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In Number 19 th presented in the article *Quality of Work Life as an Indicator of Business Profitability* by ARGÜELLES-MA, Luis Alfredo, QUIJANO-GARCÍA, Roman Alberto, MEDINA-BLUM, Fernando, CRUZ-MORA, Carlos Enrique, with adcription in the *Universidad Autónoma de Campeche*, in the next Section the article *Knowledge management in the organizational culture of tourism msmes* by QUIJANO-GARCÍA, Román Alberto, ARQUELLES-MA, Luis Alfredo and MEDINA-BLUM, Fernando, with adscription in the *Universidad Autónoma de Campeche*, in the next Section the article *Natural Heritage and Tourism in a Higher Education Institution in South Mexico* by NIÑO, Naú, in the next Section the article *Public tourism policy to increase the international tourism* by MOLINA, Rubén, OCHOA, Melissa and LEDESMA, Beatriz, with adscription in the Universidad Michoacana de San Nicolás de Hidalgo, in the next Section the article *Current Situation of the Demographic Bonus in the Plurinational State of Bolivia* by CANDIA-CALDERÓN, Alethea Gabriela with adscription in the Universidad San Francisco Xavier de Chuquisaca, in the next Section an article *The Impact of Time-Varying Systemic Risk on Predicting the Dynamics of Stock Return Volatility in Tehran Stock Exchange* by MAGHSOUD, Hosein, RAHNAMAY-ROODPOSHTI, Fraydoon, VAKILIFARD, Hamidreza and TORABI, Taghi with adscription in the Islamic Azad University, in the next Section an article *Thirlwall's Law: the export sector and economic growth in Mexico, 1993-2016* by CONTRERAS-ÁLVAREZ, Isaí with adscription in the Universidad Politécnica Metropolitana de Hidalgo, in the next Section an article, *Total sales of lightweight automobiles in Mexico, 1988-2016,* by FIGUEROA-HERNÁNDEZ, Esther, ESPINOSA-TORRES, Luis Enrique and GODÍNEZ-MONTOYA, Lucila, with adscription in the Universidad Autónoma del Estado de México.

Content

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Quality of work life as an indicator of business profitability

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Abstract

The tourism sector is one of the strategic axes of greater promotion in the Mexican public policies, the actions are oriented to the work environment for a better impact in the business finances. The businesses that want to survive, to be successful and to consolidate their positioning in the market, must innovate; The participants of the economic life: society and investors, pressure to generate balanced and productive work environments that recognize the capacities of the workers and establish the platforms suitable for their development. The descriptive and correlational research that is presented is framed in the quality of work life, carried out in the first quarter of 2017 with 33 companies of the tourism sector in which 264 workers were located, to know the perception of the employees On the conditions established at its productive centre and if they are appropriate to impact the financial results of the organizations, the results determined are satisfactory when obtaining through the coefficient of multiple correlation (R) 0.815 and the coefficient of determination (R2) 0.664 A predictive mathematical model that associates the working conditions with the usefulness of the negotiation, useful tool for the decision making in the executive management.

Quality of working life, workers, financial results, company

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Introduction

The human being has characteristics that make it different from each other, being considered eminently social finds the way to satisfy their needs seeking to be part of a group, to belong to it is transformed and developed creating new modalities of organization, enabling them to be generated in the organizations norms, rules, and platforms of control and displacement as a worker in order to gradually improve their quality of working life, which the businessman envisions as a difficult point to meet when encountering a number of different workers but with common objectives which will have to be addressed to maximize their business productivity.

The quality of work life, although not a new term, has presented difficulties in finding a precise definition because it is clothed with particular characteristics by the subjectivity and multidimensionality derived from the culture of the people and the environment in which it develops, in which will have to be carefully visualized at the moment of evaluating in an objective and non-subjective way the different focuses of attention of human needs.

The productive plant is the impeller of organizational development, and in addition to this, management must consider in its business vision the innovation, development and participation of this group of collaborators, generating the human resources policies that impact them within which they must consider: compensations, benefits, scale system, work-family balance, schedules, care of the social and family environment.

Happiness and well-being have been considered as antecedents of the definition of quality of life, and have been used as alternatives in field research according to the time and space in which they have been developed, values, beliefs, region and history influence the perception of the human being to establish their position regarding physical, psychic, social and spiritual well-being as the fields of communication and consumption advance.

The well-being and satisfaction of workers conditions the effectiveness of the administration of an organization, as well as generates the necessary platforms to enhance the human resource; in its evolutionary process the quality of life was associated with the basic human needs and later it was related to health and, more recently, to work efficiency. Herrera and Cassal (2004) point out that the Quality of Life in the Work acts on important aspects for the psychological and socio-professional development of the individual and induces the motivation in the work, the creativity and the will to innovate and the capacity of adaptation and acceptance of changes in organizations. These same authors explain that poor quality of work life can lead to dissatisfaction and misconduct (performance errors, absenteeism and others) and, on the contrary, a high quality of life at work leads to a climate of trust and mutual respect.

Insured and Agulló (2002) affirm the importance of the humanization of work, in which work tables should be designed where space, instruments and tasks are congruent with the physiological, anatomical, psychological and workers' capacities, as well as channeling them towards professional and personal development.

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The first approaches to quality of life for their precise definition were satisfaction and well-being strategically focused on health (Sison, 1994), leading to a later change to relate it to the perception with life, culture and business results in the political context, economic and social organizations (Espinosa and Morris, 2002).

In the strategic management of organizations, there is a constant question: does the lack of knowledge about the quality of life of workers generate problems that affect business productivity and the optimal performance of the employee ?, this results in a real problematic reason for the translated research a: that the companies that know the variables that impact on the quality of life of their workers will be able to improve their financial profitability ?, that is relieved in this work using the valid and reliable CVT-GOHISALO instrument (González, Hidalgo, Salazar and Preciado, 2010) divided into 7 dimensions of study, focusing particularly on 4 that support the satisfaction of the worker in the production plant and that correspond to the dimensions of: 1. Integration to the job, 2. Welfare achieved through work, 3. Personal development of the worker, and 4. Administration of free time. All the above is supported by a solid theoretical framework, which is subsequently developed methodologically, results are determined and concluded.

Theoretical framework

Argüelles et al (2013) compiles definitions of the quality of work life that support the approach of the research work that is presented for two theoretical-methodological perspectives, under the work environment and its psychological orientation:

1) "A process to humanize the workplace" (Walton, 1973).

2) "Favorable working conditions and environments that protect and promote employee satisfaction through rewards, job security and personal development opportunities" (Lau, 2000).

3) "High quality of life, when: a) experiences positive feelings towards their work and future prospects, b) is motivated to stay in their job and doing well, and c) when they feel that their working life fits well with his private life, in such a way that he is able to perceive that there is a balance between the two according to his personal values "(Katzell et al., 1975).

4) "It is the process through which an organization responds to the needs of its employees, developing the mechanisms that allow them to participate fully in the decision making of their work lives" (Robbins, 1984).

5) "Degree of personal and professional satisfaction existing in the performance of the job and in the work environment, given by a certain type of management and management, working conditions, compensation, attraction and interest for the activities performed and level of individual and team self-development and self-development "(Fernández, 1999).

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6) "Set of Change Strategies in order to optimize organizations, management methods and / or jobs, by improving the skills and abilities of workers, encouraging more stimulating and satisfactory work and transferring power, responsibility and autonomy at lower levels "(De la Poza, 1998).

The mutual benefits that are produced in the company-worker binomial are demonstrated, when the bosses relations are good the benefits are reflected in the operative and directive part of the company reducing costs in the operability of the company in all its levels; Hallowell, Schlesinger and Sornistsky (1996) mention that the worker can increase his contributions towards the organization and obtain success in his professional development when the Quality of Work Life is good. In the same way, the organization reduces its control mechanisms and this generates a work climate of trust and mutual respect. And in this context, when the Quality of Life in the Work is good increases the worker's performance, as the worker becomes a motivated person, who has less degree of absenteeism, reduces his leisure time and, consequently, there is a greater satisfaction and greater organizational effectiveness.

Work activity usually happens in formal organizations that have a defined structure, established work procedures, hierarchical levels, schedules, roles, staff activities, philosophies and conditions to achieve the goals of the company in the most effective and efficient way. However, the labor reality shows different scenarios for each worker.

In this sense Peiró (1993) points out that the labor reality is very diversified, in some jobs there is the possibility of professional and personal development, there are also jobs where this possibility is little or nonexistent, so the worker does not feel guaranteed the satisfaction of security needs, self-esteem or fulfillment. In this scenario, the perception of a higher or lower quality of life in relation to the work environment depends on the work experience of each person.

According to Chiavenato (2004), the quality of work life assimilates two opposing positions: on the one hand, the employees' claim for well-being and job satisfaction and, on the other, the interest of organizations for their effects on the productivity and quality of life, that is, organizations must undoubtedly care about the human resource that propitiates the satisfaction of their objectives and that while better resources are provided to the employee, better performance will be achieved at the corporate level. With this dynamic concept, the full human development when referring to Quality of Work Life is to approach a multidimensional concept that frames all aspects of work, aimed at achieving full satisfaction in the work achieving the mutual benefits previously mentioned; and above all find the point of attachment of the worker to the company.

It is necessary to recognize that human resources are indispensable for productive organizations, since it requires the participation of people and a constant relationship with companies; the factors that affect productivity are motivation, job satisfaction, and the working environment among others (Cequea and Nuñez, 2011).

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The concept of quality of working life is difficult to define and operationalize due to the complexity and richness of dimensions that go beyond the organizational and labor limits. González, Hidalgo and Salazar (2007) and Gonzalez, Hidalgo, Salazar and Preciado (2010) propose that the Quality of Work Life is a multidimensional concept that is integrated when the worker, through his work and under his perception, meets the following needs personal: institutional support, security and integration to the job and satisfaction, identifying the well-being achieved through work and personal development achieved, as well as the administration of their free time. Therefore, these authors propose the objective and subjective assessment of seven dimensions of the Quality of Work Life: institutional support for work, job security, job integration, job satisfaction, well-being achieved through work, personal development of the worker and administration of free time.

Likewise, the concept influenced by the neo-positivism that chooses as categories the categories and includes as object of study all that can be described in the structure of the organizations, besides that recognizes the necessity of being based on the functionalism that proposes a theory of the motivation for to know the Quality of Work Life and that contains the satisfaction of workers is the one pointed out by González et al. (2010), which concludes: "It is a multidimensional concept that is integrated when the worker, through employment and under his own perception, meets the following personal needs: institutional support, security and integration to the job and satisfaction for the same, identifying the well-being achieved through his work activity and the personal development achieved, as well as the administration of his free time ".

When referring to business profitability, it will be necessary to address the concepts focused on value created by economic entities whose impact can be felt in two ways: 1. The creation of the "Future Benefit" consisting of the ability to generate a value in time for 2. The "Accounting Utility" created by the production chain to which it is aspired in optimal conditions of distribution and sales. As a result of this, it is pointed out that the financial result is the contribution to the company factor to participate in the processes of creation of social value (Sastré, 2006), the employees being the strategic elements necessary to obtain profit forecasts (Zohurul and Siengthai, 2009).

The profitability is expressed as the quotient derived from the comparison of the utility of the company with the totality of properties totaled as "Asset", interpreted as the intensity of production of the utility with the permanent and non-permanent resources of the organization (Sánchez, 2002).

Methodology

This descriptive and correlational research begins with an exploration of the concepts related to profitability and the quality of work life, determining the fine points and intertwining to select the theoretical current that supports the development of the process. In Campeche, Campeche state, according to figures provided by the Chamber responsible for the tourism sector, it is composed of 135 establishments among hotels, restaurants and support services, to locate those companies of the aforementioned branch with an average number of workers of 10 throwing to 33 companies as a result, based on the Mexican Business System (SIEM), were located 264 employees who were applied the instrument in the first quarter of 2017, becoming a census type sample (Cárdenas, 1996) in which the entire population participates without having to determine the sample.

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To obtain corporate profitability, dependent variable, the proposal of Sánchez (2002) is applied; for the analysis of the independent variables we use the valid and reliable instrument that measures the quality of working life elaborated by González et al. (2010) constructed with 74 items in 7 dimensions: 1. Institutional support for work, 2. Work safety, 3. Integration to the job, 4. Work satisfaction, 5. Work well-being, 6 Personal development, and 7. Leisure management. For the research in question the dimensions used are: 1. Integration to the job, 2. Work well-being, 3. Personal development and 4. Leisure management. The items are evaluated through a Lickert scale ranging from 0 (the worst perception) to 4 (the best perception), it is recommended to use the limits of the low, medium and high satisfaction scores for each dimension for interpretation. The aforementioned instrument was piloted prior to its application having obtained a cronbach alpha of 0.86 considered reliable, subsequent to the application this statistic was determined again and the result was 0.88, being totally acceptable and within the confidence range for its use (Hernández et al., 2006).

In order to obtain the score value, the average value of the respondents' perceived responses was obtained for each of the dimensions of the 4 independent variables, followed by the dependent variable using the Pearson multiple correlation coefficient through the SPSS (version 23), thus identifying whether there is a close association between independent and dependent variables, or some dissociation.

For a better understanding the variables are described operationally. See Table 1

Dependent / independent variables	**Concept**
Financial profit	They are the profits to be distributed among the shareholders of the organizations, obtained from the net profit according to the assets.
Integration to the job	Degree of insertion of the worker in his work activity, study aspects of pertinence, motivation and work environment.
Welfare Achieved Through Work	Position of satisfaction for the basic necessities, which includes the obtained through the development of the work. It evaluates the aspects of: organizational identity, equality of positions in the business structure, housing and health aspects.
Personal Development of the Worker	Personal added value obtained by the work activity; we study the achievements, security and personal improvement.
Leisure Time Administration	It is the perception of the enjoyment of the free time of the worker, when it is not in its work function, referred to: free time, as well as the balance between the life in society and the productive exercise.

Table 1 Operationalisation of dependent and independent variables. For a better interpretation of the results to be achieved, Table 1 defines the 5 variables that are studied and which together comprise the profitability and the instrument that measures the quality of work life; and each of them in particular, is evaluated through subdimensions that are contained in the concept, and are structured in a questionnaire
Source: self made

The work begins analyzing the approximation of the concepts of the dimensions: Integration to the work position, Welfare by the work, Personal development and Administration of the free time, Business results and the degree of association between them, the methodological design is non-experimental, descriptive, correlational and transectional (Hernández et al., 2006), since the object of study is to describe the degree of satisfaction of workers with their employment as part of the quality of working life and its relation with the profitability of organizations.

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In the first 3 months of 2017, work is done in a census form with 264 employees of 33 companies in the tourism sector of the Municipality of Campeche, the representatives conform to the Mexican Business System by focusing on those organizations that have more than 10 workers, with it more meaningful work is achieved.

To obtain the data for the independent variables identified as: X1 to X4 was performed through the valid and reliable instrument elaborated by González et al. (2010), which was contextualized and piloted with a cronbach alpha of 0.88 that is satisfactory. The instrument in question consists of 74 items classified in 7 dimensions, for the present study 33 items of the dimensions were analyzed as independent variables: "X1 Integration to the job" = 10 items, "X2 Work wellness" = 11 items, "X3 Personal Development" = 8 items and "X4 Time Management" = 4 items, are structured on a Likert scale with five response options: Not satisfactory = 0, Not satisfactory = 1, Neutral point = 2, Satisfactory = 3, Very satisfactory = 4. Relative to Profitability taken as a dependent variable is identified as Y, whose assigned value is relative to the financial results of companies for fiscal year 2015.

The dimensions in analysis pertaining to the quality of life are shown in Table 2 which become the independent variables denominated of the X1 to the X4, as well as the dependent variable that corresponds to the financial results identified as Y.

Variable	Description
Y	Financial profit
X_1	Integration to the job
X_2	Wellness for work
X_3	Personal development
X_4	Leisure Time Management

Table 2 Description of the dependent variable and the independent variables used. Identification of independent and dependent variables
Source: own elaboration with elements of the questionnaire González et al., (2010)

The 264 workers of the 33 companies were applied the questionnaire directly in order to verify the truthfulness and the reliable obtaining of the data, on the other hand, the financial information was made via formal request to the organizations that for confidentiality only gave this information, without further information. From the data thus collected in the first instance the mean was obtained for each of the independent variables and were grouped into a data matrix for each of the companies. The mathematical model is obtained using the program Satistic Package for Social Science SPSS version 23.0 for Windows. Obtaining as a result of the analysis the multiple regression equation that represents the association of the variables under study and it is verified with the goodness adjustment statistic the greater reliability by allowing to verify the reasonable tendency of the results by means of the figure.

Results

Applying the established methodology now corresponds to show the results of the 264 instruments applied to the employees of the 33 companies of the census sample, as well as the financial data obtained from them.

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With this information, a document called "Profitability Matrix / Study Dimensions" is created, where the data of the four dimensions considered as independent variables are recorded: "Integration for the job", "Welfare for work", "Personal development" and " "Administration of free time", as well as that of the dependent assigned to "Profitability". See Table 3

Businesses	Profitability y	Int. At work place x1	Wellness by work x2	Personal development x3	Administration of time x4
1	0.37	4	3	4	4
2	0.33	3	4	4	2
3	0.31	3	2	3	4
4	0.33	3	4	4	2
5	0.38	4	3	4	4
6	0.35	2	3	4	3
7	0.33	3	2	4	4
8	0.29	2	4	3	3
9	0.35	4	3	3	4
10	0.30	2	2	4	4
11	0.35	4	4	3	3
12	0.32	3	3	3	4
13	0.33	3	3	3	4
14	0.35	4	4	2	4
15	0.29	3	3	4	2
16	0.33	3	3	4	3
17	0.35	4	4	3	3
18	0.42	3	4	3	4
19	0.45	4	3	4	3
20	0.33	3	3	3	4
21	0.33	4	3	2	4
22	0.20	2	1	4	1
23	0.34	4	3	3	4
24	0.32	3	3	4	3
25	0.35	4	3	3	4
26	0.28	4	3	1	2
27	0.33	4	3	3	3
28	0.35	2	4	4	4
29	0.31	3	3	4	3
30	0.33	3	3	3	4
31	0.30	3	3	4	3
32	0.38	4	3	4	4
33	0.28	3	2	4	4

Table 3 Results obtained from the application of the instrument and the mathematical equation. Matrix of data Financial results / dimensions under study
Source: Authors' calculations with survey data

Table 3 illustrates the trend that the profitability of companies ranges from 0.20 to 0.45, meaning that for each weight of assets invested are generating between 0.20 and 0.45 of financial results; Likewise, the tendency of workers' perception of the dimensions involved in the study is satisfactory, since the highest frequency occurs at levels 3 = Satisfactory and 4 = Very Satisfactory.

The results of the estimation of the regression model and multiple correlation Financial Profitability / "Integration to the work place", "Welfare by the work", "Personal development" and "Administration of free time", are the following: independent variables were included in the model, that is, none was rejected for the analysis because its value other than zero; the coefficient of multiple correlation (R) is 0.815, and the one of determination (R2) is of 0.664, the typical error of the estimate is 0.02679 of with a level of significance of 0.000, the previous one supports that the obtained mathematical model as a result it is reliable; the analysis of variance (ANOVA) yields a F statistic with a value of 13,806 greater than the level of significance that is 0.000; the dependent variable "Y" acquires a constant value of 0.002 when all the independent variables are equal to zero "0"; the coefficients B (Beta) with 95% confidence interval for each of the independent variables show: B1 = 0.027, B2 = 0.030, B3 = 0.023 and B4 = 0.022.

The multiple regression equation with 4 independent variables is shown as equation (1):

$$Y = 0.002 + 0.027X_1 + 0.030X_2 + 0.023X_3 + 0.022X_4 \quad (1)$$

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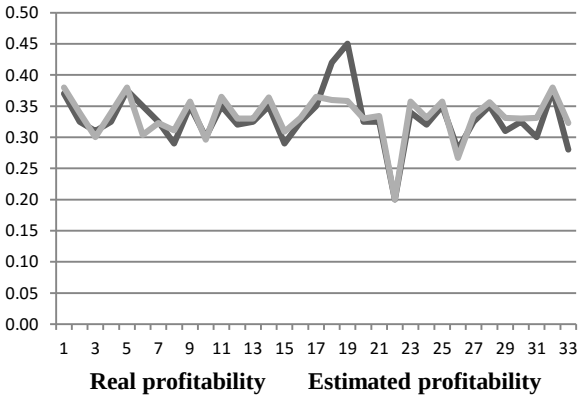
By means of the goodness of fit statistic it is verified that there is an alignment of the values of the variables and that they are not dispersed, comparing the real values with the estimated ones, which implies that the mathematical model is highly reliable and predictive. See Graphic 1



Graphic 1 Goodness of fit of the model Financial Results-Satisfaction in the work
Source: self made

Discussion and Conclusions

It is observed that all the companies mark an acceptable return according to the analysis made to the answers collected in the 33 companies and 264 workers that depend on them, through the descriptive statistic, and that their employees are satisfied with respect to the dimensions evaluated with respect to the quality of working life in the activities they carry out in their job. The indexes reflect this by presenting positive financial results ranging from 0.20 to 0.45, as well as a perception of between 3 and 4, which in itself are satisfactory. The companies that were taken as part of the study maintain an average of 9 workers and are similar in terms of profitability than the ones investigated by Benavente (2008), having financial returns on average 35% of their assets, whose research reveals the influence quality of life on these results.

When the components derived from the conditions of work, the performance of the position and in general the organizational context are satisfied; and, on the other, to the psychosocial processes through which the worker experiences an adequate work environment, the financial results will be in a growing situation that the managers of the organizations expect. Given this scenario, equation (1) obtained is a valuable predictor that ratifies the above when determining an increasing positive relationship between financial results and the dimensions "Integration to the job", "Welfare for work", "Development personnel "and" Administration of free time "in accordance with the perception of each one of them by the workers. Ratified with the correlation coefficient of 0.815 and that of the determination of 0.664, meaning that the independent variables give a response to the financial results (dependent).

The determination of the predictive character of equation (1) is more strongly emphasized by replacing the values of the real profitability in the equation and being reviewed through the goodness of the adjustment (Figure 1), with the real values we project the estimates, and it is observed that there is the same positive trend in obtaining the profitability business.

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Knowledge management in the organizational culture of tourism msmes

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Abstract

Acquiring, applying, transmitting and safeguarding the business knowledge is initially considered by mature and newly created companies as a necessity which later can become a competitive advantage and being part of the organizational culture in the long term, which could be a determining factor for the growth and sustainable development of the enterprises whose leaders consider the implementation of this process important. The objective of this research is to evaluate the processes by which the owned and acquired knowledge is managed and safeguarded in MSMEs of the hotel industry and if it is part of their business culture. It was developed a descriptive research, with non-experimental transversal design, correlating the indicators obtained as part of the results, where it is highlighted that the knowledge management and the business culture are highly linked to each other in the participating businesses.

Knowledge management, organizational culture, tourism msmes

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Introduction

In recent years, Mexico has not evolved at the same pace as other countries in the tourism sector and visitor arrivals have registered lower growth rates well below the potential of the country, thus limiting job creation and the development of the companies involved in this market. Therefore, the National Development Plan (PND, 2013-2018), as the guiding document of the economy, considers the tourism sector as one of the main sources of foreign exchange, after oil and remittances from dollars sent by Mexicans from abroad. The states of the country have incorporated in their respective economic plans strategies that allow to underpin this activity, as a source of employment and companies. In the case of Campeche, section VI of the public policy axes of the State Development Plan (PED, 2015-2021) proposes to increase the competitiveness and economic sustainability of the tourist activity with the effective participation of the state and federal authorities involved through the ordering and flow of investments. The state of Campeche is located in the area known as "Mayan Ruta" along with the states of Yucatan and Quintana Roo. In addition, the Fortified City has been recognized as a World Heritage Site since 1999 and the Mayan city of Calakmul and the tropical forest have the denomination of Mixed Heritage (cultural and natural) of Mexico since 2014, both granted by UNESCO. Visitors demand quality tourism services that preserve the Maya and colonial identity that distinguish southeast Mexico. Tourism has evolved positively in the economy of many countries although it depends on economic policy and crises derived from devaluations, changes in oil prices as well as globalization, therefore the hotel sector must increase its advantages competitive and empowering learning based on the needs of clients, thus fostering a continuous knowledge management avoiding a deterioration of what has been learned by organizations (Rodríguez, Oliva and Laguna, 2003).

For the aforementioned, the study proposes the following objectives: a) To determine the management practices of the MSMEs in the city of Campeche; b) To identify how MSMEs acquire the knowledge, apply and safeguard the knowledge of the tourism sector the city of Campeche and c) Identify how the organizational culture and the knowledge management in the MSMEs of the tourism sector of the city of Campeche.

Theoretical Framework

The National Institute of Statistics and Geography (INEGI, 2016) points out that Mexico faces a loss of competitiveness according to the international indexes for measuring tourism activity. In economic terms, this activity contributes to the country's gross domestic product by 2.1%, above the Other services sector and below the professional, scientific and technical services sector (2.2%), according to the statistical information generated in the 2014 and occupies 7% of the economically active population, at the end of the first quarter of 2016.

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Organizational culture in tourism SMEs

The culture and its management has been the subject of analysis as a relevant factor to guarantee quality standards, this is possible when the organization orientates its culture towards a management based on the roles and professionalism of the collaborators; studies have also been developed to establish the relationship between the culture of intrapreneurship and innovation in companies, considering as a population companies in the tourism sector, these practices have a positive influence on innovation, production processes and management of MSMEs, considering that Collaboration through teamwork is the intra-entrepreneurship factor with the greatest impact that stimulates the synergy and creative capacity of collaborators at all levels (Goncalves, Goncalves and Narloch, 2006) and (Galvez, 2011).

Benavides and Quintana (2003), cited by Mul, Mercado and Ojeda (2013) consider that organizational culture is a factor that supports the stimulation of innovation and creativity and that supports decision making and performance.

According to studies by Tarore (2016), Kyriakidou and Gore (2005), there is a direct relationship between the values of the organizational culture shared by employees and the performance of SMEs. Wallingre (2005) establishes the need to implement an innovative organizational culture in hotel SMEs, but as in other sectors, the main limitation is the resistance to change of the owners or leaders of the organizations; therefore, a high degree of commitment and dedication to success in the implementation process must be agreed upon.

González, Zizaldra and Mercado (2015), consider that the role of MSMEs in the economy of a country establishes the importance of being organizationally sustainable and that this is manifested through the thinking of the leader of the organization.

As a fundamental element in sustainable tourism Ortíz and Camargo (2010) establish that values and beliefs as a whole serve as the basis for the construction of a new model of organizational culture and that can guarantee optimal levels of economic profitability in balance with the responsibility social and natural right, (Castellucci, 2009).

In order to characterize the organizational culture, Ortiz, Daza and Labarcés (2014) studied the physical conditions of work, cultural environment and organizational behavior as elements related to work performance, considering as premise that a good motivation is reflected in productivity.

On the other hand, Esparza and García (2011) evaluated the influence of tourism business culture on strategic management, finding that family SMEs with an ad hoc, clan and hierarchical culture perceive similar values, resort to analytical strategies and compete in the market differentiating both their products and their services and organizations with market culture have as their primary value the intensive work and apply defensive strategies and compete through specialization in a segment of the market.

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Knowledge management in the tourism sector

According to Mannington (1999), Pérez (2008) and Dos Anjos, Flores, Gadoti and Domareski (2011), the attention given to the organization's knowledge management has been such that the value of the organization could be based on its capital intellectual and surpassing what it would have if we considered only the value of its tangible assets.

The management of this knowledge and the ability to use it to obtain a competitive advantage requires careful planning and understanding of the knowledge within the organization and its workers, therefore, design and implement strategies for generating knowledge is positive and significant, because it generates coherence between knowledge and technological innovation, (Donate and Guadamillas, 2008).

Starting from the concept of intangibility as an element related to the processes of creation of value within the organizations Simaro, Tonelli and Carús (2012), consider that the companies of the tourist sector must professionalize the knowledge management for a better sustainability and to improve the development of their companies.

Globalization, economics and new technologies are elements that have made knowledge management a differentiator between knowledge as a resource that gives the possibility of action in organizations and management that seeks to optimize the use of this resource which is integrated by two fundamental processes, the creation of knowledge and its transmission, which are not independent and are interrelated (Canals, 2003); (Alawi, Marzooqi, and Fraidoon, 2007). In addition, organizational trust, communication, systems and structure are cultural factors that contribute to knowledge management within organizations.

According to Goncalves, Sass, Rastrollo and Savi (2014), knowledge management intends that the organization act intelligently to ensure success by maximizing its resources and guaranteeing its renewal, as a whole, it strengthens the competitive advantage, not by itself, but is the result of the creation, transmission and application of knowledge in the company.

In this sense, Falquemberg (2012) considers that knowledge management is a strategy that improves competition by combining resources with capabilities where the conviction and commitment of management are fundamental to managing the intellectual capital of their organizations.

Pérez, Leal, Barceló and León (2013) formulated a study in northwest Mexico to diagnose knowledge management processes in the restaurant sector, finding that the companies under study have an adequate level of development in the processes of identification, acquisition, creation, transfer and application and, on the contrary, storage and valuation of knowledge are the areas in which they have least evolved, emphasizes the availability of entrepreneurs and staff to share their knowledge, and point out as main barriers resistance to change, low knowledge in the use of technologies and resistance to the documentation of good practices.

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Leadership and its influence on culture and knowledge management

Pedraja and Rodríguez (2008), relate the style of leadership with the management of knowledge and the design and implementation of strategies, finding that there is a significant relationship between these variables where leadership explains in some way the processes of creation and application of knowledge in SMEs, establishing a causal relationship between leadership styles and knowledge management, as well as between knowledge management and strategy design. Abounding in the influence that leadership and organizational culture has on the effectiveness of SMEs, Rodríguez (2010) points out that transformational leadership has a significant impact on the innovation culture and the competitive culture, and it is precisely this style that affects the effectiveness

Applying the case method, Komppula (2014) studied the role of entrepreneurs of tourism organizations in a rural environment, finding that the commitment and collaboration they assume as leaders of these small enterprises is fundamental to being competitive and leading them to success.

In the same sense Haven-Tang and Jones (2012), abound in the benefits of transformational and effective leadership in rural tourism through the achievement of strategic partnerships with local small businesses, which allows to achieve positive results in the long term. Brás, Da Costa and Pardal (2011) inquired about the level of well-being achieved in this type of company through a leadership that allows to establish the differences or coincidences of perception that have the staff and the leader on this concept.

With respect to sustainability, Semenovych (2014) studied how leadership can integrate this concept in tourism companies for their harmonious development in the community, under the concept of mobilization and linking factors such as structures, processes and people

According to Terrazas (2015), one can not do without the role of leadership, whether in societies, human groups or countries, analyzed the characteristics that a leader must have in order to exert a positive influence and transform the spheres where it develops. Velázquez (2005) proposes a style of leadership called empathic as an alternative to Mexican organizations to design work schemes and organizational structures around teams under high-performance leadership.

Zayas (2011), formulated a study to establish the link between performance, leadership and competencies in the tourism sector managers, finding that the acceptance as a quality of the leader of these organizations is intimately linked to professional technical capacity, communication, problem solving and commitment. Barreto and Azeglio (2013) analyzed entrepreneurs' recognition of the importance of human resources, but also the complexity of selection processes in a sector where the service is a differentiator within the market.

Methodology

Type and research design

Descriptive research, because it was measured and obtained information about the variables that participate in the problem subject to study integrated by the organizational culture and knowledge management practices.

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The design is non-experimental cross-sectional since data were collected in a single moment in its natural context, through questionnaires administered to the leading managers of MSMEs in the hotel sector, with the purpose of describing variables and analyzing their incidence. The method used for the collection of quantitative information is through fieldwork and the technique used is the survey (Hernández, Fernández and Baptista, 2010).

Subjects in the study

It was considered as a population the tourist SMEs in the hotel sector specifically hotels and hostels that do not belong to hotel chains or franchises, located in the city of Campeche, Mexico.

These organizations need to identify the activities they develop in favor of business knowledge and management, as well as the link with the culture of the organization, both as elements of permanence and development in the market as well as: a) generate employment for people who in their majority do not have studies with professional level that allows them to accede to other activities, and b) by their contribution to the economy of the state. The companies identified with this specialty were 26, according to the Mexican Business System directory as of February 2, 2016, of which 23 (88% of the population).

Instrument

Quantitative information was obtained from the dimensions identified as organizational culture and knowledge management of the questionnaire designed by Mul, Mercado y Ojeda (2013). This instrument is linked to the central objective of the research by contributing to the identification of the management practices developed and its relationship with the organizational culture. The elements that integrate it are indicated in Table 1.

Variable	Dimension	Operational Definition	Reagents	Proportion
Organizational culture	Open communication	Process through which knowledge is transferred among the members of the entity.	53, 55, 58, 70, 71, 72	8.6%
	Trust	It is the willingness to share knowledge in a fluid way	46, 47, 48, 49, 50, 54	8.6%
	Collaboration and support	It is the managerial intervention to facilitate and encourage knowledge permeate throughout the organization	51, 52, 64, 66, 67, 69	8.6%
	Clear structure	They are the processes or mechanisms that facilitate the acquisition and transmission of knowledge	56, 57, 59, 60, 61, 62, 63, 65, 68	12.9%
Knowledge management	Acquisition	It is the natural or designed process by which the company obtains and generates the organizational knowledge that allows to reach its objectives	2, 3, 5, 6, 11, 12, 16, 25, 29, 31, 32, 33, 40	18.6%
	Application	They are the processes developed by the company to spread knowledge to the various areas that make up the organization.	17, 37, 38	4.2%
		Methods implemented to convey the knowledge acquired or acquired to the staff that collaborates with the organization.	1, 8, 10, 26, 27, 30, 35, 36, 41	12.8%
	Transfer	Use of technological systems and tools to safeguard the knowledge generated by the company	4, 7, 15, 14, 18, 19, 20, 21, 22, 23, 24, 28, 34, 39	20.0%
	Storage	It is the safeguard of knowledge applied and generated in the company and that allows it to remain or lead the market.	42, 43, 44, 45	5.7%

Table 1 Definitions of the questionnaire administered to managers of MSMEs in the hotel sector
Source: own elaboration with Mul, Mercado and Ojeda data (2013)

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The scale of the instrument is a Likert type and an initial section was added to obtain socio-demographic and position information of the leader, followed by questions to establish the administrative profile of the organization.

Reliability of the instrument

A pilot test was developed to evaluate the understanding of the instrument with 10% of the population obtaining a Cronbach alpha of .836 for the knowledge management variable and .800 for organizational culture. Subsequently, the test was replicated, establishing the values in general for each variable and dimension, which are shown in Table 2.

Variable	Dimension	Elements number	Cronbach alpha
Organizational culture		27	.961
	Open communication	6	.841
	Trust	6	.876
	Collaboration and support	6	.900
	Clear structure	9	.919
Knowledge management		43	.972
	Acquisition	13	.925
	Application	3	.937
	Transfer	9	.878
	Storage	14	.922
	Protection	4	.876

Table 2 Reliability of the survey administered to managers of MSMEs in the hotel sector
Source: Own elaboration

Personal questionnaires were administered to the managing directors of the hotels with a duration of twenty minutes each, and the information obtained was processed through SPSS software version 21

Results

The sociodemographic and administrative profile aspects were established in a previous study (Quijano, Arguelles and Fajardo, 2016), on leadership and its practices considering the same population, where it is established that entrepreneurs are between 41 and 50 according to the age range with the highest frequency, and that 30.4% refer between 9 and 12 years of business experience. 69.6% of companies have between 5 and 13 employees.

In terms of competitiveness, 47.8% consider themselves to have a good level and 42.4% indicate that the price of the services they offer is their main competitive advantage, followed by quality (27.3%) and the same percentage of service. Of note are the active and participative working environment (24.2%), as well as good commercial relations with the government sector (47.8%), private sector (78.3%) and social sector (60.9%).

Among the business objectives, profits (73.9%) stood out, supported by respect for values such as honesty (24.4%) and service to customers (20.7%), facing challenges such as hiring qualified personnel (24.6%) and competition (13.8%). For this, they used better internal and external communication (26.8%), applying added value to products or services (23.2%).

The questionnaire administered to the leaders participating in the study contemplates four dimensions for the organizational culture variable and five for knowledge management, which were determined both the mean and its standard deviation with the objective of analyzing the reagents closest and far from the values assigned, as well as the level of dispersion of the responses, which are observed in Table 3.

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Variable	Dimension	N	Minimum value	Maximum value	average	Standard deviation
Organizational culture	Open communication	23	1	4	2.81	4.003
	Trust	23	1	4	3.00	3.813
	Collaboration and support	23	1	4	2.86	4.238
	Clear structure	23	1	4	2.95	6.861
Knowledge management	Acquisition	23	1	4	2.35	8.659
	Application	23	1	4	2.52	2.793
	Transfer	23	1	4	2.27	6.185
	Storage	23	1	4	2.73	9.456
	Protection	23	1	4	2.52	3.553

Table 3 Descriptive statistics related to organizational culture and knowledge management variables.The table shows the level of dispersion that is presented in the opinion of the respondents, which ratifies with the levels reached by the arithmetic mean
Source: Statistical information obtained from the survey

In the dimensions of the organizational culture variable the average obtained is not high since no data is higher than 3, where the dimension "confidence" obtained the highest value (3.0), and "open communication" the smaller (2.81), above reflects an environment of openness and interaction, where workers do not actively participate in problem solving and decisions are not transmitted quickly to staff.

In most organizations, employees are not being rewarded when working as a team and the elements of strategic planning are not clearly defined, based on the dispersion in responses obtained in the "clear structure" dimension (Table 4).

Reactivo	Minimum	Maximum	average	Standard desviation
59. The jobs and lines of command are clearly defined.	1	4	3.13	.968
60. For the company it is essential that the workers recognize the tasks that they must carry out according to their position.	1	4	3.39	.783
57. Employees are rewarded when working as a team and not just for individual performance.	1	4	2.87	1.100
65. The strategy, mission, values, objectives and standards are clearly defined.	1	4	2.26	1.096
56. Employees are rewarded for sharing their knowledge and experiences with their peers.	1	4	2.43	.992
68. The company is committed to continuous improvement.	1	4	3.00	1.044
63. Employees are highly motivated and committed to the values of the company.	1	4	2.74	.915
61. Employees are clear who their superior is.	1	4	3.39	.941
62. Employees are clear who their subordinates are.	1	4	3.35	.935

Table 4 Descriptive statistics relating to the clear structure dimension

On the contrary, the lowest standard deviation was generated in the "confidence" dimension, which allows to infer that in the MSMEs studied, employment security is promoted with an acceptable level of uncertainty, as described in Table 5.

Reactivo	Minimum	Maximum	average	Standard desviation
48. There is a high level of face-to-face interaction among workers in the workplace.	1	4	3.04	1.065
47. In the company there is an atmosphere of trust and openness.	1	4	3.17	.650
46. The company is promoting job security and the existence of little uncertainty.	1	4	3.13	.626
49. Information flows easily at all levels of the organization.	1	4	2.74	.864
54. The company values informal communication networks.	1	4	2.83	.778
50. In the company the ideas of employees are heard.	1	4	3.09	.793

Table 5 Descriptive statistics related to the trust dimension

For the case of the knowledge management variable it is observed that the average generated in the five dimensions are also not high since in no case were values close to 3 or 4, the highest corresponds to the dimension "storage", and the lowest to "transfer" which indicates that the population studied is more concerned with the safeguarding of their information but suffers from own schemes to make known the organizational knowledge.

Protocols on information repositories, activity feedback or the use of electronic media as a key tool, according to the dispersion of responses in the "storage" dimension (Table 6) are not well defined in most participating organizations.

Reactivo	Minimum	Maximum	average	Standard desviation
18. Company procedures are documented in protocols or manuals.	1	4	2.09	1.125
7. Induction courses are given so that staff know the workplace, their colleagues, as well as everything related to their position.	1	4	2.52	.898
34. Internal rules, procedures and processes are constantly being disseminated.	1	4	2.83	.778
19. Reporting and reporting on processes and best practices is an established practice.	1	4	2.48	1.238
15. Writing documents written as repositories of valuable information is commonplace.	1	4	2.30	1.105
28. There are formal mechanisms that allow for the exchange of best practices among areas or departments.	1	4	2.43	.788
20. The company provides employees with databases and paper files with information that is relevant to their work.	1	4	2.70	1.020
39. The company has mechanisms to respond to the opinions, suggestions, needs and complaints of customers.	1	4	3.17	.778
21. It is important for the company that the databases be updated regularly.	1	4	3.22	.951
14. In the company electronic means are indispensable to capture and store information relevant to the business.	2	4	3.43	.728
22. The company has specific catalogs and files for important documents such as reports and reports.	1	4	2.91	.793
23. It is possible to access information repositories, through some type of internal computer network (for example, intranet).	1	4	2.43	1.121
24. The work teams have regular meetings to feedback their activities.	1	4	2.61	.988
4. The use of electronic media is a key tool for accessing valuable information for the business.	1	4	3.04	.928

Table 6 Descriptive statistics for the storage dimension

In general, there are established and defined processes for the design and redesign of products and services, as well as market research as a standard practice for generating information, which corresponds to the application dimension (Table 7).

Reactivo	Minimum	Maximum	average	Standard desviation
38. The analysis and design of new processes, products and services is carried out on a regular basis.	1	4	2.39	1.033
37. The analysis and redesign of processes, products and services is carried out on a regular basis in the company.	1	4	2.52	.898
17. Reporting and reporting on markets, technologies and new products and / or services is an established practice.	1	4	2.65	1.027

Table 7 Descriptive statistics for the application dimension

In order to establish the influence of sociodemographic factors and the administrative profile on the studied variables, t-tests were used for independent tests such as gender and marital status, and ANOVA was used to determine the most important differences between variances for the case of age, level of studies, position in the company, seniority of the organization, origin of the same, seniority in the position, number of workers and subordinates.

Referring to the variable organizational culture no significant statistical differences were found when examining the sociodemographic elements for both independent tests and for variances.

The analysis of the knowledge management variable did not show statistical differences for gender and marital status. For age, significant differences were obtained in the "application" dimension, which allows us to assume that evolution as a person over time, influences the elaboration of processes for the design and redesign of services, as well as market research for the generation of information, Table 8.

Dimention	Age range	average	Standard Desviation	F	Sig.
Acquisition	26-30	29.80	9.066	1.352	.290
	31-40	43.00	.		
	41-50	34.28	9.604		
	51-60	26.57	7.934		
	61-70	28.33	2.081		
Application	26-30	9.40	2.190	5.137	.006
	31-40	12.00	.		
	41-50	8.28	2.563		
	51-60	4.85	1.772		
	61-70	7.66	1.154		
Transfer	26-30	20.20	7.328	.894	.488
	31-40	24.00	.		
	41-50	23.42	6.106		
	51-60	17.42	6.553		
	61-70	20.00	1.732		
Storage	26-30	41.00	7.314	1.203	.344
	31-40	52.00	.		
	41-50	39.85	12.979		
	51-60	34.71	7.387		
	61-70	33.00	.000		
Protection	26-30	9.60	4.277	.694	.606
	31-40	12.00	.		
	41-50	11.71	3.988		
	51-60	8.71	3.401		
	61-70	9.66	1.154		

Table 8 Comparison of population means by age range N=23* $p < 0.05$

When analyzing the seniority in the position only the dimension "application" reported important differences, which allows to assume that the experience acquired in carrying out functions of the position influences the design of processes for the use of own or acquired knowledge, (Table 9).

Dimention	Age range	average	Standard Desviation	F	Sig.
Acquisition	1-3	33.40	9.191	1.465	.254
	4-8	31.20	9.523		
	9-13	29.60	5.504		
	14-18	18.00	.000		
	19-23	29.00	.		
Application	1-3	8.50	2.460	4.228	.014
	4-8	9.40	2.792		
	9-13	5.80	.836		
	14-18	3.00	.000		
	19-23	7.00	.		
Transfer	1-3	21.10	7.093	1.050	.409
	4-8	21.20	6.942		
	9-13	21.80	3.033		
	14-18	12.00	.000		
	19-23	21.00	.		
Storage	1-3	40.40	10.926	.735	.580
	4-8	41.20	8.555		
	9-13	33.00	9.000		
	14-18	35.00	.000		
	19-23	33.00	.		
Protection	1-3	11.40	3.835	1.091	.391
	4-8	10.00	4.062		
	9-13	9.40	2.509		
	14-18	6.00	.000		
	19-23	9.00	.		

Table 9 Comparison of the population averages by seniority in the position.N=23* $p < 0.05$

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The "acquisition" and "transfer" dimensions reported statistically significant differences for the number of workers and subordinates who collaborate in the company, which allows us to assume that this element influences the decision to participate in training courses, of specialized personnel and formation of interdisciplinary teams, (Table 10 and 11).

Dimention	Age range	average	Standard Desviation	F	Sig.
Acquisition	1-4	24.50	5.196	4.285	.018
	5-13	33.93	7.758		
	14-22	18.00	.000		
	32-40	26.00	.		
Application	1-4	7.50	3.872	2.651	.078
	5-13	8.00	2.250		
	14-22	3.00	.000		
	32-40	10.00	.		
Transfer	1-4	15.00	4.242	4.914	.011
	5-13	23.00	5.291		
	14-22	12.00	.000		
	32-40	19.00	.		
Storage	1-4	33.00	9.626	.602	.621
	5-13	39.81	10.061		
	14-22	35.00	.000		
	32-40	39.00	.		
	1-4	7.75	4.349	2.326	.107
	5-13	11.18	3.124		
	14-22	6.00	.000		
	32-40	10.00	.		

Table 10 Comparison of the population averages by number of workers in the company. N=23* $p < 0.05$

Dimention	Age range	average	Standard Desviation	F	Sig.
Acquisition	1-3	24.50	5.196	3.775	.021
	4-6	31.58	8.317		
	7-9	37.66	4.618		
	10-12	38.50	3.535		
	13-15	18.00	.000		
Application	1-3	7.50	3.872	1.915	.152
	4-6	7.91	2.151		
	7-9	8.00	3.464		
	10-12	9.50	.707		
	13-15	3.00	.000		
Transfer	1-3	15.00	4.242	3.643	.024
	4-6	22.00	5.640		
	7-9	24.66	.577		
	10-12	24.50	7.778		
	13-15	12.00	.000		
Storage	1-3	33.00	9.626	1.331	.297
	4-6	37.16	10.107		
	7-9	45.33	5.773		
	10-12	47.00	7.071		
	13-15	35.00	.000		
Protection	1-3	7.75	4.349	2.023	.134
	4-6	10.58	3.260		
	7-9	12.00	.000		
	10-12	13.00	4.242		
	13-15	6.00	.000		

Table 11 Comparison of Population Averages by Number of Subordinates.N=23* $p < 0.05$

In addition, with the objective of having a clearer idea of the perception of the managers of the companies regarding the organizational culture, a quantitative analysis was developed to evaluate this perception and obtain an Organizational Culture Index (ICO), developing the following Steps:

a) The sum of the values assigned in each question per company was obtained.

b) The maximum score that could have any company was 108 (4 points maximum for 27 items).

c) The number obtained in section "a" was divided by 108 and the result was multiplied by 100, to obtain an "Organizational Culture Index" (ICO). At higher ICO, it means that the manager has a better perception of it, (Table 12).

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Enterprise	Score by company	Top Score	ICO (%)
1	64	108	59.26
2	60	108	55.56
3	68	108	62.96
4	95	108	87.96
5	106	108	98.15
6	95	108	87.96
7	82	108	75.93
8	108	108	100.00
9	102	108	94.44
10	81	108	75.00
11	103	108	95.37
12	64	108	59.26
13	75	108	69.44
14	77	108	71.30
15	77	108	71.30
16	80	108	74.07
17	76	108	70.37
18	80	108	74.07
19	67	108	62.04
20	67	108	62.04
21	35	108	32.41
22	73	108	67.59
23	73	108	67.59

Table 12 Organizational Culture Index (ICO).ICO= Index of organizational culture = Score / Score x 100. The result obtained for each company can be interpreted as the perception of the manager or founding member regarding the importance of culture and its management as an element of permanence and growth in the sector
Source: self made

The average obtained by the ICO of the population studied is 72.78%, which gives an idea of the actions developed by these organizations to achieve an adequate communication with the collaborators of the company, the level of confidence that prevails within them, the way in which staff are organized to perform their functions individually or by work teams and the level of definition of posts and lines of command according to the established administrative structure.

For the variable knowledge management, the same steps of the organizational culture variable were followed to construct a Knowledge Management Index, which are described below:

a) The sum of the values assigned in each question per company was obtained.

b) The maximum score that could have any company was 172 (4 points maximum for 43 items).

c) The number obtained in section "a" was divided by 172 and the result was multiplied by 100, in order to obtain a "Knowledge Management Index" (IGC). At higher IGC, it means that the manager has a greater knowledge of it as a competitive advantage, (Table 13).

Enterprise	Score by company	Top Score	ICO (%)
1	97	172	56.40
2	96	172	55.81
3	81	172	47.09
4	141	172	81.98
5	143	172	83.14
6	149	172	86.63
7	120	172	69.77
8	162	172	94.19
9	103	172	59.88
10	116	172	67.44
11	149	172	86.63
12	97	172	56.40
13	104	172	60.47
14	120	172	69.77
15	120	172	69.77
16	99	172	57.56
17	100	172	58.14
18	100	172	58.14
19	79	172	45.93
20	79	172	45.93
21	55	172	31.98
22	74	172	43.02
23	74	172	43.02

Table 13 Knowledge Management Index (IGC).IGC= Index of organizational culture = Score / Score x 100. The result obtained for each company can be interpreted as the perception of the manager or founding member regarding the importance of culture and its management as an element of permanence and growth in the sector
Source: self made

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For the case of the IGC, the average was 62.13%, as a reference of the practices of acquisition, transmission and safeguard of information and management of own or acquired knowledge through the operation of the organization. The present study, being descriptive, does not present an initial hypothesis, however, in the development of the same it is deduced the possibility of establishing the correlation between the variables, without it being preconceived of origin.

The results of Tables 12 and 13 were compared to evaluate the relationship between entrepreneurs' perception of organizational culture and knowledge management. By means of a linear regression analysis, the Pearson coefficient (1) and the coefficient of determination (2) were determined, which was obtained by squaring the previously obtained value of the Pearson coefficient. (Lind, Marchal and Wathen, 2012).

Where: N = Population; X = Values obtained from the ICO in each company; Y = Values obtained from the global IGC in each company.

$$r = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}} \quad (1)$$

Substituting:

N = 23
$\sum X$ = 1674.07
$\sum Y$ = 1429.07
$\sum XY$ = 108793.2

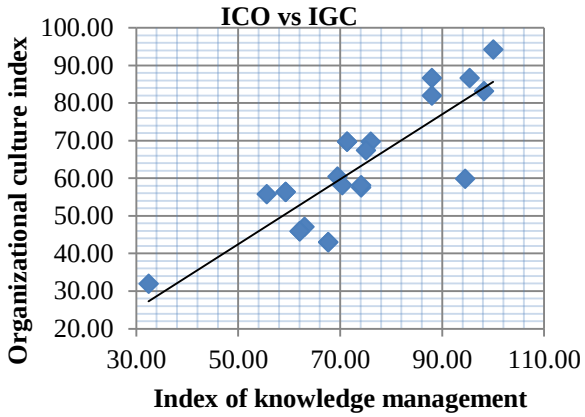
$$r = \frac{23(108793.2)-(1674.07)(1429.07)}{\sqrt{[23(127385.5-(1674.07)^2][23(94619.3)-(1429.07)^2]}}$$

r = 0.841

$$r^2 = \frac{b_0\sum Y + b_1\sum XY - n\bar{Y}^2}{\sum Y^2 - n\bar{Y}^2} \quad (2)$$

$r^2 = (0.841)^2$
r^2 = 0.7072 = 70.72%

The correlation of the values obtained for each index is observed in Graphic 1.



Graphic 1 Scatter diagram between organizational culture and knowledge management indexes. The grouping of the results indicates that the data obtained are not dispersed and the correlation is considered high when being in a range of 0.75 and 1.0 which indicates that there is a relation or nexus between the variables
Source: Own elaboration

Conclusions

Discussion of results

The contrast of the results obtained with previous research makes it possible to establish that the companies studied in the tourism sector are not transmitting in a formal way the knowledge acquired or generated by the organization, which is in opposition to what has been suggested by Canals (2003), Pérez) and Goncalvez et. to (2014), and that may be the source of loss of operational and administrative information. In general, the participants point out that, for the company, electronic media are indispensable for capturing and storing relevant information, as well as constant updating, since they are considered a fundamental tool for the business; as happened in the study developed by Mul and Ojeda (2014), who consider that the technology is key to the management activities of the organizations and factor that contributes to the competitiveness of the same.

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For participating companies, it is important to have established processes for the design and redesign of services, as well as market research to generate information, as concluded Pérez et. to (2014). 50% of the population considers having good relations with the different social and productive sectors, although this has not impacted in their competitive level, in spite of the signed governmental agreements for the support to the sector; this can be due to the lack of adequate strategic management based on values (Simaro et al., 2012), with a view to being sustainable companies.

For the case of the organizational culture in the participating companies, there is an acceptable level of interaction with workers, in an open and safe environment, where employees' ideas are heard (Goncalves et al., 2006), on the contrary, open communication requires an active participation of the collaborators and to promote the exchange of knowledge with the superior managers, this would foment a culture of innovation as suggested by Mul et. to 2013.

In the studied population, the way in which the organizational culture is managed is reflected in the motivation and satisfaction of the collaborators, as well as their performance, whose origin may be that the jobs and lines of command are not clearly defined, as well as the strategies and objectives, and that can be reflected in employees who are not motivated and committed to the values of the participating organizations (Ortiz et al., 2014).

Most of the participants agree that job security is promoted, in an atmosphere of trust and with the openness to listen to the ideas of the employees, as established by Esparza and García (2011) who consider as a fundamental element for tourism sustainable respect for values as the basis for building a new model of organizational culture, (González et al, 2015).

Conclusions

In accordance with the objectives of the study, it is possible to conclude that the activities of acquisition, application, transfer, storage and protection are carried out within the companies studied, without having a high level of development according to the information obtained; which requires greater formalization of the operational and administrative processes by those responsible for safeguarding organizational information.

Regarding the processes implemented to share, store and protect knowledge is used information technology and communication to share experiences, and consider it important to ensure the permanence of people recognized by their knowledge of the business.

Socio-demographic factors do not influence the organizational culture, and in the case of knowledge and its age management they influence the promotion of their practices according to the business and professional experience that is acquired over time. There are elements within the administrative profile that favor the establishment and formalization of knowledge management actions such as seniority in the position, the number of employees that collaborate in it and the number of subordinates, which is justified because it is precisely the human resource who originates and perfects the knowledge in the companies.

The activities of open communication, trust, collaboration and clear structures are present in the companies studied, without having a high level of development so that the organizational culture is strengthened by the confidence levels originated by the security environment and little uncertainty but there are no formalized processes to foster better communication through the exchange of knowledge and learning.

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The companies studied should establish mechanisms to formalize and strengthen knowledge management practices as a competitive advantage that, over time, and their results be integrated into the organizational culture, based on the individual results generated through the indexes of knowledge management and organizational culture, which fluctuate in values not higher than 70% on average, but which are highly interrelated.

The population studied consists of small hotels and hostels, which represent investment efforts of its owners in infrastructure according to the demand of domestic and foreign clients whose main restriction is the lack of interest in developing sectoral studies with an administrative approach. Future research lines would allow to know if the variables studied have the same behavior in other regions of the country and their results would contribute to a real linkage of the government with the needs of the sector.

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Natural heritage and tourism in a higher education institution in South Mexico

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Abstract

The objective was: Synthetisize the content of the Learning Unit (UA) Natural Heritage and Tourism into the Master Science: Sustainable Tourism Development at Autonomous University of Guerrero (UAGro). The method used was sustained in the documentary material checking: archives, books, magazines, Web pages on Internet, printed statistic data consulting, digital data bases and that included the direct observation, exploratory routes, photographic interviews with members of non-governmental organizations. It was developed according to the geographical approach which involved the spotting of the state of Guerrero in the national territory, the reading of printed and digital information about that Master's Degree, as well as the relationship between local economic and social characteristics; all of this enriched with the social and formative approach. In this sense, the approach is multimodal or mixed since the qualitative and quantitative points of view through and they define the reach of this investigation with explanatory character. The results were: a compilation of works which appeared in the book "Sustainable Management of Tourism" was cited. The book was published in 2014 by PRAXIS publishing house as a reference book for students who are masters. It has to do with the natural heritage-tourism relationship. At the beginning of 2016 the proposal of contents of the homonymous Learning Unit for the Master's level supported on the Competencies-Based Approach (EBC: Enfoque Basado en Competencias) was developed. To conclude, I can say that: 1) the UA Natural Heritage and Tourism contributes in a solid way to the growth of graduate students with competencies which allow them to make innovative proposals about situations society demands; 2) the topic natural heritage and tourism means an educational process of systematized character, involving facilitators, students and the information they handle and 3) education based on competencies and learning and teaching the natural heritage-tourism relationship are important to understand the world around us, every time more globalized.

Natural Heritage, Tourism, Higher Education Institution, Guerrero, South Mexico

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Introduction

Mexico has great physical-biological wealth that generates environmental goods and services through its biodiversity and wild spaces. It has motivated the adoption of a conservational attitude to save the natural patrimony of the country, since the FPAM are an alternative to maintain the integrity of the ecosystems. At the moment, the declaration, handling and administration of these areas are in charge of CONANP (*Comisión Nacional de Áreas Naturales Protegidas*, which means National Commission of Natural Protected Areas) whose policy tends to favor processes of supporting development in which diverse sectors of the national society, and the restraining and reverting of the degradation that hits the atmosphere and its natural resources are implicit (Conanp, 2016). Therefore, to preserve habitats in their natural state demands to maintain some areas in the margin of the anarchical human intervention (Niño, 2015b).

First of all, we would like to refer to the definition that was proposed in the 90's of the last century about the Protected Natural Areas and the own characteristics of each category that were united in the LGEEPA (*Ley General del Equilibrio Ecológico y la Protección al Ambiente*, which means: General Law of the Ecological Balance and the Atmosphere Protection).

LGEEPA defined the zones of the national territory and those on which the Nation extercises its sovereignty and jurisdiction as ANP in which the original atmospheres have not been strongly altered by the activity of man and have been subject to the protection regime (Porrúa, 1991:2-3).

The actual competitive environment which surrounds educational organizations and institutions has allowed working on the creation of new pedagogical actions (Tobón, Pimienta & García, 2016). Here is where the educational research and action favor the changes in teaching practice (as part of the pedagogical act), and at the same time allows the creation of new didactic strategies in order to exploit the learning process of the students (Tobón, 2014).

The general purposes of analyzing the issues related to natural heritage are due to the fact that the great variety of terrestrial and marine sights for tourist purposes have been degraded one way or the other. That is why the Secretariat of Public Education (SEP: Secretaría de Educación Pública), the National Council of Science and Technology (Conacyt: Consejo Nacional de Ciencia y Tecnología) and the members of postgraduate programs registered in the National Register of Postgraduate Quality (PNPC: Padrón Nacional de Posgrados de Calidad) have undertaken the immediate educational policy goal of evaluating the learning actions between students and facilitators through the orientation on the creation of case studies and the integration of the Portfolio of evidence which must contain the work of grade realized during the two and a half years of study by the Master's Degree students.

An example of how to succeed in setting into practice the strategy of the promotion of basic and applied research in natural heritage and tourism of tourism can be achieved through: a) the review of theoretical referents, b) theories, c) methods, d) quantitative and qualitative technics, e) classroom exercises and f) field practice in hotels, all of which can be realized solo or in teams, in the classroom or outside of it. The work, as a sketch, and completed, must be in a personalized Portfolio of evidence.

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The fields of learning which form the curriculum of the Master's Degree in Science: Sustainable Management of Tourism (MCGST: Maestría en Ciencias: Gestión Sustentable del Turismo) in the Autonomous University of Guerrero (UAGro) stimulate the development of generic competencies in students. They were expressed in the following categories: self-determination, self-care, expression and communication, critical and reflective thinking, self-learning, cooperative working and participation being responsible to society. All the aforementioned will get the student a reflective, critical, creative and cooperative profile with integral education.

The idea of contributing on the conservation of the earth´s natural heritage from academy has become strong for the last sixty years. Man has realized that natural resources are not in exhaustible and it is impossible to survive without them. That is why during these sixteen years of the XXI century it is necessary for the Higher Education Institutions (IES: Instituciones de Educación Superior), in Mexico and worldwide, to include in their Curricula (PE: Planes de Estudio) Learning Units that have to deal with the growth and exercise of a quality and social integration education oriented to the conservation of the natural heritage and the responsible exercise of tourism, even in the natural heritage (Niño, 2014).

In the case of UAGro, such an issue is remedied, as much as possible, in the Learning Unit (UA: Unidad de Aprendizaje) Natural Heritage and Tourism for the MCGST where theory and practice are joined through the Competencies- Based Approach (EBC: Enfoque Basado en Competencias, Cruz & Niño, 2013). That is why the *goal* was to synthesize the contents of such Learning Unit.

The Learning Unit (UA) Natural Heritage and Tourism was created in the first half of 2016, so in this essay the new version of such Learning Unit (UA) corresponding to the second semester of the curriculum of the MCGST of the Learning Unit in Acapulco, Guerrero is presented. According to such curricula every week there are three hours of theory, two hours of practice and one hour of research, a total of six hours a week, times sixteen sessions, it equals 96 hours per semester, which are worth six credits with status in the Learning Unit (Niño, Almazán, Saldaña & Tobón, 2016). The main *goal* of the Learning Unit (UA) is to make students develop competitive skills focused on basic and applied research toward natural heritage and tourism, whose significant learnin gallows students to propose real solutions to concrete problems about protected natural scenery, even green areas of hotels in Tecpan, Acapulco and Taxco (in the state of Guerrero), as well as hotels in Guadalajara (in the state of Jalisco).

One of the two Lines of Creation and Application of Knowledge (LGAC: Líneas de Generación y Aplicación del Conocimiento) of the MCGST is called Sustainable Environment and Tourism, which relates to environmental and economic aspects, where the territory is the support of the interactions between natural heritage and tourism, which are supposed to enable the achievement of sustainable development in specific sites that contribute to the global ecological balance.

Research problem. At the level of Master's Degree, there are many examples of schooled and semi-schooled studies in Mexico, even on line. Then it is convenient to know which the strategies that were applied in those studies that are part of PNPC-Conacyt are, and especially of the MCGST in UAGro.

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Goals of research. They meant to display the actions that were realized in the MCGST whose antecedent was the Master's Degree in Tourist Development (1988-2011) at UAGro, in Acapulco. On the other hand, in the particular goals, the updated historical antecedents were synthesized, as well as the structure of the UA. Both, among other things, brought about the inclusion of the MCGST in the PNPC with a status of Newly Created Master's Degree on September 13, 2013, and the change of status to Developing Master's Degree, before Conacyt on July 13, 2016. A positive outcome on the matter is expected to be official on September 13, 2016.

The purpose of the essay is to increment the interest in the flora and fauna elements of the Mexican natural resources. It is important the planning of resources accompanied for better environmental management has resulted in maximal preservation of the national territory and to get the ecological equilibrium. This act increase the esthetic of the nature reserve and the environmental educational potential, the cultural knowledge and human welfare of the Natural Protected Areas. The flora and fauna provides the visitors with a place to recuperate physically, mentally and spiritually.

Research question: How is the UA formed?

The hypothesis was that if the positive actions developed and implemented by facilitators of the Basic Academic Nucleus (NAB: Núcleo Académico Básico) of the MCGST have been positive to explain the relationship between natural heritage and tourism, then they can be adapted to other Master's Degrees in different geographical enclaves around the world (Niño, 2015a).

The method. It was developed according to the geographical approach which involved the spotting of the state of Guerrero in the national territory, the reading of printed and digital information about that Master's Degree, as well as the relationship between local economic and social characteristics; all of this enriched with the social and formative approach.

The working method was based on the theoretical concepts of the social and formative approach, which allows the analysis and relationship between physical and geographical elements with social and economic aspects. The theoretical-methodical elements of the social and formative approach "had a great vogue due to the paradoxical increase of environmental and tourist issues worldwide" (erosion, lack of food and water, pollution, deforestation, etc.; Niño, 2015b:23).

In the first place, it comprised the consultation of printed and digital literature. Later, a sketch of the contents of the UA through an academic analysis was realized. Finally, the contents of the UA were definitely elaborated and were included in the curriculum of the MCGST of UAGro.

The development of the social and formative approach involved office work, which included the consultation of specialized literature about topics related to social and formative approach, complex problems, project working, curricular design, and learning guides. All this work was done in different libraries and map libraries in Mexico City, or in situ via internet. The information was processed at the building where the MCGST is taught. Other activities realized there were: data processing and its display in charts, explanatory texts and final editing of the text.

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Among the results, a compilation of works which appeared in the book "Sustainable Management of Tourism" was cited. The book was published in 2014 by PRAXIS publishing house as a reference book for students who are masters (Treviño & Niño, 2014). It has to do with the natural heritage-tourism relationship. At the beginning of 2016 the proposal of contents of the homonymous Learning Unit for the Master's level supported on the Competencies-Based Approach (EBC: Enfoque Basado en Competencias) was developed.

There are six sections that integrate this essay, these sections are: introduction, objective, methodology, results, conclusions and references.

Objective

To synthetisize the content of the Learning Unit (UA) Natural Heritage and Tourism into the Master Science: Sustainable Tourism Development at Autonomous University of Guerrero (UAGro).

Methodology

Firstly, an office work was carried out through consultation of digital and printed literature of topics as the competitiveness of the flora and fauna in Alicante, España (Niño & Segrelles, 2014); Guanajuato (Niño & Saldaña, 2014a & 2014b), Guerrero (Niño, 2014 and Ruíz & Niño, 2014) and Michoacán, México (Correa, Niño & Segrelles, 2013).

The field work included the direct observation, exploratory routes, photographic interviews with members of non-governmental organizations, photography and videos. In this sense, the approach is multimodal or mixed since the qualitative and quantitative points of view through the Geographical Focus.

Results

The teaching-learning methodology in the UA Natural Heritage and Tourism comprises: facilitator and student presentations, individual and collaborative work, use and application of the territorial approach of tourism to cases of study, which are analyzed through the dynamics of a workshop in a classroom where the six students who were admitted in the Line of Management and Application of Knowledge (LGAC: Línea de Generación y Aplicación del Conocimiento) of the UA Environment and Tourism, fourth generation , 2016-2018 of the MCGST, are working. At the beginning of the UA Natural Heritage and Tourism they will take a diagnostic test, and during that UA they will do a test at the middle of the term and one at the end of the term.

Relief, geology, slope, soil, hydrography and climate are very important elements of the geographic space which modify and catalyze the landscape and tourism processes (Niño, 2014).

It is important to take this into account in order to pay close attention to the problematic field of graduate studies in Tourist Sciences since tourism is a matter of multifactorial origin which leads to the fact that its diagnostic and treatment involve the gathering of several disciplines whose sensible and suitable results generate new ways to manage the natural heritage with a vision to taking advantage of tourism in order to benefit the population and their vital needs.

The general purpose of the UA is to trigger the building of meaningful learning that permits the examination and interpretation of the origin and development of the natural Mexican heritage, particularly the one of the State of Guerrero, with a tourist sustainable vision, as well as the analysis of theoretical and applied studies, in Mexico and abroad.

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The generic competencies (capacities, skills, dexterities, and values) which are to be strengthen are: creating a research project while applying the recommended methodology for the type of proposed study, and coordinating the learning of a Master's Degree students, either in a classroom or in the field. Next is the educational model by competencies (Tobón, 2013), focused on the student, to contribute on the formation of teachers with the necessary competencies to practice their grade with efficiency, responsibility, and honesty, as well as to follow the ethical codes which rule their occupation.

The specific competencies to be strengthen are: A) identifying the problems related to the sustainable exploitation of the natural heritage in the State of Guerrero with a sustainable tourist vision, from local to global confines, in order to elaborate feasible proposals for the study, solution and prevention of those problems with a critical sense and B) facilitating the development of competencies with efficiency, responsibility and honesty in the Learning Units in the field of tourism sciences by following the educational model focused on the student in order to contribute to the formation of highly critical masters.

A competency unit refers to: examining, interpreting and formulating hypotheses about the origin and evolution of the sustainable exploitation of natural heritage in order to project the best way to manage nature for the benefit of society as we know it today.

In the structure of the plan, specific competencies are made of one group of learning units which are mandatory. A second group is made of elective and free learning units. The seminars correspond to integration-association, such as integration seminars and the corresponding mention. The credits obtained by the student from attending those seminars are added in order to get those 122 that are required in the MCGST.

It is also important to emphasize the coordinated participation of the three sectors of government: Federal, State and Municipal, as well as the participation of the local population, taking into consideration the natural, social, cultural, economic and politic contexts where the aim is to reduce or check the negative impact of traditional tourism and conserve the natural heritage through highly planned tourism.

Nowadays the relationship between natural heritage and tourism is a topic widely discussed due to the fact that the balance between the rational exploitation of natural resources and the environment conservation is to be achieved. In order to get that, education plays an important role in all of its levels to seek global competitiveness supported on logical and regional strategies thanks to the study of specific cases in this UA, as in the case of the MCGST. "This suggests that the formative process of every (student) dialectically conjugates and harmonizes general issues of university education" (Alonso, Álvarez & Castillo, 2016: 144).

Society is an open system since it is related to the environment, and it permanently influences society. That is why the best actual approach to investigate the relationship between society and nature is its analysis under the concept of system, enriched by the social and formative approach.

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Quality offers competitive advantages in two ways: the first one is in the short run and implies offering quality education, which allows increasing benefits through increasing the number of masters in the MCGST; whereas the second one refers to improved quality, which is the most effective way for public enterprises, such as UAGro, and even private enterprises, to grow. Quality has an impact in two ways, one is the territorial expansion of the market, and the other is the increase of mercantile participation.

Quality affords true students and loyal graduates to the graduate studies incorporated to the PNPC, since they feel comfortable when choosing a Master's Degree to study and to perform as a career in a professional way. This becomes a recommendation toward other people who wish to study the MCGST, or others offered by UAGro.

Some considerations derived from this work are: 1) nowadays it is important to talk about quality education through economic and functional diversification of the graduate studies included in the PNPC. This idea is the origin of its initiatives in favor of exploiting educational competitiveness, i.e. the exploitation of each one of the possibilities offered by public and private educational facilities. And 2) thus, it is important to get new income sources which could be a complement, but not a substitute, of the income for which the members of the Basic Academic Nucleus (NAB: Núcleo Académico Básico) of the MCGST apply.

This is not about, as selfishly and wrongly it has sometimes been claimed, promoting Master's Degrees as an educational monoculture, but getting worthy and attractive life conditions for the facilitators and masters, exploiting through investment and imagination a quality education with social inclusion, and at the same time sustainable, which will ease the preservation of the environment as well as the essential functions of education in this superior case. Moreover, many of its possibilities will come from ecological respect and preservation of the environment when practicing tourism in a responsible way.

Therefore, the four pillars of Competencies-Based Education (EBC: Educación Basada en Competencias) focused on complex learning, i.e. "competencies on which a person must structurehis/her continuous education, are: learning to know, learning to do, learning to be and learning to get along with others" (Tobón, 2013:121). Thus, those four pillars rescue the value of the human being (students and facilitators) as participants in the changes, as individuals or as a group, in an environmental and tourist space where their contribution offers innovations, modifications and/ordevelopment.

Solving a problem in a suitable way starts with the interest of doing things right, achieving the determined goals, getting valuable products in the cultural context and working cooperatively with others (knowing to be). It requires knowing the environment and understanding the problem starting with concepts and categories previously built (knowing to know) which lead the way toface it.

On this basis, a person sets into action specific procedures to find a solution to the problem, taking into consideration the context and possible changes.

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The contents of the UA Natural Heritage and Tourism are sinthesized in the Table 1.

Date/ Session	Thematic contents	Learning results (Sub-competencies or competency elements)	Bibliography/ Reading Passages	Professor
1	**1 Natural Heritage**	Realizing the issues the Mexican natural heritage faces	Correa *et al*, 2013: 23-42	Dr. Naú Niño
2	**2 Conservation of the natural heritage** ° Use °Abuse °Planning	Explaining the causes and effects from lack of strategy to conserve natural heritage	Valencia *et al*, 2013: 43-66	Dr. Naú Niño
4-6	**3 Alternative Tourism in the natural heritage** °Rural community ° Material Flows °Energy °Information	Examining and identifying the environmental benefits alternative tourism brings	González *et al*, 2013: 67-93	Dr. Naú Niño
7	**4 Methodology for the study of natural heritage**	Realizing the importance of the elaboration and application of a geo-touristic methodology.	Niño and Saldaña: 25-31	Dr. Naú Niño
8	**5 Geo-touristic planning in natural heritage**	Knowing the importance of sustainable geo-touristic planning and its application on a concrete case	Correa and Correa: 95-103	Dr. Naú Niño
9	**6 Natural Heritage in the state of Guerrero.**	Examining the role of the environment, man´s appropriation of nature and projecting the carrying out of SOWT (Strengths, Opportunities, Weaknesses and Threats) methodology, (FODA: Fortalezas, Oportunidades, Debilidades y Amenazas)	Avilés: 121-128	Dr. Naú Niño
10	**7 Case study: Cíntora, Guanajuato**	Realizing the touristic-environmental issues in Cíntora, Guanajuato and possible solutions	Niño and Saldaña: 19-29	Dr. Naú Niño
11	**8 Partial examination**	Evaluating the most important concepts applied to the exploitation of Mexican natural heritage	Written examination	Dr. Naú Niño
12	**9 Elaboration of a study of a local case**	Elaborating a study case chosen in an equalized way about a site in the State of Guerrero	Collaborative work	Dr. Naú Niño
13	**10 Follow-through of the case study**	Examining and applying sustainable touristic methodology applied to natural heritage proposed by Niño (2012)	Progress in the group case study	Dr. Naú Niño
14	**11 Follow-through of the case study**	Examining and applying sustainable touristic methodology applied to natural heritage proposed by Niño (2012)	Progress in the group case study	Dr. Naú Niño

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15	**12 Follow-through of the case study**	Examining and applying sustainable touristic methodology applied to natural heritage proposed by Niño (2012).	Progress in the group case study	Dr. Naú Niño
16	**13 Follow-through of the case study**	Examining and applying sustainable touristic methodology applied to natural heritage proposed by Niño (2012)	Progress in the group case study	Dr. Naú Niño
17	**14 Follow-through of the case study**	Examining and applying sustainable touristic methodology applied to natural heritage proposed by Niño (2012)	Progress in the group case study	Dr. Naú Niño
18	**15 Ending of the case study**	Synthesis of results in the analyzed case study	Collaborative work	Dr. Naú Niño
19	**16 Handing in term paper and final examination**	Application of methodology to the study case and evaluation of the most important ideas about natural heritage planning	Individual work	Dr. Naú Niño
20	**17 Final evaluation**	Summary final evaluation	Individual	Dr. Naú Niño

Table 1 Contents of the UA Natural Heritage and Tourism
Source: Own elaboration

Some of the admission requirements to this UA were: competencies for oral and written communication, attitude to work in a group and skill to search for information on the internet. The previous knowledge the student must have before this unit is about having taken and passed the subject Evolution and Development of the Touristic System; conceptional bases of sustainable development, fundamentals and analysis of management and methodology of research (qualitative and quantitative).

"Is to observe how some cooperative activities make students acquire the main principles of cooperative learning (…) at the same time that they contribute to the development of social competences in a language classroom" (Martínez, 2016:43).

Conclusions

According to the established goal and the results that were achieved, it can be inferred that: 1) the UA Natural Heritage and Tourism contributes in a solid way to the growth of graduate students with competencies which allow them to make innovative proposals about situations society demands and, as much as possible, to manage ecological balance; 2) the topic natural heritage and tourism means an educational process of systematized character, involving facilitators, students and the information they handle, which converge in one place to interact, communicate and learn on each other, as well as build new knowledge and 3) education based on competencies and learning and teaching the natural heritage-tourism relationship are important to understand the world around us, every time more globalized.

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Public tourism policy to increase the international tourism

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Abstract

This article is part of an ongoing research on how to develop a better public policy to attract international tourists to Mexico. The paper presents a theoretical analysis on public policy and a discussion on how it is applied in our country and the effects it has had on the increase of international tourists, in order to determine if it has been successful or can be made improvements to achieve it. The Mexican government considers that tourism is a key sector to increase the country's development and aims to consolidate Mexico as a global destination, consolidating its tourism competitiveness, however, it seems that policies have not been adequately addressed.

Public policies, tourism, tourism competitiveness

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Introduction

Tourism has experienced continued growth and deepening diversification to become one of the fastest growing economic sectors in the world. The tourism industry is one of the worthwhile industries which can support country's income. Public policies play an important role in tourism, like promoting the image of the country in the international perception, plan and make strategies to attract more tourists to visit the destination. The destinations face competitive pressures which are more and more important and complicated in today's globalized society. Therefore, tourism destinations compete for visitors at tourism market and subsequently get into a competitive struggle and it's important that destinations know and analyses their weaknesses and strengths in order to improve and maintain destination performances. Thus, through an analysis of the tourism offer of a destination and the evaluation and impact of public policies, destinations can attract a greater number of visitors and be competitive.

Public Policy

When we talk about public policy, we talk about the processes, decision-making and the results elaborated by the governments, but without ruling out the conflicts of interest, the tensions between the different points of view to solve the problems that are presented in countries, as well as actions, decisions or omissions by the different actors involved in the policy; is a scenario full of powers in conflict, confrontation and collaboration of opinions and actions.

Policies are the creation of collective actions that result in the decision making to carry out such actions. Policies are "the course of action followed by an actor or a set of actors in dealing with a problem or issue of interest. The concept of politics pays attention to what is actually done and carried out, rather than what is proposed and desired.

Policies are shaped by a set of decisions, and the choice between "alternatives" (Aguilar, 1993).

In the 1950s and 1960s, science considered that public policies were variables dependent on political activity (Roth, 2006).

It was assumed that policies were no more than the result or consequence of the rulers or those represented in the system by the political parties. In other words, the policies were the decisions of the governors for the solution of a particular problem, and that they were only carried out to legitimize their power before the governed (Aguilar y Lima, 2009).

Lasswell (1971) defines public policy as a "discipline that deals with explaining science-based, interdisciplinary and policy-making processes and the services of democratic governments", twenty years later, would add: "knowledge of the decision-making process and knowledge in the decision process "; the first, refers to the professional skills needed to participate in policy-making (knowing the policy-making process) and the second based on reliable scientific knowledge necessary to contribute to the invention of a theory and practice (data and theories of science in the policy decision process in order to improve public procurement).

On the other hand, Tamayo (1997), defines that the public policies are the set of objectives, decisions and actions carried out by a government to solve the problems that at any given moment, the citizens and the own government consider a priority.

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Public policies are government actions with objectives of public interest that arise from decisions based on a process of diagnosis and feasibility analysis, for effective attention to specific public problems, where citizens participate in the definition of problems and solutions (Corzo, 2013).

Therefore, public policies are not any action taken by governments in response to certain circumstances or to the demand of a country; they are a set of planned, analyzed and intentional actions that are aimed at achieving a goal for the public interest or a benefit and that combined with instruments, procedures and resources can be reproduced consistently in time, making the necessary corrections as time passes and as societies and countries evolve (Ochoa, 2013).

Consequently, public policy refers to actions taken by a government to solve problems that arise in society, and thus, to produce a favorable change.

Tourism is an activity that gives a benefit to society and countries, and therefore, there is a need for certain actions, strategies and laws to govern and regulate this activity, hence we can say that tourism policy emerges.

Tourism policy

Tourism is an important activity for countries because the contributions it makes to the domestic product and to the balance of payments. Therefore, this importance is reflected by the public sector in the elaboration of actions, plans and programs for the countries, so it is necessary to create public policies focused on tourism and thus, to achieve a greater competitiveness in the international tourist market.

The World Tourism Organization defines the "Tourism Policy" as the action that develops the public sector from the set of administrations and institutions that compose it and affect in relevant way to the public activity (Arcoraci, 2009).

Acerenza (2006) defines tourism policy as "the set of decisions on tourism that, are integrated in the context of the national (sustainable) development policy, and guide the conduct of the sector and regulate the actions to be followed, which are translated into plans and programs of sectoral development".

Public tourism policies promote the growth of national income, create jobs, increase foreign exchange earnings and help to increase the number of tourists in different areas of a country (Velasco, 2005). This results in the improvement of the quality of life and the well-being of society (Monfort, 2000).

The position of a government in the development of public policies in tourism can be passive when the basic actions affect the activities, but without influencing their development, or active, manifested in actions that favor tourism development.

This implies the recognition of specific needs, such as providing accommodation in areas with attractive potential, or protecting areas of tourism development (Monfort, 2000)

One of the main objectives of tourism policy is to promote receptive tourism so that different types of measures can be applied, for example, marketing campaigns, improvement of the image of the destination to the outside, as well as the presentation of the products at international fairs and exhibitions, support tourist enterprises and create measures for the establishment of foreign companies (Arcoraci, 2009).

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According to Hall (2000), the objectives and functions of public policies in the field of tourism are related to coordination, planning, legislation, promotion, stimulation, and support with the public interest. For example:

- Economic development: refers to the generation of foreign income; assistance in the balance of payments; employment at the national level; improving the economy of destination; provide employment; research and dissemination of information on future market trends and strengthening the image of the destination.

- Competitiveness: ensure the viability and competitiveness of tourism destinations and companies, so that they are able to continue to succeed.

- Local prosperity: tourism contributions should maximize the prosperity of destinations; policies strengthen the prosperity of the destination and seek to avoid leakage outside the economy, for example using local products and local human resources in the tourism sector.

- Quality jobs: policies should seek to strengthen working conditions in tourism and ensure the quality and creation of jobs in this sector.

- Cultural wealth: keep traditions and cultural heritage so they do not get lost.

Therefore, through public policies, destinations are able to create or strengthen their tourism products and services through strategies and actions aimed at improving the quality and conditions of these. Consequently, public policies are a factor that influences the tourist competitiveness of a destination as they help to make decisions, designate resources and solve any problem that is present in society.

Tourism competitiveness

The location of countries obliges tourists to choose between destinations, and to decide which tourism products and services have quality, as well as some added value. As a result, competitiveness and the constant pursuit of excellence and quality have become fundamental objectives of tourist destinations. Hassan (2000) defines tourism competitiveness as a destination's ability to create and integrate value-added products that support local resources and retain its market position respect its competitors. Crouch and Ritchie (1999) defines that tourism competitiveness is the ability of a country to create added value and thus increase national well-being through the management of advantages, processes and attractions, integrating linkages among themselves. Therefore, tourism competitiveness can be defined as the capacity of a destination to create, develop and integrate tourism products with added value that allow increasing the tourist's economic output and national welfare; increasing the profitability of the sector; sustain local resources and improve their competitive position in the market through different strategies to promote and market supply (Ochoa, 2013).

Tourism Policy in Mexico

In Mexico, since the 1950s, the promotion of tourism begun and with this, hotels were developed at strategic points such as Cancun, Los Cabos and Loreto, as well as a major number of buses connecting with more destinations and the introduction of international airlines.

The following is a brief description of what was done in each six-year period to develop Mexico's tourism sector, either through agreements, developing more infrastructure or allocating more funds to the sector.

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In 1962 the first National Tourism Development Plan is created; although longer it considered a formal plan is not developed from the concept of strategic planning. It was considered, again, strengthen tourism infrastructure and its peripheral areas, but another very important aspect forgot to project strongly to competitiveness in tourism markets, human capital: entrepreneurs and managers (Magaña, 2004).

During the period 1970-1976 tourism was encouraged by policies that sought to increase the number of visitors to the country. The Mexican Caribbean, especially Cancun and Quintana Roo were pushed; this was an advantage in the use of resources and benefits for the region and strengthened the sector in general. In this period the joint ventures were encouraged to strengthen infrastructure in hospitality; especially the offer rooms were increased and with this, the tourist category which allowed Mexico to improve its offer hosting to internationally competitive levels. In 1975, the initiative was taken to promote Cancún as an Integrally Planned Center, being a pioneer in this type of tourism products (Molina, 2007).

From 1976 to 1982 the importance of tourism was identified as a source of foreign exchange. Emphasis was placed on improving infrastructure, particularly transport and communications and possibilities to open national and foreign private investment.

They were provided tax breaks and credits were granted to support investment in this sector. Tourist hotel classification (from one to five stars and great tourism) began, which allowed organizing the promotion and marketing of accommodation in the main national tourist destinations (Jiménez, 1993).

From 1982 to 1988 the opening of the country's economy began to other markets, which beneficent the establishment of tourism policy efficiently and competitive pricing policy was implemented at the international level, in order to be on par with the tourist destinations in the world (Magaña, 2009).

The Tourist Market was promoted with the National Tourism Program 1984-1988, as an international event for Mexico to offer, market, promote and disseminate their products to national operators and specialized journalists and foreign, especially US and Canada, but also to some European countries (Jiménez, 1993).

The years 1988-1994, tourism was promoted in the US and Europe. Tourist policies highlighted this interest, and expansion of infrastructure investment was supported and promoted again. Also, several mega projects were supported in order to expand tourism and create jobs (Magaña, 2009).

From 1994-2000, the Program for Development of Tourism Sector 1995-2000 was aimed to strength the competitiveness and sustainability of mexican tourism products, which helped in job creation, foreign exchange earnings and promoting regional development. This required conduct research to give guidelines to design strategies that would penetrate and satisfy new markets (Molina, 2007).

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From 2001-2006, the National Tourism Program confirmed that tourism can be considered one of the decisive factors to increase opportunities, improve income distribution and use natural and cultural resources.

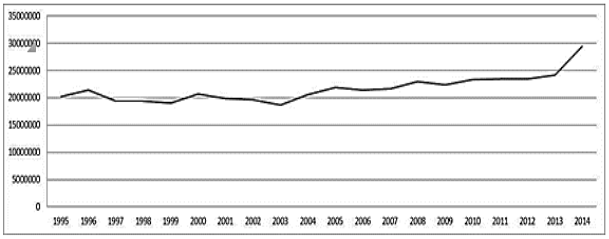
In addition, emphasis was placed on a new tourism policy which aims to reverse the inertia that have limited the potential of this sector, which would be an agent of change and transformation, a true source of economic wealth and social development for Mexico (Magaña, 2009).

The years of 2006-2012, Sectorial Tourism Program is created from a planning process of specific studies on competitiveness, development and evaluation of public policy and sought to achieve a competitive, productive, efficient, job-creating economy. In addition, it was established to make Mexico a leader in tourism through diversification of its markets, products and destinations, as well as promoting the competitiveness of companies in the sector so as to provide a service of international quality (SECTUR, 2007).

In the 2013-2018, the Institutional Program of the Tourism Promotion Council aims to strengthen the country's image through the promotion, quality and diversity and authenticity of the attractions; also seeks to expand connectivity between countries; diversify the products and make greater investments to the sector; as well as seek greater tourism agreements between countries (SEGOB, 2015).

Public policy is an instrument by which the government defines its work plan, the necessary actions to get results and how to translate the qualitative and quantitative benefits in favor of the community.

Graphic 1 shows the international tourist arrivals to Mexico from 1995 to 2014. Peaks are presented in 1996, 2000, 2005, 2008 and 2014, years in which tourism plans were developed for encourage tourism through a series of actions and strategies, mostly in promotion the country to the exterior. Therefore, public policies had a positive influence on attracting tourists in that years.



Graphic1 International Tourist Arrivals from 1995-2014

Countries with more tourism

In this section, a comparative analysis will be carried out between Mexico and the most visited countries according to UNWTO data to determine what factors influenced the attraction of tourists.

The countries that attract more tourists according to the UNWTO (2016) are France, United States and Spain, as shown in table 1 (We add Mexico to compare).

(Millions of people)						
	2010	2011	2012	2013	2014	2015*
France	77,1	81,6	82,0	89,2	83,6	84,5
United States	59,8	62,7	67,0	69,8	75,0	77,5
Spain	52,7	56,7	57,7	60,5	65,0	68,2
Mexico	23,3	23,4	23,7	24,2	29,1	32,1

Table 1 International tourist arrivals 2010-2015. *Preliminary data
Source: UNWTO, 2016

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From the countries mentioned, a brief analysis will be made of the political factors that have influenced the increase of tourists to these countries, such as prioritization of tourism, budgets, marketing campaigns, infrastructure, among others.

The data for this analysis was obtained from The Travel & Tourism Competitiveness Report (WEF) 2017, 2015 and 2013, having values from 1 to 7, where one is the minimum and seven, the maximum.

This index is chosen because it is a country performance report according to certain subscripts (eg regulatory framework, infrastructure, cultural and natural resources) and measures a set of factors and policies that allow sustainable development of the tourism sector and tourism, which contributes to the development and competitiveness of a country.

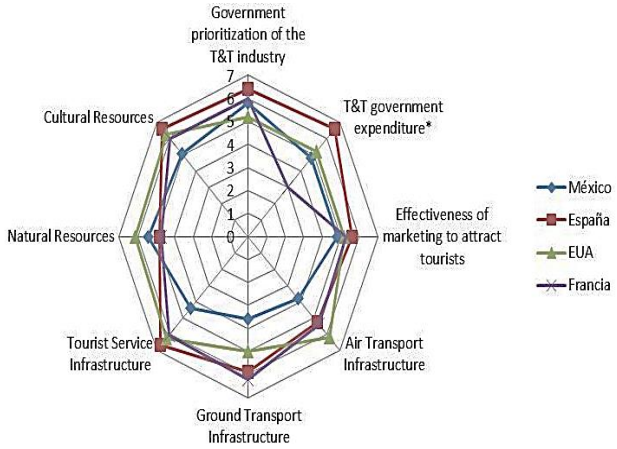
The following table shows the factors analyzed by country and by years:

	Mexico			Spain			USA			France		
Factors	2017	2015	2013	2017	2015	2013	2017	2015	2013	2017	2015	2013
Government prioritization of the T&T industry	5,3	5,6	5,8	6,1	6,4	6,4	5,2	5,3	5,2	5,5	5,8	6
T&T government expenditure *	4,8	4,7	4,8	6,5	6,5	6,6	5,2	5,2	5,2	3	3	3
Effectiveness of marketing to attract tourists	5	4,8	4,8	5,6	5,3	5,6	5,4	5,3	5,2	5,3	5	5,3
Air Transport Infrastructure	3,7	3,6	3,8	5	4,9	5,3	6	6	6,2	4,9	5	5,4
Ground Transport Infrastructure	3,2	3,3	3,6	5,2	5,5	5,9	4,6	4,7	5	5,6	5,7	6,2
Tourist Service Infrastructure	4,7	4,7	4,4	6,7	6,6	6,7	6,6	6,3	6,3	5,7	6,1	6,1
Natural Resources	5,6	5,1	5,4	4,9	4,6	4,8	4,9	5,4	6,1	4,8	4,8	4,7
Cultural Resources	5,3	4,9	5,1	6,8	6,7	6,6	4,8	4,8	6,3	6,7	6,6	6

Table 2 Selected countries and factors
Source: own elaboration based on WEF data, 2017

Next, a comparative analysis will be carried out for years using radial graphs to visually present the gaps between the current state and the ideal state (Mexico vs. the best country), to show changes in strengths or weaknesses, and to present clearly the important categories of performance.

The first graph to be made will be the year 2013:



Graphic 2 Comparative 2013
Source: own elaboration based on WEF data, 2017

In graphic 2 it can be seen that the country with the best performance was Spain. According to the analyzed points, this year, Mexico did not get a good score in the tourism budget, which is a fundamental axis, since through this it could allocate more resources to have a greater demand capture through new products, providing training to service providers, or improving the quality of the products and services that are available, etc.

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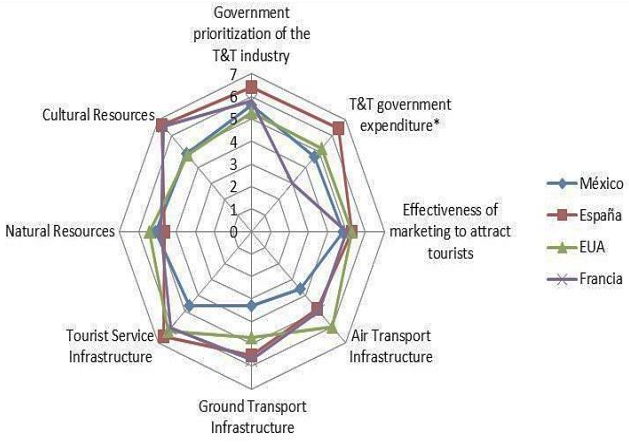
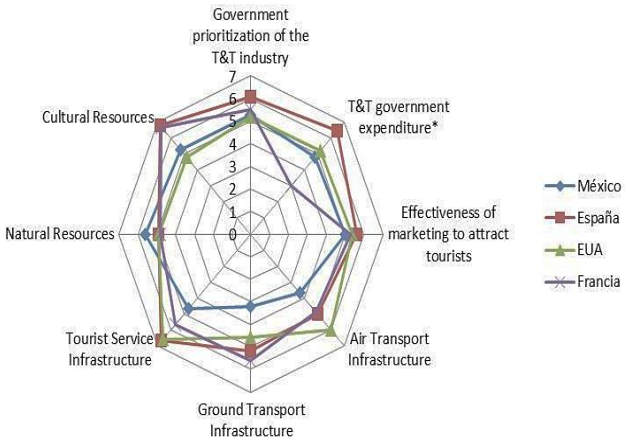
Another weak point that Mexico had in this year was the infrastructure: aerial, terrestrial and touristic. This indicates that the country lacks good roads, as well as airport connectivity and hotel quality.

Graphic 3 shows the comparative of the year 2015, where it can be seen that Mexico continues with failures in infrastructure.



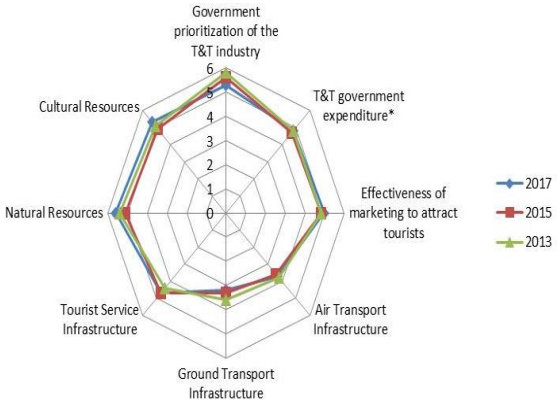
Graphic 3 Comparative 2015
Source: own elaboration based on WEF data, 2017

And in Graphic 4, which is the comparative of the year 2017, continues to present the same flaws.



Graphic 4 Comparative 2017
Source: own elaboration based on WEF data, 2017

And making an annual comparison of Mexico, we get the following:



Graphic 5 Comparative of Mexico 2013-2017
Source: own elaboration based on WEF data, 2017

Therefore, the political aspects that Mexico must consider so that it can compete and attract more tourists would be in terms of infrastructure, since the country has a good tourist offer, good marketing campaigns and has prioritized the importance of tourism over the years, as noted in the section on Tourism Policy in Mexico.

Conclusions and recommendations

The tourism sector of Mexico has a wide variety of tourism products and resources that have not been managed efficiently and effectively. Tourism policies implemented by other countries have focused on building infrastructure, giving greater value to heritage, containing prices and making a strong promotion of brands, destinations or products abroad . On the other hand, the Mexican government has implemented a tourism policy that has been characterized only by promoting tourism abroad: by launching plans focused on strengthening or developing new tourism products and have greater participation in tourism fairs.

Public policies in tourism involve collective actions and provide a framework that guides actions and strategies for the development of such activity.

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In addition, for a destination to be successful, it is necessary that the government manage the social and economic factors that influence the tourism sector and stimulate the creation of new products to remain competitive in the market and add value to the country. Therefore, the government has to make strategies and actions to guideline and to attract new tourists.

It is necessary to considerate that tourism is not only promotion, quality is required before promoting a product or service, also, it's necessary to analyze the market, analyze what other countries have done and involve all sectors that intervene in the tourist activity: governmental, private initiative and educational institutions.

Tourism policy shoul include at least the following points to increase the arrival of tourists:

Tourist superstructure: requires an organism to develop and implement plans, also required to review the structure and legal framework on a regular basis.

Tourist Promotion: the country's tourism sector requires greater promotion and more capital to be more competitive in world markets.

Training and Human Resources Training: improve the human resources according to the new tourism markets.

Tourist Services: modernization of facilities, equipment, operation systems to make them attractive to tourists.

National Tourist Information System: through Internet, maps, brochures, videos and photos.

Tourist Culture: generate greater tourist culture and raise awareness of the importance of tourism.

The following specific actions are olso proposed:

1. Promotion: Promote greater integration and coordination among the different governmental actors, the different levels of government and the private sector; eliminate resource constraints in order to provide greater support to the private sector, improve strategies to prevent political cycles (six-year periods) from impeding the development of the tourism sector and strengthen the link between advocacy and policies.

2. About infrastructure: Improve means of transport and roads; create an integrated and fluid transport system for visitors and residents; continue with air service agreements to support tourism and increase the connectivity with all Mexican airports, both domestic and international flights.

3. Diversification of products and services: Develop a more diversified portfolio of tourism products with greater value, focusing on different market segments; it's also necessary to innovate the existing model to offer more value to consumers and to create new experiences, as well as to take advantage of the experience that has with products like "Pueblos Mágicos", tourist routes and tourist clusters.

4. About finance: Finance tourism projects that offer greater potential and guarantee the efficient use of public resources and support micro, small and medium-sized enterprises.

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Current situation of the demographic bonus in the Plurinational State of Bolivia

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Abstract

The present article aims to present the current demographic situation in Bolivia, determining at what stage of the demographic transition and how advanced the demographic bonus is. For the development of the subject, socio-demographic concepts such as demographic bonus, demographic transition, aging, savings, labor supply, labor insertion, age structure, public policies and others were taken. As for the methodological framework, a bibliographical review was made based on the main authors who discuss the demographic transition in Europe and Latin America. A descriptive approach of the phenomenon was used, taking as base of data the population and housing CENSO of Bolivia of the 2012, realized by the National Institute of Statistics; and the Statistical Database and Publications of the Economic Commission for Latin America and the Caribbean. Finally, a referential review was carried out on the main public policies that are being implemented within the country regarding the use of the demographic bonus.

Demographic bonus, demographic transition, public policies, human capital, savings, labor supply, labor insertion and age structure

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Introduction

The decline in mortality and fertility is constituted by the so-called demographic transition, but in some cases these phenomena do not always act synchronously (Bloom 2002: 22), especially in Latin American countries that experienced changes demographic differences, by the regional context that surrounds them, in this sense states like Bolivia lived a slower process than the average of the rest of the countries; the purpose of this article is to make known the main characteristics of the current demographic moment that the country is going through and in order to determine the situation of the demographic bonus of the country.

For that purpose, a quantitative research was carried out with a descriptive approach to the phenomenon, using as main data bases the population CENSO of 2012 carried out by the National Institute of Statistics (INE) and the Database and Statistics Publications of the Economic Commission for America Latin America and the Caribbean (CEPALSTAT); with that a contrast of the data and the proposed theory of the demographic transition and of the demographic dividend or bonus was realized, as well as referring like the National Plan of Development "To Live Well", the Patriotic Agenda 2025 and the Political Constitution of the State, thus determining the main state actions for the use of the demographic bonus.

This article is divided into 3 parts; on the one hand, a bibliographical review of the subject was made, starting from the demographic transition, the concept of the demographic dividend or bonus and the structure by age; later a description of the sociodemographic panorama of the country was made and finally the main public policies related to the use of the bond in the Plurinational State of Bolivia.

Theoretical aspects of the demographic transition

Demographic transition

The process of the demographic transition (TD), as Notestein asserts, is the transition from agrarian societies to industrial societies, which moved from a primitive regime (characterized by the non existence of some form of birth limitation, marriage, or by abstention or delay of marriage) to an intermediate regime (celibacy and delay of marriage) ending in a contemporary regime (which are concerned with improving the standard of living). (Tapinos, 1990).

Livi - Bacci, adds that T.D. is characterized by the passage from a disordered population to an orderly one, that is, that demographic growth "was inefficient and disorderly, since biological continuity (grandfather, father, grandson) disappeared because of the high rate of infant mortality; the demographic transition, refers to the passage of disorder to order, as mortality and fertility rates decline and the demographic order is restored" (Livi-Bacci, 1998, p.14), to this is also added the reason for the high fertility rate, since the number of children who were born replaced the number of children who died; while modern societies began with the decline of mortality in the first place and subsequently the decline of fertility (it can be inferred that this generated the phenomenon known as the Baby Boom) to have a low degree of fertility and mortality is generated a balance population, it should be noted that the gap between the decline in mortality and fertility is explained by socio-cultural processes in different regions.

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To this process Adolphe Landry called it demographic revolution, in which concept it incorporates the notion of demographic regime that was defined in terms of the level of life that the individuals propose by means of demographic regulation (to those who resort to that goal). Thus, it distinguishes three types of demographic regime:

- Primitive regime: Characterized by the lack of forms of limitation of births, marriages and abstention or delay of marriage; high mortality rates and therefore high birthrates.

- Intermediate regime: Fertility rates remain high, but lower than in the previous regime; a decline in mortality is generated, which causes an imbalance. In turn, methods of maintenance of the standard of living are generated, such as celibacy and delay of marriage

- Contemporary Regime: the main concern is to improve the standard of living, a generalized practice of restricting births, a decline in birth rates and mortality, and a demographic balance (Reher, 2011).

Caldwell to the above process incorporates the concept of modes of production or basic models of production, each with a model of society and level of well-being, which were analyzed by different sociologists, such as Max Weber, Emile Durkheim and Karl Marx, among the main modes of production, are:

- Collecting and hunting: It is characterized by a low development of material well-being, weak family ties, as far as religion is based on nature, sacred and spiritual sites that favor hunting, while at the same time reinforcing the family and creating societies that are more united.

- Sedentary agriculture, Based on the family nucleus, on the production of the land, where the family works within the property and the moral rules are fundamental for this society, the marriage was arranged, it suppresses the sexual activity of the women before or outside the marriage; it should be noted that family ties are rooted in immobility. In turn within this process was developed one in parallel "commercial activities" by which the invention was derived from writing and income growth, capital concentration, industry development and universal research that brought with new inventions.

- Industrial production, at this stage it can be observed that family ties, moral ethics diminish in their importance, religion takes a secondary point in the forming role of society, women enter the labor market and the complex industrial system based on global trade. As for the demographic changes, it can be analyzed that after the scientific processes, a decrease in the infant mortality was generated; this in turn produced a reduction of the size of the family provoking a sexual revolution, linked more with the modern societies. (Caldwell, 2004, pp. 300-303)

Taking over Landry, the American author F.W Notestein calls the process described above as a "demographic transition", becoming one of the most important paradigms of demographic history, distinguishing three phases, through which this transition:

- Phase 1 Pre-transition, characterized by high rates of mortality and fertility

- Phase 2 Transition, characterized by a decline in mortality and still high fertility rates

- Phase 3 Post transition, finally this phase is characterized by low rates of mortality and fertility. (Chesnais, 2001)

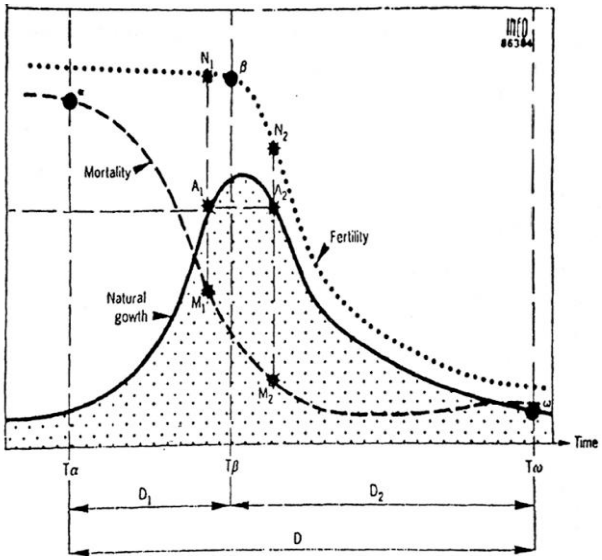

Figure 1 Stages of the Demographic Transition
Source: J.C. Chesnais in The Demographic Transition, stages, patterns, and economic implications: a longitudinal study of sixty-seven countries covering the period 1720-1984 (1992) pag. 27

During the second half of the nineteenth century, growth slowed down and was called "Ski Jump effect". Increased control along with increased time between one pregnancy and another (Reher, 2011). The second wave of transition in fertility takes place first in countries close to Europe, but later it would eventually spread to the rest of the world.

The process of the demographic transition raises the fact that to a greater social economic development the population change takes place, however, as it is the case of Latin America with GDP inferior to the European one obtains a demographic transition to more accelerated levels, it is probable that this is a phase of development during which the impact of non-material factors is important in determining the level of fertility, reflecting the role of cultural and institutional factors, as well as demographic systems prevailing in different populations. (Livi - Bacci, 1998, p.21)

According to Livi - Bacci "The transition in less developed countries in general and in Latin America occurred two or three generations later than in Europe, in a completely different world (...) (however, Latin America) has benefited from important transformations of technology (coming from more developed countries) thus accelerating the transition "(Livi - Bacci, 1998, p.22).

As far as the transition from fertility to the development of the Latin American regions was concerned, until the 1960s the average was 6 to 7 children per woman, which in the 1980s was reduced to 3.5 children per woman. In turn there is a phenomenon of population increase, due to the advance of technology, the decline of the diseases that produced sterilization and marriages at a young age, producing the phenomenon called "baby boom", which shows how marriages at an early age are influenced by the postwar reconstruction, the implementation of Keynesian policies and high employment rates, it is in this context that some theorists at this stage call it the "second demographic transition".

Demographic bonus and age structure

As for the Demographic Bonus phenomenon, the contradiction between global (even high) population growth and the decline in fertility in developing cities is analyzed; this phenomenon has a close relationship with age structure, since high fertility rates in the reproductive period increase in most developing countries and this factor acts to maintain high gross birth rates, even in the context of fall in rates per woman (Cleland, 1994, p.269).

As shown in the image below, each age group involves different behaviors with different economic consequences; given that they require or provide certain goods and services, for example by observing the demands of young people, the need to improve health services, education and labor inclusion, older people provide and generate greater economic growth; not only demand health and services, but also a pension; observing the relationship between population growth and age structure is generated around the consumption that each age group performs and its contribution to economic growth. (Bloom, 2002) and (Lee & Andrew, 2003)

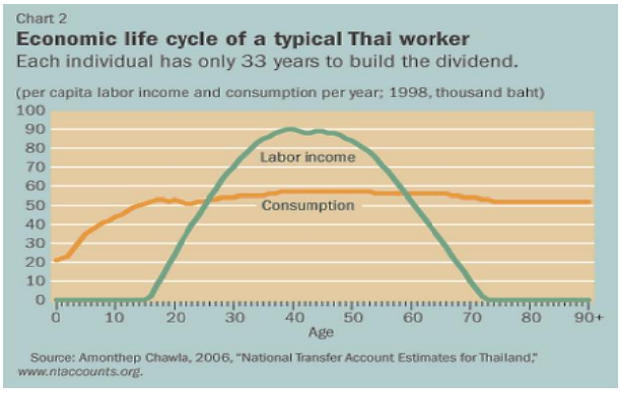

Figure 2 Economic life cycle of a typical Thai worker
Source: Ronald Lee and Andrew Mason in What Is the Demographic Dividend? (2003); p. 6

While the age structure remains constant, the effect of population growth is neutral, but when the proportion of the working-age population increases or decreases, so do economic growth opportunities. To take advantage of the demographic dividend in the field of public policies that must be realized, public health has been taken into account; family planning, education, and economic policies that promote labor market flexibility, trade openness, and savings.

1) Labor supply, the demographic transition affects the labor supply in two ways: a) the aging of the baby boom generation and b) greater participation of women in the labor market and a decrease in family size.

2) Saving (voluntary and compulsory), the demographic transition encourages savings as health conditions improve and longevity increases.

3) Human capital, higher expectations of life cause changes in the way people live, experience profound cultural changes. (Bloom, 2002, pp. 33-34)

The demographic changes discussed above initiated processes that directly or indirectly led to economic and social changes, with implications that are reflected in the age structure.

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The immediate effect of the decline in fertility is reflected in the age structure, with the base of the pyramid being the first to be affected by these changes, the initial decline in the population at younger ages is not compensated by the population of the size of the working age population tends to increase and this occurs as the birth cohort continues to increase, this was the case for the first countries that went through the demographic transition between 1950 and 1980, as is observed in the image # 3, from this last year the size of the cohort began to decline, so the cohort decline in births / decrease in the working-age population and reproductive age, providing a window of opportunity with economic effects, where a growing working-age population pays for the pension of a still relatively small population. As the very structure of the population grows older, it will pose challenges to that system based on the intergenerational transfer of income. (Bloom, 2002)

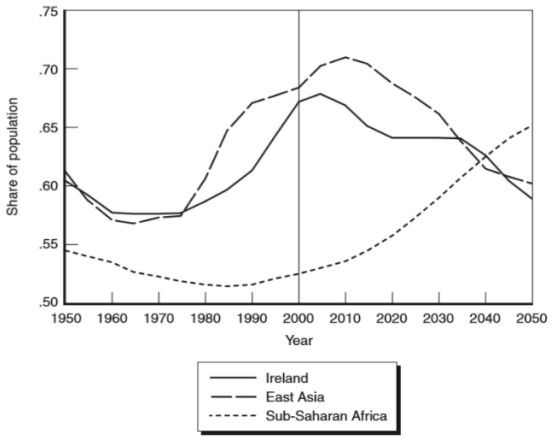
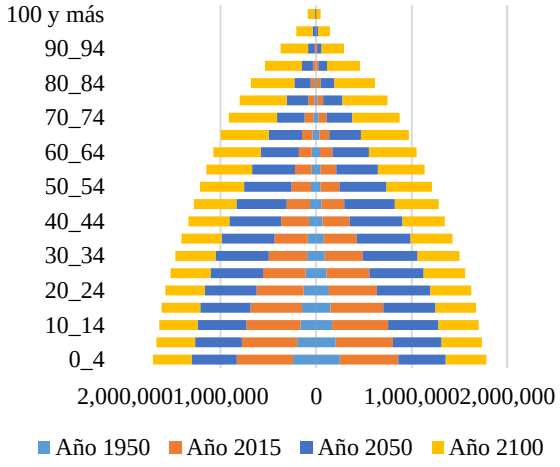


Figure 3 percentage of the population of working age
Source: Bloom, D., Canning, D., & Sevilla, J in "The Demographic Dividend" (2002); p. 38

Bolivia: Partner demographic picture

The Plurinational State of Bolivia is located in the center-west of South America, has a population, according to the latest population census of 2012 carried out by the National Institute of Statistics, 10,290,003 inhabitants (approximately) and an index of masculinity of 99.67%, with a territorial area of 1,098,581 square kilometers, has a demographic density of about 9 inhabitants per square kilometer, being the country with the lowest population density of the region.In the last fifty years, the Bolivian population has tripled, reaching an annual growth rate of 2.25%.

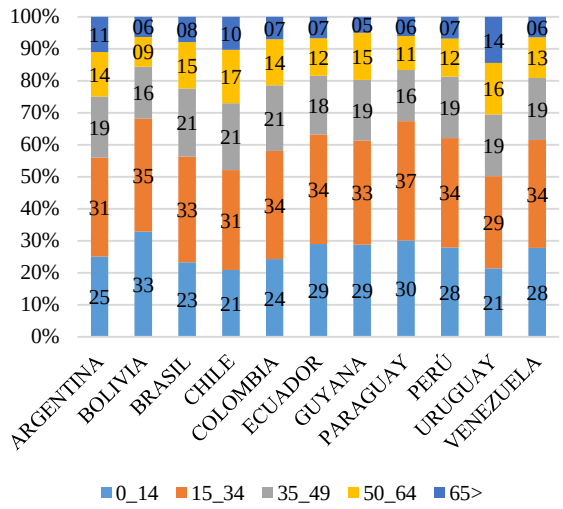
As can be seen in the graphic of the population pyramid, built on projections of the Economic Commission for Latin America and the Caribbean (ECLAC), Bolivia is a country with a young population structure which will continue to rapidly increase its population of 10.3 million that is currently at a projection of 40 million by the year 2100.



Graphic 1 Population pyramid projections years 1950 - 2015 - 2050 – 2100
Source: own elaboration based on ECLAC: Economic Commission for Latin America and the Caribbean - Population database. 2016 Revision. - http://www.eclac.cl/celade/proyecciones/basedatos_BD.htm

A report prepared by the United Nations Development Program (UNDP) states that Bolivia is the youngest country in South America with a population of 60.7% of the population aged 15-65 and 45.3% of those under 15 (UNDP, 2016); by downloading the ECLAC database it can be ensured that the report of the P.N.U.D is correct in considering the country as the youngest in South America; however we observed certain differences in the population of 0 to 4 years and the population of advanced ages.

It should be noted that these variations do not alter the category of Bolivia as the youngest country in the region when compared to countries such as Chile or Uruguay, whose population from 0 to 4 years of age is around 20.9 and 21.4 per cent of its population, the child population of Bolivia is 10% larger than that of these countries. As for the productive ages, ie the economically active population (PEA), both Uruguay and Chile have a higher percentage than Bolivia, this is due to the demographic bonus process, which in these countries is more developed than the Bolivian case, which still has a high degree of underage population. Finally, in the case of the elderly population, Uruguay has the oldest population followed by Chile, with an average of 14.4 and 10.3 percent, respectively, but Bolivia only 6.3% of its population is within this range.



Graphic 2 Structure of the population by sex and by age group
Source: own elaboration based on: ECLAC: Economic Commission for Latin America and the Caribbean - Population database. 2016 Revision. - http://www.eclac.cl/celade/proyecciones/basedatos_BD.htm http://esa.un.org/unpd/wpp/index.htm

This situation of relative advantage in the use of the demographic bonus, turns out to be and as mentioned by the UNDP, a great asset but at the same time presents a great challenge since, according to investigations of the Center of Studies of Population of the Greater University of San Simón (Cochabamba - Bolivia), even though Bolivia is at an earlier stage of the demographic bond, this transition will be very rapid and the demographic bond will age in 50 years, during which time the government must invest in social policies and programs, all in issues of labor inclusion, education, retirement system, etc. in order to take full advantage of this stage and in the aging the country does not have to live times of economic crisis.

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“Bolivia dignified and productive ", main public policies of labor inclusion

As Bloon states, the most important thing to consider is that the demographic dividend or demographic bond has a limited time, and must be driven by a series of mechanisms, such as labor supply, savings and human capital. In this sense, the government has a complicated mission regarding the use of the demographic bonus, since, apart from the fact that Bolivia is the youngest country in the region, it is also among the countries with the greatest economic backwardness, high rates of unemployment and informal work, factors which negatively influence the country (in the matter of accumulation and saving of resources for the stage of aging).

Regarding the informal market, ECLAC affirms that there is a total of 70% of informal workers in Bolivia, although at present this means an economic cushion for the State, since it does not have to ensure the labor insertion of this group of people, once demographic bonus stage ends the government will be surrounded by older adults, without pensions that will require the state public services of health and welfare, in this sense it is necessary to examine the main contributions to mitigate these unfavorable aspects .

Bolivia in recent years underwent an important ideological and political change since, since the arrival of President Evo Morales to power, in 2005, with a process of cultural revaluation, the Andean worldview of Living Well was implemented as a state ideology. , begins its management with the modification of the Constitution of the State and launches the "National Plan of Development: Bolivia Digna, Soberana, Productiva y Democrática para Vivir Bien", in which it provides the main strategic guidelines to address the country's command. As for the issue we address the main axis is that of the dignification of employment that affirms:

“The dignification of employment; During the validity of the neoliberal model in our country, the employment issue has been neglected, due to the fact that a set of economic measures of structural adjustment, expressed in D.S. 21060, which liberates labor markets, goods and services, and capital markets. In this sense, the labor market lost dynamism, which translates into an open unemployment rate, which for 2006 represented 8.15 percent; the most affected being young people aged 18 to 24 years. Jobs have been concentrated in micro and small economic initiatives, low productivity, income and social security. Similarly, workers 'organizations weakened because of the application of neoliberal norms, whose direct impact was felt in the Ministry of Labor, which reduced their ability to speak in the defense of workers' rights. On the other hand, the low dynamism of the productive apparatus, and particularly of the business sector of the economy, failed to generate enough jobs, which forced the social agents to join informal activities, family type and small enterprises, a context in which wage labor was not the first option for labor insertion. To improve employment conditions, a drastic change in the orientation of the State is required, transforming employment into the pivot of economic policy, making the dignity of work the engine of Living Well. To this end, it is necessary to strengthen the institutions of the Ministry of Labor, as responsible for articulating and coordinating employment policy "(Official Gazette of Bolivia, 2007).

In the framework of what has been proposed to date, various changes were made in favor of the inclusion of young people in the labor market, such as the creation of the National Youth Law, which obliges municipalities to generate a youth, with the aim of technifying youth and collaborating in labor insertion, in turn the Ministry of Labor, Employment and Social Security launches its plan to:

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My first decent job within the framework of the employment support program, which aims to "provide intermediation, orientation, job training and self-employment management to job bidders, employers and priority groups, thus facilitating the young boys. We distinguish ourselves as a personalized, comprehensive, free and national service "(Ministry of Labor, 2016).

On the other hand already in the context of the planning towards the end of the administration of the government of turn a "Patriotic Agenda 2025 To Live Well" was generated; which points out 13 fundamental pillars for the constitution of a dignified and sovereign Bolivia, in which the pillar number 6 of productive sovereignty with diversification and integral development, refers to the labor insertion of the young people affirming that a "Productive Sovereignty with diversification and integral development without the dictatorship of the capitalist market in Bolivia will have increased the formal employment, the income of the workers, and will be generated permanently and sustainably numerous and diverse sources of labor, mainly for the young, guaranteeing a decent life, through the strengthening of micro, small and medium-sized enterprises and massive and sustained financial investments in the productive sector "(Official Gazette of the Nation, 2013).

PILAR 6			
PRODUCTIVE SOVEREIGNTY DIVERSIFICATION AND INTEGRAL DEVELOPMENT			
DIMENSIONS	MINISTRY	ATRIBUTIONS	
		ARTICLE	SUBMIT
11. To increase the formal employment, the income of the workers and will generate permanent and sustainable numerous and diverse labor sources, mainly for young people, guaranteeing a decent life, through the strengthening of the micro, small and medium enterprise and investments in the productive sector	MINISTRY OF PRODUCTIVE DEVELOPMENT AND PLURAL ECONOMY	64	E
	VICEMINISTERIO OF INDUSTRIAL PRODUCTION IN THE MEDIUM AND LARGE SCALE	66	b, c, g, k, l
	MINISTRY OF LABOR EMPLOYMENT AND SOCIAL SECURITY	86	b, c
	VICEMINISTERY OF WORK AND SOCIAL FORECAST	87	b
	VICEMINISTERIO DE EMPLEO, CIVIL SERVICE AND COOPERATIVES	88	c

Figure 4 Pillar 6: Patriotic Agenda 2025

In its eagerness to generate sources of work, the government created different state-owned enterprises, such as: BOLTUR (Tourism Company), CARTONBOL (Bolivia's Productive Public Company of Cartons), EASBA (Empresa Azucarera San Buenaventura), EBA (Empresa Boliviana de Almendras), EBIH (Bolivian Company of Hydrocarbons Industrialization), EBOCOCA (Bolivian Community Company of Coca), EBT (Bolivian Tourism Company), ECEBOL (Productive Public Company of Cement of Bolivia), ECOBOL , EEPS (Strategic Company for the Production of Fertilizers), EMAPA (Empresa de Apoyo a la Producción de Alimentos), ENATEX (National Public Textile Company) SUPPLIES BOLIVIA LACTEOSBOL (Dairy of Bolivia) , PAPELBOL (Empresa Papeles de Bolivia), PROMIEL (Empresa Productiva Apicola), QUIPUS (Computer Assembly Company Quipus), YACANA (production complex of camelids), ENAVI (Ministry of Development Planning, 2016).

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In the legal and constitutional framework the labor insertion does not seem to have obstacles since new laws of labor inclusion and respect to the young people were implemented and even the above companies were created; however, many of these companies went bankrupt in recent years and even had to close, creating a concern for the labor sector, and regardless of having a number of laws should be an analysis and evaluation of these state policies and laws, what their real contribution is and if they are reaching the youth sector that requires it.

If these actions are not followed up, alternative strategies will not be implemented to take advantage of the demographic bonus and the creation of public policies for the management of retirement will be obstructed; the State will not be able to sustain the burden of demographic aging, entering into economic crises, which can lead to a setback in the social and economic development of the country.

Conclusions

The present essay emphasized the importance of the structure by age in the social economic development, for which it emphasizes the demographic bond. As for the demographic characteristics of Bolivia, as compared with other countries in the region, Bolivia is only entering the first demographic bond, which implies that it is the right moment for the government to carry out different actions in Bolivia. However, it is of vital importance not only to launch public policies for the inclusion of young people in the labor market, but also to improve and improve the income or retirement system in the country. determine the real impact that is being generated.

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The impact of time-varying systemic risk on predicting the dynamics of stock return volatility in tehran stock exchange

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Abstract

Stock market volatility has received much attention in the finance literature in the last few decades. Analysts need to make correct forecasts of the price volatility as a necessary input for tasks such as risk management, allocation of portfolios, Value at Risk assessment, option pricing, and future contracts. Ignoring the effects of volatility will reduce the accuracy of stock return predictions. In this regard, the aim of the present study is to identify the dynamics of stock return to increase the accuracy of predictions. The results of time-varying parameter (TVP), dynamic model selection (DMS), dynamic model averaging (DMA) and Kalman filter output in the state-space showed that DMS with $\alpha=\beta=0.90$ outperforms other models in terms of prediction accuracy. According to this model, after the first lag of stock returns (126 periods), the oil price (58 periods), inflation rate (35 periods), interest rate (31 periods) and exchange rate (20 periods) had the highest impact on stock returns. According to the results, of 126 periods, the systemic risk indexes affected stock returns in 102 periods. As a result, it can be concluded that systemic risk plays an important role in predicting the dynamics of stock return volatility.

Macro Indicators, Kalman Filter, Stock Returns, Time-Varying Parameter, Dynamic Models

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Introduction

Due to their dynamic nature, economic and financial indicators are always changing. The factors that cause changes in financial indicators are sometimes voluntary in the form of politics and sometimes are involuntary in the form of natural phenomena. But it seems important to investigate the nature of shocks and their influence on financial markets. Previous studies indicate that the origins of economic shocks can be explained form different perspectives. Some researchers believe that inflation is the source of instability of macroeconomic variables and financial markets. However, some believe that the volatility of exchange rate, energy carrier prices and other factors such as monetary and financial shocks is the source of instability (Fischer, 2011; Fama, 1981; Daisy Li et al., 2010; Bjornland, 2009).

Various models and theories have been proposed in the academic literature to achieve an optimal investment to help investors in their decisions and assessments. It is accepted that returns on investment relates to the level of its standard deviation. On the other hand, most investment decisions are based on the relationship between the risk and return (Sharpe, 1964; Black & Scholes,1974). Consequently, an investor always considers these two factors in portfolio analysis and management. One of the key areas of economic research deals with the behavior of financial and economic variables. In addition to the direction of changes, the rate of volatility gives valuable information on the behavior of a variable and its effect. Due to uncertainty caused by the volatility of economic variables, economic models pay particular attention to decision making under uncertainty (Bollerslev et al., 1992; Jacquier et al., 2002). As a disadvantage, expected returns prediction models are not stable but are highly sensitive to different markets and conditions (Goyal & Welch, 2008).

In fact, studies have shown that although there is evidence for the predictability of expected returns prediction models, such models show a poor performance so that investors cannot use them in practice. There are several reasons for this assumption that the standard out-of-sample approach probably fails. First, the key features of stock returns are not considered in the regression model. Especially, constant volatility is strongly inconsistent with observed data, because stock returns volatility changes over time (Johannes et al., 2014).

Also, according to Johannes et al. (2014), ignoring this volatility leads to optimal portfolios solely based on the expected return (taking into consideration the constant variables over time) leading to a poor performance.

In this study we seek the causes taking into account realistic assumptions to reach stability in determining factors influencing stock returns for Tehran Stock Exchange. The goal of this work is to find out how stock return volatility affected when new data enters (changes in systemic risk macro-indicators) in Tehran Stock Exchange. The authors believe that this is the first attempt in Iran which examines the dynamic models for prediction on stock return.

The rest of the paper is organized as follows. In section 2, the theoretical backgrounds of our proposed model is presented and reviewed in brief. In section 3, the models adopted in our study with their underlying variables are introduced. Section 4, our model estimations and results are presented. Finally, section 5 contains concluding remarks and guidelines for future researches.

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Theoretical Backgrounds and Review

Dynamicity (changes over time) is the inherent nature of economic and financial phenomena. Ignoring this dynamic nature will oversimplify financial phenomena. Accordingly, the resulting models are not often realistic leading to misinterpretation of such phenomena (Belmonte & Koop, 2013). In modern portfolio theory it is assumed that a trade-off existed between the risk and expected return. Expected return changes over time with changes in risk factors and thus price action will not follow a random walk due to the changes in the expected returns of shareholders over time. Therefore, many financial experts believe that it is impossible to investigate predictability of stock prices regardless of the risks (Pesaran & Timmerman, 1995).

In recent decades, various models have been introduced to determine prices and changes in stock prices. The volatility of financial variables as one of the main components of pricing of financial assets has been the focus of many studies. The Capital Asset Pricing Model (CAPM) is based on the assumptions and findings of the modern investment and Markowitz's portfolio theory which indeed had an undeniable effect on the field finance and investment. In CAPM, the relationship between variables in regression-based ordinary least squares is always assumed static. And, it is ignored the evolution of these relationships over time which alters the equation coefficients. In these models, it is supposed that a relationship with constant coefficients can be applied at different times. Incorrect results due to this unrealistic assumption led to dynamic models with more resemblance to the reality of the outside world (Belmonte & Koop, 2013).

According to Stock and Watson (2008), the traditional prediction models were not able to provide correct predictions over time.

Some models provided good estimates during the economic boom and some in the depression era. This led to the development of time-varying parameter (TVP) models and Markov Chain Monte Carlo Models (MCMC) that were able to predict large models (with a large number of variables) over time ((Nakajima, 2011; Mumtaz, 2010). In these models, estimated coefficients can change over time.

Due to the variation of condition, structural breaks and cyclic changes, the traditional models were not capable of calculating the parameters. Moreover, a large number of variables and estimators lead to large and bulky models. In this class of models, if there are m variables at the time interval t, there will be $2m^t$estimation models (koop & Korobilis, 2011; Korobilis, 2013). There are several studies on structural models using time-varying parameters (TVP) models.

Naser and Alaali (2015) investigated the role of oil prices and other macroeconomic and financial variables including the index of industrial production, interest rate, inflation rate, unemployment rate and financial ratios in predicting the S&P 500 index. Their empirical evidences show that the use of DMA/DMS approach leads to a significant improvement in prediction performance compared to other prediction methods. The performance of these models is improved when oil price is considered as a predictor.

Fux (2014) examined the predictability and structural modeling of stock returns. The results of this study showed that predictability of US out-of-sample stock returns over time is poor due to structural breaks and changes in the coefficients.

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Based on the findings, an investor can increase the utility level up to 1.2% using DMA where instability, time-varying coefficients, and model uncertainty are taken into account compared with forecasts based on ordinary least squares.

In recent years, Bossaerts and Hillion (1999), Pastor and Stambaugh (2001), Pesaran and Timmermann (2002), Clements and Hendry (2004), Paye and Timmermann (2006), Goyal and Welch (2008) and Pettenuzo and Timmermann (2011) conducted studies on time-varying parameter and dynamic models to investigate the relationships between predictor variables and stock returns following structural breaks. Johannes, Korteweg, and Polson (2008) focused on random volatility while Dangl and Halling (2012) used time-varying variables in the state-space model to predict the S & P 500 index. Table 1 summarizes the results of various studies (proponents and opponents) on the impact of macroeconomic variables on stock returns as well as the performance of time-varying volatility models compared with traditional models.

According to Table 1, most studies show that the volatility of macroeconomic variables affects stock returns. As a result, when creating an optimal portfolio, investors should pay special attention to the influence of these indicators. In addition, time-varying models are more effective than traditional models.

Effect of microeconomic variables on stock return	
Advocates	**Opponents**
Daisy Li et al (2010), Hoogerheide et al (2010) ,Jammazi and Aloui(2009), Liu et al (2008), Buyuksalvarci(2010), Brahmasrene et al(2007)	Gay (2008), Poitras, M. (2004), Karamustafa et al (2003)
Efficiency of time-varying volatility models in comparison to traditional models	
Advocates	**Opponents**
Chan et al(2015), Gupta et al(2014), Johannes et al(2014), Nakajima(2011), Mumtaz(2010), Fux (2014), Naser and Alaali (2015), Wang et al *(*2016)	-

Table 1 Summary of the results

The Research Models and Variables

Time-series regression model is a conventional statistical model where the changes of a phenomenon are studied over time. Such techniques assume that an equation with constant coefficients can be used in different times. Inaccurate results originated from such a non-realistic assumption leaded to dynamic models which are very closer to the real world. State-space model is a method for modeling dynamic systems which models, predicts and analyzes the behavior of system in such conditions.

State-space models let parameters have structural instability and let coefficients be constant over time. This is one of the applications of such models. Such models are known as time-varying parameter (TVP) models which is a special state of state-space models. State-space equations system consists of two equations: observation equation and equation of state.

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The equations are estimated using recursive algorithms Kalman filter. Bayes filter is the most typical estimation method. From Bayesian theory point of view, the problem of estimation is estimating probability density function posterior. Given probability density function posterior, the optimal estimation of states can be calculated in terms of any criterion function. There are different techniques for practical solution of Bayes filter, depending on relevant process and measurement. For example, if the studied dynamic system is a linear system and process and measurement noises are of Gaussian nature, Kalman filter will be used (Nakajima, 2011; Fux 2014; Belmonte & Koop, 2013).

In the following section, we will introduce the methods adopted in this study.

TVP Regression with Stochastic Volatility

TVP model with stochastic volatility enables us to record the probable changes of the fundamental structure of economy more flexibly and more powerfully. According to many studies, combining stochastic volatilities with TVP estimation improves estimation performance significantly (Nakajima, 2011). Let us consider TVP regression model as follows:

Regression.

$$y_t = x'_t\beta + z'_t\alpha_t + \varepsilon_t \qquad \varepsilon_t \sim \mathrm{N}(0, \sigma_t^2), \quad \mathrm{t} = 1, \dots, \mathrm{n} \tag{1}$$

Time-varying coefficients:

$$\alpha_{t+1} = \alpha_t + u_t, \quad u_t \sim \mathrm{N}(0, \sum), \ \mathrm{t} = 1, \dots, \mathrm{n} - 1 \tag{2}$$

Stochastic volatility.

$$\sigma_t^2 = \gamma \exp(h_t), \qquad u_{t+1} = \varphi h_t + \eta_t, \quad \eta_t \sim \mathrm{N}(0, \sigma_t^2), \quad \mathrm{t} = 1, \dots, \mathrm{n} - 1 \tag{3}$$

Where y_t is a scalar of response, x_t and z_t are $(k \times 1)$ and $(p \times 1)$ vectors of covariates, respectively, β is $(k \times 1)$ vector of constant coefficients, α_t is a $(p \times 1)$ vector of Time-varying coefficients, and h_t is stochastic volatility. Stochastic volatility plays a significant role in TVP models. Although the idea of stochastic volatility was first presented by Black (1976), financial econometrics has experienced many changes (Ghysels et al, 2002; Shephard, 2005).

Dynamic Models

The standard form of state-space models, especially that of Kalman filter, is as follows:

$$y_t = z_t\theta_t + \epsilon_t \tag{4}$$

$$\theta_t = \theta_{t-1} + \mu_t \tag{5}$$

Where $y_t$the dependent variable of model is, $z_t = [1, x_{t-1}, y_{t-1}, \cdots, y_{t-p}]$ is a $1 \times m$ vector constituted of intercepts estimators and dependent variable interval and $\theta_t = [\varphi_{t-1}, \beta_{t-1}, \gamma_{t-1}, \cdots, \gamma_{t-p}]$ is a $m \times 1$ vector constituted of coefficients (states). $\varepsilon_t \sim N(0, H_t)$ And$\mu_t \sim (0, Q_t)$, which have normal distribution with zero mean, are H_t and Q_t variances, respectively.

These models have many advantages the most important of which is the possibility of varying estimated coefficients at any time. The main disadvantage of such models is that if z_t gains a high value, the estimations will not be reliable. The extended TVP model has the same problems of TVP-VAR models. This model was properly developed by Garvin et al (2008) in which the behavior uncertainties of estimators were introduced to the model as follows:

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$$y_t = \sum_{j=1}^{m} s_j \theta_{jt} z_{jt} + \varepsilon_t \quad (6)$$

Where θ_{jt} and z_{jt} are the j^{jt} element of θ_t and z_t, respectively. Their model has an additional element: the existence of $s_j \in \{0,1\}$ variable. This variable cannot vary with time and serves as a permanent variable which can accept 1 and 0 for any estimator (Hoogerheide et al., 2009).

Raftery et al. (2010) introduced DMA method and eliminated all restrictions of previous methods. This method could estimate large models at any instant and made it possible to change the input variables of model at any time.

In order to explain DMA process, let us assume that there are k sub-set models of z_t variables of estimators where $z^{(k)} (k = 1,2,\cdots,K)$ indicates 6 sub-set models. Based on this assumption, given k sub-set models at any time, state-space model is described as follows:

$$y_t = z_t^{(k)} \theta_t^{(k)} + \varepsilon_t^{(k)} \quad (7)$$

$$\theta_{t+1}^{(k)} = \theta_t^{(k)} + \mu_t^{(k)} \quad (8)$$

Where $\varepsilon_t^{(k)} \sim N(0, H_t^{(k)})$ and $\mu_t^{(k)} \sim (0, Q_t^{(k)})$. $\vartheta_t = (\theta_t^{(1)}, \cdots, \theta_t^{(k)})$ $L_t \in \{1,2,\ldots,K\}$ stands for the model, out of the K sub-set models, which best fits with a given time. That method which makes it possible to estimate a different model at a given instant is called dynamic averaging model (Coop & Kroublis, 2011).

Regarding the differences of DMA and DMS dynamic models in forecasting a variable at time t based on data of time $t-1$, it can be argued that given $L_t \in \{1,2,\ldots,K\}$, DMA calculates $Pr(L_t = k|y^{t-1})$ and determines the average of the models predictions based on the above probability; while DMS selects a model with the highest possible probability of $Pr(L_t = k|y^{t-1})$ and forecasts the model with the maximum probability.

Evaluation of the Accuracy of Estimation Models

In order to evaluate a prediction model or to select the best fit model out of different available models for given time series, we need an index by which we can make decision about the acceptance or rejection of prediction model. This study adopts mean squared forecast error (MEFE) and mean absolute forecast error (MAFE) indices as follows:

$$MSFE = \frac{\sum_{\tau=\tau_0}^{T} [y_\tau - E(y_\tau|Data_{\tau-h})]^2}{T-\tau_0+1} \quad (9)$$

$$MAFE = \frac{\sum_{\tau=\tau_0+1}^{T} [y_\tau - E(y_\tau|Data_{\tau-h})]}{T-\tau_0+1} \quad (10)$$

Where $Data_{\tau-h}$ is data derived from period $\tau-h$ and h is forecasting time horizon and $E(y_\tau|Data_{\tau-h})$ is the point forecast of y_τ.

Our Model Estimations and Results

This study employed 1382-1392 data (with monthly intervals) for the variables of Tehran Stock Exchange return, non-official exchange rate change as the variable of internal market shock, interest rate (monetary policy), oil price change as the variable of foreign shock and inflation (general policy).

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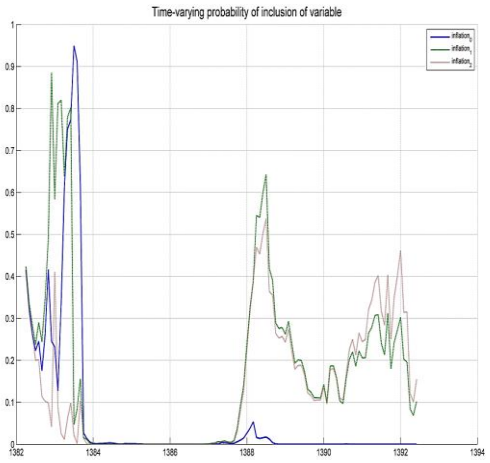
These variables were extracted form Iranian Central Bank official website and International Monetary Fund data, respectively. Tehran Stock Exchange Index at a given period to the previous period was multiplied by 100 and was considered as the return of Tehran Stock Exchange via the below calculation:

$$Y_t = 100 \times ln\,(\frac{TEPIX_t}{TEPIX_{t-1}})$$

The variables used in computer-based calculations to forecast and estimate the return of Tehran Stock Exchange are extracted as below:

stock return –
Inflation –
Non-official exchange rate change –
Interest rate –
Oil price change –

Figures 1 to 4 show the time-varying coefficients obtained from TVP model with the Stochastic Volatility of individual independent variables. In traditional regression models, only one point coefficient is calculated for each variable. In nonlinear models such as regime change models, depending on the number of regimes which is generally two or three regimes, two or three coefficients are calculated for each variable. TVP models with Stochastic volatility are used in the following figures. In this method, a coefficient is calculated for each time period. As a result, the number of model coefficients is equal to the number of time periods. The following figures show the estimated coefficients for each variable (not data trends).



Graphic 1 The probability of the impact of inflation in the level and first and second lags on stock returns

As can be seen in Graph 1, of the three modes of level, first and second lags, the impact of inflation rate in the first lag is greater than the level and second lag. Furthermore, the impact of inflation on stock returns in the second lag is greater than in level.

The impact of inflation on stock returns in the level and first lag from 2003 to 2005 is greater than the second lag. In the period from 2005 to 2009, none of the levels have a significant impact on stock returns.

In the period from 2009 to 2013, the first and second lags have a more significant impact on stock returns than the level. A similar analysis can be provided for interest rate, oil price, and exchange rate.

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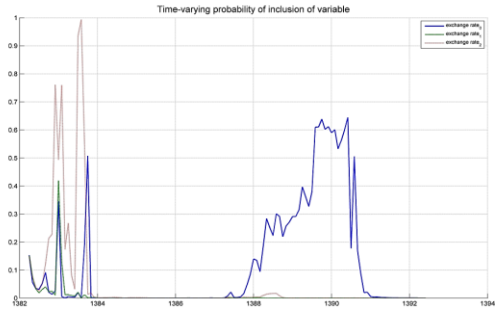
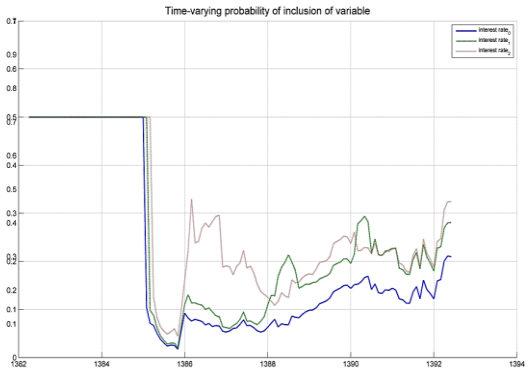
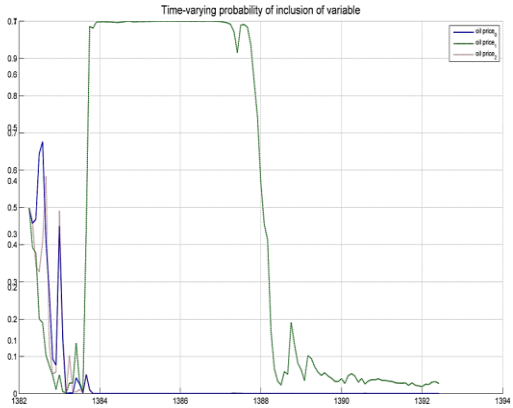


Graphic 2 The probability of the impact of exchange rate in the level and first and second lags on stock returns



Graphic 3 The probability of the impact of interest rate in the level and first and second lags on stock returns



Graphic 4 The probability of the impact of oil price in the level and the first and second lags on stock returns

According to the coefficients of macro-indicators at different time intervals and their probabilities, the accuracy of stock returns predictions is investigated using MAFE and MSFE estimated by DMA, DMS and TVP in the 1 and 4 anticipation horizons.

According to Table 2, DMS with α=β= 0.90 shows the highest prediction accuracy compared to other methods. Table 4 shows the results of the best estimation model with the input parameters, α=β=0.90. The above model with time-varying input variables provides the best prediction of stock returns in the Tehran Stock Exchange.

MSFE	MAFE	Prediction method
h = 1		
DMA $\boldsymbol{\alpha = \beta = 0.99}$	7.87	98.11
DMS $\boldsymbol{\alpha = \beta = 0.99}$	7.03	72.66
DMA $\boldsymbol{\alpha = \beta = 0.90}$	6.68	73.87
DMS $\boldsymbol{\alpha = \beta = 0.90}$	6.13	50.64
DMA $\boldsymbol{\alpha = 0.99; \beta = 0.90}$	6.67	71.08
DMS $\boldsymbol{\alpha = 0.99; \beta = 0.90}$	5.90	56.25
DMA $\boldsymbol{\alpha = 0.90; \beta = 0.99}$	6.22	71.25
DMS $\boldsymbol{\alpha = 0.90; \beta = 0.99}$	4.88	44.91
TVP-SV	7.86	101.31
h = 4		
DMA $\boldsymbol{\alpha = \beta = 0.99}$	114.08	8.68
DMS $\boldsymbol{\alpha = \beta = 0.99}$	106.02	7.93
DMA $\boldsymbol{\alpha = \beta = 0.90}$	62.34	7.04
DMS $\boldsymbol{\alpha = \beta = 0.90}$	39.87	4.77
DMA $\boldsymbol{\alpha = 0.99; \beta = 0.90}$	62.11	6.86
DMS $\boldsymbol{\alpha = 0.99; \beta = 0.90}$	53.65	5.96
DMA $\boldsymbol{\alpha = 0.90; \beta = 0.99}$	85.19	7.89
DMS $\boldsymbol{\alpha = 0.90; \beta = 0.99}$	47.68	5.73
TVP-SV	128.02	9.05

Table 2 Comparison of Different Models based on the Kalman Filter

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Table 3 shows variables affecting stock returns in different time periods. For example, in the period 2003-3, the first lag of stock returns and interest rate affect stock returns. In the period 2003-10, the first lag of stock returns, inflation rate and interest rate in the current period had the highest impact on stock returns in the Tehran Stock Exchange. Such analyses can be provided for all other periods.

Time periods			Variables		
2003-3	constant	ARY_1	interest rate_0	-	-
2003-4	constant	ARY_1	interest rate_0	-	-
2003-5	constant	ARY_1	oil price_0	-	-
2003-6	constant	ARY_1	interest rate_0	oil price_0	-
2003-7	constant	ARY_1	interest rate_0	oil price_0	-
2003-8	constant	ARY_1	oil price_2	-	-
2003-9	constant	ARY_1	interest rate_0	-	-
2003-10	constant	ARY_1	inflation_0	interest rate_0	-
2003-11	constant	ARY_1	interest rate_0	inflation_1	exchange rate_2
2003-12	constant	ARY_1	interest rate_0	inflation_1	exchange rate_2
2004-1	constant	ARY_1	interest rate_0	inflation_1	exchange rate_2
2004-2	constant	ARY_1	inflation_1	interest rate_1	-
2013-2	constant	ARY_1	inflation_2	-	-
2013-3	constant	ARY_1	-	-	-
2013-4	constant	ARY_1	-	-	-
2013-5	constant	ARY_1	-	-	-
2013-6	constant	ARY_1	-	-	-
2013-7	constant	ARY_1	-	-	-

Note: The indexes 0 and 1 respectively refer to the variable level and the first lag.

Table 3 Variables at Different Time Periods in the Best_Model[1]

Below, the results of the above table are summarized:

The first lag of stock returns in all time periods (126 periods) had a significant impact on stock returns.

Interest rate and its lags had a significant impact on stock returns in 31 time periods.

Inflation rate and its lags had a significant impact on stock returns in 35 time periods.

Oil price and its lags had a significant impact on stock returns in 58 time periods.

Exchange rate had a significant impact on stock returns in 20 time periods.

In general, after the first lag of stock returns, oil prices, inflation rate, interest rate and exchange rate had the highest impact on stock returns during the study period. Based on the results of 126 periods, systemic risk factors had a significant impact on stock returns in 102 periods. As a result, it can be concluded that systemic risk plays an important factor in stock returns volatility.

Conclusion and Results

The results clearly indicated this fact that the systematic risks at different time intervals have different effects on stock returns. Combining DMA and DMS with TVP models, it was shown that certain systemic risks affect stock returns in each period and the likelihood of this type of risks is dependent on their probabilities mainly due to the repeating nature of this type of risks. The results showed that variables with different intensities (different coefficients) affect stock returns at various time intervals. Accordingly, the impact of oil prices and inflation rate on stock return is greater than interest rate and exchange rate. The results of the present study are consistent with those of Naser and Alaali (2015), Chan *et al.* (2015), Johannes et al. (2014), Fux (2014), Nakajima (2011) and Wang et al. *(*2016).

[1] In order to be concise, only the results of the first and last year are provided

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According to the research findings, given that different variables at different time intervals have different effects on stock returns, the use of models to separate the regime changes in different risk levels is recommended to predict stock returns. As a result, policy-makers and those involved in financial markets are suggested not to use the general policies at all times to improve financial markets. They are also recommended to set policies in every regime depending on the most important factors affecting stock returns using appropriate tools.

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Article
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Thirlwall's Law: the export sector and economic growth in Mexico, 1993-2016

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Abstract

This paper applies the basic balance-of-payments constraint growth (BPCG) model, to the analysis of Mexico's economic growth using data from BIE (INEGI) over the period 1993-2016. Hence, following Moreno Brid (1999), a VAR model with cointegration is applied to estimate the long-run relation between the exports and real output in 1993-2016. Also, this research provides an overview of the change in the external sector during the period of trade liberalization in order to improve export competitiveness and achieve better integration into the international market. The results show that there is a positive cointegration between these two variables and, therefore, it's plausible to consider the Thirwall's Law as a hypothesis capable of explaining the economic growth of Mexico in the long run.

Balance of payments, foreing trade, exports, economic growth

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Introduction

Nowadays, economic growth is one of the topics that more debate generates within the academic circles, as there are different schools of economic thought that try to explain their causal factors from a particular perspective. Specifically, Thirwall (1979) proposes that growth analysis be developed from a demand-driven approach to understanding the role of exports within the economic system. In fact, the contribution made by Thirlwall stands out because it establishes how the supply of productive factors responds in an endogenous way to an expansion of production and aggregate demand.

These studies are summarized in the Thirlwall's Law (or Harrod-Thirlwall's Law), which establishes that the rate of income growth of a country is equal to the quotient that results from dividing the income elasticity of the exports between the elasticity income of the imports. This idea is based on the assumption that a country can't resort to foreign capital to sustainably finance its trade deficit, in addition to the fact that there is no influence on the terms of trade or other price effects.

In particular, this research applies the basic balance-of-payments constrained growth (BPCG) model to the analysis of Mexico's economic growth to determine if the export sector has been able to transfer its success to the rest of the local economy, as proposed by neoclassical theory.

The methodology applied consist in a VAR model with cointegration to estimate the long-run relation between the exports and real output in 1993-2016, introducing two dummy variables to capture the structural changes that ocurred in Mexico due to the devaluation of the local curreny in 1995 and the international financial crisis in 2008.

The structure of this research is organized as follows: the first section presents the theoretical basic model of the Thirlwall's Law. Second section shows a brief description of the Mexican economy during the period of trade opening. The next section present the econometric results of this study. Finally, the last section provides conclusions and economic policy advices.

Thirlwall's Law. Theoretical elements

The original version of this model (1979)[2] can be expressed using the following equations. These are:

$$x = \eta[p - p^* - e] + \varepsilon z \quad (1)$$

$$m = \psi[p^* + e - p] + \pi y \quad (2)$$

$$p + x = p^* + m + e \quad (3)$$

Equations (1) and (2) represent the demand functions for exports and imports. While (3) represents the current account balance. Where *x, p, m, p*, e, y, z* represent continuous rates of change of the following variables: exports, domestic prices, nominal exchange rate, domestic income and world income. In addition, $\eta<0$ and $\varepsilon>0$ are the price and income elasticities of exports, $\psi<0$ and $\pi>0$ are the price and income elasticities of imports.

To solve the system of equations (1) - (3) and thus find the growth rate of the economy in the long run, be replaced (1) and (2) in (3):

$$p + [\eta(p - p^* - e) + \varepsilon z] = p^* + [\psi(p^* + e - p) + \pi y] + e \quad (4)$$

[2] Does not include capital flows.

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It follows that:

$$(1+\eta+\psi)p-(1+\eta+\psi)p^{*} \\ -(1+\eta+\psi)e+\varepsilon z=\pi y \quad (5)$$

Ordering in terms of $(1+\eta+\psi)$, we have:

$$(1+\eta+\psi)(p-p^{*}-e)+\varepsilon z \\ =\pi y \quad (6)$$

Finally we get:

$$\frac{(1+\eta+\psi)(p-p^{*}-e)+\varepsilon z}{\pi}=y \quad (7)$$

Taking equations (1) and (7), and considering that reative prices are constant in the long term (i. e. *p, p *, e = 0*), we obtain:

$$\frac{\varepsilon z}{\pi}\Leftrightarrow\left(\frac{\varepsilon}{\pi}\right)z=y_{B} \quad (8)$$

According to Thirlwall (2003), in the long run the actual growth rate (y) equals the growth rate consistent with the equilibrium of the balance of payments (y_B) and this is known as *the fundamental law of growth*:

$$y_{B}=y=\left(\frac{\varepsilon z}{\pi}\right)=\left(\frac{x}{\pi}\right) \quad (9)$$

So, this is the proposed approach to study the case of Mexico for the period 1993-2016

A brief characterization of the Mexican economy under the open economy regime

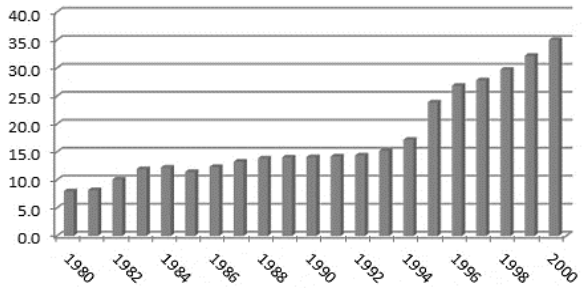
With Mexico's entry into GATT in 1986, trade began a phase of liberalization in which it was intended to integrate the country in a different way in the world market. Thus, the economy was oriented towards the foreign with the intention of achieving greater competitiveness through trade, boosted by the dynamics of exports.

This way, the mexican government hoped to get a higher GDP growth.

That's how it began the construction of the trade structure that Mexico used in the following years. Then, to consolidate the process of opening-up and encourage capital inflows, Mexico negotiated with the United States and Canada, the trade integration through NAFTA, which began in 1994.

This trade agreement has been considered as a pioneer because of the inclusion of some disciplines that did not often form part of the free trade agreements until that time, in the sense that it not only advocated the elimination of tariffs and non-tariff barriers to agricultural products, but also promoted the liberalization of trade in services and foreign investment flows; rules for the protection of intellectual property rights and new mechanisms for the settlement of disputes in order to protect both the rights of member countries and the investor's and exporter's rights. In this sense, NAFTA represented a watershed in terms of Mexico's trade policy because it established a new approach to trade negotiations (López and Zabludovsky, 2010).

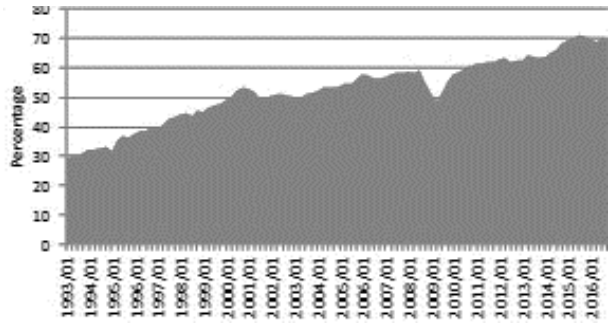
According to Ruiz Nápoles and Moreno-Brid (2006), all these mechanisms aimed at the liberalization of trade and capital were part of a policy whose purpose was to boost economic growth through the increase in manufacturing exports, without any subsidy by the mexican government. Thus, by increasing exports, aggregate demand would also increase, which would lead to increases in domestic production and employment



Graphic 1 Total volume of exports as a proportion of GDP, 1980-2000
Source: own elaboration with information from INEGI

As can be seen in graphic 1, exports have increased their share of GDP during the period 1980-2000. In 1980, these represented only 8% of GDP, while by the end of that decade exports represented 14% of total production. Finally, in 1995, these increased to 35% as a share of GDP.

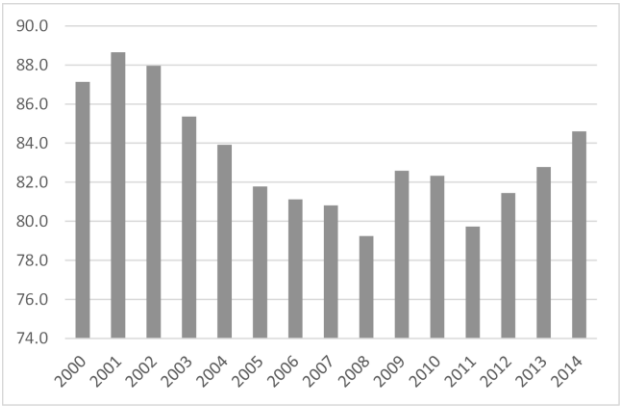
The accelerated growth of exports is explained by the evolution of the degree of trade opening, since from 1993 it's observed that it has deepened by passing from 25% in 1993 to 61% in 2010 and the continuous trend upward. This behavior shows that from the beginning of NAFTA, foreign trade has acquired great economic relevance by becoming the development pole of the Mexican economy (see Graphic 2).



G**raphic 2** Trade Openning of Mexico: 1993-2016, (X+M)/GDP
Source: own elaboration with information from INEGI

Within the total exports, the most dynamic component is the manufacturing exports, which have experienced a huge boom since 1980 and which prevails until today. In particular, these exports suffered some decline in their participation during the period corresponding to the financial crisis of 2008, which originated in the sub-prime mortgage problem (see Graphic 3).

This behavior clearly reflected the Government's commitment to the open economy model, whose axis is the relatively diversified manufacturing sector and dominated by FDI flows (Salinas and Tavera, 2007).



Graphic 3 Share of manufacturing exports with respect to total exports, 2000-2015
Source: own elaboration with information from CEFP

In summary, during the commercial opening process it was promoted to the industrial sector as a key part of achieving growth. This is verified by analyzing the performance of the industry through industrial GDP, because it includes activities such as the extractive industry, energy, construction and of course, manufactures, which currently serve as the engine of economic growth by boosting sales and domestic production, also provide the necessary currencies to finance the acquisition of intermediate and capital goods necessary for the productive process.

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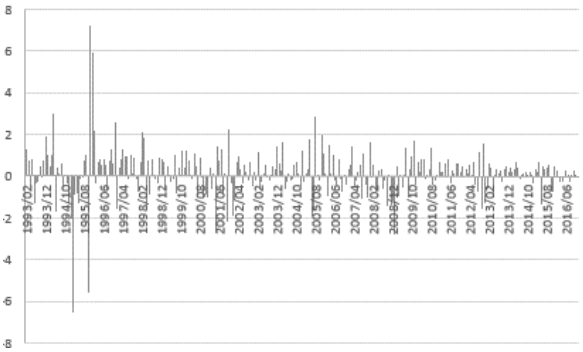
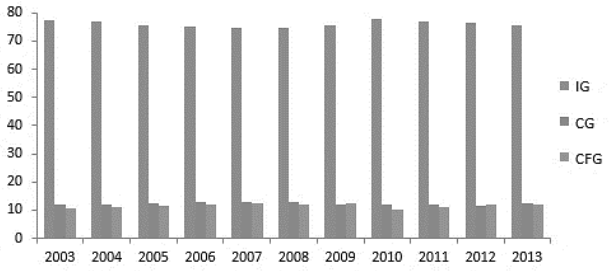
According chart 4, in 2007 the Mexican economy experienced a lower growth compared to previous years due to a slowdown in US demand, caused by the slow growth of its industrial activity and, in the second instance, by the reduction in domestic spending. It should be noted that this trend was maintained towards 2008, as a result of the contraction in the motor, materials and construction activities, among others. In addition, manufacturing production was influenced by the lower dynamics of its exports, as well as the slowdown in domestic demand for its products.

In other words, this kind of exports began to dwindle because of America's economic downturn, which also affected other developed regions of the world. However, in 2009 Mexico experienced a severe contraction in its levels of productive activity, explained by a more critical decline in external demand (mainly from the United States), which impacted directly on the domestic market.



Graphic 4 Growth rate of industrial production, 1993:01-2016:12
Source: own elaboration with information from INEGI

The final reflection is as follows: While the growth of this industrial sector has been highlighted, the truth is that it has not had the capacity to transfer its positive effects to the economy as a whole because it's accompanied by a strong increase in the volume of imports (particularly intermediate and capital goods), which implies the existence of a high income elasticity of imports (see Graphic 5).



Graphic 5 Import of goods by destination (%), 2003-2013
Source: own elaboration with information from INEGI

In particular, the manufacturing sector functions as an enclave because of the emergence of transnational corporations, which tend to promote intra-industry trade, implying that by increasing exports, imports also increase in a similar or larger proportion, thus generating insufficient effects on the internal productive dynamics.

Empirical evidence: Theoretical proposal of the econometric model, methodology and results

The variables used for the study are: the domestic output (Y) and the exports (X). All expressed in millions of pesos at 2008 prices. The database has been taken from the *Banco de Información Económica* (BIE), the INEGI and has a quarterly frequency for the period 1993-2016[3].

[3] http://www.inegi.org.mx/sistemas/bie/

The starting point for the construction of the econometric model is equation (8'), which defines the long run equilibrium economic growth rate of a country as a linear function of three variables: the income elasticities of exports and imports and the growth rate of the rest of the world (Davidson, 1991). Hence, given the income elasticities of the external sector, a higher growth of the world economy would allow a higher rate of output growth without affecting the current account equilibrium or assuming the economic growth of the rest of the world as an exogenous variable, an increase in the ratio of income elasticities of exports and imports would lead to a higher long run real output growth rate (Guerrero de Lizardi, 2006).

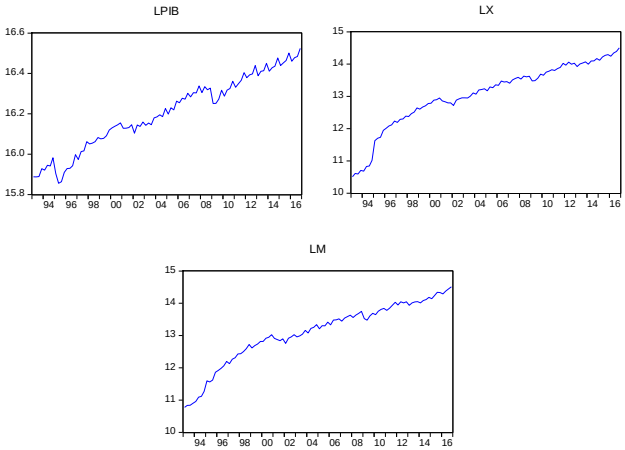
Then, following Moreno-Brid (1999), the stochastic equation used is defined as:

$$Log(PIB_t)= \alpha_0+\alpha_1 Log(X_t)+\mu_t \quad (9)$$

Where $log(PIB_t)$ and $log(X_t)$ are logs of the real GDP and the real exports of goods, respectively. Also, it's important to note that the variables are in logarithms to work with their elasticities.

As part of the econometric methodology, the first step is to make a brief descriptive analysis on the development and behavior of the variables used for the econometric estimation in order to determine if there is any kind of long-term relation between them: according to chart 6, it's observed that the dynamics of GDP follow a trend quite similar to the performance of imports. The evidence show that by increasing the economic activity, the imports also do so because of the strong dependence that exists of the intermediate goods and of capital, that are necessary to promote the national productive activity.

By incorporating into the analysis the export behavior, it is observed that they also seem to follow a trend similar to the one described earlier by the previous two. Consequently, the three variables seem to be integrated in the long term, coinciding the periods of larger expansion of exports and imports with those of real production.



Graphic 6 Development of GDP, exports (X) and imports (M)
Source: own elaboration with information from INEGI

When using the cointegration approach, it is important to consider the order of integration of the variables used; That is, the number of times to differentiate a time series to make it stationary. Therefore, to determine the integration of the variables, standard root-unit tests of Dickey Fuller (ADF) (1981) and Phillips Perron (PP) (1988) are used. As well as the KPSS test (Kwiatkowsky, Phillips, Schmidt and Shin) (1992). The first two tests work under the H_0 of unit root, while the KPSS test does it under the H_0 of stationarity.

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The results are:

Variables	ADF Test (Ho: Unit Root)			PP Test (Ho:Unit Root)			KPSS Test	
	C & Trd	C	No C & Trd	C & Trd	C	No C & Trd	C & Trd	C
ln PIB	-3.639809®	-2.018535	4.071703	-3.050723	-0.237590	3.061971	0.296358	1.279259
Δ ln PIB	-7.230597	-7.270673	-6.338558	-14.17087	-14.246900	-13.047655	0.026644	0.026309
ln X	-3.278244	-3.144225®	1.899834	-3.238297	-3.395738®	4.366129	0.701991	4.296607
Δ ln X	-3.5628081	-3.15890814	-2.290743	-10.631084	-8.298915	-8.425983	0.171107®	0.65635®

The term "®" indicates that Ho is rejected at a level of 5%. For the "1" model that includes intercept and trend, the critical values at the 5% level for the ADF and PP tests are 3.45. In Model 2 (intercept only), the values used for these tests are 2.89. Also, for the purely random model (Model 3), the ADF and PP tests assume the value of-1.9446. As for the test KPSS, the critical value for the case of the intercept and trend is 0.1460, whereas for the intercept, the critical value is 0.4630. Both values at a level of 5%.

Table 1 Unit Root Tests

Source: Own elaboration with information from Eviews 9

According to the results in Table 1, all time series are integrated of order I(1). Therefore, it's necessary to specify the vector autoregressive (VAR) with these.

The above results suggest to differentiate once the variables to induce stationarity and, at the same time, to avoid spurious results based on the proposed estimate. However, under the presence of unit roots, differentiating variables as often as necessary may result in a loss of information that the series at levels can provide (Matesanz et al, 2007).

About that, Sims. Stock y Watson (2009: 136) comment that the common practice of attempting to transform models to stationary form by difference or cointegration operators whenever it appears likely that the data are integrated is in many cases unnecessary. Even with a classical approach, the issue is not whether the data are integrated, but rather whether the estimated coefficients or test statistics of interest have a distribution which is nonstandard if in fact the regressors are integrated.

It will often be the case that the statistics of interest have distributions unaffected by the nonstationarity, in which case the hypotheses can be tested without first transforming to stationary regressors.

After determining the order of integration of the variables, the technique of multivariate cointegration is used by the method of Johanssen (1988). Immediately, it is possible to find a cointegration vector from the model that only includes intercept and VAR type 1, it's to say, $\Delta y_t = \beta_1 + \delta y_{t-1} + \sum_{i=1}^{m}(\alpha_1 \Delta y_{t-1}) + \varepsilon_t$.

On the other hand, to determine the optimal number of lags, the criteria of akaike and Schwarz are used, which determined 8 lags to obtain a statistically consistent model. Additionally, an exogenous dichotomous variable[4] has been incorporated to capture atypical observations (Loría, 2007).

After obtaining the VAR model, it's important to do the residuals tests to prove that there are no problems of autocorrelation, heteroskedasticity and verify fulfillment of the normality assumption. So, then, Table 2 presents a summary of the results:

VAR Model			Lags: 8
Tests	**Statistic**	**Probability**	**H_0**
Autocorrelation	LM	0.9396	Accept
Heteroskedasticity*	Ch-Sq	0.1758	Accept
Normality*	JB	0.0738	Accept

(*) denotes the joint test

Table 2 Residual Tests
Source: own elaboration using Eviews 9.0

[4] the dichotomous variables are not evaluated in terms of their order of integration, only incorporated in the models from an *ad hoc* theoretical approach. In this case, dum: 1995Q1, 2009Q1=-1

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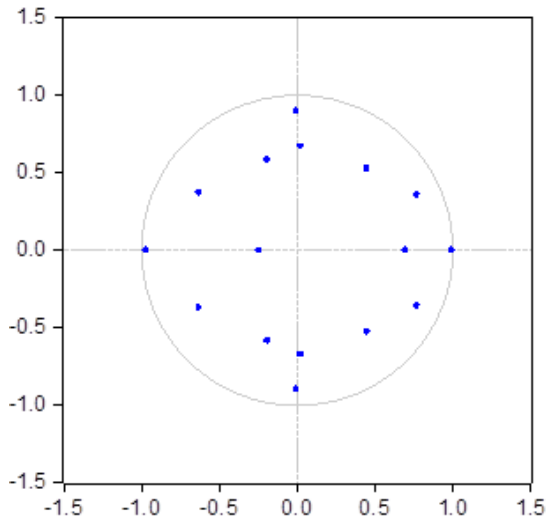
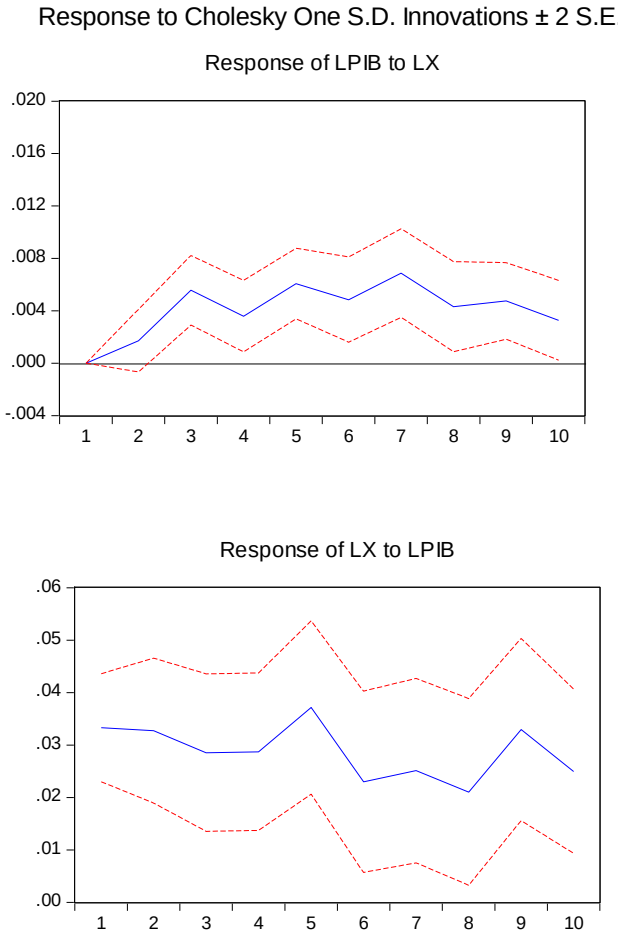


Graphic 7 Unit Inverse Roots of AR Characteristic Polynomial
Source: own elaboration using Eviews 9.0

Also, it's important to examine the inverse roots of characteristic polynomial, which is used to analyze the stability of the estimated model.In this case the graphical representation of the eigen-values shows that all values are within the unit circle (see Graphic 7). Therefore, it's possible to say that there is stability in the proposed model.

Next, the signs of the cointegration vector are verified by the impulse-response functions. These functions allow us to observe the dynamic response of a variable "y" to shocks or unexpected changes in an "x" variable, on which it depends.



Graphic 8 Impulse Responses Functions
Source: own elaboration using Eviews 9.0

An unexpected shock over exports generates an immediate effect on GDP, which persists over ten periods. This trend is explained because, under an open economy scheme, exports represent the main concept of the economy.

By the other hand, an exogenous impact on GDP generates positive effects on long-run exports, which is explained by the fact that they're part of domestic production (see Graph 8).

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To finish this analysis, it use the Granger's Causality Test. This test determines whether an endogenous variable can be treated as exogenous. Additionally it's useful to determine how much some variables improve the forecasting of others.

H0: Prob.> 0.05, does not Granger Cause			
Sample: 1993Q1 2016Q4			
Included observations: 88			
Dependent variable: LPIB			
Excluded	**Chi-sq**	**df**	**Prob.**
LX	76.0167211	8	3.09E-13
All	76.0167211	8	3.09E-13
Dependent variable: LX			
Excluded	**Chi-sq**	**df**	**Prob.**
LPIB	37.2789992	8	1.02E-05
All	37.2789992	8	1.02E-05

Table 3 VAR Granger Causality/Block Exogeneity Wald Tests

According Table 3, there is a feedback effect between GDP and exports which is explained by the increase in exports that favors economic growth as a result of efficient allocation of resources, while output growth has a positive impact on exports through improvements in competitiveness in international markets, as proposed by Jung and Marshall (1985) and Chow (1987), among others Finally, there is a log-log equation in the cointegration vector, which is standardized to be resolved in terms of gross domestic product (GDP). Therefore, the result is the following:

$$log(PIB) = 13.135 + 0.2333\ log(X)$$
$$Std.\ Error = (0.00507)\quad (0.06981)$$

Econometric results show a positive and significant cointegration between real exports and GDP, with an estimation that indicate an upward trend in the long term income-elasticity of imports. Over the period 1993:01-2016:04, a multiplier of the export of 0.2333 was obtained, which corresponds to an implicit estimate of the income elasticity of the imports (π) of 4.28.

Similar research applied to Mexico also supports the results obtained in this research, for example, Moreno-Brid (1998, 1999), estimated that the value of π doubled (from 1.57% to 3.14%) over the period 1967- 1999, severely restricting long-run growth (from 6 to 2.6%). On the other hand, Loría (2001) determined the historical value of π around 3.5%, while Matesanz et al. (2007) determined the values of π for different subperiods, obtaining the following results: 1968-2003: 3.97%, 1968-1994: 4.32%, 1968-1981: 3.86% and 1982-2003: 4.26%.

In short, this research is part of the literature of balance-of-payments constrained growth and also proposes the possibility of inducing a structural change that seeks to reduce the value of import income (π) significantly.

Conclusions

In general terms, the analysis confirms that Mexico's growth is explained by the demand orientation, and validates compliance with the Thirlwall Law during the period analyzed, in terms of the restriction to growth through the balance of payments.

In the framework of an open economy, despite the dynamics of exports, the problem of external constraint on growth hasn't been solved. The results support this argument, because when exports increase by 1%, real production increases by 0.23 %.

This result is an insufficient multiplier in terms of the generation of economic growth by the exports sector, since it behaves as a sector of enclave oriented mainly towards the world market.

So, the growth of exports, which are a means of obtaining consumption, has not been enough to finance the growth of imports. Hence, the unbalance in the trade balance is mainly explained by the importation of capital goods that have greater elasticity of demand.

In fact, the exports have increased their coefficient imported because they're based largely on the production of corporations that can have a large content of *Inter-Industrial Trade* (IIT), while the rest belongs to the maquila system, which works with limited value added due to the assembly of imported parts. Therefore, in both cases there is a low domestic production chained.

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

In fact, as manufacturing exports increase and generate economic growth, the import requirement grows even more due to the very dynamics of manufacturing exports. If this trend continues, by increasing the rate of growth, the Mexican economy will exacerbate its foreign-exchange requirements and therefore of foreing capital, so the viability of the current model is complicated in the long run.

Therefore, it's necessary to design policy measures for changing the income elasticities of foreign trade. One of these may be the creation of an industrial development plan that links the manufacturing sector with the rest of the domestic economy and it's capable of generating internal productive chains to strengthen domestic production and thus achieve real growth for the Mexican economy.

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Total sales of lightweight automobiles in Mexico, 1988-2016

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Abstract

The automotive industry in Mexico has been strengthened in such a way that the country is already part of the Top 15 of those that produce and sell the most cars in the world. From 2010 to 2016, it went from place 16 to 12 among the countries that sell more vehicles in the world, according to data from the International Organization of Automobile Manufacturers (OICA). Six years ago, Mexico sold 503 thousand 748 vehicles, which placed it in 16th place worldwide. The country was below Russia (1 million 912 thousand) Canada (694 thousand 349) or Spain (982 thousand 015) (HuffPost, 2017). The objective of the work was to analyze the variables that most influence the total sales of light vehicles in Mexico. To carry out the study, a multiple linear regression model of the total sales of light automobiles in Mexico was elaborated according to the exchange rate, the monthly average remuneration, the interest rate, unemployment and the inflation rate. Of the results obtained, the variation of the VTA according to the coefficient of determination (R^2) was explained in 93.75% by the variables included in the equation, of which, the most statistically significant variables were the monthly average remuneration, the Unemployment rate and the exchange rate. According to the elasticities, the greatest effect on sales was the average monthly remuneration and the exchange rate. Although the interest rate and inflation are very important variables and were not significant.

Automotive industry, Automotive sales, Exchange rate, Inflation and interest rate

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Introduction

The global competition on the part of the three large blocks is explained through transnational organizations among the most important firms in terms of production, so that in each country and for each industry regional schemes are imposed on the production networks global economy, at the same time that economic sectors are integrated on a planetary scale. In this framework, under the premise that the industrial sectors have different behaviors, we examine the outlines of the globalization of the automotive industry (AI), which responds to a logic different from that of the transnational networks of light industries that do not depend in the same way the cost of transport, or the demographic processes linked to the growing consumption of durable goods.

The automotive sector, like other manufacturing sectors with high international dynamism, has experienced a persistent development with a favorable impact for the Asia-Pacific region and lower socio-economic effects in other emerging areas, such as the economies of the American continent. In Mexico, the AI has grown like no other industry in recent years and has generated dynamic relationships with producer countries that dispute the United States, the primacy in world leadership or the conquest of new markets consumption of these products (Basurto, 2013).

To understand the importance of the automotive industry in Iran's economy, it is necessary to take into account some data. Iran is the largest car market in the Middle East. Before the sanctions, Iran was the eleventh producer of cars in the world. The automotive sector is today the second industry in the country after the petrochemical industry. According to the World Bank, Iran's automotive sector constitutes 10.0% of the GDP of its economy. This sector employs 700,000 workers, representing 4.0% of the total active workers in the country.

The sanctions were a severe setback for Iran's auto industry. The annual production of cars fell from 1.5 million to 700,000 units, and prices went up to 300.0%. However, after the lifting of the sanctions, the sector comes back to life and the government plans to reach the production of three million cars a year in 2021. The government wants to boost the privatization and competitiveness of the sector to enter the market world car. To achieve these objectives, Iran needs to collaborate with international manufacturers (Iranactual, 2016).

As a market, Iran has been growing in car demand for several years. Even with the sanctions, in Iran there was a thriving market for cars. According to the International Organization of Automobile Manufacturers (OICA), the total sale of vehicles, including commercial vehicles, in Iran places this country in 13th position in the world market. In 2011, with nearly 1.7 million registered sales, Iran ranked 11th in the world market. Due to high tariffs, the importation of finished cars into the country is limited.

In the Iranian year 1393 (March 2014 to March 2015) it was allowed to import 102,000 cars, which represents an increase of 31.0% over the previous year. However, the current regime is relaxing tariff rates. It has recently lowered tariffs for hybrid vehicles to only 4.0%. With the lifting of sanctions, Iran can become a regional power in the sector and a center for selling and exporting cars. European companies (European companies want to compete with Chinese manufacturers in the Iranian market) Renault, Peugeot, Mercedes and Volvo have declared their interest in using Iran as a center for exporting their products to neighboring countries such as Iraq, Azerbaijan, Syria and Afghanistan (Iranactual, 2016).

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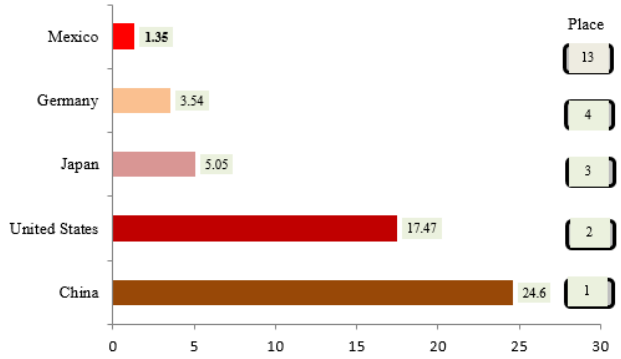

Figure 1 The number of vehicles purchased per country, 2015 (Millions)
Source: Prepared with data from El Financiero, March 17, 2016

In 2015, the number of vehicles purchased by country were: China ranked first (24.6), followed by the United States (17.47), Japan (5.05), Germany (3.54) in place 13 and Mexico with 1.35 million vehicles in the world (Figure 1).

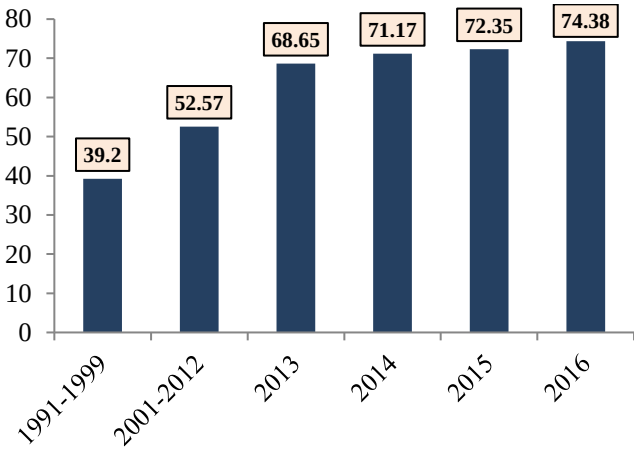

Figure 2 Total number of cars sold worldwide from 1990 to 2016(Millions of units)
Source: Elaborated with data from Statista, 2018

This statistic represents the number of vehicles sold worldwide from 1991 to 2015. In addition, it presents a forecast for the year 2016. It was estimated that a little less than 74.4 million cars would be sold in 2015. It was forecast that sales worldwide cars will exceed 100 million units by 2020 (Statista, 2018).

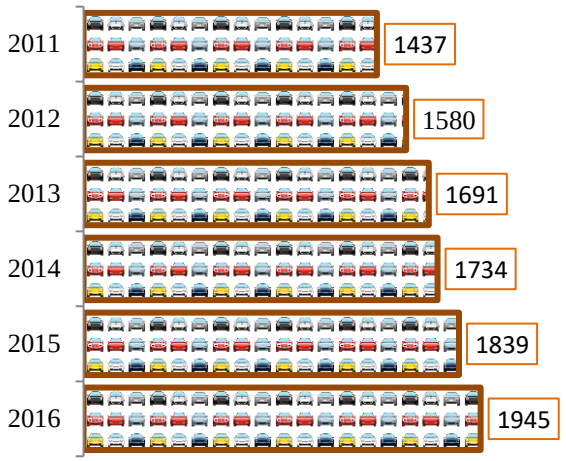

Figure 3 Global overview of light vehicle consumption, 2014 (Billions of dollars)
Source: Elaborated with data from the Ministry of Economy, 2014. The picture of the carts was obtained from: http://www.thetruthaboutcars.com/2016/09/fight-back-bad-emojis-porsche-automoji-sticker-pack-ios-10/

As can be seen in Figure 3, the consumption of light vehicles of 2011 (1,437) -2016 (1,945 million dollars) has been growing. In the light vehicle segment, the main region for the sale of vehicle units was the Asia-Pacific region, which represents 42.7% of the total, followed by Europe with 30.7%, America with 22.9%, Middle East with 2.7 % and the Rest of the World with 1.0%.

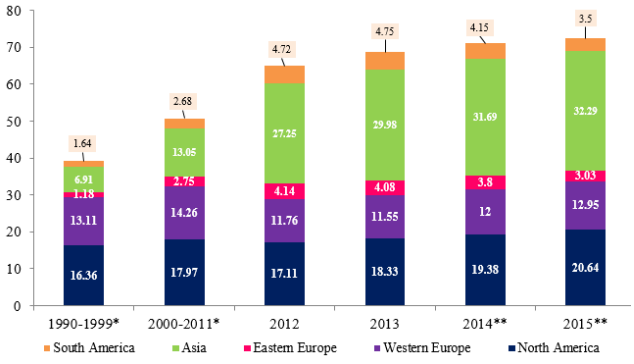

Figure 4 Total number of cars sold per region worldwide from 1990 to 2015 (Millions of units)
Source: Elaborated with data from Statista, 2018.

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Figure 4 shows the number of vehicles sold in the world from 1990-2015, broken down by region. In 2012, around 4.7 million cars were sold in South America, for Asia it was 27.25. Figures for 2015 are projections.

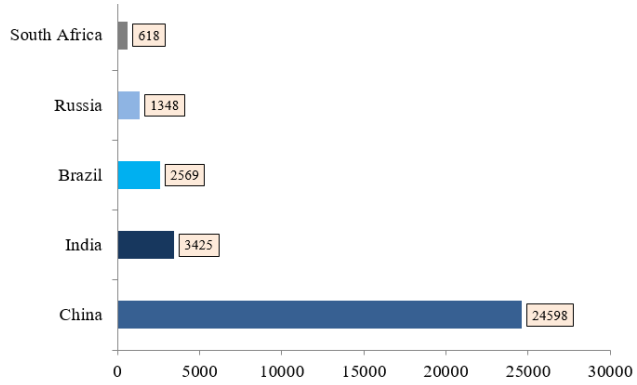

Figure 5 Total number of vehicles sold in the BRICS countries in 2015 (Thousands of units)
Source: Elaborated with data from Statista, 2018

The statistics shows the total number of vehicles sold in each of the BRICS countries in 2015, in thousands of units. In that year, there were total sales of approximately 3.4 million vehicles in India, which was the second highest figure among the group of five countries (Figure 5).

Figure 6 Sales of new light vehicles, Mexico VS EE. UU (Thousands of units)
Source: Elaborated with data from the Ministry of Economy, 2012

New vehicle sales from the US The UU and Mexico show the same long-term behavior, registering an upward trend from 1996 to 2006. This behavior was reversed with the global economic crisis of 2009, since in that year sales of new vehicles globally fell by 4.0%, the North American region being the most affected, as the demand for new light vehicles contracted 20.4%. In Mexico, the drop in sales was 24.7%. Despite the seriousness of the crisis and the levels prior to it have not yet recovered, it should be noted that the recovery of the domestic market for light vehicles was faster than that observed during the 1995 crisis (Secretary of Economy, 2012).

According to the report of Ward's Automotive, in EE. In the US, 1,150,130 light vehicles were sold during January 2017, 1.0% more than what was commercialized in the same month of 2017. In this first month, Mexican vehicles represented 15.5% of the total light vehicles sold in the United States, when exported. 178,667 units (AMIA, 2018).

The automotive industry in Mexico

Although the international car market has shown less dynamism, the national market, on the other hand, is advancing at high rates. In the first six months of the year, vehicle sales in Mexico totaled 722,000 units, equivalent to a growth of 18.4% compared to the same period of the previous year. The sustained growth of these years is mainly due to an offer of varied and competitive credit from the banking sector and the financial arms of the automotive assembly companies, as well as the improvement of consumer confidence. The outlook for the sale of new vehicles for the remainder of the year in Mexico is promising if the good pace of the number of car loans observed so far is maintained. From January to June, financing grew by 25.3% per year considering both financial, banking and even self-financing. At the end of 2016, an advance of new vehicle sales of 13.8% is estimated equivalent to 1,530,000 units (Martínez, 2016).

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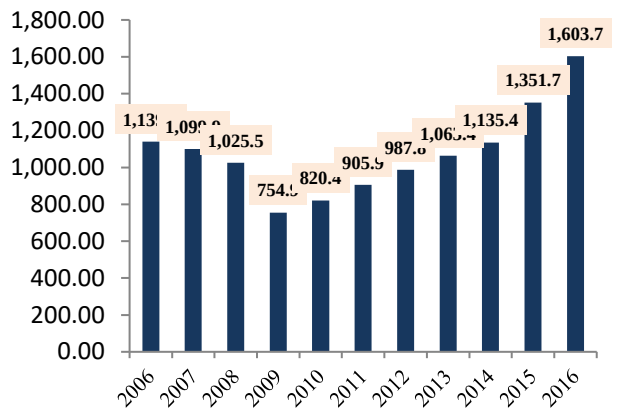

Figure 7 Evolution of the number of light vehicles sold in Mexico, 2006-2016 (Thousands of units)
Source: Elaborated with data from Statista, 2018

According to figure 7, the annual evolution of sales to the public of light vehicles in Mexico, in 2006 was 1,139.7 and in 2009 decreased to 754.9 as a result of the global financial crisis, from 2010 onwards it has been increasing, for 2016 the cars sold directly to consumers in the country were just over one and a half million units, which not only represented an approximate increase of 250,000 vehicles compared to the figure recorded the previous year, but was also greater than the amount of the study period.

In previous years there has been growth in this industry and it was estimated that vehicle production would increase 1.5% in 2016 compared to the previous year, despite an unfavorable start to the year due to a 3.1% drop in the first half of this year. This represents an increase of around 51,000 units. By 2017, it could produce just over four million units which would represent an advance of 17.4%, which would once again place the industry at the forefront of the Mexican economy. The automotive production in the country has gained importance because of the large investments that have been made to serve the domestic market, but primarily because of the potential of the external market.

Up to 79.0% of the cars manufactured in the country are destined for export, primarily to the United States of America. During the first half of this year, 1.3 million vehicles were manufactured to be exported, which meant a reduction of 5.6% compared to the first semester of the previous year. This lower dynamism was partly due to the fact that it was contrasted with what was done in 2015 when an extraordinary increase of 10.4% was observed. The majority of automotive exports are destined for the United States and will continue to grow during this year. In contrast, other regions and countries have decreased their demand for Mexican vehicles, such as Canada, Latin America, Asia and Europe. This result is attributable, among other things, to a lower demand in these countries attributable to a slow expansion of their economies (Martínez, 2016).

The sale of light vehicles decreased 5.3% in June compared to the same month in 2016, from 134 thousand 536 units to 127 thousand 410, which represents the worst figure for a sixth month since 2009, reported the Mexican Association of Distributors Automotores (AMDA) in its Internal Automotive Market Report. According to the report, the category that represented the biggest decrease in units sold was that of heavy trucks, with a 28.9% decrease in units sold, followed by sports cars, with 21.6% fewer units sold, and subcompacts, with 14.7% fewer cars placed on the market. In this regard, the AMDA highlights that June records the second negative rate of the year in the line of commercialization of light vehicles. In fact, the behavior of light car sales last June represents the worst performance of this concept for a sixth month for eight years, when sales plummeted 31.3% in June 2009 in the context of the international financial crisis. Meanwhile, annualized sales were one million 624 thousand 867 units as of June 2017, that is. This figure represents a growth of 11.0% over the same period of 2015-2016, when it closed with one million 463 thousand 679 vehicles (aristeguinoticias.com, 2017).

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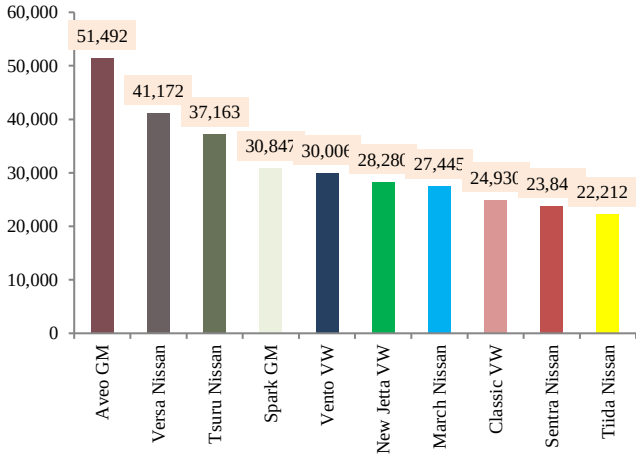

Figure 8 The Top 10 best-selling vehicles in Mexico
Source: Elaborated with data from El Economista, 2014

From Figure 8, the AMDA details that the Aveo of General Motors remains the most sold unit in the country, with 51,492 vehicles marketed so far this year, representing 6.5% market share, followed by the Nissan Versa, with 41,172 units of 5.2% of total sales. Indicates that in third place was the Tsuru of Nissan with 37,163, while the fourth position went to the General Motors Spark with 30,847, followed by the Vento and the New Jetta of Volkswagen with 30,006 and 28,280 units, in each case. Nissan's March model was ranked number seven with 27,445 vehicles placed, then the Volkswagen Classic with 24,930, as well as the Nissan Tiida and Sentra with 23,843 and 22,212 vehicles, respectively, with sites 9 and 10 from the best-seller list.

In this way, adds the AMDA, to October 2014, the 10 best-selling models in the Mexican market accumulated 317,390 units, which meant a coverage of 35.6% of the total light vehicles marketed in the country (El Financiero, 2014).

Figures between January and November		
Model	**Brand**	**Cars**
Versa	Nissan	83,346
NP300	Nissan	66,938
Aveo	Chevrolet	59,453
Vento	Volkswagen	57,441
March	Nissan	48,836
Jetta	Volkswagen	41,645
Sentra	Nissan	38,731
Spark	Chevrolet	32,772
CR-V	Honda	24,198
Tsuru	Nissan	23,156

Table 1 The Top 10 most sold vehicles in Mexico, 2017
Source: Elaborated with data from AMDA, 2018

Based on table 1, the 10 models, of the more than 200 that are offered in the country, were those that dominated the Mexican market and represented 39.0% of the total vehicles sold between January and November of 2017. Mexico will end 2017 with the commercialization of one million 550 thousand cars, 3.3% less than the reported in the same period of 2016, estimated AMDA. This is the first reduction presented by the industry since the economic crisis of 2009.

The objective of the work was to analyze the variable that has the greatest impact on the total sales of light vehicles in Mexico.

Methodology

To carry out this research, different sources were consulted: such as the Statistics Portal (STATISTA), National Institute of Statistics and Geography (INEGI), Bank of Mexico (B de M or Banxico), Mexican Association of Automotive Distributors (AMDA), Mexican Association of the Automotive Industry (AMIA), Center for Public Finance Studies of the Chamber of Deputies (CEFP), among others. From these sources, statistical information was obtained on the following variables: total sales of light automobiles, the vacancy rate, interest rate (CETES), the inflation rate, the average monthly remuneration, and the exchange rate.

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Based on the information collected, a multiple linear regression model was formulated that tries to explain the behavior of total sales of light automobiles in Mexico. The equation was the following:

$$VTA_t = \alpha_0 + \alpha_1 i_t + \alpha_2 E_t + \alpha_3 INF_t + \alpha_4 W_t + \alpha_5 U_t + \varepsilon_t \quad (1)$$

Where: $\alpha_0, \alpha_1, \ldots, \alpha_n$= Are the parameters to be estimated from the model; ε_t = it is the error term; VTA_t = total sales of light vehicles (number of units); i_t = Interest rate (30-day CETES); E_t = Real exchange rate (Pesos / dollar); INF_t = Rate of inflation (%); W_t = Average monthly remuneration (Actual prices for 2008); U_t= Unemployment in Mexico (% of the EAP). The model was estimated by the Ordinary Least Squares Method (MCO), using the SAS Statistical Package version 9; later, the results were analyzed and interpreted from the statistical and economic point of view, for which elasticities were calculated and interpreted.

Results

The results of the model allowed analyzing from the statistical and economic point of view, the parameters obtained from the variables studied of the total sales of light vehicles.

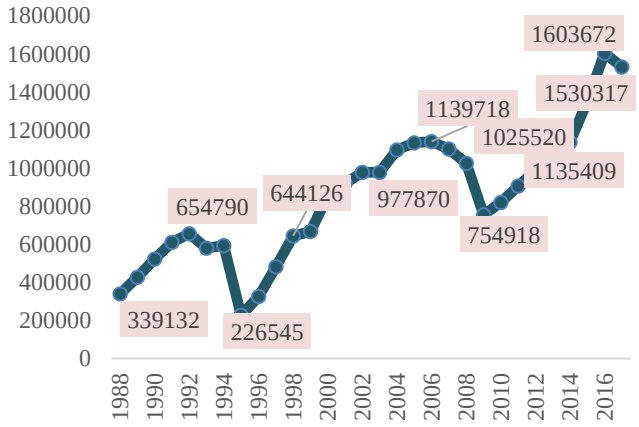

Figure 9 Total sales of light vehicles in Mexico, 1988-2017 (Units)
Source: Elaborated with data from AMDA, 2017

The total sales of light vehicles in the country have been increasing from the period from 1988 to 2017 except for the years 1995 and 2009 as a result of the financial crisis in the United States that took effect worldwide (Figure 9).

The domestic sale of light vehicles registered a decrease in January 2018. During the first month of the year 109,145 units were sold, 11.5% below the units sold during January 2017. The sale in the Mexican market in January 2018 was integrated into 39.0% with vehicles produced in the country and 61.0% of foreign origin (AMIA, 2018).

The Mexican Association of the Automotive Industry (AMIA) reported that sales of the automotive sector had its first contraction since 2009, with the marketing of one million 530 thousand 317 light vehicles in 2017, 4.6% less than in 2016, when they were sold one million 603 thousand 672 units (aristeguinoticias.com, 2018).

The president of the Mexican Association of Automotive Distributors (AMDA) said that the current economic environment, the elections in 2018 and the NAFTA are the factors by which sales lose strength. It was estimated to end in 2017 with 1.55 million units sold. This figure is lower than the expectation that had at the beginning of 2017 to place 1.7 million vehicles, some factors facing the sector are a differentiated growth of the domestic market by regions, a late adjustment in the prices of new vehicles and the own advance in the inflation, as well as the diminution of the unsatisfied internal demand, the federal elections 2018 and the renegotiation of the Free Trade Agreement with North America (NAFTA), are some of the main factors that have to the distribution in a change of market cycle (Expansión, 2017).

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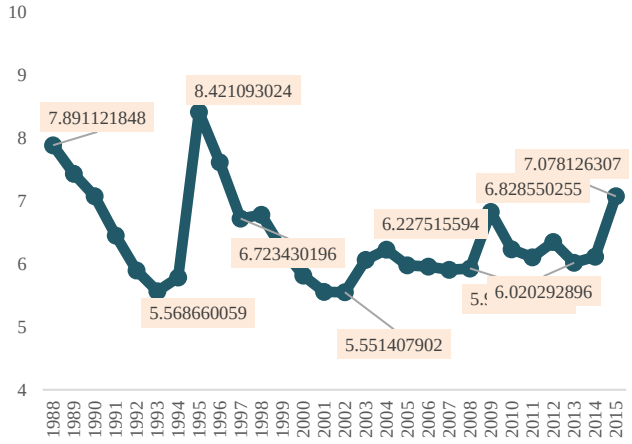

Figure 10 The real exchange rate in Mexico, 1988-2015 (Pesos / dollar)
Source: Elaborated with data from CEFP, 1980-2015

The real exchange rate showed a greater fluctuation from 1988 to 1997, from then on it remained oscillating until 2015 (Figure 10). Since the second half of 2015, the evolution of financial markets has presented transitory episodes of high volatility. In the current year there have been external events that produced conditions of uncertainty and additional volatility: the Brexit, the continuous decline in oil prices, the implementation of divergent monetary policies by central banks, among others.

Against this background, the Mexican currency has depreciated by 8.18%, reaching a maximum of 19.18 pesos per dollar (p / d) (February 11) and a minimum of 17.18 (April 29). Given the volatility conditions in the international financial markets, CGPE establishes that the exchange rate will reach an average of 18.30 pesos per dollar in 2016, a figure higher than that predicted in the Pre-Criteria (18.0). For 2017, it is estimated that the peso will reach 18.2 per dollar (17.2 Pre-Criteria). For its part, the private sector expects that the exchange rate levels will reach 18.50 p / d in 2016 and 18.30 in 2017, placing the exchange rate in horizons higher than those foreseen in CGPE (CEFP, 2016).

Analysts predict that by the end of 2017 the exchange rate will be at 20.15 pesos per dollar, while for 2018 the expectation of closing is 20.01 (Banxico, 2017). At the end of 2016, the 28-day Cete rate stood at 5.69%, while for March 2017, it closed at 6.43 (0.07% below the target) (AMDA, 2017).

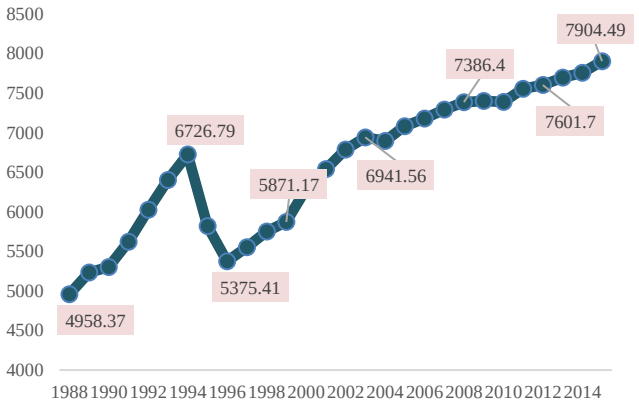

Figure 11 Average monthly remuneration, 1988-2015 (Actual prices for 2008)
Source: Elaborated with data from CAMACRO, 2015

As can be seen in Figure 11, the average monthly remuneration has remained around 6700 and 7900 with the exception of 1988 and 1995 to 1999. The issue of remuneration paid to employed personnel is fundamental in economic statistics because they represent the payment to the labor factor in the productive processes. In general, the remunerations (salaries, salaries, social benefits and utilities) paid to the remunerated personnel (operating personnel, employees, executives, etc.). During 2008, 54.3% of what the economic units paid for remuneration corresponded to salaries paid to operational personnel (workers, counter employees, drivers, etc.); 25.2% to Salaries paid to employees; and 20.6% to Social benefits (employer contributions paid to the Mexican Institute of Social Security (IMSS), Institute of Security and Social Services of State Workers (ISSSTE), National Workers Housing Fund Institute (INFONAVIT), Utilities distributed and Other benefits).

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By economic activity, Fisheries and aquaculture was the activity in which salaries paid to operational personnel had the highest proportion with respect to total remuneration (72.2%), mainly because in these activities the proportion of operational personnel is very high (90.0% of paid employees); whereas, in Electricity, water and gas, social benefits represented the highest proportion with 36.3% (INEGI, 2009).

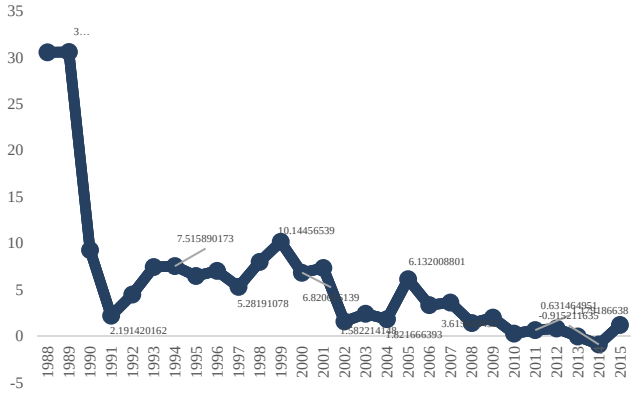

Figure 12 The interest rate for the period 1988-2015 (%)
Source: Elaborated with data from CEFP, 1980-2015

The behavior of the interest rate for the study period of 30.6% in 1988 has been decreasing to 1.2% in 2015 (Figure 12).

During 2014 and 2015 there was a fierce competition in the country among the banks that give loans for housing, by significantly lowering their respective interest rates, to such an extent that the average reached 10.0%. As a result of the period of rate hike by Banxico, which has increased the reference rate by 400 basis points from December 2015 to date (from 3.0 to 7.0%), the banks tried to absorb the increase or at least not act on the same level in mortgage credit. In fact, to say of Enrique Margain, mortgage director of the Association of Banks of Mexico (ABM), in this period the increase in the rate of financing for housing acquisition was 100 basis points in commercial banking.

Now that it seems that the central bank will take a break in its rate increase, commercial banks no longer see that the cost of mortgage credit can rise. The high competition has resulted in more and more people changing their mortgage to another bank that offers them better credit terms. So far in 2017, according to the ABM, 66,000 such financing had improved their conditions; 47,000 with another bank and 19,000 with it (El Economista, August 8, 2017).

Statistic analysis

The statistical analysis was based on the following parameters: the coefficient of determination (R^2), the value of the calculated F (Fc), probability, the value of the partial t's for each of the estimators based on the analysis of the given variance. Finally, to test the statistical significance of the adjusted regression equation, the following sets of hypotheses were considered.: H_0: $\alpha_1 = \alpha_2 = \ldots = \alpha_n = 0$ contra Ha: $\alpha_i \neq 0$ *para* $i \geq 1$ así como H_0: $\beta_1 = \beta_2 = \ldots = \beta_n = 0$ contra Ha: $\beta_i \neq 0$ *para* $i \geq 1$.

Dependent Variable	**Independent Variables**				
Equation 1					
VTA	***i***	**E**	**INF**	**W**	**U**
Coefficient	-3628.6766	88129	191.81337	268.09572	-141879
t_c	-1.05	2.38	0.17	**10.18**	**-7.61**
P	0.3048	0.0264	0.8632	<.0001	<.0001
R^2= 0.9375					
F-valor = 65.98					
Prob>F = <.0001					

Table 2 Parameters obtained for the proposed model of total sales of light automobiles in Mexico (VTA)
Source: Elaborada con la salida del Paquete Estadístico

The results of Table 2, for the equation indicated that for a level of significance of 0.1, the F_c = 65.98 was greater than $F_{t,0.1\ (5,\ 22)}$ = 2.66, therefore, Ho is rejected in favor of the Ha hypothesis that indicates that at least one of the parameters is nonzero, that is, the regression was highly significant, which implies a high explanatory power of the estimated model.

On the other hand, the variation of the VTA according to the coefficient of determination (R^2) is explained in 93.75% by the variables included in the equation. The most highly significant were: W_t, the U_t, which showed a reliability value of the order of <0.0001, <0.0001, and the exchange rate (E_t), the interest rate (i) of 0.0264 and 0.3048 respectively and a t value of 10.18> 1, -7.61> 1, 2.38> 1 and -1.05> 1 for each variable, which were significant indicating that these variables fall in the region of non-rejection of the null hypothesis. On the other hand, the INFt with value of t of 0.17 <1 and probability of 0.8632 was not significant.

Economic analysis

This section presents the economic analysis of the coefficients, according to economic theory. At this point, it is important to analyze the coefficients of the parameters in their structural form, since they allowed to appreciate the congruence of some of the estimators in relation to the established in the economic theory.

The estimated model for total light car sales (VTA) was as follows:

$$\widehat{VTA_t} = -858084 - 3628.67658\, i_t + 88129E_t + 191.81337INF_t + 268.09572W_t - 141879\, U_t + \varepsilon_t \quad (2)$$

From equation 2, increasing the exchange rate and the monthly remunerations will result in an increase in the total sales of light cars, in accordance with the economic theory. For the case of the interest rate, the rate of inflation and unemployment was not met. All of the above, based on the information available, as well as the period analyzed in this particular study.

Interpretation of the elasticities of the structural form

The economic results of the elasticities in their structural form for each of the equations, is shown in the following table:

ε_i^{VTA}= -0.0262433962 ε_E^{VTA}= 0.6856100819
ε_{INF}^{VTA}= 0.0034526876 ε_W^{VTA}= 2.1401630619
ε_U^{VTA}= -0.0000259776

Table 3 Elasticities of the structural form
Source: Own elaboration based on the output of the Statistical Analysis System (SAS) package

In the analysis of elasticities, for any model, the concept of ceteris paribus was considered, using it allowed to study a variable isolated from the rest to better observe its changes when the other variables were not modified, that is, all other variables remained constant.

Total sales of light cars (VTA_t)

The elasticity of sales, with respect to the average monthly remuneration and the exchange rate was 2.14 and 0.6856, respectively, that is to say that before an increase of 10.0% of these variables sales increased by 21.4 and 6.85% in average, respectively. The sales with respect to the interest rate and the unemployment rate means that if they increase 10%, sales will decrease by 0.26 and 0.00026% respectively, for the case of the inflation rate did not comply with the sign of the economic theory, according to official data (Table 3).

Discussion

"The increase in inflation and the rise in interest rates have affected the availability of liquidity for consumers, since most of them purchase vehicles on credit, "Rosales said. "Now there are fewer consumers, there is a stability that is expected to remain in the remainder of the year and next." According to AMDA figures, 67.0% of the sale of cars is made through financing (Expansión, 2017).

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According to the results obtained, one of the factors that affected sales in December was the depreciation of the peso against the dollar, which was marketed above 20 pesos, as a result of the tax reform in the United States and its impact on Mexico. December is the most important month in sales, so the data to the downside is added to a total of eight consecutive months of falls in the sector. "December brings the most important sales of the year and, with this, confirmed a negative adjustment trend throughout 2017, more tightly in the second half of the year," the Deputy Director General of AMDA explained that inflation and The rise in interest rates is the impact that has had on the purchasing power of Mexicans.

In December, the Bank of Mexico raised the interest rate to 7.25%, the fifth increase made by the central bank in 2017 driven by the rise in general inflation in Mexico. Year-on-year inflation soared in the first half of December, reaching 6.69%, the second highest in 16 years and above what analysts expected. These indicators, higher interest rates and higher prices, caused a low demand in the automotive industry. With respect to other markets, the fall of sales of 4.6% in 2017 in Mexico contrasts with the increase of 9.4% in Brazil. However, this comparison should be made considering the recovery of the Brazilian market and the boom in sales that occurred in Mexico as of 2013 (HuffPost, 2018)

According to the Secretary of Economy (2012) at a global level, the importance of the automotive industry in national economies and its role as a driver for the development of other sectors of high added value have caused several countries to have as one of their main objectives the development and / or strengthening of this industry. Mexico is not the exception, because the automotive industry has represented a strategic sector for the development of the country. Its participation in exports places it as the most important industry, surpassing even the oil sector.

In 2011, the automotive industry exported 22.5% of the value of total exports, also four out of every five vehicles produced in Mexico were exported, which positions it among the most important nations in the world, occupying 8th place in manufacturing and the 6th among those that export automotive vehicles. Additionally, this has become a precursor of competitiveness in the regions where it has been established, which has translated into more qualified and better paid jobs, as well as in a greater development of human capital. On average, the remunerations of the terminal automotive industry in Mexico are 2.3 times that of the rest of manufactures. Likewise, the sector has generated an important outpouring of technological capabilities that find application in other sectors, such as electrical, electronic and aerospace and which, in turn, have led to the generation of specialized technical teams.

The macroeconomic situation of the automotive industry has established itself as one of the main contributors to economic growth and is one of the main foreign currency generators in the country, as it remains one of the sectors with the largest share of foreign investment flows direct In 2015, in the light vehicle segment, Mexico ranked as the seventh largest producer in the world, and the fourth largest exporter in the world. The production of heavy vehicles places the country as the sixth world producer of this type of vehicle and second in America. Within the automotive industry, close to 90.0% of the employment generated corresponds to the auto parts industry (www.gob.mx).

The automotive industry is one of the most dynamic and competitive in the Mexican export sector. Currently, it represents 3.0% of the Gross Domestic Product (GDP) of Mexico (18.0% of manufacturing GDP), provides around 900 thousand direct jobs (The figure includes the automotive, trucking and auto parts sectors) at the national level and represents around of 27.0% of total Mexican exports (ProMéxico, 2016).

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Derived from Mexico's own competitiveness in terms of costs and geographical location (immediate neighbor of the main consumer of automobiles worldwide, United States), as well as value chains created from the entry into force of the Free Trade Agreement of North America (NAFTA) in 1994, the assembly of automobiles has become a genuinely North American process. Now, as is common in all industrial readjustment derived from a commercial opening, this process of productive integration has caused that automotive companies from all over the world have decided to install some stages of the productive process in Mexico instead of in the United States, with the consequent impacts in terms of employment for that country (CEIGB, 2017).

Conclusions

Based on the results obtained from the model, the following is concluded: For the equation of total sales of light automobiles, the statistically most significant variables were the average monthly remuneration, the unemployment rate and the exchange rate. According to, the elasticities that had the greatest impact on sales were the average monthly remuneration and the exchange rate.

This is consistent with what was stated by the Mexican Association of Automotive Distributors (AMDA) and the Mexican Association of the Automotive Industry (AMIA), detailing that the sale of cars in the country accumulates a decrease of 7.8%. "We have not been able to stabilize the drop in sales," said Guillermo Rosales, deputy general director (AMDA). In the last 17 months, 16 have presented negative rates in car sales. For September, the industry was expected to sell 114,000 units, to close the year at 1.45 million vehicles, which represents a decrease of almost 10.0% compared to the previous year.

It also explains that the drop in domestic sales is due to the loss of purchasing power among Mexicans with average incomes, since 67.0% of the vehicles sold correspond to the compact and subcompact models, which have a value of less than 300,000 pesos. These two categories are those that accumulate the steepest fall in sales with 8.0 and 14.4%, respectively (Forbes Magazine, 2018).

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Title

Objectives, methodology

Contribution

(150-200 words)

Keywords

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

What is your added value with respect to other techniques?

Clearly focus each of its features

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

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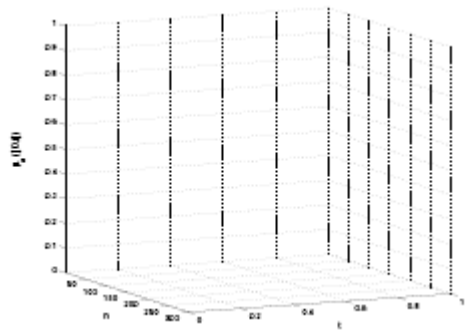

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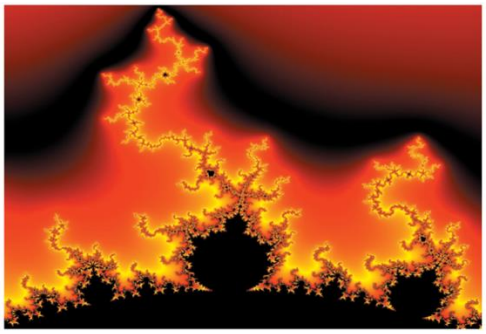

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Develop give the meaning of the variables in linear writing and important is the comparison of the used criteria.

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

Conclusions

Explain clearly the results and possibilities of improvement.

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