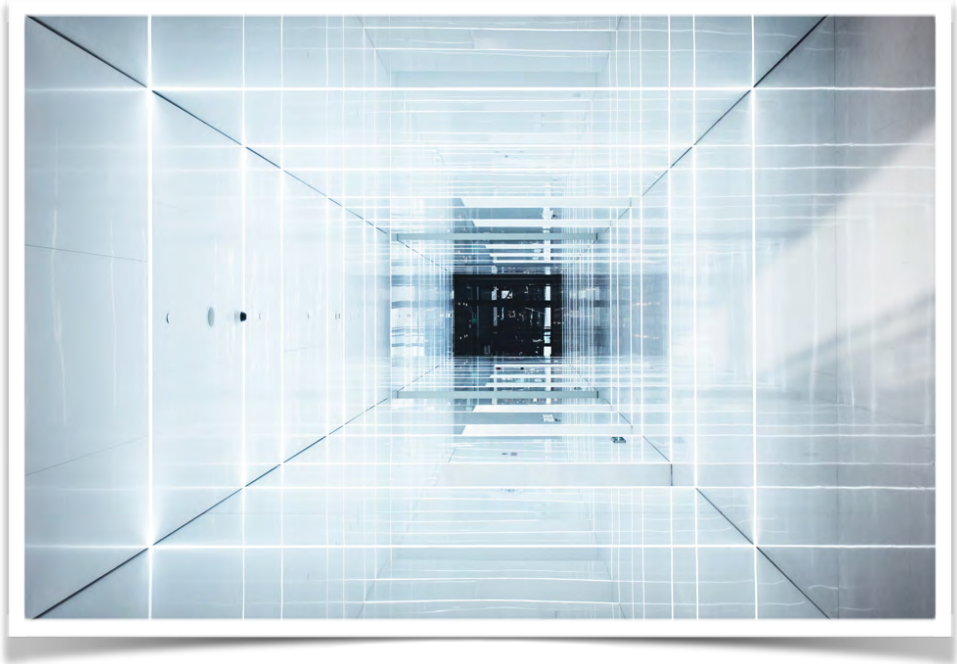


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## **Asymmetric collaboration in Mexican companies in IT: causes and effects**

*Tania Elena González-Alvarado and Renata Kubus*





## **Asymmetric collaboration in Mexican companies in IT: causes and effects**

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### **INTRODUCTION**

Collaboration between companies is essential for local development (Esser *et al.*, 1996; Alburquerque, 2006; Erkuş-Öztürk & Eraydın, 2010). In free market environments, such collaboration needs to be run with agents coming from other countries (González & Rodenes, 2008). It allows the company to operate in several regions with lower risks, costs and resources (González, 2007).

These collaborations may or may not lead to the creation of value (Band, 1994, Fernández, Montes & Vázquez, Vidal, 2000, Prahalad & Ramaswamy, 2004, Zott & Amit, 2009). Asymmetric relationships (Keohane, 1990, Di Filippo, 1998, Tickner, 2011; Pérez, & Cambra-Fierro, 2015) present an obstacle to business cooperation strategies and, almost always, the ties that are formed are characterized by the dependence of the smaller company towards the bigger one. The relationships encouraged among Information Technology (IT) companies worldwide are mainly asymmetric. They are maintained progressively through certifications. They validate the representation and use of certain technology, property of the transnational company for a smaller one.

In this way, the information technology sector is no stranger to the relations under the competition strategy. It is a sector in which the ties tend to be many, but they mostly translate into asymmetric and dependent relationships. One of the reasons, is the need for telecommunications infrastructure which is in the hands of one or two companies (Almeida, 2001, Fisher & Serra, 2004, Razo & Rojas, 2007). During the last century, telecommunications infrastructure was developed by public capital, which when privatized led to the existence of monopolies that persist to these days.

Another reason, is that technological innovation corresponds to more developed countries, and its adoption has barriers for the transfer and assimilation that many time results in another, own innovation (Godínez, 2000, Yarza, 2004, Bandala, 2007, González, 2008, Arceo & Urturi , 2010; Maldonado, 2012). These two facts, infrastructure and barriers to technology transfer, combine to characterize Mexican IT companies based on the existing infrastructure for Telecommunications. Furthermore, it implies scarce development of proprietary technologies; minor development in terms of hardware; high concentration on a smaller size and customized software development; oriented mainly to consulting.

In general, foreign corporations intensive in digitised services (for instance, from banking sector), establishing itself in other countries, enter accompanied by the need of their software adoption and implementation in order to effectively take the control of their subsidiaries (being) established there. In case of the periphery countries, lower costs and the distance from the headquarters makes interesting an establishment of their own software companies there, if prospering foreseen to provide even some IT services to

the mother company and its subsidiaries in other countries. In a particular case of Mexico, relative proximity of the strong economy of the United States or Canada, furthermore implying higher development and lower risk level of Mexico, makes from this country an interesting starting operational point for such IT of multinational companies which are for instance from Europe.

However, the multinational companies are obliged to maintain strict internal cost controls and to provide an extensive overview of the labour conditions of their employees to the shareholders (and customers). Thus, they do not expand so much the number of internal IT departments and employees. They rather establish new IT and consultancy companies and/or enter the allegiances with the existing ones. Because of the IT software and hardware strict audit requirements perspective, they would need to have the partners among the so called Big 5 global consultancy companies, such as Accenture (formerly Andersen Consulting), Deloitte Touche Consulting (Deloitte Consulting), Ernst & Young, KPMG Consulting, PriceWaterhouseCoopers. Big international IT companies (IBM, Oracle, INDRA, for instance) will be other partners to take into account for this reason.

Prestige, lower risk and common history of collaboration in other markets and countries are also relevant dimensions being taken into account. Other IT companies to be considered would rather need to have strong, local knowledge (reporting to national authorities is in general such an area, for instance) or connections, or probably personal relationships, even if most probably not direct ones. In sum, it leads to the establishment of rather an opaque framework of flow of exchanging the benefits and losses, and

favours among the companies and their high executives and widening, deepening and in general enlarging the sub-contraction chain of projects and workers. Only at further stages, more genuinely local providers would be probably able to enter the allegiances. Open source software companies can be an interesting case to study, probably showing other dynamics in place.

## **CUSTOMIZED SOFTWARE INFRASTRUCTURE IN TELECOMMUNICATIONS**

The development and incorporation of new technologies in the economy is essential in the process of value creation (Yoguel, 2000; Capó *et al.*, 2007), it translates into a major evolution of production and organization models and other activities of the companies. (Sieber & Valor, 2008). However, for its incorporation into the economy, innovative technologies require telecommunications infrastructure. The combination of both, infrastructure and technology, gives way to the development of customized software.

The software industry is knowledge-intensive (Novick, 2002, Erbes *et al.*, 2006) and can generate skilled and better-paid jobs, as well as innovative environments. In addition, this business requires less initial investment than others (Hualde & Gomis, 2007). It also implies high value-added activities related to the software industry such as consulting, maintenance, support and integration that, in general, are aimed at satisfying a specific need of the client.

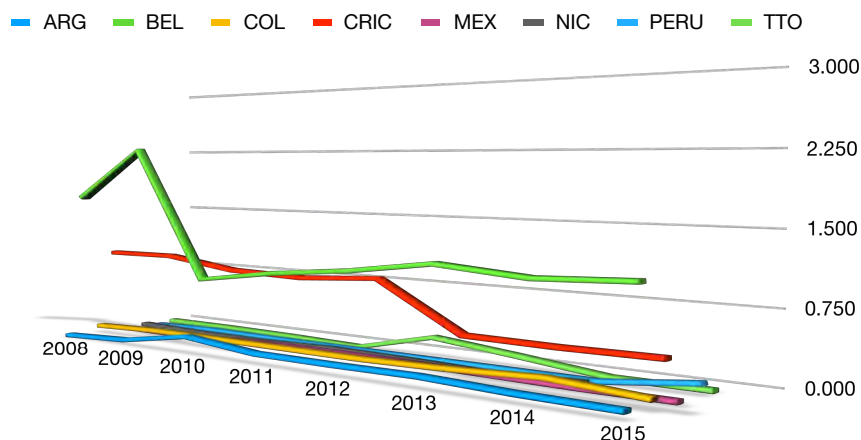
The technical and productive characteristics of the different activities that the software industry comprises give rise to different relationships between companies and, therefore, to a different geography of their disposal.

Customized software is developed through close and constant interaction with the client (Hualde & Gomis, 2007). It is characterized by the provision of intangible services, making intensive use of knowledge and innovation, that are main sources of generation of competitive advantages. It has a high potential to generate added value and create new jobs, it also implies training that is much higher than for the average economy. In addition, there is an evidence of an increasing penetration in various economic activities and a clear predominance of micro, small and medium enterprises (Estayno *et al.*, 2009).

## **ECONOMIC ENVIRONMENT FOR INFORMATION TECHNOLOGY IN LATIN AMERICA**

Infrastructure has a high impact on poverty reduction and sustained economic development (González, 1993; Moser, 1998; Roller & Waverman, 2001; Ali & Pernia, 2003). According to Perrotti and Sánchez (2011) in Latin America and the Caribbean, recent years have shown a decrease in investments earmarked for this purpose, which caused a distancing between the infrastructure requirements and the effective provision of it. According to Perrotti and Sánchez (2011), it is necessary to invest annually around 5.2% of the regional GDP to respond to the needs of companies and final consumers in the region, only in the period 2006-2020. This volume investment has not been achieved in Latin America. Graphs 1 and 2 show the low and inconstant investment in telecommunications infrastructure in Latin America. Careful consideration of the data is required as the time span is corresponding to the last collapse related to international crisis. There is an inconsistency happening both in public and private investment. The countries with the greatest impact of investment in this area are the smallest of the region.

**Graph 1. Private investment in telecommunications as a percentage of GDP (2008-2014)**



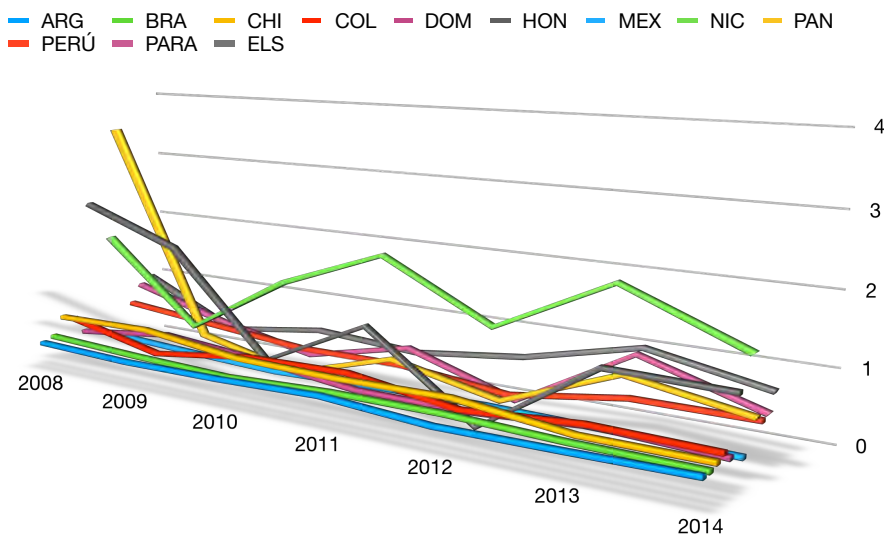
Source: Own elaboration based on BID (2017) data.

Mexico is positioned in the last places in this statistical comparison (Graphs 1 & 2). This is unfortunate because it impedes the development of the region. The maximum investment has been concentrated in the big cities and in the main commercial routes, both of them are attractive for foreign investment that is shaping up as a maquiladora (assembly line services and industry).

This favors economic growth in the short term in certain regions of the country but accentuates the inequalities between regions and hinders the growth of rural areas. There are locations areas of companies with international activities that have no proper communication infrastructure and, therefore, do not have Internet access. This condition in turn requires

establishing offices in the urban area, increasing operating costs and further complicating the company operations.

**Graph 2. Public investment in Telecommunications as a GDP percentage (2008-2014)**



Source: Own elaboration based on BID (2017) data.

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A greater availability and quality of infrastructure services facilitates a higher productivity and lower production costs for producers (Rozas, 2010). The higher profitability encourages investment and, therefore, increases the product growth potential. The main reason for the insufficient development of the basic infrastructure of Latin America in the last two decades lies in the difficulties that countries have had to maintain an adequate rhythm of investment in the different activities of the sector (Rozas, 2010).

Both public and private investment retain an important role in the construction of environments that facilitate the use of IT and its adequate assimilation by local agents. The existence of competitive companies that operate in the IT sector depend heavily on the existence of telecommunication infrastructure.

Investment in infrastructure leads to an increase in the number of companies operating in the sector; such is the Spanish case. It needs to be taken into careful consideration as Spanish economy and its actors have a prevailing old-school inclination towards the hard infrastructure (see for instance, real estate and associated bubble undermining the general economy, regional airports or motorways explosion with the waste of



public money due to their closing or need for compensation for the private losses).

The telecommunications infrastructure is one of the best in Europe, however the operations run on them are not at the level that hopefully will increase in the future. The Spanish IT sector is characterized by the sustained growth in the number of companies, which went from 25,838 in 1999 to 55,707 in 2008. Small companies, however, are proliferating, and in many cases, micro-companies with sole ownership. Thus, 56% of the total companies in the sector correspond to self-employed professionals without contracted employees (which represents an increase of 5 percentage points with respect to 2001), and 24% corresponds to companies with one or two employees, especially in the IT services segment, where 58% of the companies are formed by independent professionals. It is followed by the telecommunications services segment, with 50%, and third, manufacturing, with 34%. (Sieber & Valor, 2008)

Likewise, the IT services segment brings together 88% of the total number of companies in the IT sector, which are mainly focused on consultancy, supply, IT assessment for applications and computer programs, as well as rental, maintenance and repair of machinery and equipment. (Sieber & Valor, 2008).

Another example is Egypt. During more than three decades, Egypt has implemented IT policy plans and established the relevant institutions and regional technology centers in order to boost the international competitiveness of the sector and the inflows of IT related foreign investments. In 2011 and 2012, the number of Egyptian IT companies

increased at an annual rate of approximately 15%, so that in 2012 the country had more than 5,000 companies of this type. (WIPO, 2014)

In the period 2011-2012, the income of the IT industry reached 65,000 million Egyptian pounds. In 2012, exports reached a total of 1,442 million Egyptian pounds. In the period 2012-2013, the ICT sector contributed 3.3 percentage points to Egyptian GDP. In 2012, the IT sector employed 283,000 workers through direct contracting. For IT companies in other countries, Egypt has been an attractive destination for investment for more than a decade. Companies such as Apple, Cisco, HP, Intel, Microsoft, Oracle, Teradata, Valeo, Vodafone or Yahoo!, among others, have subsidiaries in the country (WIPO, 2014).

Most Egyptian companies are engaged in data transmission and hosting activities in the field of IT services and related administrative support services, or what is also referred to as outsourcing of business services, or software manufacturing. Either these are Egyptian companies that provide their services mainly to foreign multinationals from high income countries or else such multinationals have established subsidiaries in Egypt, and those are the ones that execute the activities directly (WIPO, 2014).

On the basis of available data, it is not easy to adequately analyze the extent and nature of innovation in the IT sector in Egypt, whether these are local ICT companies or subsidiaries of multinational companies (WIPO, 2014). When analyzing the available IT specific data; or the main data compiled during the study mission, it appears that only a small number of Egyptian IT companies were engaged in R & D and innovation activities. Thus, for instance, among the 400 software companies, the focus is on the

production of a customized software, intended for another end user, as input to services aimed at completion of a tangible or intangible product (WIPO, 2014). The activity focuses on traditional processes, testing and configuration and other basic activities, rather than on more advanced innovation.

When deciding on matters and investment, multinational companies did not usually take into account Egypt's R & D capabilities or considered them irrelevant. Most of the affiliates of the multinationals in the ICT sector in Egypt are engaged in marketing and sales and the possible manufacturing or adaptation of existing products to local markets or other Arabic-speaking countries. For these companies, the main investment factor in Egypt is a highly qualified and specialized workforce (WIPO, 2014). The point is here that this is a stage in the innovation ecosystem establishment. With time probably this activity will have the possibility of evolving into a more advanced one.

Mexico is the sixth best destination in the world for the location of global services, which include outsourcing of Information Technology (IT) and business process outsourcing (BPO) services, as well as work in voice (such as contact and call centers). On the other hand, Mexico ranked second in Latin America as an investment destination, attracting 23% of the total investment in the software sector projects. Furthermore, it is considered also the best destination in the Americas for the establishment of IT companies (ProMéxico, 2017).

Mexico has become the third largest exporter of IT services worldwide. Exports of IT services and BPOs showed a 12.25% growth, increasing its

value to 5.560 million dollars with respect to the previous year, 2011. (ProMéxico, 2017).

The IT industry in Mexico is composed by small and medium-sized companies oriented mainly to the production of services. A significant proportion of software production in the country is self- or in-house consumption, so that large companies in other sectors develop or adapt internally the software programs they use and the IT services they require. (ProMéxico, 2017).

The largest or so-called corporate companies are focused on implementation services and, in particular, the development of customized software and the implementation and support of solutions; a very high proportion of these services are offered through outsourcing of personnel where the company is not responsible for the project, which reflects lower added value and vulnerability (Select, 2012).

It seems that when the size of the Mexican company decreases, its portfolio of goods and services is becoming more diversified; that is, smaller companies sell equipment, software and services in a more heterogeneous mix, reflecting less focus and specialization. The same happens when analyzing ICT services divided into consulting, implementation, support and outsourcing. This diversification is also associated with lower proportions of turnover per employee, so it can be affirmed that the most specialized companies are those with the highest performance (Select, 2012).

Both, small and medium companies are those that have a higher percentage of linkage with multinational companies. In general, all sizes of companies mainly serve as distribution channels (23%), solution integrators (30%) and / or service providers (47%) of multinational companies that do not necessarily have headquarters in Mexico (Select, 2012). Of the 23% of the companies that serve as distribution channels, 35% reported that in addition to distributing solutions, they are in the process of obtaining the necessary certifications that accredit them as service providers (Select, 2012).

On the other hand, of 42% of the companies that do not have a business relationship with a multinational company, 47% reported that they are already in the process of having it. The software development and IT services sectors, as well as the research centers, have high percentages of association with global companies and institutions. It is noteworthy that the creative media segment is mainly focused on the realization of local projects. This finding reflects the need for programs focused on the internationalization of this sector in Mexico. Lastly, remote business services and contact centers are the segments with the lowest linkage percentages due to the weight of local content derived from the type of activities they perform (Select, 2012). Under this scenario, we proceeded to analyze the results achieved by a group of small and medium-sized Mexican companies.

## **METHODOLOGY**

The database on companies operating in business cooperation networks within the framework of Al-Invest corresponding to the information technology sector, was integrated by companies that participated in the

program through Nacional Financiera (NAFIN) . The Eurocentro Nafin organized 16 business meetings in the period 2002-2009 (2,724 participating companies). Two of these events were for Information Technology. About the companies studied, those that had disappeared were identified and a comparison was made between those that are still operating and those that closed. In a period of ten years the information is available for the companies that once operated in the sector and are not there any longer (2008-2017).

The companies initially had the requirements included in different directories, these were: website and links with companies from other regions. The Nafin Eurocenter was asked for the data about the events starting in 2002 because it was allowing a greater distance between the current situation of the companies and the meetings. In this way, we were able to analyze in retrospection the behavior of the links between companies and other local agents. Since the strategies within the business collaboration link were the aim of the study, the employer or strategist was required to facilitate interviews, workshops and field visits. This greatly reduced the study group and subordinated its size in terms of the phenomenon studied. In this way a study group consisted of only 35 Mexican companies.

Flyvbjerg (2006) points out that when the objective is to achieve as much information as possible about a given problem or phenomenon, a representative case or a random sample may not be the most appropriate strategy. This is because the typical case or the average case usually does not provide the best or the most appropriate information. Atypical or extreme cases usually reveal more information because they activate more

actors and more basic mechanisms in the situation being studied. In addition, from a perspective oriented to the understanding but also to the action, it is usually more important to clarify the deep causes of a certain problem and its consequences than to describe the symptoms of the problem and the frequency with which they occur.

Random samples that accentuate representativeness will rarely produce this type of knowledge and it is more appropriate to select only some cases due to their validity. (Flyvbjerg, 2006: 45) That is why within this project the case study is deepened, even if this leads to obtain results more slowly and with a greater cost.

A questionnaire was applied to entrepreneurs in the sector, field visits were made, and a workshop was held with eight businessmen. The evidence recovered through these three tools has been complemented with the search for information about companies through electronic means. This allows to triangulate the results and complement the obtained information.

A database was created, containing both qualitative and quantitative information for each company. That allowed the recording and analysis of the results. In relation to qualitative information, the binary system has been fundamental to measure the frequency of events among the companies studied, identifying tendencies, contradictions and unusual situations that may contribute to the theory of international cooperation links, local development and strategies for international competitiveness in the Information Technology sector.

The analysis of the data is enriched with the statistical and economic data obtained by international organizations (IDB, ECLAC, among others) and national organizations (INEGI, WIPO, SE, among others). Because the phenomenon studied is the international business cooperation network and its local impact, the development of the analysis and interpretation were run at three levels: global, national and local.

## RESULTS

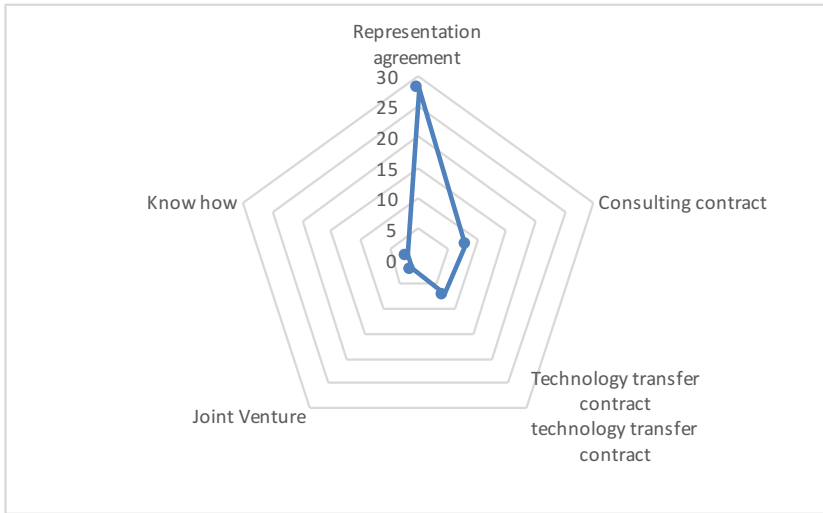
The studied companies are mainly concentrated in large cities (Mexico City, Guadalajara and Monterrey). Because they depend on the telecommunications infrastructure, none of the group of companies studied is located in the rural areas.

As indicated in Graph 3, the inward trend of ties with foreign companies is the establishment of representation agreements. Second, and with fewer companies interested, are consulting and technology transfer contracts. This is contrary to what would be expected in the sector. As a sector understood to be oriented on the development of technologies, in principle, agreements should be characterized by technology transfer and joint investment projects. In relation to the establishment of ties and their maintenance over time, entrepreneurs show a highly rational attitude in terms of profitability and liquidity. The same, in principle, cannot be applied for the risk derived from the links, only 57.14 percent considers it. In fact, 94.28 percent of companies are in a constant process of search of new international partners despite the fact that 74.28% have faced failures within the ties. This is due to the fact that especially in the IT sector, the strength of the company is considered also in terms of the agreements portfolio (with a particular accent on the international ones). When larger



and more diverse, the negotiation power and future outlook of the company in particular are reinforced.

**Graphic 3. Collaboration agreements type**



Source: own elaboration based on the results from the projects PAPIIT IN308008 UNAM and "Generation of value and international cooperation in the small companies in Latin America" UDG-CA-484.

The history of the collaborations is also relevant for acquiring new contracts, some of them can even be not profitable in the economic terms but are considered due to the terms of prestige. Being in the game is an important asset for company image also. As for the results and quality of the cooperation itself it is always prone to mixed experience.

According to generally accessible estimates two thirds to 90% of the IT contracts are not delivered in time and within the budget and when this is the case it is because they were initially overestimated as recognized by the companies' managers. This is due to the limited knowledge of the reality, not sufficient time taken for the assessment and also the fierce competition in the field meaning that high executives know that probably the evaluation provided would need severe amendments.

In principle, the extreme cases of projects proposals are not contemplated directly (the most expensive or the cheaper, for instance) as not being 'rational'. It can be considered a kind of silent pact between both sides. In this way software or service provided in the estimated timeframe is somehow corresponding to the initial requirements but not really working for the reality. As this is the general dynamic this is rather hard to recognize who was bad or worse.

Especially that it is mixed with the human factor, simply accompanying the customer with different problems arising during the project implementation can be considered more valuable than the real success of some project, anyway very difficult to reach with the unrealistic expectations being the general dynamic (as much as 75% of IT managers believe that their projects are doomed from start).

Probably this is the unwanted outcome of the 2000 IT bubble when some even small IT amendments were charged very high, after that the general expectation was that IT sector specialists are always 'overshooting' with the difficulty. From higher level everything is tending to be simplified, and smaller projects can be more easily sold in and outside the company for

running them. Once in the project, it is difficult to leave it and restart it with other partners, the same is the case for the innovation companies. This shows the high rationality of the strategists when establishing the ties (Table 1).

**Table 1. Perception of the informant about international ties**

Maintains relations considered as an international cooperation	80%
Has failed to establish links with agents from abroad	74.28%
Considers profitability in establishing relations with agents from abroad	94.28%
Considers liquidity when engaging with agents from abroad	74.28%
Calculates the risk derived from the links with agents from abroad	57.14%
Remains in search of new international collaborators	94.28%

Source: own elaboration based on the results from the projects PAPIIT IN308008 UNAM and "Generation of value and international cooperation in the small companies in Latin America" UDG-CA-484.

Following the explanation, 80 percent of the companies studied maintain ties with foreign companies. This is a fundamental characteristic if one takes into account the need for certifications to participate in the market and the interest in representations. In other words, the Information Technologies sector is characterized by international ties, the exception being the existence of unrelated companies. These unrelated companies pursue the establishment of such links (Table 1).

The group of companies that closed shows similar results to the group of companies that remain active (table 2). Although, there is greater interest in calculating profitability, liquidity and risk in the companies that are active. 85% of the companies that closed maintained international ties, and even, they had fewer failures than the active ones. This shows that in business

collaboration for one hundred percent open and high-speed industries, international collaboration is basic and in principle does not add more to the competitiveness of the company, even for the case of economies in the periphery. Everything depends on the particular partners, agreements, ways of approaching the projects executions and perhaps simply the good luck in its implementation and the environment of the time. However, in case of the periphery, this collaboration is probably more dependent, asymmetric and competition mechanisms are more forced.

**Table 2. Comparison between active and non-active companies**

	Companies that closed (percentage over 13)	Active companies (percentage over 22)
International cooperation ties	85%	77.27%
Failed to establish links with agents abroad	69.23%	77.27%
Consider profitability in establishing links with agents from abroad	92.30%	95.45%
Consider liquidity when engaging with agents from abroad	69.23%	77.27%
Calculate the risk derived from the links with agents from abroad	53.84%	59.09%
It remains in search of new international collaborators	92.30%	95.45%

Source: own elaboration based on the results from the projects PAPIIT IN308008 UNAM and "Generation of value and international cooperation in the small companies in Latin America". UDG-CA-484

## CONCLUSIONS

There is rather scarce commercial policy and development in the telecommunications sector in Mexico. Although this sector is an important step towards innovation and furthermore supposes an increase in the

population welfare. Such is the case in countries like Korea, an example of the positive impact of telecommunications on development.

The data shows that in Latin America the symptoms are general. The smaller countries have a higher proportion of investment compared to GDP. In the case of the larger countries, such as Mexico, the proportion is smaller. This can be retracted to the scale effects. Being a maquiladora (assembly line industry and services) country, in principle this does not negatively affect economic growth; but it does not positively affect economic growth accompanied by local development.

The main symptom is the drastic change from year to year in the amount of investment dedicated to this question. It is clear that investment in the telecommunications sector depends more on the individual decision of the investors in the unfolding world scenario, leading to investment and disinvestment, rather than a national policy that attracts capital to this area.

This can be traced back to the disposition of exploitation of the market potential by the international companies, which in principle does not require an active country policy, probably involving the national and local governing part wanting to participate in the benefits, which in turn rather retracts the investors appetites due to the higher risks of involvement in doubtful and prone to the prestige affecting operations, furthermore not easily gaining support at the higher company levels.

The problem with the infrastructure is that it can hardly be 'rolled-back', once done it will stay in the country benefitting or not the investor. So that, the investment in this case will highly depend on the economic cycles,

expanding when the environment is favorable and retracting in more challenging times. Anyway, the international companies need to be in the picture, for the international prestige and for demonstrating the business savviness of the managers, i.e. not losing the potential business opportunities that can arise in unforeseeable future. This makes it difficult to distinguish the real dynamic behind the infrastructure investments.

What happens with the Mexican companies that operate in the sector? They identify more with software development than with hardware. It is considered that the most important innovation should be in the hardware, or hardware plus software ... otherwise, there is a risk of having only companies that create small systems without importance and which rather foster the technological dependence on the countries advanced in this area.

The question here is also that this software is volatile, can be rather easily copied and replaced by a cheaper one in the future. In other words, in Mexico we are facing the companies that hopefully only at this preliminary stage adapt the technology already created to the activities of local agents who demand their services, encouraging the consumption of technology rather than innovation.

It is not surprising that these companies are passive in the search of foreign partners. Neither, that most of them have foreign suppliers and probably no customers from other regions. Nor it is surprising that companies that are competitive at the national level, are those with foreign capital. But the IT companies from Mexico or with Mexican participation are starting to be involved in the game, which opens the doors for learning and taking a more proactive stance in the global world of IT sector in the future. As

already explained, probably Mexico is the best bet for IT development among the Latin American countries anyway. Hopefully further research can deepen the analysis proposed.

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Every part of this book was based on empirical and real evidence from enterprises, universities, governments and institutions. All of these studied organizations are part of the competitive environment that involves the market. The writers believe in economic progress across of the innovation, the entrepreneurship and the international cooperation between regions, countries and corporations.



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