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Content

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Tourism in Mexico: Its descent in the rankings of the World Tourism Organization

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Abstract

The importance of tourism in the world it is the level of investment, participation in job creation, foreign exchange contribution, and the contribution to regional development. There are agencies that measure tourism and the flow that generates both economic and tourism in each country by a ranking, in which Mexico has been characterized by the countries belonging to more attract tourists. However in recent years it has been displaced by placing it in the thirteenth place, for this reason, the following question arose what were the main causes of the Mexico Descent in tourism ranking managed by OMT? In this way it has the primary objective to know the main reasons why Mexico has been ousted the tourism ranking as the recipient of tourists through a comparative analysis of probable causes that originated it, in order to find which one had more influence on demotivation of tourist to travel to the country.

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Introduction

Tourism is one of the most important and dynamic economic sectors in today's world, both for its level of investment, participation in job creation, contribution currency, as well as the contribution to regional economic development sectors. Therefore there are organisms that measure tourism, in which Mexico is characterized by highlighting one of the countries with the highest uptake of tourists; so it remained within the top ten, managed by the World Tourism Organization.

However in recent years it has been displaced by placing it in the thirteenth place, for this reason, the following question arose what were the main causes of the decline in Mexico in the tourism ranking handled by WTO ? The main advantages generated conduct such research was the collection of important data, and the future benefits plans or actions that may arise. Given the main objective, to know the main reasons why Mexico has been ousted the tourism ranking as inbound tourism, through a comparative analysis of probable cause that originated it, in order to find which one had more influence on demotivation of tourist to travel to the country. The subject of study for conducting such research, tourism was in Mexico, focusing on the decline in the tourism ranking.

Which was based on official information search experts in the field, through databases established and reliable search engines, newspapers, magazines, etc. Also he chose to perform a documented research through exploratory research, which was based on the search process proposed by Vargas, Guerrero, Camargo & Resendiz (2000).

Generating outstanding results in terms of, human factor in the tourism industry, infrastructure development, accessibility and connectivity by public transport.

Diversification of tourism products and natural and cultural resources. And noting the importance of the sector and thereby detecting areas of opportunity.

Background

The importance of tourism in the world its level of investment, participation in job creation, foreign exchange contribution, and the contribution to regional development. It is estimated that contributes about 11% of world production and generates one of every eleven jobs (SECTUR, 2013).

In Mexico, it is the third source of foreign exchange, behind petroleum export revenues and remittances from abroad, according to the Tourism Board of Mexico (2013).

Within the country, there is a vast natural wealth, as biosphere nature reserves, parks, monuments, diverse flora and fauna sanctuaries, among others. Aplia Mexico has a variety of tourist attractions such as ancient ruins of Mesoamerican cultures, colonial cities and beach resorts. At the same time owns a wide variety of climates, along with its historical heritage, part of a profound change in cultural mergers, why they make Mexico an attractive tourist destination worldwide.

With the main objective to promote and boost tourism activad at national and international level, have created various bodies such as the case of the National Fund for Tourism Development, which has been given the task of studying the preferences and tastes of their leisure tourists; resulting in improvements in roads and transport, renovation of airports, upgrading telecommunications systems.

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Opening credits for new infrastructure catering and services, opening places of entertainment, health improvement and safer recreational activity areas.

Tourism has become one of the main activities is favorable for the economy of any developing country, for that reason there are organizations such as the World Tourism Organisation, which means a ranking measures the tourist activity and the pours it generates. Mexico has been characterized by the countries belonging to more attract tourists, where it was placed within the top ten. In 1996 he caught a tourist attracting 21.4millones 6000 generating $ 894 million in foreign exchange earnings, putting in place 7 and 12 respectively (Date, 2000). During the first year of Vicente Fox, Mexico had a relapse in arrivals of tourists were 19.8 million due to the global economic recession; However, there was a slight increase in foreign exchange earnings, reaching 8.4 billion dollars. So that Mexico kept the place 8 tourist arrivals and foreign exchange earnings 12. The lowest year on account of tourist arrivals to the country in the decade was 2003, with 18.6, although it maintained the world's eighth place. The objective proposed by the Fox government was that Mexico was among the top five. While Mexico has grown in tourist arrivals and foreign exchange earnings, it has not been enough to make being in fifth place worldwide; since other countries have grown faster.

In 2010 Mexico ranked tenth by arrival of tourists were 22.4 million and decreased to 23 in place of foreign exchange, achieving a figure of 11.9 billion dollars (Morales, 2013). Subsequently the decline in tourism ranking Mexico grew, losing its 10th place position he kept in 2009 and 2010, to 12th place at the end of 2011, giving a total of 22.7 million tourist arrivals.

Mexico received 11.7 billion dollars in foreign exchange from tourism in 2011, representing a fall of 0.8 percent against 2010 (Alcántara, 2012).

As the passage of time and the continued emergence of countries like Russia, Austria and Hong Kong, Mexico fell to 13th place in the ranking of the top tourist destinations worldwide, while 24 fell to place foreign exchange earnings. This occurred since in 2012 the influx of foreign visitors recorded 23.1 million, against 23.4 million of 2011 (Elola 2013).

Problem Statement

Tourism is an important economic activity within the country, because positioned Mexico as one of the nations most important in tourism worldwide, due to the wide variety of wealth that has, for that reason it is that; According to the WTO, Mexico, it is the first tourist destination in Latin America, and the thirteenth most visited worldwide. Most attracting international tourism is coming from neighboring countries such as United States and Canada, the next largest group are tourists from European and Asian continent.

According to the Index of Competitiveness in Travel and Tourism (2011) in his classification which measures factors that make tourism development possible. Mexico, peaked at 43 worldwide as attractive to invest and develop business in the travel and tourism, being ranked the first among Latin American countries.

However, Mexico was left off the list of 10 countries that receive more international tourists in 2012, according announced the OMT. The country is located on the site 13 below countries like Russia and Hong Kong, according to the barometer of that body.

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Until 2011 Mexico was positioned in tenth place on this list to receive 23.4 million tourists, however, the outlook for 2012 was not the most positive, which meant that only 23.1 million outstripping the country will be captured despite three positions programs of the various drivers of the tourism sector and the wide variety of cultural and natural attractions. So conclusive is important to note this fall presented within the ranking of the top tourist destinations in the world, which has increased the concern to investigate what were the reasons that led to a low uptake of tourists. For this assignment the next question that aims to provide a possible answer or solution to the issues raised arises.

What were the main causes of the decline in Mexico in the tourism ranking handled by WTO?

Justification

As one of the main economic activities in the country reflects the importance that tourism has, it has taken into account the decline in the tourism ranking Mexico has suffered in recent years by attracting tourists and consequently for foreign exchange earnings, the which it is necessary to give importance to know the main root causes that Mexico no longer is inside. The main advantages generated by the conduct such research will collect important data that will serve as the basis of study of the current situation in the country in similar studies conducted subsequently.

In addition to provide the benefits this research will be that knowing and identifying the main causes may generate future action plans to correct or minimize these causes, thus achieving an improvement in attracting tourists and further domestic and foreign currencies.

Which may not be possible in such research not be done, because founded and directed towards specific areas of opportunity information is created, since this issue is left open.

Objective

Analyze the root causes of why Mexico has been ousted the tourism ranking as the recipient of tourists through a comparative analysis of probable reasons that led him, in order to find which one had more influence on the motivation of tourists to visit the country.

General tourism

In the next section generalities such as tourism in Mexico's history, the origin and the current position is within the country, likewise mentioned the importance of this economic activity both benefits and impacts it generates for the country will be raised.

Background of Tourism in Mexico

For many years, tourism has experienced continued growth. Its deep diversification has become a sector with the highest economic growth in the world, according to Ruiz (2008). So that this sector as economic activity has been present worldwide since ancient times, with peak in the European continent, leaving Mexico far behind the progress made on the issue, since the country's infrastructure is not It had what it takes to attract visitors, so that in the early twentieth century began to build the necessary infrastructure generating an elitist tourism (Jimenez, 1993).

It is considered as the birth of tourism in Mexico the period of 1920-1940, a period in which the first born tourist services such as tourist hotels and travel agencies.

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Which are demanded by tourists in their foreign entirety at par in 1922 Administration Mexican Association of Hotels and Motels AC is created On June 7, 1937, the office of tourist guide and activity of travel agencies is regulated. The tourism department, organ of the Interior Ministry in charge of carrying out activities related to tourism is created; trigger action allowing tourism in the country (Carrillo, Colin, Flowers & Hernandez Martinez, 2012).

After the Second World War, Mexico observed an intense tourist flow so the government created the Pro-dependent Tourism Joint Commission of the Ministry of Interior. Because of the importance acquired tourism in Mexico, for 1930 the National Tourism Commission was established. Later on May 21, 1937 the Regulations of the General Population Law was published, becoming known the creation of a Department of Tourism, zonificándose the country in 15 regions of interest. To encourage the development of tourism, the June 6, 1959 a decree was issued establishing national populations and places of interest, so that the Tourism Department conduct studies on the subject (SECTUR, 2012)

The second stage of development is considered in 1940 to 1958, it begins to develop mass tourism product. In services are created large hotels, travel agencies multiply, tourist transport and guides appear, but until now there is a planning and regulation of this activity (Carrillo et. Al., 2012)

According Clancy (2001) in her research on Mexican tourism from 1970 says that tourism has been Mexico's biggest export accounted for in the balance of payments, from at least the end of World War II. Mexico has become one of the most popular destinations in the world.

As is well known the principal engine economic issue for the country is represented by the primary sector such as agriculture and livestock.

Is so late twentieth century the role of tourism provides an important economy change as reflected in the increased activities of the tertiary sector (Vargas, 2009).

Thus the Hotels.com guest status in the world is reaffirmed as a country of great interest due to its extensive cultural and natural wealth, however, we need to pursue as was done at first by the constant improvement in infrastructure and services for improved attracting visitors to the country.

Importance of tourism as an economic activity

From World War II and as a result of economic growth and incomes of people in most developing countries, tourism has become one of the main economic factors (MEET, 2000). Like all developing countries, this economic activity is very important for Mexico and its economy, as tourism is not only reflected in jobs and regional development, but is also spreading factor of cultural and natural attractions through the world, due to the wide variety of attractions it has, according to SECTUR (2013). In turn, the author Jose Luis Castro Gomez, in an article called "The economics of tourism" (2013) notes that thanks to the tourism industry, have improved means of communication and transportation in Mexico, remodeled airports, Updated telecommunications systems, generated opening credits for hotel infrastructure and services, open and renovated recreation centers, entertainment and spaces between other activities that tourists need for their stay, the image of some cities also improved and consequently improved its economy and its public security. All this was achieved by the efforts made by society, business and government of the country.

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According to the Tourism Satellite Account, tourism is divided into two types: national and international visitors and domestic visitors. Both types of visitors, national or international and internal, include both people who stay, as they are considered to hikers.

According to the above, we can establish some distinctions and types of tourism: a) Domestic tourism comprises Doméstico.- or residents of the country in which the accounts, and moving only within the same country. b) Incoming or Entrada.- This concept Tourism non-residents traveling to the country in which the study is conducted are recorded. c) Tourism Egresivo or Salida.- Here are contemplated residents compiler of statistics, traveling to another nation country.

The three mentioned types of tourism are mutually exclusive, however, when combined give rise to other forms of tourism, these groupings are important in measuring monetary flows that flow from them, and are required to establish trade policies, promotional programming and SECTUR in tourism (2005).

Undoubtedly, much of the basis of the country's economy is in the tourism sector as it involves the opening of new jobs, poverty reduction in tourist areas, economic movements etc.

Impacts of Tourism in Mexico

The WTO launched a campaign in 2004 called "Tourism Enriches", where he said that besides export also benefits or enriched in many other ways a country, as it represents a way to compete in the service sector growth, and that this activity helps raise funds to local, regional and national governments because of the economic impact that tourism generates, also seeks to protect the environment and local culture.

On the other hand, SECTUR (2011) mentioned that tourism helps to preserve and enjoy the cultural and tourist heritage of the country, generating an increase in tourist arrivals, economic benefit and job creation, while promoting economic development tourist communities, all of this with the help of constant training and continuous improvement.

Meanwhile Kotler, Bowen and Makens (1997) mentioned that there are four main benefits of tourism, which are: direct employment in hotels, restaurants, shops and transport companies, industries and professions to support tourism, the multiplier effect as to tourist consumption in local economic and finally, state and local income taxes derived from tourism.

Similarly the tourism sector can have a negative effect, because it can increase social differentiation. This is because often the benefits are in the target area are usually not spread evenly, but tend to be monopolized by a minority sector of the population (Ibanez, Villalobos, 2007).

Due to the strong influence of tourism in the economy and the need to promote sustainable tourism based on the three pillars of equity, they have taken various actions in favor of it, either within training or infrastructure investment in order to boost the economy as an engine of culture and society.

UNWTO World Tourism Barometer.

Conducted by the World Tourism Organization (UNWTO), performs regular monitoring of tourism trends in the short term it is proposed to provide adequate and timely information where three important aspects mentioned below are evaluated. (Program Tourism Trends and Marketing Strategies WTO, 2013).

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International Tourist Arrivals by Country of Destination

In terms of international tourist arrivals in the various WTO regions, series that may serve to indicate the evolution of tourism to selected destinations are chosen. This is measured according to visitor arrivals or nights instead of tourist arrivals in some cases refers to the total tourist traffic as it is air transport and specific entry points (OMT, 2013).

Income from international tourism

For recipient countries, international tourism receipts are assimilated to income from exports and cover all transactions related to the consumption by international visitors; accommodation, food, drinks, fuel, transport, entertainment both day visitors as overnight visitors (OMT, 2013).

International tourism expenditure

Tourism expenditure refers to the amount paid for the acquisition of consumer goods and services, and valuables, for own use or to give away, during tourist trips and for the same (OMT, 2008)

International tourism expenditure is the expenditure incurred in other countries for outbound international visitors. Goods and services are purchased by the traveler. You can include the costs incurred by residents traveling abroad as visitors for a day (World Bank, 2013).

Competitiveness Index

On a global level, which does not compete a destination, not grow, can not give welfare to their citizens and can easily fall into a spiral of poverty and violence (SECTUR, 2011).

According to the Word Economic Forum determines competitiveness, the set of institutions, policies and factors that determine the level of productivity of a country. Also meanwhile the Mexican Institute of Competitiveness is defined as the ability of a country or region to attract and retain investment and talent (Ministry of Economy, 2015).

So we can infer the importance of innovation in tourism, because by this is you can attract tourism to the country, generating significant economic benefit, which may increase their competitiveness to other potential destinations. That is why various agencies that measure this factor according to various indicators themselves have emerged.

Criteria to measure competitiveness

World Travel and Tourism Council works to increase awareness of the enormous capacity of the travel and tourism as a positive force for the world, which not only creates jobs, wealth and economic growth sector. It strives to remove barriers to growth in the travel and tourism industry urging governments and regulators to keep the sector as a priority on the political agenda and create policies that support growth and long-term prosperity (WTTC, 2011).

MoniTUR 2009, is a monitor of tourism competitiveness of the Spanish autonomous communities which was driven by Exceltur, this contributes to the improvement of information available for decision-making of public and private managers (Exceltur 2010).

The Center for Research and Tourism Studies ITESM (Cietec) generated the Tourism Competitiveness Index of the United Mexican States (ICTEM, 2010) which represents an inventory of resources and actions taken by each state to contribute to the tourism competitiveness.

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The competitiveness is assessed hundred twelve variables, which are grouped into ten large statewide to identify their comparative position (Cietec, 2009).

Mexican Institute for Competitiveness (IMCO) is an applied research center based on evidence. Through analytical documents and the development and dissemination of competitiveness indices (global, national and city level), the IMCO provides useful information for the design, monitoring and follow up national policies for competitiveness and economic development of Mexico (IMCO, 2013).

Historic frame

Within the historical framework are three related to the research carried out, in order to broaden awareness of the problem cases. Difference in the position of Mexico, Japan and China as recipients of international tourism.

This research includes and explains the differences in competitiveness within the tourism line between Mexico and countries in the Asia Pacific region, as is Japan and China.

A challenge that arises from the apparent contradiction that Mexico has to be a leader in international arrivals, but with a low competitive performance is addressed, according to the International Tourism Competitiveness Index. Mexico compares with Japan and China, it helps to understand what aspects need to modify the country to improve competitively, as suggested by the Tourism Sector Plan 2007-2012 (Carrillo and Magaña, 2010)

Analysis of tourism competitiveness in Mexico and the world

Objective of this case is the conceptual comparison and study of the implications of two key terms: leadership and competitiveness, positioning Mexico mentioned in different fields are listed in the World Tourism Organization (UNWTO).

In 2008 Mexico was positioned globally within the first 15 countries that receive most visitors. In terms of foreign currency generation, Mexico generates a significant contribution globally, despite the onset of the global economic crisis in late 2007, Mexico was within the first twenty places in revenue. In general, it follows the importance acquired by tourism worldwide is evident, however, for countries to retain its leading position, that condition will have to complement with all the elements that make a competitive nation. In the case of Mexico, there is no doubt it has many attributes that enable it to match its leadership with its competitiveness in the tourism sector. However, it requires hard work and unity among different groups in society and the state (Ibáñez and García, 2013).

Diagnosis of the quality and competitiveness of tourism in Mexico

The globalization of the world economy intensifies competition among destinations. Given this, it is necessary to make efforts to maintain the privileged position currently enjoyed by some countries.

Mexico, which is distinguished as one of the leaders in the world tourism market to occupy the tenth position in receiving visitors; has not yet established culture of quality and competitiveness, therefore a tendency to linger in the competitiveness ranking of the top tourist destinations in the world (Ibanez, 2011).

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Method

This research was based on official information search experts in the field, through databases, newspapers, magazines, etc. Focusing primarily on the causes of this decline in the tourism ranking.

Information collected, only came from reliable data bases, and authors recognized and supported. As mentioned, they conducted investigations, which are related to the subject matter resumed; with the main search engine Google.com.

To know the causes of the decline in Mexico in the Tourism Ranking, a matrix was made with competitiveness indicators, provided by specialized agencies in tourism; confronting views of various authors or characters recognized in this area, and publication of statistical data obtained through newspapers, journals, web sites, etc.

It was decided to perform a documented research through exploratory research, which is used when searching for a deeper understanding of the nature of the problem, possible alternative decisions and relevant variables that need to be considered, according to Aaker, Kumar & Day (2001).

This research was based on the search process proposed by Vargas, Guerrero, Camargo & Resendiz (2000). Which consists in identifying the need, once detected proceed to the definition of the main subject, then a stage of exploration is done in order to collect relevant information, continuous This requires the approach to the problem and continue with collecting data to finally obtain an analysis and interpretation and thereby perform presentación of the results, which will be explained below in applied research.

First, the need to know the causes that have led to Mexico is at the low ranking in tourism, as in recent years, countries}'p5como Russia and Malaysia, have resurfaced regarding tourism was identified leaving in backwardness and moving the country out of the top ten places in which he found himself.

Later, it was identified that the main issue to investigate Mexico's decline in the tourism ranking. Consecutively, in the exploration stage, we chose to use an extensive search process, in order to find an explanation to this problem, showing possible causes of interest that led to that event, according to information and knowledge gathered in the stage formulation is able to generate the problem statement.

Once the statement of the problem set, we continued to research and data collection in order to find the main causes that have led to this very sudden drop in the ranking. In the search for information relevant to the subject several articles where tourism trends in that ranking and possible causes to the decline that has been presented so well that caused an array provided competitiveness indicators are presented by bodies found specialized in tourism as it is The World Travel and Tourism Council (WTTC), Exceltur, The Center for Research and Tourism Studies ITESM (Cietec), the Mexican Institute for Competitiveness (IMCO), finally by World Economic Forum.

Subsequently, an analysis of these indicators is performed by comparing the models proposed creating a hybrid that would take relevant factors.

Finally at the stage of presentation, based on the information collected in accordance with hybrid created, we continued with this analysis, allowing translate conclusions and recommendations, which may be used in future research.

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Results and discussion

Results

To conduct this research, it was necessary to find information, generating an array of competitiveness indicators provided by specialized agencies in tourism (Matrix 1).

Subsequently, an analysis of these indicators was conducted, comparing the proposed models (Matrix 2), for purposes of this investigation were selected indicators: the human factor in the tourism industry, infrastructure development, accessibility and transport connectivity, diversification of tourism products, natural and cultural resources. .

Taking into account selected in the Matrix 2 indicators, it was found that the Human Factor in the tourism industry plays a very important role in the competitiveness of the emerging role as the human element is essential in obtaining quality parameters high, enabling it to differentiate itself from competitors in the tourism market (Bañuls, Ramon, Seville, 2009). For conclusive, it must be human capital generates service quality and consequently fidelity and / or destination recommendation. According to the ranking handled by the Travel & Tourism Competitiveness 2009 Mexico obtained a score above the average in the following areas as human resources, education and training, providing qualified jobs, affinity for Tourism, on a scale from 1 -7 (Ibanez, 2009). The federal government has given the task of implementing strategies that generate higher quality human capital in this industry, thus encouraging training in the sector (SECTUR, 2013). Where by Integral Training Program for Tourism Competitiveness (PICCT), 31 state protocols were reviewed

Following the investigation, the second indicator, development of tourist infrastructure, it was found that estimated public investment of 7,400 million pesos for the sector (Gómez, 2008), which may have influenced that the number of hotel chains have grown significantly (Jimenez, 2007). Despite this, Suarez (2009), says that hotels have stopped investing in the expansion of tourism and travel in the world, which could indicate that Mexico has enough to attract tourists infrastructure. It is worth mentioning that Mexico has 14.963 583.731 quarts in lodging establishments as CNT 2008, which supports the above Palafox, Zizumbo & (Arriaga, 2010).

Of equal way in the First Government Report (SECTUR, 2013), relevant information about the following indicator it was found; Accessibility and transport connectivity. In 2008, public and private investment for the creation and maintenance of infrastructure in transport and communications rose versus 2007. Within the report of government figures released by the Bank of Mexico were found which indicate that the number of international tourists airway December 2012 to June 2013 it was 7.7 million, 6.9% higher than the same period in 2011-2012. However, according to the publication made by De la Rosa (2013), a journalist for The Economist mentions the need to "remove restrictions", since among the 10 countries that received more tourists in 2012, highlights the jump Russia to ninth, and tenth place is Malaysia, followed by Austria, Hong Kong and Mexico. The development of this segment is linked to the air connectivity and Mexico is not yet solved the bankruptcy of Mexicana Airlines, 60% were international operations. Today, Aeromexico only travels to South America, Asia and Europe.

Regarding the diversification of tourism products, according to Brunet, Almeida & Monteserin Lopez (2005).

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The tourism that had been growing for some time in quantitative terms, entered a phase obsolete as a result of non-renewal and diversification needed , to keep competitive with the new emerging markets, however, in 2008 a significant investment to expand the supply of beach destinations in the country was carried out, and to achieve diversification is necessary to promote an offer comprehensively that promotes tourism; so according to the government report of 2013, 1,031'850,00 pesos were invested in cultural tourism, nature, sun and beach tourism for all, meetings and other forms of tourism SECTUR (2013).

Mexico is positioned as a spearhead in the generation of infrastructure and foreign direct investment for the tourism sector in Latin America, which is causing a depletion of natural resources of the country, especially in rural communities where they have established developments and projects tourist. Today Mexico is not bound by commitments to reduce emissions of greenhouse gases; however, international pressure will increase in the next 20 years, and it is anticipated that most of the emissions are generated by developing countries (Ruiz, 2008).

According to the ranking managed by The Travel & Tourism Competitiveness 2009, which manages a scale of 1 to 7, Mexico scored 4.7 in natural resources (Ibanez, 2011).

The importance of preserving the environment, due in the case of tourism, the stringent need to maintain the competitiveness of the tourist destinations. It should be understood that the actions of human beings that contribute to damage to ecosystems, so that environmental damage and reduced competitiveness of destinations, are directly related, it is noteworthy the implementation of policies that contribute to innovation and adoption of practices related to tourism.

So that technological innovation is a priority in favor of the environment.

Similarly, in the search for information, several articles relevant to the topic where tourism trends in that ranking are presented, and possible causes of the decline that has occurred, such as low competitiveness that the country has found. Claudia Ruiz Massieu tourism secretary, says the WTO Barometer, is made with the indicators provided by the countries themselves "that is, it does not represent an overall assessment of the performance of tourism in the different nations." He conceded that "rankings are useful to identify areas where each country should strive to be more competitive in the world." Similarly he recalled that during the celebration of the Tourism Tianguis held in Puebla, in 2013, Claudia Ruiz Massieu anticipated these results and warned that international competition is becoming more intense day, forcing Mexico to raise their competitiveness Zaragoza (2013).

Moreover Armando Uribe del Valle, president of the Mexican Association of Hotels and Motels (AMHM), he mentioned that an explanation of these repeated drops in the country in the ranking of the WTO is that a monopoly was wagered in the supply of products since only the sun and beach destinations were sold. Among areas such as Los Cabos, Baja California Sur, Cancun, Quintana Roo, Puerto Vallarta and Jalisco; They take 70 percent of international travelers. Thus, the remaining 10 percent is spread among the other 50 or more destinations in the country.

"In the last 20 years the supply of accommodation doubled in the country; however, the territorial distribution of rooms available for accommodation, is located in coastal destinations.

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Is there is a high concentration of supply in sun and beach product that centralizes much of the tourist services, "said SECTUR in its sector program. Reliance added that, although the country is renowned for beach destinations, there are signs of exhaustion. For his part, Jorge Hernandez, president of the National Tourism Confederation (CNT), stressed that do need to come more walkers foreign hoteliers because they require more guests, also mentions that the sector always gives more importance to the international tourist arrivals, which the movement of nationals when the latter leaves a larger spills, as such national social tourism, should have more support (Valdez (2014).

Other important indicators include affection and undoubtedly country was the economic recession for developed countries, which was presented in 2009 and the emergence of the new H1N1 virus, as the red flags were alert in tourism especially in the Americas, causing a decline in visitors and consequent economic benefit (Cruz Mancilla, Urciaga & Ruiz, 2014). For sightseeing, before the flu epidemic began, there was talk of a reduction as a result of the global economic crisis. After the appearance of the H1N1 virus and the decision to virtually shut the country in late April, the sector, key to the Mexican economy has shown a very slow recovery. Even in the summer hotels and Mexican beaches they attracted few tourists (Blanke, 2009). Periods greater negative impact were 1997, 2001, 2003 and 2009, and that these conditions respond to economic crisis, public health impacts, and issues of insecurity (Cruz et. Al., 2014).

Certainly the degree of importance with which currently has worldwide tourism, which is why developing countries have opted for this economic activity as one of the main generators of foreign exchange, as is the case of Mexico, as in recent years this activity has generated great attracting visitors and consequently large foreign exchange earnings.

However in recent tourist records ranking; Mexico is down being overtaken by countries like Russia and Malaysia, which is why we proceeded to perform a table of variables that allow the search for specific information, taking into account qualitative and quantitative indicators including the Human Factor found in the tourist industry, infrastructure development, accessibility and connectivity by public transport, diversification of tourism products, natural and cultural resources.

Also, within the research important factors to consider on the issue as was the quality of the destination, tourism performance collaborators, political problems, insecurity, health measures employed, lack of projection trends they found tourism, implementation of new trends, and finally the level of customer satisfaction; which they were of great importance for research, as they helped to find the main causes of the decline in Mexico in the tourism ranking while meanwhile Cruz, Juarez, Urciaga & Ruiz (2014) recently published a similar article for the International Journal Administration & Finance; where external factors that have led to the decline in tourism in some years, to identify the conditions of the tourism industry in Mexico proceeded to use the main statistical sources of formal organizations in Mexico and internationally identified.

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Of which the main quantitative variables such as visitor arrivals, visitor spending, tourism facilities, rooms accommodation, lodging establishments by category of service and finally by category rooms available were obtained.

Variables	Organisms				
	WTTC	CIETEC	IMCO	MONITUR	ITCI
Price competitiveness	X	X	X		X
Human factor in the tourism industry	X	X			X
Infrastructure development	X	X		X	X
Technological development	X				X
Social development	X		X		X
Accessibility and transport connectivity		X		X	X
Diversification of tourism products		X		X	
Natural and cultural resources	X	X	X		X
Security					X
Perception of nations over the country's tourism					X

Table 1 Indicators of Competitiveness conducted by specialized agencies in tourism.

In this table a comparison of the indicators used by five different specialized agencies in the field can identify matches in indicators.

Indicator	Authors		
Human factor in the tourism industry	Investment of 149 million pesos in training for tourism competitiveness. (SECTUR 2013)	Mejxco received a score 5.1 Human Resources, 4.7 Education and Training, 5.5 Qualified availability for work Affinity for Tourism 4.6. On a scale of 1-7 ranking handled by the Travel & Tourism Competitiveness. (Ibañes, 2009)	Basic for distinctive capabilities that allow you to differentiate themselves from their competitors in the tourism market item. (Bañuls, Ramon, Seville, 2009)
Infrastructure development	Hotels have stopped investing in the expansion of tourism and travel in the world (the number of international arrivals increased from 25 million in 1950 to 898,000,000 in 2007, Suarez (2009)	The number of hotel chains has grown significantly from 1983 (20 domestic and 12 foreign chains) to 2006 where 42 national and 40 foreign 2008, Jimenez (2008)	Public investment of 7,400 million pesos Gomez Mont (2008) Mejxco has 14.963 583.731 quarts in lodging establishments zs CNT 2008, Palafox, Zizumbo & Arriaga (2010)
Accessibility and transport connectivity	In 2008, public and private investment for the creation and maintenance of infrastructure in transport and communications amounted to 92,047.3 million pesos, 3.7% higher in real terms to $4,428.5 million pesos exercised in 2007. The number of international tourists airway December 2012 to June 2013 was 7.7 million people SECTUR (2013)	The development of this segment is linked to the air connectivity and Mejxco is not yet solved the bankruptcy of Mexicana Airlines, 60% were international operations. Today, Aeromexico only travels to South America, Asia and Europe De la Rosa (2013)	
Diversification of tourism products	The investment tour in 2008 was 2771.44 million and They were used to extend the offer in beach destinations Palafox, Zizumbo & Arriaga (2010	1,031'850,00 pesos were invested in cultural tourism, nature, sun and beach tourism for all, meetings and other forms of tourism in 2013 SECTUR (2013)	The tourist offer, which had been growing for some time in quantitative terms, entered a phase of obsolescence and premature aging because of the lack of renewal and diversification Brunet, Almeida Lopez & Monteserin (2005).
Natural and cultural resources	Diminishing natural resources of the country, especially in rural communities where they have established developments and tourism projects. Today Mejxco is not bound by commitments to reduce emissions of greenhouse gases Ruiz (2008).	According to the ranking managed by The Travel & Tourism Competitiveness 2009, which manages a scale of 1 to 7, Mejxco scored 4.7 in natural resources (Ibanez, 2011).	

Table 2 Study Indicators

Conclusions

It mainly concludes that the investigation complied with in order to know the main reasons why Mexico has been ousted the tourism ranking, presenting relevant information on the latest developments in tourism.

Also it can be seen the importance of this economic sector in the country, where the interest in the development of the sector through improvement actions are reflected. It is important to note that the country has great natural and cultural wealth which is being used for this sector, however, puende notice as to put aside the wide range of alternative tourism with which it is told and not He has focused successfully on attracting foreign tourists increased uptake.

It is vital to take into account the external assessment with which the country has, as a key point in the decision or choice of destination is the security offered by this, although it is well known how difficult it is to manage external factors as crime or epidemics such as the H1N1 virus that affected the country, you can control internal factors that benefit the tourism industry, so that the culture of service and hospitality with the aim of generating totally different experiences that are He believes they are received.

It is noteworthy that the investigation arose in order to find the main causes of the decline in ranking, however, this can be the starting point for future research or detecting areas of opportunity that can be taken by the government or the private sector, with the intention of attracting more tourists, breaking down barriers that were found or could arouse.

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Within these areas of opportunity is the diversification of tourism, meet the needs of tourists as trends, generate action plans that enable increased uptake eventually include the importance of further research in order to have information date and accurate at the time of future action plans.

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Troubleshooting process in computer networks

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Abstract

One of the hardest things for administrators of computer networks is the solution of the problems that may arise in the infrastructure they manage. Troubleshooing is defined as the process of solution to a problem where the analysis and solution is included. Here are different methods and troubleshooting procedures exist to give the best solution to the problems that may arise in different types of computer networks of an organization or company.

Troubleshooting, Top-Down, Botton-Up, SNMP, Netflow, ping.

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Introduction

You could say that one of the hardest things for computer network administrators is the solution of the problems that may arise in the infrastructure they manage.

Troubleshooing [1] is defined as the process of solution to a problem where the analysis and solution is included.

The answer can be proactive, in the case of being the same person doing the troubleshooting who has found the problem or reactive if it has reached as trouble ticket or otherwise reported by a user or group.

The first step to take when the problem comes, the administrator is to gather as much information as possible related changes that had been made during the time that the problem occurred, etc., so that you can identify the root cause more precisely.

The selection and removal of all information relating not prevent the loss of time or even possible confusion.

Since the root cause of the problem is known to be looking for the best approach to resolve and depending on the situation can be a quick action (eg fix an RJ45 connector) or may take some time (eg replace an ethernet card), in If you can not resolve the problem instantly the next step is to ask whether a client is being affected, if so, should try to solve the connectivity for the client while the root cause is solved (for example, changing the port to which it is I connected that client).

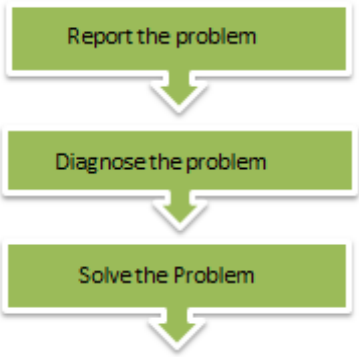

Figure 1 Steps to solving a problem

We present the methods, procedures and basic tools to be used for the best solution to a network problem, because if a structured process troubleshooting plan is not followed it may be that not remember something already done or just someone come to the aid and can not explain exactly what steps have been followed and in what order.

Schematic of a structured plan

A constitution a figure (Figure 1) showing the steps in a structured way, to reach the best solution to a problem of networks that we present is as follows:

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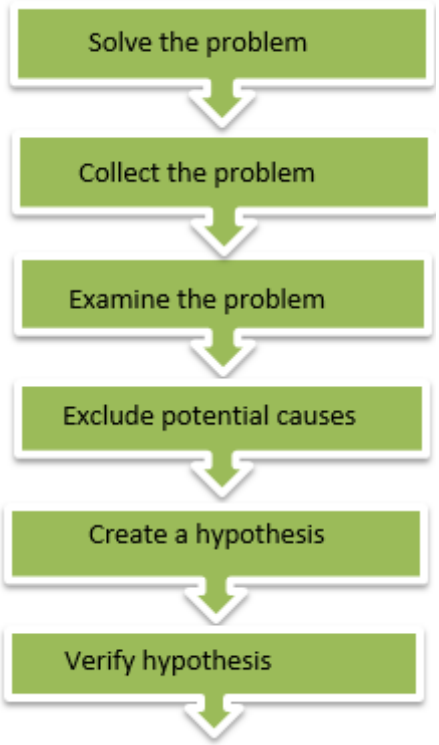

Figure 2 structured plan

However it may happen that the problem you have is familiar and already knows how to solve it. This method is commonly referred to shoot from the hip.

Outline of a shoot from the hip plan

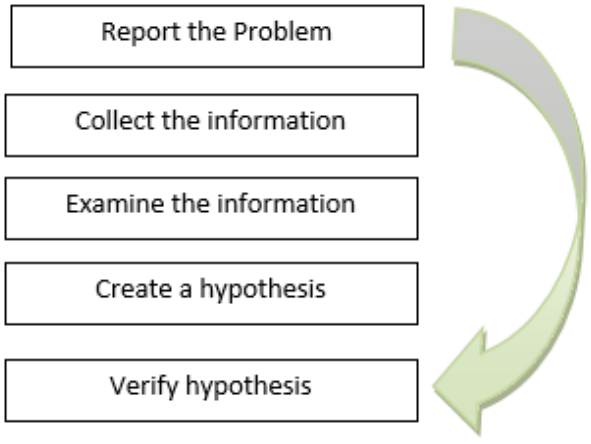

Figure 3 Schematic plan of a shoot from the hip

Methods troubleshooting

Then several troubleshooting methods widely used are:

Top-Down Method: Based on start searching for the problem in the higher layers of the OSI model, assuming that if certain layer operates there under so will.

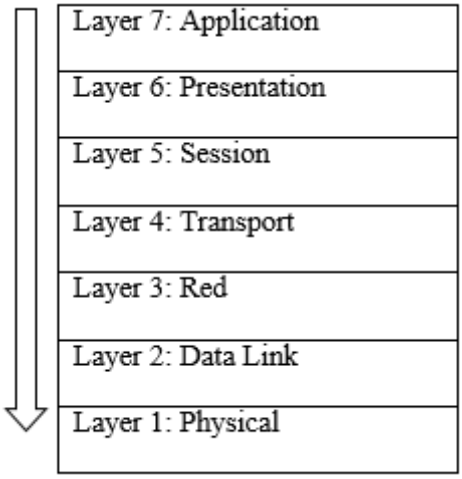

Figure 4 Top-down method

Bottom-Up Method: This is the opposite case of the above method. It can be very effective but slow in large networks.

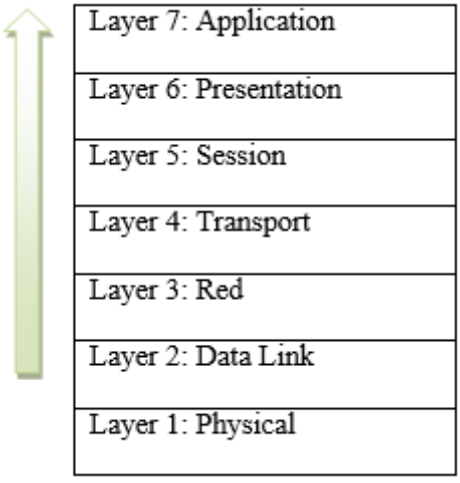

Figure 5 Bottom-Up Method

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Divide and Conquer Method: In this method should first check the intermediate layers of the OSI model, the test is successful if it is assumed that the part relating to the first is correct to focus on the second part. Otherwise the problem is sought in the first half.

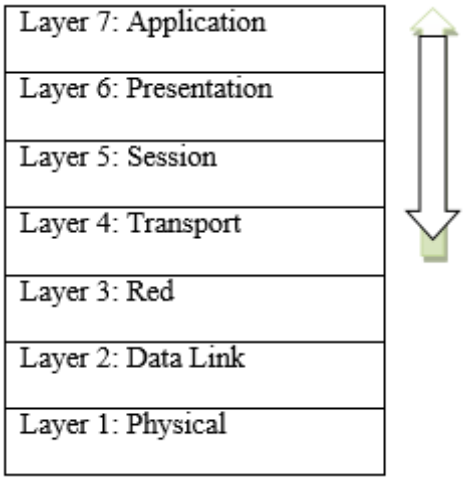

Figure 6 Method Divide and Conquer

Traffic monitoring method: Based on the analysis of the devices between the origin and destination traffic.

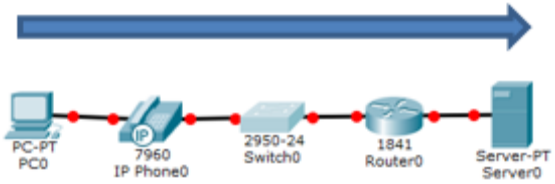

Figure 7 Method traffic monitoring

Method to compare configurations: It is especially useful in cases where after making a change in network problems occur. It is simply based on comparing the current configuration with the last known good.

Method of replacing parts: It consists physically replace parts that form the network segment where there are problems. It is very useful when you are doing troubleshooting and error level 1 of the OSI model are verified, for example by failing to Internet on a host physically first check the network card, cable, connector port router, etc.

Troubleshooting procedures

A good structured troubleshooting process helps to more efficiently use resources in an enterprise and, in case an administrator must continue the work of another will be easier to take. Through the combination of the above steps, the following process is obtained structured:

Report of the problem. Normally it gives someone who makes use of network resources, and often this information is inaccurate and sometimes erroneous. Someone reporting problems primarily serve to identify that part of the network has been affected, which devices or group is responsible for the failure.

Gather your information. Once the bug has been reported and identified part of the network that has the problem, you should gather as much information as possible from both the affected devices, such as logs, historical changes, etc. In case there are network devices that do not have access will need to contact the relevant groups for this information.

Examine the information collected. After gathering all the necessary information must be thoroughly analyze it, always being aware of:

- Identify the root causes that target problem.
- Remove unnecessary information.

Depending on the degree of experience of the administrator must make some questions to be answered more or less quickly, you need to analyze all the information it collected, or just watching the behavior of network protocols, etc. These questions can be such as:

What is happening in the network?

What I should be happening?

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How should I be working?

Eliminates potential causes. Once the data considered must discard information on causes not own the problem and what is very important not imagine or wish to make based on data that are not on the information collected hypothesis.

Create a hypothesis for the cause. After eliminating potential causes, you should focus only on the cause believed to be the final. In case you have access to the device will proceed to try to solve the problem. Failure to access the device should look for an alternative solution through appropriate network administrator.

Verify the hypothesis. Once we know the cause can try to resolve it. It is important to think about how to act because the fact immediately implement the solution can cause network outages, then perhaps better plan for a better intervention, at night or when the impact is minimal now.

It is very important to document all the changes that apply to that case the intended solution does not solve the problem possible to step back and think of another solution.

Problem solution. Once the problem is solved, it should clearly documented as was the solution, and all parties are to receive an explanation of what happened and how it was solved.

Tools for maintenance and throubleshooting

He is also familiar with the important tools troubleshooting connectivity built, that come with the operating system you are using.

Some of these basic tools are:

Ping: the function uses ICMP echo (Internet Control Message Protocol) and is the lowest level test to determine if a host is connected. Ping is a tool that checks whether a remote computer is functioning properly and whether the network connections are intact [7].

Ping is extremely useful for troubleshooting at Layer 3 level, not only indicates whether a particular host is active or not, but also offers the possibility of extra parameters that provide much more information.

Traceroute (Tracert aka): Follow the path of a packet until it reaches its destination. That is measures how long it takes for a packet on its way through each hop to reach its destination [7].

Pathping: A routing tool that combines features of Ping and Tracert along with other information.

IPconfig: Check the IP configuration of your computer and outputs the information used to determine whether the computer has proper connectivity to the network.

Telnet: used to test connectivity from a remote host or server.

Netstat: Lists all the TCP / UDP ports listening to your server, including all active network connections to and from your server.

Network Monitor: Lets you capture the network packets for further analysis.

SNMP: Collects device statistics such as resource utilization, number of errors at different counters, etc. It employs a so-called pull station where NMS (Network Management Station) requested statistics periodically. This widespread, one can say that virtually any network device can use SNMP [6].

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Netflow: Collect samples of traffic. Uses a model called push. That is, the device from time to time send a sample of the traffic to another device called a collector. It is available only in routers and high-end switches.

Conclusions

A computer network is a complex system that cannot be created or working for you. The network administrator should be able to configure, monitor and properly plan their evolution. In addition, Network Manager is expected to quickly resuelver Network problems and derivatives users. It is vital to have the resources and skills to logically determine the cause of the problem and how to solve it.

With the application of methods and troubleshooting procedures presented in this document, the administrator can now formulate a methodology to detect and identify problems in a systematic and logical manner and thus arrive at the best solution for the problems in your network computer.

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Carcass characteristics, proximate composition and mineral analysis of African giant snail (Archachantina marginata)

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Abstract

The experiment was carried out at the Snailry unit of the Department of Forestry and Wild life, Faculty of Agricultural Sciences, Ekiti State University, Ado Ekiti using African Giant Land Snails (Archachatina marginata) procured from farmers in a settlement close to Ado Ekiti and reared in improvised plastic baskets between 1st of August and 30th of November 2012. At the end of the rearing period, the snails were killed and the internal mass separated from the shell. The separated feet were randomly divided into two groups tagged Treatments 1 and 2. Treatment 1 was deslimed with lime while Treatment 2 was deslimed with alum. The mean live weight, foot weight, viscera weight and shell weight of the experimental animals were determined and their respective percentages calculated. The sensory evaluation study, proximate and mineral analyses were also carried out. All the data obtained were subjected to statistical analyses using the cross sectional design of the two-sample t-Test for independent samples with equal and unequal variances. The results of the study showed that the percentage constituents of the body parts that made up a matured snail include: Foot (40.15 – 41.18 %), viscera mass (15.98 – 16.12 %), shell (16.97 – 17.17 %) and the balance of 25.53 - 26.89 % was water. The result of the sensory evaluation study revealed no significant ($p>0.05$) differences between the two treatments but treatment 1 was the more preferred combining all the sensory profiling parameters investigated. The proximate analysis of the snail meat showed that the values of protein, ash, moisture and crude fat were similar ($p>0.05$) in the two treatments. The content of carbohydrate was significantly ($p<0.05$) higher in Treatment 2 but crude fibre was however not detected in both treatments. The results of the mineral profile of the two treatments showed consistent significant ($p<0.05$) differences in all the macrominerals and in the micro mineral components, they were all similar ($p>0.05$). In conclusion, Achachantina marginata meat is rich in nutrients and the edible flesh (meat) of snails deslimed with lime was preferred to the alum deslimed meat.

Snailery, African Giant Land Snail, deslimed, carcass study, sensory evaluation study, proximate analysis, mineral analysis

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Introduction

The growing burden of death resulting from chronic disease in the world today is attracting global interest. Red meat (beef, mutton, chevon, pork) have being associated with this unhealthy image due to the relative proportion of saturated fatty acids present in them which do not favour their consumptions. However diets low in saturated fatty acid had been reported to have major impacts in combating this high toll of death and disease (FAO/WHO, 2003). Consequently, exploiting the potentials of non-conventional animal protein sources referred to as 'Mini – livestock' that are environmentally friendly like land snails becomes imperative.

The chief source of snail meat to consumers in Nigeria is those collected from the wild and brought for sale in markets. The most worrisome challenge to continuous availability of the meat in Nigeria markets is the decline in production from this source as a result of man's impact on their natural habitat in areas of deforestation, use of chemicals, slash and bush burning and possibly collection of snails before maturity. It is therefore a well thought and mindful efforts made by man to rear snails domestically so that the availability and conservation of the animal species can be guaranteed.

Consequent upon this, a re-orientation from old system of snail hunting to a new branch of animal agriculture called heliculture has evolved. Helicultre is the system of rearing snails domestically and it is becoming more popular each passing day. For a venture in animal agriculture to be successful, productivity in terms of quality and quantity should not be compromised. However, this cannot come about without re-allocation of resources from other biological functions. Such reallocations can interrupt biological balances and disrupt nutritive value of the animal species.

In appreciation of this, various researchers have investigated the nutritive values (Imevbore and Ademosun, 1988; Ademolu et al, 2004; Fagbuaro et al. 2006 and Babalola and Akinsoyinu, 2009) and carcass characteristics (Omole, 2010 and Ojebiyi et al., 2011) of this animal species. However there were no consistencies in their findings. Therefore, this work is carried out to validate or/and invalidate these findings.

Materials and methods

Experimental site and Housing

The experiment was carried out at the Snailry unit of the Department of Forestry and Wild life, Faculty of Agricultural Sciences, Ekiti State University, Ado Ekiti. The experiment lasted between 1st of August and 30th of November 2012. The snails were reared under shade in improvised plastic baskets suspended 30 cm off the ground with planks. The legs of the planks were placed in large plastic bowls containing water with engine oil. The floors of the baskets were covered with sacks after which loamy soil rich in organic matter was poured to a depth of 14 cm. The sides of the baskets were covered with wire mesh and mosquito nets and the top covered with rough aluminum sheets. This exercise was carried out to protect the snails from invasion by soldier ants, insects and predators like reptiles, birds and rodents.

Experimental animal

The African Giant Snails (Archachatina marginata) used for this study were procured from farmers in a settlement close to Ado Ekiti called Aba Egbira and reared in improvised plastic baskets described above.

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Feeding and watering

The snails were fed with pawpaw leaf once daily throughout the duration of the experiment. The leftover feeds were removed before given a fresh one. Adequate amount of water was given by wetting them regularly during the rearing period.

Processing

The steps involved in processing the meat included deshelling to expose the entire snail meat; desliming and cleaning the meat.

Deshelling

Two methods could be used to deshell snails - either by hot water soak which lubricates the interior of the shells and enables snails to easily slip out or to crack the shell, using a mallet or a stone. The first method softens the meat but keeps the shells intact, and available for future decoration uses. In this study the snails were killed by striking iron rod on the shell carefully at the apex of the shell. The internal mass made up of the foot and the visceral mass was then separated from the shell. The viscera mass lies above the foot of the snail. It is a light grey sac full of fluid and snail guts. The mass was separated by gripping the sac, where it connects to the foot and pulling it. The sac/guts were discarded. The foot was then slit open along a natural line using a small sharp knife. The separated feet were randomly divided into two groups tagged Treatments 1 and 2. Treatment 1 was to be deslimed with lime while the other Treatment was to be deslimed with alum.

Desliming and cleaning snails

The snails were deslimed by using lime for Treatment 1 and alum for Treatment 2.

Though, lime is acidic while alum, as used in preparing snails is hydrated potassium aluminum sulphate (potassium alum) – a solid, crystalline chemical, both of them possess astringent qualities and the ability to cut through grease and slime. This was done by massaging either the alum or the lime to every inch of the snail, especially the 'hinges', on the outside of the snail which acts as a pool, trapping slime. On completion of desliming, the snails were rinsed off with clean cold water and checked for residual slime.

Carcass Analysis

The mean live weight, foot weight, viscera weight and shell weight of the experimental animals were determined and their respective percentages calculated as follows

Weight of parameter x 100

Live weight of the snail

Sensory evaluation study

Eight taste panelists, with age ranging between 23 and 25 years, were selected to participate in the sensory evaluation study. They were humbly instructed by the authors to avoid eating, drinking or smoking at least thirty minutes before each test; to avoid conversations during the exercise and to rinse their mouths with water after each text. Score sheets were given to the taste panelists for grading. Thereafter, the snail meat was steamed without spices for 10 minutes for each of the treatments. After preparation, the two treatments were replicated eight times and served in a saucer at a time and presented to each of the eight trained taste panelists using cafeteria method. Two points was awarded for the better parameter and a least score of 1 point to the other parameter for each parameter investigated in each of the treatments.

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Proximate analysis

A fraction of the deslimed foot obtained from both treatments were dried in an oven at 60oC to constant weight and then analyzed for its proximate and mineal contents. Crude protein, ether extract, and ash contents of the flesh were determined by the methods of the Association of Official Analytical Chemists (AOAC, 2005). Value for the carbohydrate was obtained by subtracting the sum of the values of moisture, crude protein, ether extract and ash from 100 %.

Mineral analysis

From the ash obtained in the proximate analysis, mineral contents were determined. Phosphorus was determined with vanadomolybdate and the concentration assessed with a UV spectrophotometer at a wavelength of 470 nm. Calcium was determined by flame photometry. Other minerals were determined by means of Atomic Absorption Spectrophotometry (AAS) at a wavelength of 324.7 nm for copper, 285.2 nm for magnesium, 248.3 nm for iron, 283.3 nm for lead and 198.5 nm for mercury.

Statistical analysis

All the Data obtained were subjected to statistical analyses using the cross sectional design of the two-sample t-Test for independent samples with equal and unequal variances (Rosner, 2000) while using PC-SAS T-test Programme (PROGT-Test) computer package to carry out the analyses. Equality of variances was verified using the F-test and significant level determined by two-sample t-Test as described by Snedecor and Cochran (1973).

Results and Discussion

Carcass analysis and sensory evaluation

Table 1 showed the results of the carcass analysis. In all the parameters investigated, the processing methods did not show significant differences ($p>0.05$). The percentage constituents of the body parts that made up a matured snail were: Foot (40.15 – 41.18 %), viscera mass (15.98 – 16.12 %), shell (16.97 – 17.17 %) and the balance of 25.53 - 26.89 % was water. This result is in agreement with the report of Omole, (2010) and Ojebiyi et al. (2011).

Parameters	Treatment 1	Treatment 2
Mean live weight (g)	324.13±3.28	323.92±34.87
Foot weight (g)	133.48±3.64	130.05±2.10
Foot percentage	41.18±1.02	40.15±0.93
Viscera weight	52.25±0.84	51,76±0.87
Viscera percentage	16.12±0.73	15.98±0.61
Shell weight	55.65±1.62	54.98±1.35
Shell weight percentage	17.17±1.12	16.97±0.98

Table 1 Carcass analysis of matured snails processed differently

T1 = Snail deslimed with lime

T2 = snail deslimed with alum

Table 2 showed the result of the sensory evaluation study. Sensory evaluation of snail meat was carried out to find out the impact of the methods of desliming snails on their sensory qualities and how the qualities may influence the palatability and preference for snail meat by consumers.

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The results revealed no significant differences between the two treatments but treatment 1 was the more preferred combining all the sensory profiling parameters investigated. Sensory qualities are very beneficial to owners of restaurants who trade in snail meat to guarantee patronage by customers.

Parameters	Treatment 1	Treatment 2
Tastiness	1.4	1.5
Toughness	1.4	1.4
Tenderness	1.3	1.3
Flavor	1.5	1.3
Mean	1.40	1.38
Preference ranking	1st	2nd

Palatability score: 1 was awarded for good and 2 for better

Table 2 Sensory profiling of differently deslimed snail meat based on tastiness, toughness, tenderness and flavour

T1: Snails deslimed by using lime

T1: Snails deslimed by using alum

Table 3 showed the proximate compositions of the snail meat. The values of protein, ash and crude fat were similar ($p>0.05$) in the two treatments. Also, the moisture contents in the two treatments were similar ($p>0.05$) though treatment one was superior by 1.48 %. The values of moisture contents recorded in the two treatments under this study were higher than the value of 73.67 % recorded for the same species of snail by Ademolu et al (2004) and 66.60 % reported for Whelk, Buccinidae, (Exler, 1987). However, the values were lower than the value of 81.22 % reported for Cod, Gadus morhua (Exler, 1987) but close to the value of 76.56 % reported by Fagbuaro et al., (2006) for Archachantina marginata (ovum) pfeiffer.

The crude protein contents of the two treatments were similar ($p>0.05$). The values were found to be inferior to the values obtained for conventional livestock (FAO, 2001); the value of 17 -18 % obtained by Awesu, 1980; Odukoya, 1998 and Omole, 2003; the value of 20.50 % obtained by Fagbuaro et al. (2006) and the values of 17.81 % and 23.84 % reported respectively for Cod and Whelk (Exler, (1987). However, it is fairly close to crude protein value of 16.9 % obtained for mutton (FAO, 1969).

The fat contents of 4.27 and 4.10 % obtained for the two treatments in this study were higher than the value of 2.44% obtained for AM by Ademolu et al (2004); 1.36% obtained by Awesu (1980); 1.3-1.5% by Asibey and Eyeson (1975); 0.005-0.8% by Cobbinah (1993) and 0.82-0.95% by Hamzat (2004). However the fat content obtained in this study was low when compared with 9.6, 21.4 and 23.0% found in egg, mutton and duck products respectively (FAO, 1969). The low fat content makes snail meat a good antidote for the hypertensive patient and those that have fat related diseases i.e. arteriosclerosis (Bright, 1999).

Nutrient composition	T_1	T_2
% Moisture content	79.11	77.62
% Ash	1.36	1.37
% Fat	4.27	4.10
% Crude protein	14.48	14.75
% Crude fibre	ND	ND
% Carbohydrate	0.78	2.16

ab means with no superscripts are statistically similar ($p>0.05$)

Table 3 Proximate composition of matured African Giant land snail (Archachantina marginata)

T1: Snails deslimed by using lime

T1: Snails deslimed by using alum

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The ash contents of the two treatments were similar ($p>0.05$) while the content of carbohydrate was significantly ($p<0.05$) higher in Treatment 2. Crude fibre was however not detected in both treatments.

The results of the mineral profile of the two treatments were shown in Table 4. Treatment 2 showed consistent significant ($p<0.05$) differences in all the macrominerals and in the micro mineral components, they were all similar ($p>0.05$). The result showed that Achachantina marginata in Treatment 1 recorded higher value (mg/100 g) in calcium (205.08), sodium (193.09), phosphorus (221.67), magnesium (47.80) and potassium (69.16) while Treatment 2 had the least values of 190.82, 182.56, 214.32, 38.14 and 49.32 respectively.. There was no detection of lead and mercury in any of the samples.

Snail meat is rich in calcium. A value of 205.08 mg/ 100 g obtained in this study is an indicator to this. This value is comparable with the value obtained by Adeyeye (1996) but higher than the value obtained by Ademolu et al., 2004). A comparison with other animal products like beef, liver, eggs, and milk whose calcium content in mg / 100g are 7, 6, 54 and 120 respectively further corroborate the richness of Achachantina marginata in calcium. Calcium is involved in calcification of bones and teeth. Its shortage therefore can affect the structure of bones which become weakened. Calcium ions are needed for blood clotting and successful functioning of nerves and muscles (Fox and Cameron, 1980). The high content of calcium in the breed of snail investigated suggests that consumption of snail can increase the calcium content in the body and contribute tremendously to the blood clotting process.

Snail meat like calcium is rich in phosphorus as obtained in this study. A range of 214.32 – 221.67 mg/ 100 g obtained in this study is an attestation to this.

This range of value is sufficiently lower than the values reported by Ademolu et al., (2004), the values of 156 and 95 mg/100g obtained for beef and milk respectively; comparable with 218 mg/100g in milk and lower than 313 mg/100g obtained for liver (Fox and Cameron, 1980). Snails are therefore a good source of phosphorus. Phosphorous like calcium is also involved in calcification of bones and teeth. It plays a vital part in the oxidation of nutrients in the form of phosphate groups in ATP (Fox and Cameron, 1980).

Magnesium like calcium and phosphorus is also involved in the formation of the bone structure of the body. The values too like potassium were comparatively low in the two treatments assessed.

The iron content in (mg /100 g) of 4.98 - 5.02 obtained in this study were high compared with a range of 2.7-3.05 reported by Imevbore and Ademosun (1988), the value of 2.29 mg/100 g reported by Ademolu et al., (2004) and corresponding values of 6, 11.4, 2.9, 1.9, 2.1, 0.1, 2.0 and 1.08 mg/100g in conventional animal products like kidney, liver, sardines, beef, eggs, milk, mutton and duck respectively (Fox and Cameron, 1980). Iron facilitates the oxidation of carbohydrates, proteins and fats. Half of the iron in meat is present as heme in hemoglobin. The iron in meat does not only enhance the absorption of iron from other sources such as cereal but increases considerably the level of iron absorption in the blood and prevent anemia which is so widespread in the developing countries such as Nigeria (Bender, 1992). Iron is one of the mineral elements which may be lacking in an average diet and so there is need to be conscious of taking diets rich in iron most especially the vulnerable group of people that is women who are in child-bearing age, pregnant and nursing women.

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The Cu content of 0.61-0.70 mg/100 g of meat obtained in this study was low compared with the value of 1.03 mg/100 g reported by Ademolu et al., (2004). Fox and Cameron, (1980) recommended a daily intake of 1-3 mg per day. Consequently, consumption of 100 g of snail per day is able to supply between 61 and 70 % of the daily need for copper. Copper is an essential trace element that forms part of several enzyme systems including cytochrome oxidase and tyrosinase. Copper is associated with iron and catalyses oxidation-reduction mechanisms concerned with tissue respiration. Tyrosinase is concerned with the oxidation of tyrosine (Fox and Cameron, 1980).

Minerals	T_1	T_2
Sodium	182.56^b	193.09^a
Magnesium	38.14^b	47.80^a
Potassium	49.32^b	69.16^a
Calcium	190.82^b	205.08^a
Phosphorus	214.32^b	221.67^a
Manganese	0.52	0.52
Iron	5.02	4.98
Copper	0.61	0.70
Zinc	1.88	2.11
Lead	ND	ND

ab means with different superscripts are significantly different ($P<0.05$)

Table 4 Mineral contents (mg/100 g) in the edible flesh of the African giant land snail (Archachantina marginata)

T1: Snails deslimed by using lime

T1: Snails deslimed by using alum

Conclusion

Succinctly, this study revealed that Achachantina marginata meat is rich in nutrients compared to the more conventional animal protein sources such as beef, chicken, chevon, mutton and pork.

The edible flesh (meat) of snails deslimed with lime was preferred to the alum deslimed meat. Snail consumption is therefore recommended for both old and young as this will combine effectively with other food components in providing the required essential element to the body.

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Article **ECORFAN Journal-Mexico**

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Environmental accounting as a tool for sustainable economy: the case of the pharmaceutical companies in Puerto Rico

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Abstract

Through institutional approach, the main aim of this research was to evaluate and analyze how and why Janssen Pharmaceutical Company in Puerto Rico uses environmental accounting. A qualitative research in environmental accounting through an empirical analysis of Sustainability Reports, the study of many pharmaceutical firms on the island and an exploratory and descriptive case study in Janssen Pharmaceutical. It was concluded that the use of environmental accounting in Janssen include a series of regulatory, normative and cognitive structures that impact on their environmental performance, based on myths and organizational ceremonies to legitimize and ensure their survival.

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Introduction

The environment is an indispensable element for the sustaining of every living thing, including the human being. Since the early 70s a greater interest in the conservation of these resources is observed, mainly because they start to talk about the depletion and degradation of them. Hence the responsibility begins to fall on all those who in some way may impact the natural environment.

To Saroki, there are reasons to fear the future we have created, as by expanding our capabilities, we expand our capacity for destruction. And despite efforts to improve human conditions, there are now more poor people than before (Saroki, 1993). Currently, our planet Earth is in crisis and its deterioration is observed. It is evident the thinning of the ozone layer and the growth of its hole, the counterproductive effects of acid rain and the greenhouse effect and to top it off air pollution, oceans contamination and disappearance of some species is increasing and with it the biodiversity . These are some of the comments and concerns that have changed the social perspective of humanity in this century.

This environmental crisis caused by the transformation in the biosphere has been a topic of great importance, thus affecting the emergence of programs and laws as the Montreal Protocol (1987); the Treaty of Geneva; Programs of the United Nations Environment Programme (UNEP); the Earth Summit held in Rio de Janeiro (1992), among others. All this concluded that environmental problems demand an international response. These changes have caused a greater reaction both public (through legal mechanisms and environmental policies) and in the private sector (individuals and companies) to contribute to the development of a favorable climate and in most cases for sustainable development.

Accordingly, the GATT (General Agreement on Tariff and Trade, now WTO) suggests that in order that the trade benefits the environment is necessary to assess the natural environment (Ropke, 1994), the SEC (Securities and Exchange Commission) have established that the companies whose publicly traded shares should provide information on the effects of the industry on the environment and the World Bank has accepted his role as global manager of the environment to begin investigating the utility of its annual distributions (money) on the surrounding environment (David Saroki and Jay Schulkin, 1993: 73). Although such liability cannot be extended, for the moment to a financial sector, (banking and insurance remain immune), but it is possible that if they analyze these effects, their own ethics will lead them to a better management of its financial assets for life human and environmental acceptable (are called ethical investors). To this should be added the concern of environmental movements, scientific research and the government's intention regarding a clean environment. What we must ask is whether this concern is only part of a better public image or actually an intrinsic change of everyone.

Puerto Rico is an island located in the Caribbean Sea with an area of 9,104 km2 (3,515 m2). It has a population of 3.7 million of people and its economy is based mainly in the manufacturing sector (47% of GDP). When the resources of the island are evaluated, the panorama does not look very flattering and it is noted that public policy and economic growth of Puerto Rico are not directed towards sustainable development. As stated Jose Javier Perez (2003: 6): "Although the picture shows that Puerto Rico is a patient in critical condition, many agree that we have time to save it.

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The key is to be creative in how countries use their resources and how governments, businesses and society manage to mobilize in sequence to build economies that are healthy for people and the planet".

This leads us to ask ourselves how aware is the government, employers and the general public in the use and degradation of natural resources and how they are to be lead towards a sustainable development. In particular, how the pharmaceutical industry can contribute to the sustainability of the planet, through the flow of information through its accounting system. As Ruth Hines points out: The accounting practices, while communicating the reality play an important role in creating, sustaining and changing social reality role, insofar as they communicate reality, construct reality (1998). Therefore, if it is recognized that the accounting-help in the construction of the world, according to Rob Gray and influence decisions and expresses "accountability", so if you have in mind the environment when designing accounting, significant changes may occur (1992).

Research objectives

It is impossible to think that if the situation of environmental degradation covers a diverse area, this remains outside in accounting analysis. One method that has been developed to try to contribute to the environment and to internalize this harmful effect has been the environmental accounting. In general, this concept is used in three different ways. First, it is associated with the national accounts of a country where it is recorded and included in the national accounts of a country's reserves, flow, use and depletion of natural resources, environmental costs and externalities incurred in the production process.

The second terminology is related to financial accounting, where the organization presents its financial information to shareholders, in this case, information regarding the costs associated with environmental damage and the responsibility of the company to these effects. Finally, the use of environmental accounting in the management accounting of the organization, which is the interest of this research. This includes the identification, collection, estimation, analysis, internal reporting, and use of the information flow of energy and materials, environmental cost information and other information necessary for decision-making in an organization.

In the research it was intended to clarify the question: Is it possible that the environmental accounting tool that uses Janssen Pharmaceutical Company in Puerto Rico has been established according to certain widespread myths that enable better management and possibly legitimize their operations to the parent (Worldwide Headquarters), but mainly to one of the biggest rationalizers of the twentieth and twenty-first century, which is the state? Hence what intends this research is to see environmental accounting in the pharmaceutical industry as an institutional process rather than a technical process, because you may find that most of the items that pharmaceutical use as part of environmental accounting (measure, evaluate and communicate information), come from events that are taken for state regulations and regulatory agencies, mainly the EPA, EPA, the AAA and the ADS of Puerto Rico , in addition to its parent corporation or worldwide headquarters. Thus, if the Janssen Pharmaceutical Company uses environmental accounting as part of institutionalized routines management accounting, therefore Janssen apply this tools to the goal of greater transparency to the power of coercion that could be using the State or parent corporation and thus.

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Legitimize their behavior, and not necessarily as an essential tool in the decision making process in the organization, or by a more commitment to the use and conservation of the natural environment.

In this paper it should be noted, that there was no intention at any time to check or test the institutional theory, since to do so would require a longitudinal study, which lacks this research, but by using this theory could explain the environmental performance of the Janssen Pharmaceutical Company. In addition, this work didn't pretended indicate that the institutional environment dominate the technical or competitive environment, or vice versa, because as Scott mentioned, both exert pressure on organizations to which they must respond in order to survive (1983 and Dimaggio 1999). This would require further research in this field.

Theoretical Framework

Institutional theory exposes the cases that the institutional environment influences the behavior of organizations. This institutional environment is consists of beliefs; cognitions or things that are taken for granted, and that are socially accepted. This argument has two great exponents. On one hand, Meyer & Rowan (1977) indicated that the behavior of organizations it's based on organizational myths and ceremonies. For them, the organizations have institutionalized certain tasks and programs that work as powerful myths that many organizations take ceremoniously, regardless of the efficiency of such practices. They just do it to improve its legitimacy and prove that they are acting in good faith, allowing ensure the survival of the organization. On the other hand, DiMaggio & Powell (1983) argued that as organizations comply, or do some of them, these institutional rules through a mimetic relationship and conformity.

Would result in an institutional isomorphism, since there would be greater homogeneity within organizations. Meyer and Rowan based their analysis on symbolic models, in which organizations would somehow reflect the values and traditions of society. However, to DiMaggio and Powell, were very visible influences acting on the behavior of the organization (mainly the government and professional groups).

This research is part of the institutional theory within the organizational field, in terms of conceptualizing, how institutions have occupied a very important place in the performance of an organization (decision making, legitimacy, survival). In particular, how the practices of environmental accounting in the organization are seen as part of institutionalized routines of management accounting that improve decision making in the organization and simultaneously legitimizing organizational activity to fulfill what is expected of them. See how environmental accounting practices in the Janssen Pharmaceutical Company have become an institutionalized routine, primarily through coercion rules and laws established by the government and thus legitimize its internal and external behavior.

This research focused mainly on qualitative research through a case study of environmental accounting in the Janssen Pharmaceutical Company in Puerto Rico. This qualitative research allowed a deep and thorough analysis, enabling us to better understand the patterns of behavior and social processes in the company (Denzin: 1977: 11).

A case study is an empirical inquiry that investigates a contemporary phenomenon in a real-life context, especially when the boundaries between phenomenon and context are not clearly and obviously when multiple resources are used to obtain the evidence.

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It is the preferred strategy when have a question of how and why; when the researcher has little control over events; and when the focus is a contemporary phenomenon in a real-life context (Yin: 1994: 13). The case study then it is a form of deep research and details some phenomenon (individual, community, programs, institutions), which helps providing a better understanding of what we want to study. This may help explain, describe, illustrate, explore and evaluate the phenomenon investigated in the context of real life (Yin, 1994: 25). So that the research is conducted primarily by observing the facts in a thoughtful manner and to the extent we can assess and explain the behavior of the phenomenon in a concise and accurate manner. Therefore, when a case study is used in research, the main objective is to explain this phenomenon and the reward is the opportunity to learn more about this phenomenon (Stake, 2005: 452).

Empirical Analysis

The empirical analysis used in this study consisted of two parts, as shown in Figure 1. In the first part, it was performed an evaluation of sustainability reports (environmental section) having pharmaceutical corporations (corporate) in its website (web). It consisted in the analysis of each of the aspects included in the G3 guide. Each firm is expected to indicate how it behaves in each of these areas and what tools are used to contribute to the sustainability of the planet. Moreover, in this part also environmental information from pharmaceutical companies located in Puerto Rico was evaluated, collected using the questionnaire. A non-random sample (for convenience) was used to distribute this questionnaire due to the concentration of these companies in the areas of greatest environmental pollution (north and southeast of the island).

A response rate of 62.5% was obtained, which is considered acceptable. In the second part of this research, analysis of case study for Janssen Pharmaceutical Company in Puerto Rico was presented.

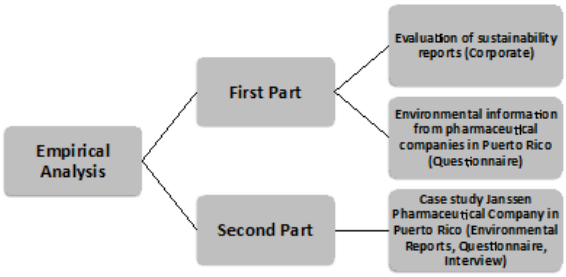

Figure 1 Empirical Analysis

Importantly, being the first time a study of environmental accounting is done in the pharmaceutical industry in Puerto Rico, I considered it was important to conduct an exploratory study in one of the firms surveyed above, to further investigate the environmental accounting in this industry. In this part, three methodological instruments were used: a questionnaire was distributed to people in the Environment Department, the Department of Finance and Production Area); interviews were performed to people in the Environment and Finance Department, a CEO of the company and persons in regulatory agencies) and analyzed the environmental reports that the company sends to regulatory agencies in Puerto Rico and published in the " Performance Track" for purposes of evaluating environmental information to the company and to compare the results with the triangulation process.

Sustainability reports (G3)

Question	Analysis
Compliance with aspects of sustainability GRI (G3)	Most fails
Using environmental accounting	Its using or starting to use this tool

It was noted that most corporations do not meet all the sustainability aspects included in the G3 guide.

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Pharmaceutical corporations primarily include information that could be considered mandatory by state regulators, such as water, emissions and compliance, avoiding data on materials, products and services, transport and biodiversity, which are usually less transparent. Moreover, this industry is taking or starting to use the tool of environmental accounting, inasmuch as collecting quantitative and qualitative information (either to comply with environmental regulations and assess their performance in terms of compliance with established goals), analyzing this information to make decisions relating to such behavior (evident in these reports all the resources used by the corporation to reduce its environmental impact), and finally presenting this information to the public through sustainability reporting.

The thing I cannot conclude is how important the environmental accounting is for decision making in the management of its operations. According to the information presented in sustainability reports, it is limited, since it is used to comply with environmental regulations and to legitimize their behavior, and not as an adjustment of major changes in the management of their operations, as stated by Carlos Larrinaga (2001).

Finally, I note that most public corporations have some type of environmental information related to its operations, confirming the claim that every day more companies are motivated by the display of this information, although still lacks financial information (Carlos Larrinaga 2002 ; Moneva and Llena 1996 and Moneva et. Al 1998). It is important to note that this research did not seek in any way to assess the quality of the information presented in these reports, much less see if this information has been increasing over time (longitudinal analysis is required).

But I conclude that the information in these reports was more an act to legitimize their behavior than an essential tools for real sustainability of their operations with respect to environmental or natural resources. Furthermore, as mentioned Larrinaga et al. (2002), it may be that some companies are somehow internally managing their activities with environmental impact even decide not to report it, either because they think it is more harmful than beneficial, wishing to hide data to shareholders or do not have adequate knowledge about rules or standards.

Questionnaire to the pharmaceutical industry in Puerto Rico

The survey was conducted with the aim of increasing knowledge about the environmental performance of the pharmaceutical industry in Puerto Rico, including the use of environmental accounting as an integral part of that flow of information. To carry out this survey several references of earlier researches were used thus obtaining a broader picture of the most relevant information to this research: A.Huizing (1992ª); Gray et.al (1993) and EPA (1995a, b, c, d; 1996; 1997a, b). Three environmental directors of three different pharmaceutical companies validated this survey. Other surveys were sent to environmental managers via e-mail, after telephone contact and engagement thereof with the environmental area.

To handling this survey, a convenience random sample was used. The population of the pharmaceutical industry on the island was evaluated and found to be mainly concentrated in two areas (north and southeast).

Of the fifty-four companies located in this region, it was decided to remove five of them, as they went only on pharmaceutical products packaging and research and not on manufacturing product.

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On the other hand, it is important to indicate that communication between fifteen (15) of the companies located in the area was impossible, for reasons of lack of interest or commitments and responsibilities of staff in the environmental and administrative area. In addition, there were five companies operating more than one firm in the island, but only one person answered the questionnaire, so that he could contact and send the questionnaire to twenty-nine companies (29), which would be the final sample used. This survey consisted of a total of eighty-one (81) questions, of which seventy-four (74) were closed and seven (7) open questions. A response rate of 62.5% was obtained, which is considered acceptable. Moreover, the responses come mainly from the two areas of greatest concentration of industry, but in particular the 80% came from the southeast area.

In the analysis of pharmaceutical companies in Puerto Rico it was intended to obtain accurate information to support the hypothesis of this research, that the information provided by the companies belonging to the pharmaceutical industry on the island, make it as a tool to legitimize their operations, mainly, to pressure groups, in particular government agencies, ensuring the continuity of its operations and its permanence in the island. We wished to investigate the following:

Question	Analysis
Environmental performance of pharmaceutical companies in Puerto Rico	– Excellent environmental behavior. – The enviroment is very important for your business.
	– Compliance with environmental regulatory agencies.
Using environmental accounting to evaluate their behavior	–Use environmental audits. –Use of environmental costs.

Table 2 Pharmaceutics companies in Puerto Rico

The environmental performance of these companies was evaluated in three ways: in general; through compliance with environmental regulations; and using environmental accounting as a tool for managing their operations.

First I point out, that according to information provided by pharmaceutical companies, the overall rating of environmental performance is excellent and consider the environment as an area of vital importance to their company. Secondly, with regard to environmental compliance, companies said they present and send information to agencies that regulate their behavior with respect to air, water and soil; and, in general, they comply with the environmental regulations. This somehow could mean a greater concern for the environment in which they operate.

In the assessment of information relating to environmental accounting, companies management or handling environmental audits, generate environmental costs information (mainly tangible costs and), calculate the energy and water consumption, emissions and discharges on the water and air, use recycling as an essential part of the production process, consider the life cycle of their product and in their investment and budget consider the natural environment. In addition, companies say that the changes generated to consider the environment in their operations is mainly to comply with established legislation (86.67%) and not by (6.67%) initiative, leaving aside the interest that they may have in managing their operations. These with the purposes for legitimize their operations to regulators and thus ensure continuity of operations. Moreover, it was observed that 40% of pharmaceutical companies do not know the term environmental accounting, however, they speak about environmental costs (98.7%), calculate environmental costs (93.33%), speak about budget, waste, audits, energy, water, recycling, emissions and investment, among others, which are an essential part of the environmental accounting.

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This may reflect on the one hand, lack of knowledge about the term and on the other hand, may involve the use of environmental accounting becomes a mere instrument of cultural elements, in particular, ceremonial ritual and/or belief or things that are taken for granted, in addition to meeting the requirements of the regulator. These are not used as a tool to contribute to organizational change, to the extent that it can transform the way the company can see its operations properly and do that they are much more transparent.

Case Study of the Janssen Pharmaceutical Company

Finally, this research aimed to evaluate and analyze how and why Janssen Pharmaceutical Company in Puerto Rico uses the tools of environmental accounting. To meet this goal, it was necessary to answer us the following:

Janssen Pharmaceutical company uses environmental accounting:

- As an integral part of its environmental management
- As a method to reduce environmental damage
- As an integral part of the administration or management of the company (in terms of decision making)
- Janssen Pharmaceutical Company uses environmental auditing as an integral part of its management program
- Janssen Pharmaceutical Company considers it important to develop a sustainable economy and uses environmental accounting as integral to a sustainable economy.

However, the main question I have to answer in this research is the one that was developed as the hypothesis of this research. My argument is that the environmental accounting tool that uses Janssen Pharmaceutical Company in Puerto Rico today do is in order to legitimize their operations mainly to one of the biggest rationalizers of the twentieth and twenty-first century, which is the State, as indicated DiMaggio and Powell (1999: 105). Hence, what intended to do this research is environmental accounting in the pharmaceutical industry as an institutional process rather than a technical process, since most of items used as part of environmental accounting, come from state regulations (EPA, the JCA, the AAA and ADS) and its parent corporation.

Concept	Find	Description
Information and environmental costs	Collects qualitative and quantitative information on environmental costs.	Tangible costs, audits, consumption of water, energy, waste management and recycling.
	1. Environment within your budget. 2. Environment in evaluating investment. 3. Considers the analysis of the product life cycle.	1.Conventional Costs 2. Does not include contingency costs, potentially hidden costs and related to the image. 3. Modify behavior when it is expected some impact on human and environmental health. 4. This analysis is done by the parent corporation.
	Communicate environmental information.	1.Environmental policy 2. Relationship with the community 3. Do not generate any environmental report
Environmental Reports	Transparency is a matter of image.	1.Environmental reports required by government agencies and parent corporation. 2. Limited to gathering and participation in environmental forums.
Participation of accountant	Their participation is limited to evaluating the budget of the Environmental Department and the costs associated with this.	

Table 3 Summary of the Janssen Company

It was observed that Janssen collects quantitative and qualitative environmental costs related information, use the budget and investment tools to analyze their environmental performance, consider the environment within their budget, including the environment in the assessment of the investment, but not consider the life cycle analysis of the product in the process of evaluating information. Finally, it communicates environmental information primarily through its environmental policy and relations with the community.

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But does not generate any public environmental report evidencing their environmental performance (only limited to the publication at the corporate level).

Janssen Gurabo is taking or starting to use this tool, as during this case study, it was shown that the company is taking part of the processes required in environmental accounting, as it might be to gather, analyze and publish information. However, it is unfortunate that is using these environmental accounting tools, ignoring its meaning and their use, which might limit its usefulness. So I note that Janssen Gurabo gathers all this information not necessarily to improve decision making within your company, but using this tool as something taken for granted, without questioning why or for what.

It is the question of why Janssen Gurabo is using environmental accounting. Which could answer the previous unknown. First, to assess all aspects of the measurement of environmental costs in Janssen Gurabo, I observe that only present general and regulated information, such as the environmental costs that are part of the overall costs of the company, in particular those in the budget of the Environmental Department and corresponding to the costs related to compliance with environmental standards established by the appropriate regulatory agencies (AAA, EPA, EQB). This negatively impacts their decision making, since underestimates their price, overestimates the economic benefits of their products, improperly selects materials, projects for pollution prevention projects and proper management of resources (water, energy, waste), among others. Second, to evaluate the behavior regarding budgeting tools and investment.

I could see that the budget is primarily aimed at those areas corresponding to some kind of environmental regulation, such as the waste tank and external costs associated with services evaluation of environmental impact of their operations (old and new) incurred by the company. On the other hand, Janssen Gurabo includes the environment in assessing investment, primarily to meet regulatory requirements and any changes make to it are directly related to meet established environmental laws and regulations. This reflects that the company is using environmental accounting as something that is taken for granted, in particular, to meet some regulatory requirements established by those government agencies that exercise over it some kind of pressure, allowing legitimize their behavior and present the image of an excellence company with their environmental performance in order to legitimize itself, coinciding with Larrinaga and Bebbington (2001), Pilar Fuentes (1993), Larrinaga (2002a, b) and Gray (1995 Larrinaga 2002a).

Moreover, little information flow between employees of the company was observed, since several occasions they did not know the information, the answers did not match, and even departments (Finance and Environment) where it should be this information, it was not collected or was unknown (sometimes not match the information within a single department). All this can influence decision-making in the company, because if not recognized and considered the environmental costs and environmental information adequately in the budget and evaluation of the investment and is not transparent to the flow of this information, it can distort their utility in their decision-making.

In assessing the behavior of Janssen Gurabo related to the environmental report.

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I believe that transparency is limited to a question of image, may coincide in some way with the motivation to provide environmental information reported by Freedman and Stagliano (1992 Larrinaga et al. 2002) and then evaluated by Larrinaga et al. (2002: 45-6), in particular the right to information of shareholders and investors and compliance with legal obligations. First, it makes those environmental reports required by regulatory agencies (AA, EPA, EQB) and J & J Corporation, in order to legitimize their behavior. This is confirmed by one of the commentaries made by one of the supervisors of the environmental area: "The environmental and safety area may be an impediment to the growth of business operations, because if I cannot deliver and pour more, I cannot produce, that is, which is worrying as it limits the production or growth. So Janssen Gurabo meets the requirements (governmental rules), because it is something that can damage the growth". Second, in the "Performance Track" I observed that transparency is limited to community orientation, participation in environmental forums, visits and inspections by regulatory agencies and community services. Which are more limited to image and not necessarily to greater transparency of the company operations. Janssen publishes information that is required by regulatory agencies or those related to environmental accidents. Moreover, as noted above, the company was very tight in providing information related to energy consumption, donations from the company, to answer the questionnaire, audits and environmental reports and finally availability in the recording of interviews.

Although this research did not interview all personnel of the Department of Finance, I think their work is mainly limited to assess the Environmental Department's budget and the costs associated with it, leaving important tasks aside as knowing the overall performance of the business.

Design and evaluation of information systems in the company to capture the environmental costs and the analysis of the product life cycle. This can weaken them in the course of playing a major role in the analysis and provision of information to make visible the relationship between business, society and ecosystem (Birkin & Woodward: 1997), thus limiting the transparency necessary for sustainability of the planet. Furthermore, as the UN (2000) states:

Accounting:

- Do not join with other groups to develop appropriate techniques environmental costs: In the case study they operate as a separate entity.
- Do not recognize the issues of environmental sustainability as an important strategic / financial issue: In the case study know the term, but do not define it.
- Is not involved in the decision-making initiatives sustainable environmental management: In the case study was limited to approving environmental budget.
- There is a weak relationship between the accounting function and environmental: In the case study each department works independently.
- The accounting is not involved in the drafting of the environmental report: The case study is limited to accept, not to write.

In this study case, I could not find is how important is the environmental accounting for decision making in the management of their operations.

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The information submitted by Janssen in the case study evidence which merely comply with environmental regulations and to legitimize their behavior, not as a agent of important changes in the management of its operations. This agrees with the analysis of Marrero (2002: 50), when he noted that managers in Puerto Rico show a social commitment to consider environmental regulation in decision making of their companies, however, cannot determine how to act if environmental legislation does not impose an obligation to comply with its provisions, reflecting a commitment to legitimacy and image.

Finally, in the case study I note that Janssen Gurabo has an environmental behavior quite similar to that of the industry on the island, which could point out, albeit of course, that environmental accounting could be used in the same way throughout the sector. While recognizing that one of the weaknesses of the case study is that it can only make generalizations about the case itself, says Lukka et al. (1995) that could generalize if companies or organizations are sufficiently similar and operate in similar conditions, which would imply, mimetic isomorphism. This way I can point out that to the similarity of the pharmaceutical industry in their environmental performance, I can conclude that they may be presenting the same behavior, thus generating environmental information and using environmental accounting as a process of legitimation and good image, rather than a process of improving decision making in the operations of your organization and a greater environmental commitment. However, I recognize that this view deserves further research.

Conclusion

The final thought in this research is that the behavior of the Janssen Pharmaceutical Company in Gurabo regarding the use of environmental accounting is based on myths and organizational ceremonies, as reaffirmed Meyer & Rowan (1977). Janssen Gurabo ceremoniously adopted environmental accounting, without really knowing its usefulness.

This process of institutionalization in the institutional theory, resulting in three ways (Zucker (1987) Fligstein 1999): the internal structure of the organization (of the own routines of the organization), other organizations (the interrelationship between organizations and organizational fields) and the institutional environment (external environment of the organization, especially the State). In this case study in the use and practice of environmental accounting a series of cognitive, normative and regulatory structures that influence on the environmental performance of the organization are mixed, although mainly comes from the influence of the state on the behavior of the organization by the rules or laws that set, as shown in table 4

Finally I note that although I noticed that the behavior of the Pharmaceutical Company Janssen are embedded the three structures, concluded that in this case study, use and practice of environmental accounting in the company comes mainly from the influence of the State on the organizational behavior through rules or laws that set. Thus consciously manipulates the actions of the company, promoting continuity and stability.

Furthermore, this research raises the argument of institutional isomorphism DiMaggio & Powell (1983), to the extent that companies will be subject to follow and comply with laws and institutional regulations.

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So their behavior is similar, which tends to institutional homogeneity. Although my research lacks a formal study of the organizational field, I point out that the pharmaceutical industry is a very similar sector with regard to environmental regulation (regulating the agencies themselves), would assume the same behavior as found in Janssen Gurabo . Unless, as Bansal and Penner (2000) postulate; while the rules and regulations on issues or social issues (where appropriate, use of recycled paper by publishing houses in Michigan) may appear to be homogeneous, the cognitive heterogeneity may exist, so there may be organizational differences in the interpretation of such issues as Zucker (1987, 1999) anticipated. However, I recognize that deserves more attention in future research.

For Janssen Gurabo, institutional isomorphism that could be allowing:

Greater legitimacy for their behavior: they incorporate institutional elements and myths generally accepted, their behavior is seen as legitimate both internally and externally, although these myths and ceremonies will not necessarily provide greater efficiency. For example, establish a department of environment in the pharmaceutical industry, it can generate higher spending and not doing so will lead to gross negligence or illegitimacy government agencies and the external environment.

Improved stability: to the extent that the rules, regulations, practices performed are widely accepted, so their behavior will go to meet him accepted.

Greater success and survival: to the extent that adapts and becomes isomorphic to that environment and be legitimized by it, its success and survival will be greater (Meyer & Rowan: 1999).

Institutional Structure	Characteristics	Janssen Behavior
Regulatory Structure	View the institutions as a set of government rules or systems, where a series of rules for that are met, otherwise, be penalized. Thus, the behavior is seen as legitimate if it conforms or act according to the rules and laws (Scott, 1999: 133-34).	Government entities like AAA, EPA, EQB, Health Dept. and the Headquarter of J & J, establish some kind of coercion (through rules, laws and metrics) on Janssen Pharmaceutical to generate information on the audits and environmental assessments, environmental emissions, consumption and water quality, the material used of waste generated and recycling.
Normative Structure	View the institutions as a set of regulatory structures that provide a moral framework for the conduct of social life, where the rules are internalized by the participants and where behavior is driven by the sense of what is appropriate for social obligations of each other or by sharing common values.	Janssen have a series of regulatory elements that are involved in environmental accounting, in particular, accounting rules and accounting groups (by environmental costs and investment budget), certifications (ISO 14001) and Performace Track (voluntary action is greater transparency) that can be formed by sharing common beliefs and what is appropriate for the organization and society.
Cognitive/ Cultural Structure	Indicate that there are processes that become routine because they are part of the beliefs that are taken for granted and the only way of doing things, and other behavior that would be unthinkable. DiMaggio & Powell (1999), include the mimetic isomorphism, referring to those beliefs that are taken for granted, noting that an organization could be imitating the behavior of another, especially when the atmosphere is permeated with much uncertainty. The higher the uncertainty, the greater likelihood that the behavior of someone or something based on rules, these may reduce that uncertainty. So you could say that firms prefer to rely on rules to express the world that is fulfilling. In addition, if the accounts is an institutionalized routine, you can predict the behavior of the entity despite the uncertainty in the environment (Scapens, 1994).	The behavior in Janssen is immersed in uncertainty, because the environmental impact of its production processes may not be well defined, as usually happens with the impact or damage to the environment. So they are using converted into beliefs that are taken for granted, for routines, or simply imitating other companies in their environmental performance, in particular the creation of an Environmental Department (Janssen assumes that if they set this department comply with environmental regulations), the use of technology (in the incident EPA-approved technology is used, as it was assuming it would work in your organization), the efficiency ratio (voluntary use can be imitating the success in other companies) and finally, to communicate the information may be assuming who only need that information are the regulatory agencies and the community (it is assumed that if you provide information to the public, can be interpreted negatively their environmental performance).

Table 4 Institutional theory and environmental accounting in janssen pharmaceutical

An organization also produce efficiently and thus ensure their survival, also need the legitimacy of their environment to survive, making the organization carries out activities with legitimate character, otherwise are seen as illegitimate before society, predicting the failure of the organization. In particular, pointed Meyer & Rowan (1977: 90) that one of the important aspects of organizational legitimacy is related to the conservation of the environment, noting that organizations should seek formal rules and safety programs to protect the environment, what otherwise, it can be seen as negligence or illegitimacy. This is the behavior observed in Gurabo Janssen, incorporating elements such as environmental department, environmental policy and compliance with environmental regulations as an essential tool to legitimize their behavior, a way of ensuring their survival.

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But in particular, the use of environmental accounting practices is mainly due to the need to legitimize their behavior for good management and conservation of natural resources, to the external environment surrounding it, mainly the state.

Thus it would be complying with the myths, rules and standards to achieve institutionalized survival (Meyer & Rowan, 1977 and DiMaggio & Powell, 1983). This, unfortunately, would limit the contribution they could make environmental accounting for sustainable development of our country, as their contribution would be based on the search for legitimacy rather than its merits as a technique or process to reduce the use, consumption and deterioration environment and make the organization a sustainable company. However, it is important to note that although it would be limiting the use that may be giving to environmental accounting (only as a legitimizing entity and not as a agent of changes), understand the institutional pressures, no rational choice and homogeneity organizational behavior, can help the organization to identify factors that may assist in the generation and use of innovative knowledge, in particular relating to the use, maintenance and preservation of the environment, which is an important part of sustainability . In addition, "Environmental problems can be solved through changes in the institutional arrangements that control the industry and social action. As the environmental issue continues to develop, institutional changes should be alert to the development of new institutional forms that can be neither imagined "(Hoffman, 1999: 367). This suggests new ways of thinking, analyze and make from the environment a necessary resource for the sustainability of human life (Goikoetxea, 1999: 177).

Recommendations

As a process of research, the study case has the weaknesses of generalization. However, there are two areas that I want to mention: certain lack of environmental information and the constant rotation of managers of the Environmental Department.

I believe that this work has contributed to the research of environmental accounting within the pharmaceutical industry, however, I acknowledge further enrich investigating the behavior of environmental accounting of Janssen and performing a multiple case study in several pharmaceutical companies in the island. Furthermore, I consider it necessary to Janssen, a greater involvement of accountants in the environmental management of the company, greater commitment in the industry with environmental accounting, greater control and greater commitment of government agencies with the sustainability of the planet and finally to all to contribute the sustainability of the island to the extent that they can become aware of the natural environment belongs to everyone and every human being on the planet.

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Strategy design to modify the corporate culture in Morelia MSMEs. Literature review and research proposal

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Abstract

This paper aims to demonstrate that a paradigm shift in corporate culture can generate growth in MSMEs of Morelia, which will bring many benefits, not only for the business but also for the community at large and for the same government. This is because there are too many MSMEs in Morelia but they are not able to generate the growth that is required on the one hand, and on the other the worrying situation of death soon after the star up.

Growth, corporate culture, MSMEs.

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Introduction

Traditionally it is intended and expected that the government (municipal, state and / or federal), is the generator of welfare in all its aspects. But its function is to regulate the activities and behavior of society as a whole, in order to assure so that citizens are the generators of the common good; and these citizens are the entrepreneurs.

From individuals with entrepreneurship skills emerge the entrepreneurs, true initiators of economic progress, wealth generators, same as in any city however small they exist, and Morelia is no exception. However, Vargas Hernandez (2007) defines culture as human behaviors learned and received from previous generations in the form of values, rituals, customs, etc., and hence, from this can follow and detach corporate culture, which is going to be analyzed with the intention check out and demonstrate how functional it is for Morelian's entrepreneurs.

Background of the problem

The Mexican Institute of Executives in Finance (IMEF) states that each year in the country two hundred thousand companies are created which by passage of one year will be gone in half and only 35,000 reach their second year. Of these, one quarter has little chance of development and only about 3,500 can be successfully integrated into the economic formality (Lemus, 2013). In Mexico it is estimated that 100,000 companies disappear just after one year of being born and the surviving are unlikely to grow. Beyond moral judgments that can be made on capitalist enterprises, their logic is to grow in a optic that for sure does not do justice to evolution, the company that fails to adapt and develop, must disappear.

According to National Directory of Economic Statistical Units (INEGI, 2012) in Morelia Michoacán, by December 2012 there were 9,842 economic units according to the following classification: in manufacturing, support services to businesses, waste management and services remediation, as well as providing temporary accommodation and food and beverage preparation, talking from small to large units.

From the above, it could be understood that there are sufficient generators of jobs that are required to create wealth and social welfare in Morelia. However, the reality is very different because it is the opposite. There are very few sources of employment and social welfare economic units, then the economic units lack of growth strategies or simply lack of a corporate culture.

Definition of the problem

In the city of Morelia Michoacán, MSMEs are the main source of wealth and the main generator of employment, but unfortunately are poorly paid jobs and the growth rate is low near zero. Therefore, the research question is to assess business models, with special emphasis on those successful but do not take the next step to grow or diversify. Is it lacking corporate spirit? Changing paradigms of corporate culture, economic growth will be functional and real?

Justification

This investigation is warranted given the importance of manufacturing MSMEs for the economy, the state and the municipality, because they are the engine of the economy. In Mexico, MSMEs account for 90% of companies, 42% of employment, and contribute to 83% of GDP. There are more than 5 million enterprises, of which 98% are micro, small and medium.

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The SME is today the center of the economic system of the country; microenterprises are real links in the production because they export and generate more jobs.

It is worrying that a high percentage of companies disappear so prematurely and the ones who manage to survive are few that have favorable results. Hence the importance and need for this research.

Hypothesis

The hypothesis of this research is posed as follows: Changing corporate culture of entrepreneurship will lead toward economic growth. This hypothesis corresponds generally to the research question posed at point 3. The variables considered in this investigation, are on one hand the corporate business culture and on the other hand, economic growth, which to unite in a relationship means- end, they show that corporate culture is a key to generate economic growth.

Independent variable (X) = EMPRENDEDORA CORPORATECULTURE

Dependent variable (Y) = ECONOMIC GROWTH

Based on these variables, the deployment of the corresponding indicators is shown in table 1 below.

Variable	Description	Concept	Indicators	Instruments
X Independent Variable	Corporate culture	Set of norms, values and ways of thinking that characterize the behavior, positioning of staff at all levels of the company, the actions of the management, the style of management, how to allocate resources, how to organize the corporation, and the image of the company "(Garcia, 1998: PAG).	Effectiveness, Risk aversion Visionary personality traits Improving management (Esparza Aguilar Garcia Perez de Lema, and Durendez Guillamón Gómez, 2010).	
Y economic growth of MSMEs	Business economic growth		Sustained return on investment Performance (Esparza Aguilar, García Pérez de Lema, y Duréndez Gómez Guillamón, 2010). Corporate social responsibility Market expansion Competitiveness	

Table 1 Deployment of variables and indicators

Research objectives

A. General purpose

To demonstrate the efficiency in economic growth of MSMEs with changing paradigms of corporate culture of corporate profile of Morelia.

B. Specific objectives

1) Check that creating new jobs is possible by modifying the corporate business culture.

2) Verify that it can be possible to generate more wealth for both the employer and the employee with the change of paradigms.

Conceptual theoretical framework of corporate culture

A. Concepts

1) Classic authors.

The study of corporate culture has been approached from different perspectives and disciplines, which is in a competitive and open economy a major strategic potential of an enterprise economy.

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Taking as the first definition of corporate culture, it will begin with Jacques (1951: 251) which says it is the culture of the factory and its customary forms and traditional ways of thinking and doing things forms, which is shared to a greater or lesser degree by all its members and which new members must learn, and at least partially accept, in order to be accepted into the company.

Therefore, culture is part of a second nature to those who have been with the company for some time. Literally in the original language "The culture of the factory is customary and traditional STI way of thinking and of doing things, Which is shared to a lesser degree by Greater or all its members and Which new members must learn, and at Least partially accept, in order to be accepted into service in the firm ... culture is part of second nature to Those Who Have Been With The firm for some time.

To Montesinos (1995) corporate culture is interpreted as the set of values, principles, norms, perceptions of life and knowledge of production processes, which show a total picture that determines the real possibilities that each society has in the process of globalization. Business culture in a society in particular offers the evaluative framework that determines the direction of relations between the peculiarities of the companies and their leading figures, entrepreneurs and managers (Vargas-Hernández, 2007). For Garcia Echevarria (1990: 68) corporate culture as an analysis intends to discover what the skills-value-based of the company that have made their managers and staff.

The corporate culture is normally used to refer to the attitudes, opinions and behavior patterns, through which the elementary virtues manifest constant work, take risks, energy and initiative.

Intelligence and preparation, honoring employees and recognition and meeting the needs of customers (Karlof, 1993). Schumpeter (1957) develops the theory of entrepreneurship derived from entrepreneurs which states that the activity of entrepreneurs can be grouped into two broad classes: those that are limited to the maintenance of the organization and structure received and those that promote the creation of new structures. It is the latter who should be called exclusively "entrepreneurs", since only they are able to appreciate new opportunities for progress for the company and for themselves (Schumpeter 2014).

It is interesting to note, when analyzed some of the classic definitions of corporate culture, how broadly refer to the values, attitudes and behavior patterns, to name a few, who are the ones who should govern all entrepreneur to bring success to the organization that represents all aimed toward the common good. That is, on the one hand to contribute to the generation of more jobs and creating new opportunities for progress, and on the other side to have growth that is also reflected on well-being for the entrepreneur is inevitable, that the most cases is the shareholder himself.

Therefore, business culture is defined by García (1988: 20) as: The set of rules, values and ways of thinking that characterize the behavior, positioning of staff at all levels of the company, the actions of the management style of management, how to allocate resources, how to organize the corporation, and the image of the company . Corporate Culture according to Pumpin (1988) covers the set of opinions, norms and values that thrive within a company and determine the actions of management and staff as a whole.

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2) State of the art of the concept of corporate culture.

The economic situation that exists today is extremely complex, compared with the situation a few years ago; so much so that now it can be seen how companies are increasingly demanding more from their employees, thereby leading to the total satisfaction of current customers and by assumption of potential customers. However a point that is worthy of shock, although still the years are passing and passing, it is shown that an important aspect of corporate culture are the values expressed in different ways but finally reaching the same point.

That said, in the Blog CorpXcoach (2013) mentions that corporate culture to Google, the Internet giant is based on the "happiness of its people". It is known that such culture is based on elements that are not typical of any company. Such is the importance of conducting its business culture, which feature people whose only function is to maintain productivity taking employees happy, which is a fact that has influenced the success of the company.

In the Empresario.mx (2012) is mentioned in simple terms, that the culture involves values, principles and practices shared by the members of the organization, and establishes not necessarily written rules that will determine what people value, say, listen and or does not, which often serves as a counterweight to what is in the written rules, mission, vision, processes, procedures and policies. On the other hand, for Manene (2014), corporate culture is a set of beliefs or basic and manifested in norms, attitudes, behaviors that guide the conduct of members and allow them to perceive, judge, feel and act in the securities assumptions different situations and relationships in a stable and consistent within an organizational environment.

B. Review of theories.

Once analyzed and mentioned some of the features and concepts of corporate culture, then it will be summarized in table 2 taking some of the authors mentioned above as well as some new ones.

C. Review of the empirical literature.

An overview on studies on corporate culture and improved management of family businesses is presented in the following table 3.

Characteristics of corporate culture.				
Deal/Kennedy	**Montesinos**	**Schumpeter**	**Schein**	**Sathe**
Values Rituals Heroes Network of cultural and business environment	Values Principles Norms Life perceptions Productive processes knowledge.	Those who are confined to the organization maintaining and structure received Those who promote the creation of new structures	Artifacts - Technology - Art - Behavior Values and norms - Preferences - Norms of behavior and possibilities of action.	Common principles concerning to - Beliefs - Values - Objects - Languages - Behaviors - Feelings

Table 2 Characteristics of corporate culture.

Author(s)	Methodology	Main results
Malone (1998)	Survey 56 to owner-managers of family businesses.	The level of strategic planning, perceived family harmony, the presence of external members of the board and the level of internal control manager-owner are positively associated with a high level of continued planning.
Gatrell, (2001)	Multiple studies of three case studies on small and medium-sized family English businesses second and third generation. It was applied the proposed questionnaire by Cameron and Quinn (1999) to a sample of non-family employees.	Case studies tended towards a hierarchical culture, more formalized and adherence to rules. Employees showed a trend toward market culture with less formality and more dynamism.
Koiranen (2002)	With a sample of 10 family businesses and 17 unfamiliar from Finland, explored the values that these companies have in their ability to remain competitive in the market.	The results show that the most important values were honesty, credibility, enforcement, quality and hard work, which represent the block of good ethical conduct.
Zahra, (2004)	Study with 218 families and 318 non-family firms from the US, examined the relationship between four dimensions of corporate culture and entrepreneurship.	The study shows a positive relationship between the systems of strategic control of the family business and entrepreneurship. The study also shows evidence that financial control systems are mainly oriented toward the short term.
Fernández y Bringmann (2007)	Analyzed by case method with four Spanish family firms, organizational culture and leadership styles.	Show that successful businesses, the founders dedicate special attention to the implementation of management control systems as tools that contribute to the growth of the company.
Duréndez, (2007)	Using a sample of 285 family businesses and 151 no Spanish family, analyzed the type of culture, systems management control and performance.	Confirm that family firms have high hierarchical values and low values of adhocracy. In terms of management control systems, confirm that they are used to a lesser extent by family businesses.

Guízar (2008)	Interviews with 120 Mexican family businesses.	In the strategic planning process should involve and engage both family members and key executives of the company for the company to remain over time.
David y Richardson (2009)	They compared empirically 163 members of family businesses and 168 bank managers in Ukraine and USA, values and beliefs of the members of these companies and their professional managers.	High flexibility, social spirituality and low power distance are potentially universal in terms of culture of the family business.

Table 3 Review of the literature on corporate culture and improving corporate governance.

From the above table, a primary feature is the fact that to conduct a strategic planning really must be carried out seriously and with absolute commitment by managers and / or owners of companies. Another important consideration is when talking about honesty, credibility, compliance with the law; the quality and hard work, which all of them somehow characterize companies in Finland. However, in the vast majority of companies in Morelia, experience shows that few are conducting a strategic planning according to their real objectives, and this is mainly due to lack important information for their own businesses and therefore their decisions are not reflected in the good expected results.

From the above table, a primary feature is the fact that to conduct a strategic planning really must be carried out seriously and with absolute commitment by managers and / or owners of companies. Another important consideration is when talking about honesty, credibility, compliance with the law; the quality and hard work, which all of them somehow characterize companies in Finland. However, in the vast majority of companies in Morelia, experience shows that few are conducting a strategic planning according to their real objectives, and this is mainly due to lack important information for their own businesses and therefore their decisions are not reflected in the good expected results.

D. Proposal.

Having studied and analyzed different concepts, from the point of view of classics to contemporary authors, it is considered in this investigation corporate culture that is normally used to refer to the attitudes, opinions and behavior patterns, through which the elementary virtues manifest constant work, take risks, energy and initiative, intelligence and preparation, honoring employees, recognition and satisfaction of customer needs (Karlof, 1993). The latter particularly anterior adding the "happiness of its people" philosophy of Google, as seen from inside the company, with happy staff expectations functioning of it is much greater than those that do not have them. Thus, the odds of satisfied and happy employees and customers ensure further success for the company.

Another important consideration mentioned by Karloff is honoring employees, a situation that is rare to hear from companies that actually carry out this practice, being that does not require a profound teaching for managers and / or owners, who can put it in action at their regular routines and can when handled as incentives and inducements whenever any of your employees deserve. Now all this is due to make very clear that it is aimed at meeting the needs of customers, who are ultimately the reason for being and existence of any business, be it products or services. Satisfied customers are permanent customers and generators of wealth and welfare for owners, employees and suppliers in a first end, and a second end to all those who are involved indirectly with companies.

Conceptual theoretical framework of business growth

A. Concepts

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1) Authors classics.

The small and medium enterprises (SMEs) have an importance in the global economic context because they represent alone 95% of companies in most OECD member countries, combined to generate a high level of employment (OECD, 2002). After analyzing the literature on business growth, it can be mentioned in a generalized way that there is no uniform and precise definition that includes all content that the concept has immersed. The various studies reviewed address the issue from different approaches depending on the view taken by the author and the approach that it is wanted to give. Following then will be mentioned several definitions of business growth.

There are some attempts to define the economic growth, which will begin with the pointing of Penrose (1962, p) who contends that growth is characterized by the complex action of the internal modifications leading to an increase in size and changes in characteristics of objects subjected to this process. Penrose discusses the perspective of business growth from an organizational or internal focus of the company. According to the same author, from the time that management strives to fully exploit the factors of production available to a truly dynamic dialectical process that favors the continued growth occurs.

For Perroux (1963, p) business growth is defined by the lasting increase in the size of a simple or complex economic unit, made with structural changes and possibly of system variables and accompanied by economic progress. This concept is inextricably linked with the increase in the size and structural change. Business growth is defined by Echevarría (1974) as any positive change in the business dimension of the production process, which involves the prior setting of a reference variable.

On the other hand, Brockhoff (1974) notes positive long-term change a reference measurement, reference being determined by the weighted sum of all those values which are the business goals, provided these are not restrictive objectives.

Now to Fernandez Garcia and Ventura (1988) defined business growth as an index of dynamic behavior of the company that measures its ability to expand its business opportunities, financial and technical markets with high technological dynamism and, consequently, with high doses of uncertainty, which requires companies that want to maintain competitive parity with its direct competitors, to meet at least the generation of resources to develop their investment strategies in R & D, marketing and new production equipment thereby ensuring survival. Similarly, AECA (1996) focuses on the same elements and believes that the growth of the company is the development that is reaching the same, manifested by the increase of economic variables that explain their activity as observed changes in economic and organizational structure.

The authors Correa Rodriguez Acosta González Pérez Molina (2001) argue that business growth does not have a general theory nor a generally accepted conceptual definition, as the concept adheres to different approaches and views on its extension, measurement parameters and determinants.

2) State of the art of the concept of corporate culture.

One of the main constraints that arise when researching business growth is the lack of knowledge accumulation, as is mentioned by several authors, which can be explained by the multidimensionality and heterogeneity of the concept of growth.

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Hence, it cannot have a conceptual definition of business growth, which makes for some authors consider growth as a desired goal and to others as a result of good management companies.

The growth of established companies aims to make sustainable business viability. However, the growth of small startups has to do with something prior, i.e. obtain viability, as sustained by Gilbert et al. (2006). Now, to Blázquez (2006, p. 172) business growth is a process of adaptation to the changes required by the environment or promoted by the corporate spirit of management. It is noted that for this author the necessary organizational changes are prompted by the corporation, all aimed towards a growth dynamic. Some other authors raise growth as Cardona and Cano (2005) which state that growth is a process that depends on intangible and tangible elements or accumulation of physical and human capital, and especially proper organization and internal structure.

B. Review of theories.

Following there is an analysis of the main theories of business growth:

Theories of business growth		
Name	Description	Authors
Growth as a stochastic phenomenon	In 1931 the Law of Proportionate Effect stated that the size does not influence the growth states. This law is not based on theoretical foundations, but presents the hypothesis that growth is a stochastic phenomenon resulting from various factors that act in multiplicative form on the initial size of the company. These factors are not only a function of the company but also the environment in which it acts, and in some cases, favor the expansion, while others induce downsizing.	Gibrat (1931) states the law of proportionate effect, which states that the size does not influence the growth.
Growth according to classical economic theory	From this point of view is the process of growth of companies based on the pursuit of minimum efficient size to compete in a given sector. According to this theory, there is a negative relationship between size and growth of the company, growing faster small businesses than large until reaching its minimum efficient size.	Viner (1932) focuses on the search for the optimal size. Penrose (1962) sustains that growth is a mere adjustment to the most appropriate size for given conditions.
Behavioral approaches (behaviorist) to growth.	These approaches are able to explain the growth of companies beyond the limits proposed by the economic efficiency in the productive sector, starting to do the existence of a separation between the functions of property and control, since growth allows managers to obtain a higher degree of satisfaction of their individual goals.	Baumol (1959 and 1962), Penrose (1959 and 1995) and Marris (1964) analyzed separately ownership and management.
Learning theory	According to this theory, only efficient firms survive and grow. This comes to explaining the growth by adding new factors such as age of the company and the industry in which it competes, with special emphasis on organizational learning through which managers know how to get better results in the company.	Jovanovic (1982) explains the faster growth of small businesses through the introduction of a learning mechanism.
Theory of resources	The existence of idle resources is the main motivation for growth. The desire for growth is conditioned by the company that tries to put resources into use to improve their efficiency. Therefore, the existence of idle resources of a specific nature will allow for growth in the industry, while the existence of idle resources allow general growth in industries other than the traditional route of diversification.	Penrose (1959) understands the company as a set of resources and business growth can be explained because there are idle resources.

Table 4 Characteristics of business growth.

C. Review of the empirical literature.

The study and analysis of business growth has been approached from different perspectives and different points of view. Mainly this is because it is not possible to generalize the concept of growth as a first difference that is about the size of companies. Thus, sales growth is valid for the purposes of this research variable.

In the corporate environment, the study of competitiveness is an essential tool. Cuervo (2004) suggests that the generation of wealth and dynamism of a country are supported on the competitiveness of their companies, and it basically depends on the capabilities of their entrepreneurs and managers.

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The international financial crisis, as mentioned by Sánchez (2009), forced to consider the feasibility of micro, small and medium-sized Mexican companies, taking the role of MSMEs, as being an instrument of social cohesion and stability by providing employment opportunities, either formal or informal, to people with or without training. Thus, the knowledge of the productive sectors' behavior in Mexico is useful for understanding the dynamics of the factors behind the growth in economic activities.

For the specific case of this investigation, it was a review of the literature finding limited information on this variable, motive by which some previous study was not found.

D. Proposal

Once analyzed and studied the variable business growth, where it makes clear that there is no definition to be as universally valid, for the present research is taken the concept of Blazquez (2006, p. 172), that states that business growth it is a process of adaptation to the changes required by the environment or promoted by the corporate spirit of the management.

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Classification of spanish credit institutions for the purposes of financial supervision

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Abstract

This paper carries out a classification of Spanish financial institutions with the aim of contributing to improving banking supervision. This classification may be used by supervisory authorities, both to act at an early stage on the institutions that present significant risks, and to establish supervisory guidelines as a tool for differentiating the institutions according to their risk, with potential implementation to other financial systems. To perform this classification, a number of economic and financial ratios are calculated using figures from the consolidated financial statements between 2005 and 2012, followed by a factor analysis which provides four dimensions, based on which the k-means analysis is performed, which allows to reach the aim of this paper.

Banking risks, banking supervision, supervisory guidelines, financial system, k-means

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Foreword

The financial crisis that started in the US in 2008 with the collapse of Lehman Brothers, has been the trigger that caused a change in the regulatory systems of financial institutions at an international level. In the case of the Spanish financial system, several laws have been adopted as bailout measures, among which Royal Decree-Law 9/2009 on bank restructuring and strengthening of the resources of credit institutions, whereby the Fund for Orderly Bank Restructuring (hereinafter, "FOBR") is created, whose responsibilities include the granting of assistance to a large number of financial institutions (Unnim, Ibercaja, Catalunya Banc among many others). Another solution chosen by banks has been to undergo restructuring processes, such as the mergers, as in the case of Bankia, a result of a merger of Bancaja, Caja Madrid and other smaller savings banks.

In recent years, there have been numerous studies on the prediction of bankruptcy or insolvency of financial institutions, as well as their classification based on the results. This paper begins with a review of existing literature on the subject, paying particular attention to those studies using factor analysis and k-means, as this is the methodology used herein.

The aim of this study is to establish supervisory guidelines. To this end, a classification of banks and savings banks in the Spanish financial system is carried out based on a set of variables that summarize the economic and financial position of the entities, which are obtained through the factor analysis applied to sixteen ratios derived from information of their consolidated financial statements.

This analysis responds, firstly, to the need to simplify and synthesize the information from different ratios in the underlying factors behind the economic and financial situation of each of the entities and, secondly, to the need of having independent variables, a desirable condition for the implementation of k-means analysis, the technique selected for the classification. The period under study ranges from 2005 to 2012, both inclusive.

From the results obtained by factor analysis and k-means, entities of the Spanish financial system are classified into five groups according to their degree of strength, proving that, in some cases, the reorganization process of the Financial System has suffered from weaknesses, not achieving the objectives that initially would have been desirable.

Review of existing literature

The cluster analysis applied to financial institutions has been used for different purposes, such as their classification according to their credit rating, the prediction of potential bankruptcy situations ("early warning" studies), to identify business models, to obtain benchmarks within each group to evaluate the performance of the entities, and the decrease in bias that occurs when analyzing the variables and indicators at an aggregate level.

For example, Ioannidis et. al. (2009) use the cluster method of k- nearest neighbors, along with other methods, for classifying the creditworthiness of various entities. These groups are useful for the supervisory authorities, as they differentiate the state of institutions, promoting the taking of prudential measures of recovery. Also, Boyacıoglu et. al. (2008), conducted a factor analysis and a k-means cluster following the same methodology as in our study, for predicting the collapse of banks in Turkey.

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For the Chilean financial system, Jara and Oda (2014) performed a hierarchical cluster analysis, depending on the degree of exposure to common risks, with the intention of reducing the bias that occurs when analyzing the variables and indicators at an aggregate level. Coinciding with our paper, Terrones and Vargas (2013) also performed a hierarchical cluster analysis of banks, with the intention of obtaining an alternative supervisory tools, which would allow an improvement in monitoring risk indicators. In line with this work, Dardac and Boitan (2009), also apply the hierarchical cluster analysis to banks, using economic and financial ratios, with the intention of establishing groups to apply an alternative supervisory technique.

In terms of business models Ferstl and Ones (2012) carry out a k-means cluster analysis to determine the characteristics the business models. Cluster analysis has also been used by Villarroya and Monsálvez (2000) to study whether specialization affects the cost efficiency of the institutions, which showed that banks engaged in trading are more cost efficient than investment banks.

Furthermore, using a k-means cluster analysis, Das (2003) obtained a benchmark for the evaluation of hedge fund, using various economic and financial variables. Among other studies that use classification and prediction methods is that of Alam et. al. (2000), which use fuzzy clustering methods and other methods as classification tools for potentially failing banks. Costea (2014) also uses fuzzy c-means clustering to benchmark the financial performance of non-banking financial institutions in Romania. The ratios used are defined in three dimensions: i) capital adequacy; ii) asset quality and iii) profitability.

These methods are not used in our study, due to the greater efficiency of the k-means method, as has been stated by authors such as Ghosh and Dubey (2013), who compare the k-means method with fuzzy clustering, concluding that the clustering of the data occurs with greater efficiency with the k-means method, without neglecting the value of fuzzy clustering to deal with mixed technical information.

Description of census and ratios used

In this paper, unlike many others, rather than using a sample as starting point, a census has been conducted using financial data from banks and saving banks for the period between 2005 and 2012. For data collection purposes the consolidated financial statements of these entities are used. Once the information from each year has been collected, a financial and economic analysis is performed using sixteen ratios.

Defined below are the sixteen financial ratios on which the factor analysis will be applied, obtaining five factors, which are aimed to meet the objectives set.

Solvency 1 (equity / total assets)

This ratio seeks to observe the institution's ability to withstand potential losses or unexpected declines in the value of its assets, without creditors or depositors suffering losses. Equity is identified, according to the definition established in the IASB Framework, with the residual interest in the assets after deducting all liabilities.

Solvency 2 (equity / total liabilities)

With this ratio, the share of equity on the obligations of the institution is obtained. This is another measure of solvency, which explains the percentage of equity over liabilities.

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It represents a measure of leverage and solvency, so that higher values for this ratio imply better solvency and lower leverage.

Solvency 3 (equity / liabilities + memorandum accounts)

This ratio, as the second ratio, seeks to analyze the solvency and leverage of the institution, although, with the difference built in the denominator, on memorandum accounts. These are possible obligations of the institution such as financial guarantees and commitments to purchase among others. The relationship of equity with a greater number of obligations is being calculated.

Solvency 4 (financial liabilities at amortized cost / total assets).

This ratio links the financial liabilities at amortized cost to the total assets of the institution. The most important item in such portfolio are the deposits, in addition to subordinated liabilities and bonds and other debt securities. This ratio is an indicator of the financing structure of the institution which has no speculative nature. The financial liabilities held for trading represent speculative funding. It is assumed that the higher the value of this ratio, the greater obligations the institution will have, resulting in erosion of its solvency.

Gross margin / average total assets (GM/ATA)

This ratio measures gross margin profitability over average total assets. As it is a measure of profitability which does not include amortization, impairment of assets, administrative expenses, and impairment. It is considered that managers will have less liberality to operate.

Liquidity 1 (credit investment / total assets)

This ratio measures the share of the loans of the institution over total assets, that is, the percentage of the total investment that is subject to credit risk. Also financial instruments that are not traded in active markets. It is assumed that the higher this ratio, the lower the institution's liquidity will be, as the resources taken by the institution are invested in long-term loans.

Liquidity 2 (Loans / total assets)

This ratio represents the investment in loans of the institution, which may be present in three portfolios: i) credit portfolio; ii) the trading portfolio; and iii) other financial assets through loss in earnings.

Through the classification of these portfolios the institution points out the management objectives. In the credit portfolio, the largest in size, the goal is the recovery of long-term investment through cash flows. The fact that long-term resources are compromised plays against liquidity. The trading portfolio, which is smaller in size, aims at short-term sale of securities thereof; and the other financial assets portfolio with changes in profits and losses, seeks to either eliminate accounting mismatches or is related to other fair value liabilities.

Liquidity 3 (total deposits / total loans)

This ratio, which represents the percentage of the bank deposits that account for the total of loans received, aims to be an expression of the extent to which deposits fund loans to customers. It is assumed that a higher value of this ratio implies greater liquidity, as the institution would have more stable funding. Retail deposits, as they are covered to a high percentage by the Deposit Guarantee Fund, give stability to this source of funding.

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Higher values also mean a smaller proportion of resources committed to long-term investments such as loans, representing increased liquidity.

Liquidity 4 (available-for-sale financial assets / total assets)

This ratio expresses the proportion that available-for-sale assets represent on total assets. The portfolio of available-for-sale assets includes debt and equity instruments, that have not been rated in other portfolios. In the case of debt instruments, they are usually traded in liquid markets, and the institution is not required to hold them to maturity. Equity instruments are supposed to be available-for-sale in the market. Therefore, this portfolio on total assets represents as a measure to assess the liquidity of the institution.

Profitability 1 (profit/loss for the period total average assets)

This ratio measures the ability of bank management to generate returns using their real and financial resources, that is, including both operating expenses and net interest income. It would be a measure of the quality of management, and would correspond to the profitability ROA.

Profitability 2 (operating profit / total average assets)

This measure of profitability is obtained from a result in which no impairments of goodwill, property, plant and equipment, property investment, shares, profit and loss of non-current assets are included, or from the results of interrupted operations according to the Bank of Spain (Circular 4/2004 of 22 December).

This measure excludes the results that are less related to the financial activity of the institution. It is a profitability measure which is more focused on the recurring business of the institution.

Size 1 (logarithm of assets)

The logarithm of assets is taken as a measure of size, making a change of scale through the logarithm. Size is an important variable for institutions to determine their economies of scale and greater possibilities when it comes to risk diversification. Furthermore, a larger size of the institution will bring it closer to "too big to fail" problem which generates a moral hazard.

Size 2 (Logarithm of interest income)

The logarithm of assets is taken as a measure of size, making a change of scale through the logarithm. It should be borne in mind that this indicator addresses the size of turnover, but focusing on interest income.

Operating costs / operating income (OC / OI)

This ratio is intended to approximate a measurement of the efficiency of the institution, considering that higher value ratios imply lower efficiency In the "operating costs" component, in compliance with the Bank of Spain (Circular 4/2004 of 22 December), interest receivable and similar charges, commissions paid, administrative expenses and amortization are found. For "operating income", interest receivable and similar income and commissions received are taken, also according to the Bank of Spain (Circular 4/2004 of 22 December).

Annex 1 displays the table with descriptive statistics of the ratios defined on a yearly basis and on the type of institution.

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Empirical results

Factor analysis seeks factors that explain most of the common variance. In this case, new "dummy variables" are calculated, which, while not observable, represent a linear combination of real variables and collect most of the relevant information of the latter. Appendix 2 contains the correlation matrix of the ratios.

Kaiser-Meyer-Olkin measure of sampling adequacy		0.705
Bartlett's test of sphericity	Approx. Chi-square	9,315.945
	Df	91
	Sig.	0.000

Table 1 KMO measure and Bartlett's test of sphericity

Table 1 and table 2 display KMO statistics (Kaiser, 1970 and 1974) Bartlett's test of sphericity (Bartlett, 1950). As it can be observed, the KMO indicates an acceptable adequacy of the data to the factor model. Moreover, the sphericity test is acceptable, given that a high value of the Chi-square (or equivalently a determining low correlation matrix) is obtained, which means that there are high correlations between variables.

Variables	PARTIAL KMO
Solvency 1	0.777
Solvency 2	0.674
Solvency 3	0.737
OC/OI	0.620
Size 1	0.650
Liquidity 1	0.672
Liquidity 4	0.824
Solvency 4	0.804
GM/ATA	0.707
Profitability 2	0.698
Size 2	0.675
Liquidity 3	0.774
Liquidity 2	0.778
Profitability 1	0.604

Table 2 Partial KMO

Table 2 (cont.)

Variable	Communality
Solvency 1	0.933
Solvency 2	0.942
Solvency 3	0.896
OA/OP	0.449
Size 1	0.950
Liquidity 1	0.917
Liquidity 4	0.588
Solvency 4	0.671
GM/TAA	0.618
Profitability 2	0.912
Size 2	0.938
Liquidity 3	0.811
Liquidity 2	0.867
Profitability 1	0.843

Table 3 Communalities

Table 3 contains the communalities obtained by the factor model. In general, as the table shows, the variables are adequately explained by the model with an average communality of 80.95%, where 10 of the 14 original variables have communalities higher than 80%.

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The square of a factor loading indicates the proportion of variance explained by a factor in a particular variable. The sum of the squares of the weights of any column of the factor matrix is what we call eigenvalues, these indicate the total amount of variance which explains that factor for the variables considered as a group.

The factor loadings can have a maximum value of 1, so the maximum value that the eigenvalue can achieve equals the number of variables.

If we divide the eigenvalue by the number of variables, we obtain the proportion of the variance of the variables that explains the factor.

Factor	Initial eigenvalues			Sum of square saturations of the extraction			Sum of square saturations of the rotation		
	Total	Variance %	Accum. %	Total	Variance %	Accum. %	Total	Variance %	Accum. %
1	4.933	35.238	35.238	4.933	35.238	35.238	4.030	28.784	28.784
2	3.128	22.342	57.579	3.128	22.342	57.579	2.984	21.318	50.101
3	2.008	14.342	71.921	2.008	14.342	71.921	2.287	16.338	66.439
4	1.265	9.034	80.955	1.265	9.034	80.955	2.032	14.516	80.955
5	.734	5.246	86.201						
6	.652	4.658	90.859						
7	.464	3.317	94.176						
8	.384	2.741	96.916						
9	.190	1.360	98.276						
10	.094	.669	98.945						
11	.077	.551	99.496						
12	.039	.281	99.777						
13	.026	.187	99.964						
14	.005	.036	100.000						

Table 4 Variances explained

Table 4 shows the variance explained and the percentage represented by each of the factors displayed.

As it can be seen, four factors obtained eigenvalues greater than one (that is, each of these factors accounts for more variance than the original variable). It was decided to extract four factors, thus explaining 80.955% of the variance.

The factor matrix indicates the relationship between the factors and variables. However, the interpretation of the factors it is often difficult from the factor matrix. Frequently, several variables present high factor coefficients in more than one factor, when what matters is that most of its variability is explained by a single factor. This leads to the development of a simple structure, according to which variables must saturate in a single factor, that is, their factor coefficients have to be high in one factor and low in the rest.

If we seek to simplify the factor structure we have to proceed to rotation. Rotation involves rotating factor axes so that they approximate the original variables. The aim is to facilitate the interpretation of the factor matrix, forcing more variables to define in a latent dimension, in preference to others. Thus, a greater differentiation among factors is achieved, obtained better defined profiles. Upon rotation, the number of factors remains as the percentage of total variance, explained by the original model and the communality of the variables. What varies is the composition of the factors when the factor coefficients of each variable in each factor changes. This also alters the proportion of variability explained by each factor. Variance is distributed between all the factors during rotation (see Table 4).

Among the various existing procedures, the Varimax method was used (Kaiser, 1958), which aims to simplify the factor structure by maximizing the variance of the squared factor coefficients for each factor. The factors finally obtained remain independent.

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	Component			
	1	2	3	4
Solvency 2	.923			
Solvency 1	.906			
Solvency 3	.896			
Solvency 4	-.792			
GM/TAA	.688			
Liquidity 1		.917		
Liquidity 2		.905		
Liquidity 3		-.818		
Liquidity 4		-.754		
Size 1			-.937	
Size 2			-.919	
Profitability 2				.894
Profitability 1				.871
OC/OI				-.578

Table 5 Matrix of rotated components

Table 5 displays the matrix of rotated components, representing the structural factor. By comparing the relative saturations of each factor, it can be seen that a change in the percentage of variance explained by each factor takes place, further changing the more successful rotation becomes (see the last three columns of Table 4). In our case, it decreases the percentage of variation of the first and second factor, and increases the percentage of variation of the third and fourth factor. This implies a success in the Varimax rotation.

Interpretation of factors

a) The first factor is highly correlated with the "Solvency 1" ratio (equity / total assets), "Solvency 2" ratio (equity / total liabilities), "Solvency 3" ratio (equity / liabilities + memorandum accounts), "Solvency 4" (financial liabilities at amortized cost / total assets) and the Gross Margin variable between Average Total Assets. This factor represents the "SOLVENCY" of the institutions. According to the results, it can be seen that a greater solvency is positively related to a higher gross margin on average total assets.

Gross margin on total assets saturates with solvency, while the operating income between total assets saturates with the rest of returns, both economic and financial. This fact leads us to believe that greater solvency is related to higher net interest income, which is the largest component within gross margin, thus it could be argued that the most solvent institutions have lower costs. This fact can be primarily attributed to a lower liability on equity for the most solvent institutions. Secondly, lower funding costs due to the lower risk perceived by the markets.

Moreover, the gross margin between the average total assets saturates with solvency. Institutions with greater solvency achieve a higher interest margins and net income from financial operations. These components are included in the gross margin. This is attributed to the fact that greater solvency implies higher net interest income due to lower cost of funding. Income from financial operations may be better than for less solvent institutions. This may be because the most solvent institutions have fewer problems in obtaining liquidity without having to make sales at low prices, thus harming the results from financial operations.
It is worth stressing that the gross margin between average total assets does not saturate with other profitability measures. The reason behind this may be that, for the calculation of the other profitability measures, the operating profit is used. This result includes more discretionary measures for senior management such as provisions to allowances, impairments, amortization and administrative expenses.

b) The second factor is constituted by the "Liquidity 1" ratio (credit investment among total assets), "Liquidity 2" ratio (Loans / total assets), "Liquidity 3" (Total deposits / total loans) and "Liquidity 4" (Available-for-sale financial assets between the total assets). This factor represents the dimension of "Liquidity" in the institutions.

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Regarding this factor, which is representative of liquidity, it can be observed that increased credit investment as well as a greater amount from other loans not classified as credit investment on total assets have a negative impact on liquidity, while a higher proportion of deposits on loans, plays in favor of liquidity.

Furthermore, in relation to the "Liquidity 2" ratio defined as "the total deposits among the total loans," we could argue that a higher level of deposits implies a more stable funding due to the existence of the deposit guarantee fund. One of the problems of the crisis in the savings banks was the evaporation of short-term funding sources, given that they presented wholesale funding sources. Secondly, fewer loans means less long-term committed resources, which implies more liquid assets. This is intended to minimize the risk of non-renewal of financing sources.

The "Liquidity 3" ratio defined as "Available-for-sale financial assets between the total assets", positively saturates with "Liquidity 2", as it is assumed that many of the instruments of this portfolio can be converted into liquid and therefore represent a way to obtain liquidity.

c) The third factor is constituted by Size 1, measured as the logarithm of assets, and Size 2, measured as interest income, plus the net equity between reserves ratio. This factor would represent the dimension of "SIZE" in the institutions.

d) The fourth factor is constituted by "Profitability 1" (profit/loss for the period total average assets), "Profitability 2" (operating profit / total average assets) and the ratio of operating costs between operating profits. This factor represents the dimension of "PROFITABILITY" in the institutions.

The ratio of operating costs between operating profit, correlates negatively with the "Profitability 1" and "Profitability 2". This is due to the fact that inefficiency affects profitability in a negative way.

Once the factors are obtained the k-means analysis is carried out ((MacQueen, 1967) and (Forguey, 1965)). It is a case clustering method to assign cases to a fixed number of clusters whose characteristics are unknown, based on a set of variables.

In our case, the factors obtained through factor analysis are used. K-means analysis is based on the distance between the cases in a set of variables (the factors). The first step is to select the K cases farthest from each other; in our analysis five clusters are set. Next, each case is assigned to the nearest center and the centroids are updated as new cases are incorporated. Therefore, it is an iterative process, in which, through iterations, shifts in the centers can be occur, which will be increasingly smaller. K-means analysis uses Euclidean distance to measure the distance between cases.

The Anova Table shows how the variables that better help differentiate the clusters are solvency and liquidity.

	Cluster		Error		F	Sig.
	Mean square	df	Mean square	df		
SOLVENCY	77.287	4	.426	532	181.247	.000
LIQUIDITY	77.182	4	.427	532	180.669	.000
SIZE	62.602	4	.537	532	116.616	.000
PROFITABILITY	68.655	4	.491	532	139.738	.000

Table 6 Anova Table

The table 7 with final centers are of great interest, as it features the groups' characteristics. Annex 3 also shows a table of each group's average equivalent ratios. Finally, Annex 4 shows the distribution of the number of institutions in each group by year and by type of institution.

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	CLUSTER				
	1	2	3	4	5
SOLVENCY	3.31852	-.11404	-.15872	0.39771	-0.25761
LIQUIDITY	0.30333	-0.22337	-0.09989	-3.44381	0.54441
SIZE	0.43530	-0.17872	-0.60025	1.22512	0.77877
PROFITABILITY	0.51014	-3.48323	0.20618	-0.1863	0.02273

Table 7 Table with final centers

Interpretation of clusters

Clusters are arranged according to the level of strength of the institutions, forming five groups which are presented below:

Healthy asset and financial services institutions (corresponds to group 1)

This cluster brings together institutions with great solvency, low liquidity, not very large in size and with high profitability.

Although it is a group of institutions that share the aforementioned characteristics, it should be noted that this represents few institutions which are mainly dedicated to assets and financial services and to support other institutions. They are mainly comprised of banks, for instance, Allfunds Bank, Privat Bank Degroof in 2008 and 2009, and Banca March. The first institution is specialized in helping others to access architecture investment funds in a more secure and efficient way. The second entity is a bank specialized in asset management.

Not so healthy asset and financial services institutions (correspond to group 4)

A cluster of institutions whose solvency is slightly above average, with good liquidity, very small in size, and poor profitability. Institutions such as the Spanish Confederation of Savings Banks (CECA) stand out in this group, which provided support services to the associated savings banks, although it should clarified that away from the cluster center.

Also property management institutions such as Banco de Alcalá, a bank property management bank, and Fibanc, a bank that belongs to the Italian Banco Mediolanum, also specialized in assets and financial services, and Banco de Madrid.

Institutions bailed-out by Europe (correspond to group 2)

This cluster groups institutions with a below average solvency, above average liquidity, large institutions, and well below average profitability.

This group includes the institutions with which the FOBR used 36.968 million euros of the 100,000 million credit from financial assistance requested to Europe. The effects of restructuring are also represented motivated by the Royal Decree-Law 2/2012 of February 3 and the Royal Decree-Law 18/2012 of May 11 which caused a large increase in provisions. There was a default in own resources in terms of regulation and public financial support became necessary. It is worth noting that the only bailed-out banks were subsidiaries of savings banks.

Doubtful institutions (correspond to group 3).

This cluster groups institutions with a solvency below average, liquidity slightly above average, very large institutions, and above average profitability.

This group gathers a large number of institutions, mostly intervened savings banks, grouped with the country's large institutions such as BBVA, Banco Santander and Caixa-Bank. This situation must be clarified as institutions such as BBVA and Santander are shifting away from the cluster center as we move from 2005 to 2012. In most cases, savings banks are close to the cluster center.

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This cluster contains both institutions which survived as banks and savings banks that had to be bailed-out with public money injections. At this point, the governance structure of saving banks which complicated good corporate governance practices must be taken into account, as well as restrictions on the savings banks to obtain first-class resources, without withholding benefits. Therefore, savings banks resorted to a high degree of wholesale funding, being an unstable source in lack of liquidity situations. Another problem with savings banks that was pointed put is the lack of diversification and their high exposure to the property sector.

Institutional protection schemes (IPS) are also included, also know as cold mergers. They were created with the objective of mutualizing the results, solvency and liquidity, intended to guarantee solvency and liquidity through IPS, allowing each savings bank to maintain its identity and legal status. To prevent that the creation of new institutions was only aimed at obtaining funding from the FOBR, the(Royal Decree-Law 6/2008 of October 10) established that there must be willingness to perpetuate the IPS in time. A period of 10 years was agreed by all institutions making up the IPS, duly notifying within a period of two years to leave the IPS.

Thus, savings bank present in this group in which banks are located, required a considerable amount of aid, while banks, having a more flexible financing structures to raise capital, survived better.

More doubtful institutions (correspond to group 5)

This cluster gathers institutions with a solvency well below average, with very poor liquidity, not very large in size and with average profitability.

In this group, institutions such as Caja Ontivent and Caja Pollensa stand out, these are the only two institutions that still function as savings banks in Spain. Various foreign bank branches as Citibank, Deutsche Bank and Lloyds Bank are also present, due to the aid received in their countries of origin. Many small banks are also included, such as Bankoa, a small bank of Basque origin focused on the industry sector that was acquired before the crisis by the French bank Credit Agricole; and some savings banks until 2009 as Caja Jaén, Caja Ávila and Caja Manlleu, involved in mergers in 2009. It could be argued that, in this group, savings banks are scarce, with a strong presence of small and foreign banks.

Set of clusters analysis

It is observed that property management institutions do not experience problems due to not having a real estate portfolio “Group 1" and "Group 4”. Furthermore, it is observed that institutions that have been bailed-out by Europe "Group 2”, are institutions that have large real estate portfolios and institutions that are savings banks except for two banks that are subsidiaries of savings banks. This aspect suggests management problems on savings banks, where the two only subsidiary banks showed signs of serious trouble.

Moreover, the cluster of doubtful institutions “Group 3" (289 cases), in which a large number of institutions is concentrated (most savings banks with the IPS formed by them), did not lead to excellent results. The economic sense of this scheme may be raised, and its usefulness in the restructuring process of the Spanish financial system. It was intended to cover fund solvency problems with others in better shape, but as it happened many IPS and mergers had to be rescued and nationalized.

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Therefore, a recapitalization as it has been done in other countries, institution by institution, in an accelerated manner, would have prevented the problem from worsening. Some relevant cases due to high cost are Catalunya Caixa (merger) and Bankia (IPS).

Another issue worth noting is how institutions belonging to doubtful institutions "group 3" (with a solvency below average) have to be bailed-out. This may be due to delayed recognition of credit impairment. This raises the issue of the convenience of the system of provisions based on incurred losses. The new IFRS 9 system reflects the expected loss as a method to record credit impairment, one of the objectives being to avoid delaying the recognition of credit impairment. The delay in the recognition of delinquency could also be due to refinancing; this practice is positive when seeking to achieve a viable future for the company. However, according to the IMF, in was widely used in Spain to delay losses, thus the royal decrees on provisions were enacted.
The Bank of Spain also modifies the Circular 4/2004 of December 22 of the Bank of Spain with the Circular 2/2012 of February 29 of the Bank of Spain in its content regarding provisions and specially the Circular 6/2012 of September 27 of the Bank of Spain, which calls for banks to record in the financial statements the refinanced amounts.

In the group ‘more doubtful institutions’ "Group 5" (180 cases) those savings banks that survived the crisis are located, Caja Ontivent and Caja Pollensa, whose distinguishing feature coincides with that of German savings banks, the fact that they did not experience growth outside their regional areas.

Conclusions

In this study, we have analyzed the annual accounts of banks and savings banks in the Spanish financial system in the time interval between 2005 and 2012. To do this, we used a series of financial ratios on which a factor analysis has been applied, intended to reduce the number of dimensions and obtaining the latent structure of the data.

The dimensions obtained were as follows: Solvency (Factor 1) Liquidity (Factor 2), Size (Factor 4) and Profitability (Factor 4).

Through factor analysis it can be observed how economic profitability is positively related to solvency, suggesting its utility to fix the remuneration of executives, rather than financial profitability.

Once these five dimensions were obtained, a k-means analysis on financial institutions was applied, obtaining five groups which were named: Healthy asset and financial services institutions (Group 1), Not so healthy asset and financial services institutions (Group 4), Institutions bailed-out by Europe (Group 2), Doubtful institutions (Group 3), and More doubtful institutions (Group 5), with solvency and liquidity being the dimensions that create the most differences among the groups.

In the group of institutions with healthy heritage services, small institutions with great solvency, high profitability, and little liquidity are gathered. This group has a reduced number of institutions dedicated to wealth management and investment fund placement.

The group of institutions of less healthy heritage services gathers small institutions that have a solvency slightly above average, good liquidity, but with poor profitability.

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In this group there are very few entities, which highlights the ECSC, an organization that provides services to the savings banks and subsidiaries of foreign banks engaged in wealth management.

In the group of institutions rescued by Europe, institutions with a solvency below average cluster are gathered. They are large institutions with good liquidity and a very bad performance. This group includes institutions that have received a bailout from Europe. They are institutions that had large real estate portfolios, being savings banks, except for only two banks that are subsidiaries of savings banks. This aspect suggests management problems on savings banks, where the two only subsidiary banks showed signs of serious trouble.

The restructuring of the financial system through the IPS and mergers is questioned as some of the participating institutions have been rescued by Europe. This fact arises the question that perhaps, as in the case of Bankia and Caixa Catalunya, a quick institution by institution resolution might have avoided the problem which originated through grouping with other institutions which, in turn, had solvency problems.

The abrupt passage of institutions from the group of doubtful institutions to the group of institutions bailed-out by Europe, as those institutions were having huge losses, raises the problem of delayed recognition of losses through impairment on loans and the possible use of refinancing. These facts may have caused a delay in the recognition of delinquency in the system, something that the royal decrees on provisions aimed to amend, together with the planned change in the systems of provisions at an international level.

The group of doubtful institutions gathers a large number of institutions that have a solvency below average and are large institutions whose liquidity is slightly above average. This group contains the bulk of the savings banks and large banks (although farther from the center of the cluster). It should be stressed that lower solvency implies an increase in liquidity, since an increase in the latter is quicker in times of crisis. The lower solvency of these institutions is also of note, coinciding with a larger size, which can be explained by the implicit support of the State for the large institutions.

The group of more doubtful institutions gathers those with worst solvency than those from the group of doubtful institutions. It shows small institutions with poor liquidity, but with average profitability. Within this group there are two savings banks worth noting, the only ones that have survived: Caja Ontivent and Caja Pollensa, whose distinguishing feature coincides with that of German savings banks, the fact that they did not experience growth outside their regional areas. Small banks and foreign banks are also present, the latter receiving aid from their countries of origin.

YEARLY AVERAGE RATIO

Year		Solvency1 (E/TA)	Solvency2 (E/TL)	Solvency3 (E/TLO+ OA)	Solvency4 (FLAC/TA)	GM/TAA	Liquidity 1 (CI/TA)	Liquidity 2 (L/TA)	Liquidity 3 (TD/TLO)	Liquidity 4 AFSFA/TA	Profitab. 1 (INP/ TAA)	Profitab. 2 EM/TAA	OC/OI	Size 1 (Active logs)	Size 2 (IT logs)
2005	Average	0.0871	0.1008	0.0817	0.8503	0.0364	0.7996	0.7595	0.9758	0.0876	0.0082	0.0092	0.5916	6.8235	5.2994
	N	77	77	77	77	77	77	77	77	77	77	77	77	77	77
	Standard dev.	0.0212	0.1292	0.1267	0.1441	0.0685	0.0099	0.0108	0.1110	0.7279	0.7573	0.0212	0.1292	0.1267	75725 939688 7549
2006	Average	0.0366	0.0184	0.7697	0.9383	0.0834	0.0097	0.0114	0.6303	6.8801	5.4052	0.0366	0.0184	0.7697	0.9383
	N	78	78	78	78	78	78	78	78	78	78	78	78	78	78
	Standard dev.	0.0257	0.0781	0.1197	0.1566	0.0643	0.0105	0.0112	0.1185	0.7473	0.7614	0.0257	0.0781	0.1197	0.1566
2007	Average	0.0364	0.0886	0.7692	0.9490	0.0947	0.0094	0.0109	0.6783	6.9473	5.5818	0.0364	0.0886	0.7692	0.9490
	N	75	75	75	75	75	75	75	75	75	75	75	75	75	75
	Standard dev.	0.0276	0.0909	0.1286	0.2245	0.0626	0.0068	0.0078	0.0875	0.7672	0.7743	0.0276	0.0909	0.1286	0.2245
2008	Average	0.0322	0.7845	0.7819	1.0163	0.0968	0.0047	0.0041	0.7928	6.9601	5.6535	0.0322	0.7845	0.7819	1.0163
	N	76	76	76	76	76	76	76	76	76	76	76	76	76	76
	Standard dev.	0.0226	0.1109	0.0956	0.1847	0.0696	0.0073	0.0091	0.1310	0.7696	0.7846	0.0226	0.1109	0.0956	0.1847

YEARLY AVERAGE RATIO (CONT.)

Year		Solvency1 (E/TA)	Solvency2 (E/TL)	Solvency3 (E/TLO+ OA)	Solvency4 (FLAC/TA)	GM/TAA	Liquidity 1 (CI/TA)	Liquidity 2 (L/TA)	Liquidity 3 (TD/TLO)	Liquidity 4 AFSFA/TA	Profitab. 1 (INP/ TAA)	Profitab. 2 EM/TAA	OC/OI	Size 1 (Active logs)	Size 2 (IT logs)
2009	Average	0.0333	0.7825	0.7502	1.0439	0.0977	0.0022	0.0047	0.7383	6.9506	5.4951	0.0333	0.7625	0.7502	1.0439
	N	77	77	77	77	77	77	77	77	77	77	77	77	77	77
	Standard dev.	0.0248	0.1255	0.1128	0.2277	0.0759	0.0093	0.0111	0.1962	0.7921	0.8633	0.0248	0.1255	0.1128	0.2277
2010	Average	0.0336	0.7477	0.7366	1.0810	0.0971	0.0002	0.0022	0.7704	6.9550	5.2213	0.0336	0.7477	0.7366	1.0810
	N	48	48	48	48	48	48	48	48	48	48	48	48	48	48
	Standard dev.	0.0352	0.1568	0.1507	0.3214	0.1026	0.0179	0.0207	0.2899	0.9859	1.0576	0.0352	0.1568	0.1507	0.3214
2011	Average	0.0326	0.7199	0.7048	1.2270	0.1016	-0.0008	0.0008	0.8800	7.0580	5.5125	0.0326	0.7199	0.7048	1.2270
	N	55	55	55	55	55	55	55	55	55	55	55	55	55	55
	Standard dev.	0.0347	0.1750	0.1775	0.7158	0.1183	0.0179	0.0249	0.3883	1.0103	1.0737	0.0347	0.1750	0.1775	0.7158
2012	Average	0.0332	0.6602	0.6518	1.4617	0.1143	-0.0206	-0.0143	0.7551	6.9837	5.4296	0.0332	0.6602	0.6518	1.4617
	N	51	51	51	51	51	51	51	51	51	51	51	51	51	51
	Standard dev.	0.0291	0.2212	0.2163	1.0055	0.1550	0.0447	0.0386	0.2195	1.0567	1.1258	0.0291	0.2212	0.2163	1.0055
Total	Average	0.0345	0.7701	0.7463	1.0634	0.0955	0.0029	0.0047	0.7199	6.9376	5.4596	0.0345	0.7701	0.7463	1.0634
	N	537	537	537	537	537	537	537	537	537	537	537	537	537	537
	Standard dev.	0.0271	0.1425	0.1436	0.4517	0.0891	0.0193	0.0190	0.2174	0.8396	0.8881	0.0271	0.1425	0.1436	0.4517

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AVERAGE RATIO BY TYPE OF INSTITUTION

Institution		Solvency1 (E/TA)	Solvency2 (E/TL)	Solvency3 (E/TLO+OA)	Solvency4 (FLAC/TA)	GM/TAA	Liquidity 1 (CI/TA)	Liquidity 2 (L/TA)	Liquidity 3 (TD/TLO)	Liquidity 4 AFSFA/TA	Profitab. 1 (NPI/ TAA)	Profitab. 2 EM/TAA	OC/OI	Size 1 (Active logs)	Size 2 (IT logs)
BANK	Average	0.1035	0.1269	0.1049	0.8470	0.0449	0.7836	0.7778	1.0783	0.0792	0.0036	0.0059	0.8143	6.6538	5.1675
	N	243	243	243	243	243	243	243	243	243	243	243	243	243	243
	Standard dev.	0.0820	0.1281	0.1121	0.1320	0.0368	0.1793	0.1701	0.6374	0.1155	0.0200	0.0230	0.2720	0.9797	1.0809
SAVINGS BANK	Average	0.0637	0.0691	0.0580	0.8807	0.0258	0.7589	0.7203	1.0510	0.1091	0.0022	0.0037	0.6418	7.1721	5.7010
	N	294	294	294	294	294	294	294	294	294	294	294	294	294	294
	Standard dev.	0.0286	0.0332	0.0268	0.0810	0.0080	0.1016	0.1111	0.1931	0.0557	0.0187	0.0149	0.1090	0.6121	0.5906
Total	Average	0.0817	0.0953	0.0792	0.8655	0.0345	0.7701	0.7463	1.0634	0.0955	0.0029	0.0047	0.7199	6.9376	5.4596
	N	537	537	537	537	537	537	537	537	537	537	537	537	537	537
	Standard dev.	0.0622	0.0940	0.0813	0.1084	0.0271	0.1425	0.1436	0.4517	0.0891	0.0193	0.0190	0.2174	0.8396	0.8881

CORRELATIONS MATRIX

Ratios		Solvency 1 (E/TA)	Solvency 2 (E/TA)	Solvency 3 E/TL+OA	Solvency 4 FLAC/TA	GM/TA A	Liquidity 1 (CI/TA)	Liquidity 2 (L/TA)	Liquidity 3 (TD/TL)	Liquidity 4 AFSFA/TA	Size 1 (Active logs)	Size 2 (IT logs)	Profitab. 1 (NPI/ TAA)	Profitab. 2 EM/TAA	OC/OI
Correlation	Solvency1 (E/TA)	1.000	.985	.955	-.582	.675	-.055	-.014	-.062	.080	-.504	-.524	.356	.381	.182
	Solvency2 (E/TL)	.985	1.000	.980	-.585	.685	-.057	-.019	-.082	.058	-.479	-.510	.329	.366	.179
	Solvency3(E/TLO+OA)	.955	.980	1.000	-.560	.595	-.107	-.068	-.043	.100	-.468	-.515	.307	.338	.204
	Solvency4(FLAC/TA)	-.582	-.585	-.560	1.000	-.434	.209	.178	.048	-.008	.137	.172	-.232	-.248	-.107
	GM/TAA	.675	.685	.595	-.434	1.000	.161	.195	-.141	-.156	-.419	-.372	.285	.402	.054
	Liquidity1(CI/TA)	-.055	-.057	-.107	.209	.161	1.000	.884	-.697	-.567	-.135	-.071	.129	.173	-.133
	Liquidity2(L/TA)	-.014	-.019	-.068	.178	.195	.884	1.000	-.670	-.542	-.153	-.082	.132	.164	-.083
	Liquidity3 (TD/TL)	-.062	-.082	-.043	.048	-.141	-.697	-.670	1.000	.459	-.195	-.212	-.178	-.203	.124
	Liquidity4 AFSFA/TA	.080	.058	.100	-.008	-.156	-.567	-.542	.459	1.000	.029	.001	.034	-.012	.000
	Size 1 (Active logs)	-.504	-.479	-.468	.137	-.419	-.135	-.153	-.195	.029	1.000	.962	-.087	-.083	-.237
	Size 2 (Log TI)	-.524	-.510	-.515	.172	-.372	-.071	-.082	-.212	.001	.962	1.000	-.085	-.072	-.282
	Profitability 1(NPI/TAA)	.356	.329	.307	-.232	.285	.129	.132	-.178	.034	-.087	-.085	1.000	.906	-.191
	Profitability 2 (EM/TAA)	.381	.366	.338	-.248	.402	.173	.164	-.203	-.012	-.083	-.072	.906	1.000	-.289
	OA/NP	.182	.179	.204	-.107	.054	-.133	-.083	.124	.000	-.237	-.282	-.191	-.289	1.000
Sig. (1-tailed)	Solvency1 (E/TA)		.000	.000	.000	.000	.100	.375	.076	.032	.000	.000	.000	.000	.000
	Solvency2 (E/TL)	.000		.000	.000	.000	.096	.333	.028	.090	.000	.000	.000	.000	.000
	Solvency3(E/TLO+OA)	.000	.000		.000	.000	.006	.057	.158	.010	.000	.000	.000	.000	.000
	Solvency4(FLAC/TA)	.000	.000	.000		.000	.000	.000	.133	.431	.001	.000	.000	.000	.007
	GM/TAA	.000	.000	.000	.000		.000	.000	.001	.000	.000	.000	.000	.000	.106
	Liquidity1(CI/TA)	.100	.096	.006	.000	.000		.000	.000	.000	.001	.050	.001	.000	.001
	Liquidity2(L/TA)	.375	.333	.057	.000	.000	.000		.000	.000	.000	.028	.001	.000	.027
	Liquidity3 (TD/TL)	.076	.028	.158	.133	.001	.000	.000		.000	.000	.000	.000	.000	.002
	Liquidity4 AFSFA/TA	.032	.090	.010	.431	.000	.000	.000	.000		.250	.490	.216	.395	.498
	Size 1 (Active logs)	.000	.000	.000	.001	.000	.001	.000	.000	.250		.000	.021	.027	.000
	Size 2 (Log TI)	.000	.000	.000	.000	.000	.050	.028	.000	.490	.000		.024	.049	.000
	Profitability 1(NPI/TAA)	.000	.000	.000	.000	.000	.001	.001	.000	.216	.021	.024		.000	.000
	Profitability 2 (EM/TAA)	.000	.000	.000	.000	.000	.000	.000	.000	.395	.027	.049	.000		.000
	OC/OI	.000	.000	.000	.007	.106	.001	.027	.002	.498	.000	.000	.000	.000	

AVERAGE EQUIVALENT RATIOS TO EACH GROUP

Institution		Solvency1 (E/TA)	Solvency2 (E/TL)	Solvency3 (E/TLO+OA)	Solvency4 (FLAC/TA)	GM/TAA	Liquidity 1 (CI/TA)	Liquidity 2 (L/TA)	Liquidity 3 (TD/TLO)	Liquidity 4 AFSFA/TA	Profitab. 1 (NPI/ TAA)	Profitab. 2 (EM/TAA)	OC/OI	Size 1 (Active logs)	Size 2 (IT logs)
1	Average	0.2813	0.4093	0.3336	0.5800	0.1008	0.7539	0.7725	0.7727	0.0624	0.0283	0.0324	0.7638	5.8391	4.2004
	N	26	26	26	26	26	26	26	26	26	26	26	26	26	26
	Standard dev.	0.0804	0.1690	0.1762	0.2245	0.0565	0.1652	0.1024	0.2387	0.1041	0.0233	0.0307	0.1992	0.8561	0.9768
2	Average	0.0505	0.0627	0.0538	0.8968	0.0217	0.6730	0.6442	1.3169	0.0849	-0.0645	-0.0577	1.0236	7.0323	5.4455
	N	21	21	21	21	21	21	21	21	21	21	21	21	21	21
	Standard dev.	0.0882	0.1102	0.0972	0.0886	0.0188	0.1512	0.1523	0.3063	0.0602	0.0465	0.0279	0.5935	1.0394	1.1349
3	Average	0.0648	0.0704	0.0585	0.8764	0.0259	0.7551	0.7242	0.9874	0.1105	0.0053	0.0063	0.6726	7.4800	6.0088
	N	289	289	289	289	289	289	289	289	289	289	289	289	289	289
	Standard dev.	0.0271	0.0325	0.0259	0.0644	0.0082	0.0859	0.1023	0.1899	0.0515	0.0063	0.0067	0.1243	0.5513	0.5823
4	Average	0.1288	0.1456	0.1366	0.7763	0.0397	0.3302	0.3374	2.6772	0.3053	0.0029	0.0018	0.9299	6.0661	4.3530
	N	21	21	21	21	21	21	21	21	21	21	21	21	21	21
	Standard dev.	0.0738	0.1032	0.0943	0.1661	0.0228	0.1273	0.1211	1.2628	0.2473	0.0125	0.0142	0.3042	0.6196	0.6668

AVERAGE EQUIVALENT RATIOS TO EACH GROUP (CONT.)

Institution		Solvency1 (E/TA)	Solvency2 (E/TL)	Solvency3 (E/TLO+OA)	Solvency4 (FLAC/TA)	GM/TAA	Liquidity 1 (CI/TA)	Liquidity 2 (L/TA)	Liquidity 3 (TD/TLO)	Liquidity 4 AFSFA/TA	Profitab. 1 (NPI/ TAA)	Profitab. 2 EM/TAA	OC/OI	Size 1 (Active logs)	Size 2 (IT logs)
5	Average	0.0789	0.0878	0.0719	0.8959	0.0395	0.8592	0.8375	1.0095	0.0530	0.0031	0.0057	0.7295	6.3160	4.8905
	N	180	180	180	180	180	180	180	180	180	180	180	180	180	180
	Standard dev.	0.0392	0.0493	0.0415	0.0526	0.0272	0.0878	0.0955	0.1365	0.0570	0.0089	0.0141	0.2037	0.4761	0.5506
Total	Average	0.0817	0.0953	0.0792	0.8655	0.0345	0.7701	0.7463	1.0634	0.0955	0.0029	0.0047	0.7199	6.9376	5.4596
	N	537	537	537	537	537	537	537	537	537	537	537	537	537	537
	Standard dev.	0.0622	0.0940	0.0813	0.1084	0.0271	0.1425	0.1436	0.4517	0.0891	0.0193	0.0190	0.2174	0.8396	0.8881

DISTRIBUTION OF THE NO. OF INSTITUTIONS OF EACH GROUP BY TYPE OF INSTITUTION

		Cluster					Total
		1	2	3	4	5	
INSTITUTION	BANK	26	10	68	18	121	243
	SAVINGS BANK	0	11	221	3	59	294
Total		26	21	289	21	180	537

DISTRIBUTION OF THE NO. OF INSTITUTIONS OF EACH GROUP BY YEAR

		Cluster					Total
		1	2	3	4	5	
Year	2005	5	1	41	0	30	77
	2006	4	0	39	0	35	78
	2007	5	0	45	1	24	75
	2008	3	0	49	0	24	76
	2009	3	1	48	2	23	77
	2010	2	2	23	5	16	48
	2011	2	5	29	5	14	55
	2012	2	12	15	8	14	51
Total		26	21	289	21	180	537

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Article **ECORFAN Journal-Mexico**

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The quality of the mexican strawberry

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Abstract

Strawberry production in Mexico to be exported goes back to the fifties. Nowadays the production has expanded from two to six states in Mexico. The strawberry grown in Mexico is appreciated and valued in the international market due to quality achieved in the crop. Nevertheless, the technological lag has a significant negative impact on farming activities. Therefore, it is necessary to incorporate a technological innovation process which allows crops to be grown with efficient yields which lead to achieve competitiveness. Currently, new production processes have been undertaken, which are focused on the characteristic of the crop in order to diversify products according to the environmental conditions and the weather of each growing region. Such situation implies a positive impact on the yields obtained, the quality and the competitiveness achieved.

Strawberry production, Mexican strawberry, agricultural production, competitiveness, harmlessness.

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Introduction

Mexico has produced strawberry since the decade of the forties. From the early fifties the cultivation was extended and focused on the domestic market, however in the late fifties, commercial companies began the exportation process. Irapuato became the main strawberry producer for domestic consumption whereas Zamora became the main producer for exportation. Other communities that have started the cultivation, production and marketing of strawberries, include the states of Baja California, Baja California Sur, Guanajuato, Jalisco, Mexico, Michoacan and Morelos.

This paper shows the quality achieved by the Mexican strawberry according to significant parameters including: size, uniformity, color, texture, aroma and flavor. In addition, the paper highlights the main issues to be faced in order to maintain and to improve cultivation processes. Such issues are approached by the analysis of aspects such as: competitiveness, the physical yield per hectare, quality and safety vegetative material.

One limitation that national producers must face since the beginning of the process, is the dependency on the importation of vegetative materials, which have to be adapted to local and regional microclimates. The undeveloped status of research projects focusing of strawberry production has led to the lack of technological capabilities intended to produce own plant varieties, which negatively impacts the production costs.

The strawberry is a vegetable that is eaten as fruit due to its nature and characteristics. It is accepted worldwide and there is a high demand in developed countries. The main producers in the American Continent include: Canada, USA, Mexico, Guatemala, Costa Rica and Chile.

However, the Mexican strawberry was able to develop a competitive advantage because of its quality, which is given by the microclimates of Irapuato and Zamora; condition which enabled the particularly market positioning in the United States.

The strawberries has a set of qualities that make it appetizing due to its taste and consistency; in addition, it has a significant nutritional content, especially its vitamin and mineral content helps in the prevention of diseases such as cancer and arthritis. Its consumption is part of balanced diets of consumers in developed countries.

This paper analyzes the production of strawberries and the market conditions in an international and national context in order to determine key aspects associated with this crop. In addition, the characteristics, problems and challenges for the quality of Mexican strawberry are addressed.

The international context of strawberry

Originally, the strawberry was from Europe. Its consumption is antique specifically in the Alpine region. Nowadays, there are 30 countries, which produce strawberry; Mexico is one of the main eleven producers worldwide. The United States, Spain, South Korea, Russia, Japan, Poland, Mexico, Italy, Turkey, Morocco and Germany generate 78% of world production of strawberry.

The production and consumption of strawberries have grown given different aspects: the increase of population, social status, changing food consumption patterns towards balanced diets, preventive health care, factors; such factor have encouraged the consumption of fruit, particularly strawberry consumption.

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Therefore the expansion of the demand encourages the production and the cost-benefit approach provides an attractive profitability.

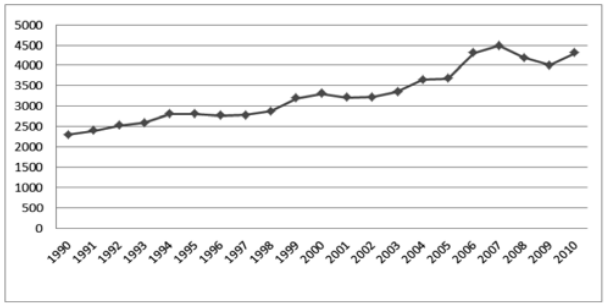
The United States has been an important actor in the world market, in production, exports and imports. Together European countries like Germany, Spain, Italy, France, Poland and

Russia overcome the United States in production. In Asia the main producers include South Korea, Japan, Turkey and China; in Africa Morocco is identified an important producer whereas in Latin America Mexico, Guatemala, Chile, Costa Rica and Argentina are major producers.

The world production raises 4.5 million tons, 20% of which is exported, 80% is for domestic consumption. This is given by the fact that the USA, Europe and Japan, which are developed economies, produce 70% of the strawberry production, from which 90% is for domestically consumed, thus the most important strawberry market is represented by the developed world. The developing countries produce strawberries for exportation and its consumption is limited within domestic markets.

World production of strawberry has been expanding from 2.3 million tons at the beginning of the nineties, to 4.5 million tons nowadays. Despite the years of decline such as 1996, 2003 and 2005 where the global economic downturn has impacted exports of strawberries, the proportion of exports has also grown from 500,000 tons to 800,000 tons (Figure 1).

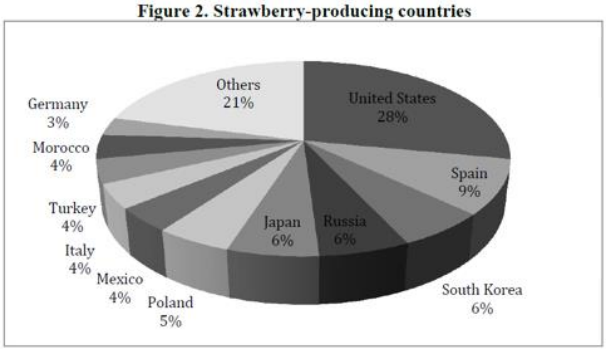
Figure 1. World production of strawberry (thousand of tons)



The demand of strawberry varies depending on the quality and the capacity of commercialization. Strawberry produced in France and Italy are highly prized in the international market, and in a smaller proportion the United States and Spain. On the other hand, among the developing countries, Morocco and Mexico are the main exporters of strawberry. In addition, the United States and Europe are the largest importers of strawberry with 75% of the world imports.

Figure 2 shows the participation of strawberry-producing countries in the world during the first decade of the XXI century; on average the USA and Europe account for 70% of the world production.

Figure 2. Strawberry-producing countries



Together, the USA and Europe are identified as the main exporters; Spain is the major exporter worldwide with 37% of the total exports. Mexico is located in the sixth place with 7% of the total (Figure 3).

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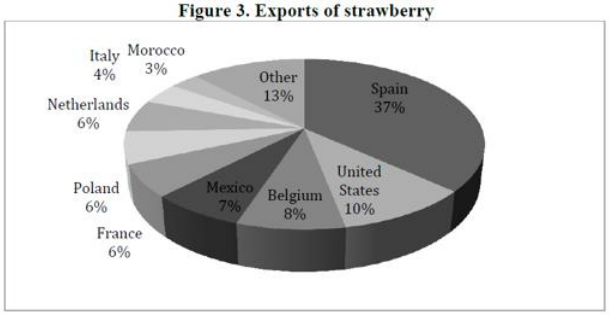
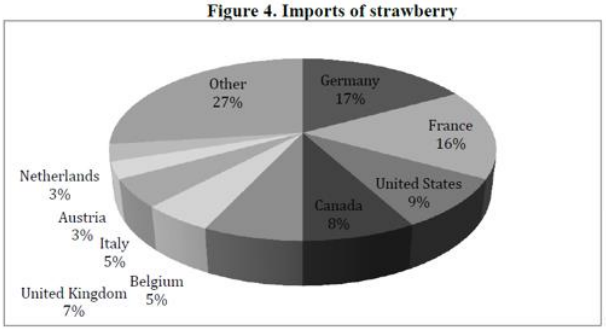
Figure 3. Exports of strawberry



The USA and Europe are also the main importers of strawberry and they consume mostly the majority of their domestic productions. Developing countries including Mexico, Morocco, Turkey, Chile and recently China, complement the consumption of markets in developed countries.

Figure 4. Imports of strawberry



The strawberry production in Mexico

Strawberry was introduced into Mexico during the Second World War. It was introduced into the state of Guanajuato and Michoacan. The commercialization for domestic consumption began on the fifties. It was in the late fifties when some marketing and processing transnational companies settled in the city of Zamora in the municipality of the same name in Michoacan. These companies organized the production and processing of fresh strawberry to be exported to the United States in the winter period, which is when US production declines.

Some companies also settled in the city of Guanajuato in Irapuato. Zamora has been distinguished by his production focused on exportations whereas Iraputo is identified as a producer for domestic consumption.

The original European varieties have been combined locally, which has resulted in the production of multiple varieties that have been refined in order to increase the efficiency of the plant, and to improve quality. The varieties used in Mexico have changed, an initial variety was the variety Fresno, then others were introduced including the "Pico de Pajaro" (Spanish for Bird Beak), Parker, Chandler, Douglas, "la Selva" (Spanish for the jungle), "la oso" (Spanish for Bear), the Camarosa, among others.

The strawberry production in Mexico has defined several cycles, the cycle of initial commercialization was in the fifties; then a boom cycle for exportation appeared during the seventies, however, such a boom cycle was characterized by the foreign investment. It was during the late seventies that the commercialization was exclusively national however, in the nineties; the production was again dominated by transnational enterprises due to the globalization context, situation that remains.

During the first export boom approximately 5000 hectares were grown in Michoacán and Guanajuato; then the production was halved until the introduction of the NAFTA, when the production raised approximately 7000 hectares. In addition, new States, including Baja California Norte, Baja California Sur, Mexico and Morelos, initiated the production of strawberry.

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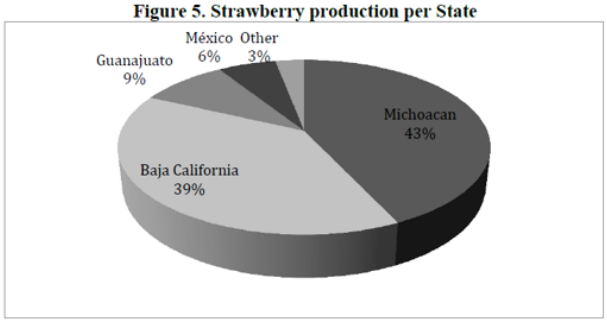
The Zamora Valley in the State of Michoacán remains as the leading producer and exporter of strawberries. Michoacán, with an area ranging from 2000 to 2500 hectares, produces half of the domestic production and 70% of the total exports, these levels of production are followed by Baja California Sur and Baja California Norte. The State of Mexico and Morelos have focused on production for domestic consumption.

The physical yield per hectare in other countries has increased significantly; in the last 20 years, the yield increased from 40 tons per hectare (t / ha) in California, United States up to 60 ton/ha in China (recently incorporated in strawberry production). In Mexico the average yield is 25 ton/ha, Baja California reaches yields of 45 ton/ha, Michoacán is located within the national average, even though some yields from producers in the Zamora Valley exceed 60 tons/ha.

Figure 5. Strawberry production per State

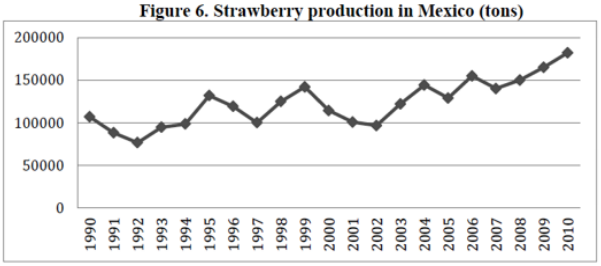


This situation led the most advantaged producers to apply technological innovations in the production process, which resulted in 1) the production of most resistant varieties with higher yields, 2) the improvement of strategies and schemes of commercialization, 3) the capture of higher investment levels, and 4) the extension of areas for cultivation in the whole country.

The strawberry production has been duplicated in the last 20 years, from 100 thousand to 200 thousand tons.

The cultivation area was almost triplicated from 2500 to 7400 hectares in its highest point, with an average area of 7000 ha during the last five years (Gonzalez, 2010). The production and exports were negatively impacted by the recession in 2008- 2009, during 2010 and 2011 there was a recovery period; however, if the negative situation appears again due to the economic recession of the United Stated, the exports and production would decrease again not only in Mexico but also worldwide given the uncertainty in European economies (figure 6).

Figure 6. Strawberry production in Mexico (tons)



The physical yield per hectare has increased. During the seventies, the average yield per hectare was 18 tons whereas in the eighties was 24 tons. During the nineties, the average yield was 28 tons with yields up to 40 tons per hectare. During the first decade of XXI century the average yield per hectare is 30 tons, however, certain producers reach 70 tons per hectare (González, 2010) (Medina y Aguirre, 2007). These differences are due to disadvantaged producers in terms of area, quality of vegetable materials, expenses in growing and harvesting activities; situation that impact negatively on the physical yield per hectare (Figures 7, 8 and 9).

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Figure 7. Physical yield of strawberry in Mexico (ton/ha)

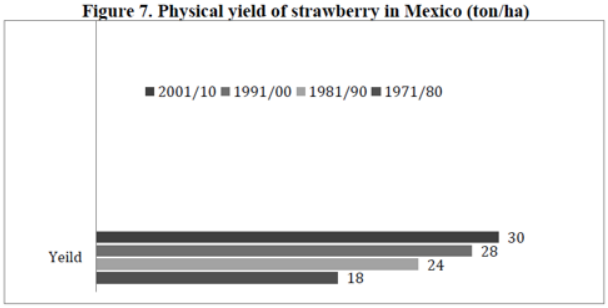


Figure 8. Physical yield per hectare per State (ton/ha)

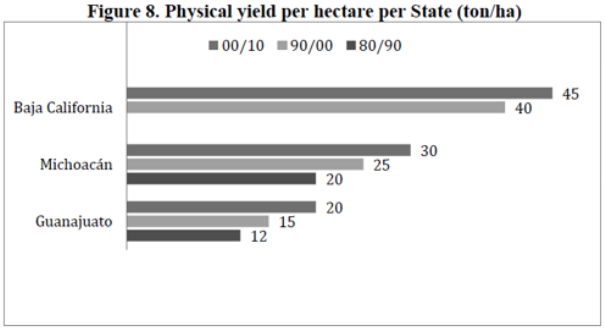
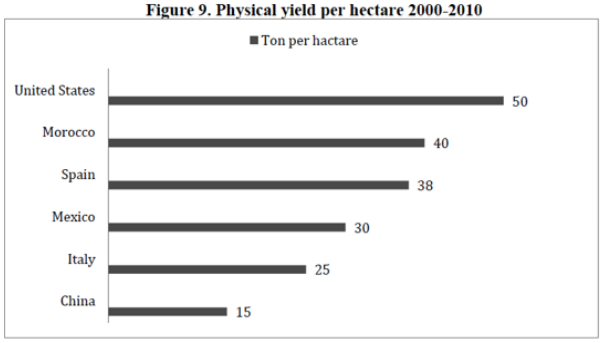
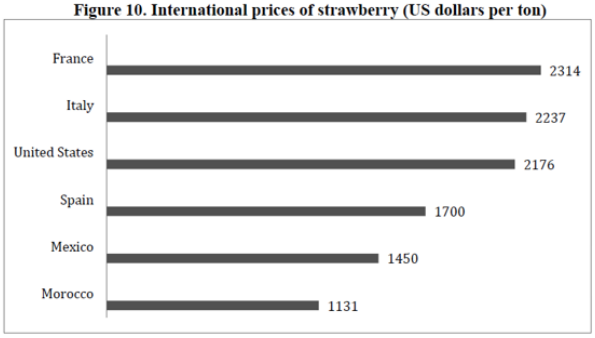


Figure 9. Physical yield per hectare 2000-2010



Regarding to the prices of the strawberry, the quality of the product defines the price levels. In this way, the valuation of the Mexican strawberry is ranked fifth worldwide. The highest valuation is located in European countries and in the United States (Figure 10).

Figure 10. International prices of strawberry (US dollars per ton)



The market of the Mexican strawberry

The United States are the main market of the Mexico strawberry. The strawberry consumption in North American, represent the 11.3% from all fruit consumption (the fourth most consumed), the North American strawberry imports represent 20% of its consumption, and the remaining is domestic production. Mexico provides the 80% of all strawberry imports in The United States. Canada imports 96% from The United States and 4% from Mexico.

Figure 11 shows the strawberry imports in the United States according to country of origin. Mainly the imports (92%) come from three Latin-American countries; Mexico, Argentina and Chile, the remaining comes from different countries from which China begins to highlight.

Figure 11. Strawberry imports in the United States

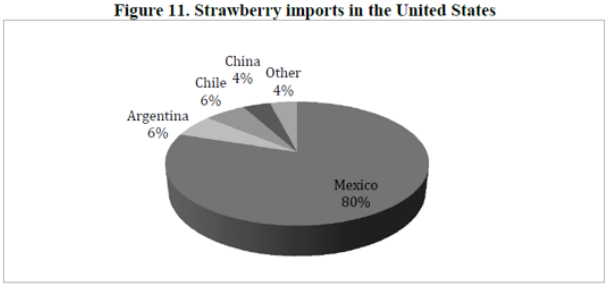


Figure 12 shows the distribution in the consumption of strawberry per region. The Northeast region (23%), the Great-Lakes region (16%) and the Southeast region (13%), together represent the 52% of the entire consumption in the United States. California, which in the main producing region, represents 11% of the national consumption only.

The Northeast region and the Great-Lakes region are the main areas and due to climatic seasons during the winter, they may be potential markets for strawberry imports (see table 1).

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Figure 12. Regional consumption of strawberry in the United States

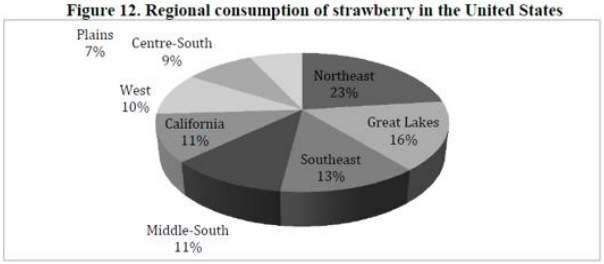
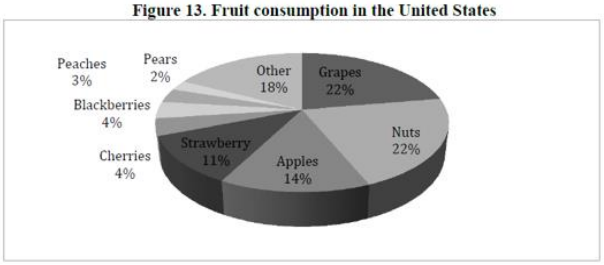


Figure 13 shows the consumption of strawberry according to type of fruit. The strawberry represents the fourth most consumed fruit after grapes, nuts and apples. The single consumption of strawberry is equivalent to the consumption of cherries, blackberries, and peaches.

Figure 13. Fruit consumption in the United States



The determining factors for the fruit demand include: demand of processed fruits, diet trends, availability of information, demographic trends, prices, exchange rates, motivations and attitudes (UARPFHVZ, 2009).

The demand of processed fruit is for the elaboration of juices, canned products, trends in diets, sweets, yogurt, soft drinks, and ice creams. There is a trend to increase the demand of strawberry due to the growing of the market. A demand expansion of 5% is expected in average in the following years. Balance diets have impacted on the fruit consumption; the per-capita consumption of fruits in the United States grew from 169 pounds in the last decade to 180 pound in the present decade, and the trends shows a continuous growing in following years (UARPFHVZ, 2009).

Consumers have increased the consumption of fresh and processed fruits due to health and diet issues, and although there is not an homogenous impacts from all kind of fruits, apples, pears and bananas have impacted significantly on consumption trends.

The demographic growth in the United States has positively impacted on the demand of fruits and nuts. Fruit has become a staple product, in any case, if the prices increase, the consumers will purchase a different variety of fruits.

The exchange rate can affect the demand. The exchange rate in the United States have favored imports due to devaluations in producing countries, its effect is adverse with respect to exports, provided that its price elasticity of demand abroad is not inelastic.

Table 1. Strawberry consuming regions

Region	Northeast	Great Lakes	Southeast	Middle-South	California	West	Centre-South	Plains
State	New York	Illinois	Florida	Tennessee	California	Washington	Texas	Kansas
	Pennsylvania	Ohio	Georgia	Louisiana		Arizona	Oklahoma	Nebraska
	New Jersey	Michigan	North Carolina	Mississippi		Colorado		South Dakota
	Massachuset	Indiana	Virginia	Arkansas		Utah		North Dakota
	Maryland	Wisconsin	Alabama			Nevada		
	Connecticut	Minnesota	South Carolina			New México		
	Maine	Iowa	Kentucky			Idaho		
	New Hampshire	Missouri				Montana		
	Delaware					Wyoming		
	Vermont							
	Rhode Island							
	West Virginia							
	District of Columbia							

Fruit consumption is greater in women than in men and it must be noted that the majority of population is composed by women. The consumption also has a greater demand in children and in the elderly, by the properties and benefits, on the one hand women tend to care more about their weight than men, on the other hand, the consumption in children is represented as a very good substitute for candy and elderly consume fruit for health and taste.

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The quality of the Mexican strawberry

The United States are the main export destination of Mexican strawberries, the NAFTA helped to increase the Mexican strawberry exports. The participation of such exports has turned Mexico into the main supplier of strawberries in the North American market.

The acceptance of the Mexican strawberries among a strong international competition is represented by the quality. Particularly the entry of Mexican strawberries to the US market is carried out on November and December, which is when the fruits reach their highest quality to be consumed as fresh strawberry. After that, although the quality drops, the Mexican strawberry remains competitive in the period from January to April. Strawberry quality depends on several factors, which can be integrated into three groups, one group is the quality of planting material which impacts on the growing, resistance to pests and the development of the fruit; a second group is represented by the environmental conditions that will influence the development of the plant, the temperature, the insolation, the light and the humidity; a third group is represented by the cares which should be taken in the growing and harvesting (Rodriguez, 2010).

Currently there are about 1,000 varieties of strawberry plants in the world, these varieties are developed according to weather conditions and the demands of market competitiveness. Mexico has imported vegetative material, the variety "Fresno" was predominant in the sixties and seventies, then other varieties came like the "Pico de Pajaro", "Parker", "Chandler", "Douglas", "la Selva" "la oso", nowadays varieties including the "Alvion", "Aromas", "Camino Real", "Diamond", "Camarosa" and "Festival" predominate.

The "Colegio de Postgraduados - ColPos" in the State of Mexico (Spanish for Graduate College) has initiated the development of plant materials for the cultivation of strawberries and created two varieties: the CPZamorana and the CPJacona, which have been successfully tested and have been adopted by Mexican producers.

This aspect has been one significant weakness of strawberry production in Mexico, the import of plant material adversely impact on productions costs because the excessive price of such materials, in addition the material must be constantly renovated in order to acquire more pest-resistant varieties with fastest growing as well as better performance.

In this context, the contribution of the ColPos is not only important but strategically vital to reduce costs and produce more varieties suitable to microclimatic characteristics of regions where the crop is cultivated. The plant should be rich in saccharose and urea to accumulate a good amount of starch in the fruit; winter temperatures favor its development, allowing obtaining a quality fruit since the first flowering and until subsequent blooms.

The first stage is the spread of varieties acquired in the vivarium, the quality of the plants is favorable in a high altitude vivarium, the resistance to diseases and pests and the performance and yields of the main plant, are critical factors. There are varieties that are suitable for its cultivation in summer, whereas others are development more efficiently during winter. In Mexico, for marketing reasons in the United States, the cultivation is done in autumn and winter, when demand of strawberry grows due to climatic factors, since during this period its production is limited to the State of Florida.

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Strawberry can be grown in opencast, in tunnels or in greenhouses. It has been shown that yields and quality are improved in tunnels or in greenhouses against the yields and quality from opencast systems. Technological changes in strawberry production, through tunnels with irrigation system and the use of agrochemicals, have helped raise yields significantly.

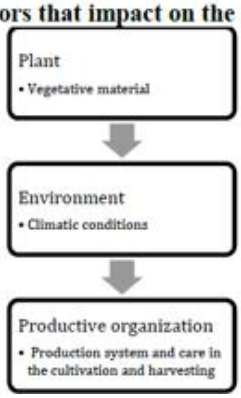
Thus, the quality of strawberry depends on multiple factors that take place in the cycle of reproduction, cultivation and harvest. On the one hand, the resistance to diseases and pests depends on the quality of the plant material; on the other hand, the season of cultivation (Winter or summer) depends on the type of variety. In addition, the yields in fruits and plants depend on genetic quality, and the density per area, the number of blooms, the size, volume and taste of the fruit, depend on the cultivation techniques. The climatic factors also impact on the yields and quality (Rodriguez, 2010) and (UARPFHVZ, 2009) (Figure 14 and 15).

The commercial importance of Strawberry has increased due to nutritional qualities and its characteristics to prevent diseases. Strawberry is rich in vitamins and minerals, and help to prevent cancer and rheumatoid arthritis. The increasing consumption of fruits in the basic diet of the population to achieve a healthy life, enables a potential increase in consumption. This is a powerful reason to encourage research focused on the plant and focused on generating varieties of competitive plants. Hence the importance of the development of research projects in Mexico focused on r the creation of plant materials.

It must be noted that the increase in yields and in quality involves investments in science and technology and the rising in production costs. However.

This financial increase is offset by the increase in yields, which enables the coverage of unit costs and/or the improvement of the quality of strawberries and the improvement of international prices which impact on the cost-benefit relation. The varieties used for export production in Mexico, are for growing in an autumn-winter cultivation cycle, the fruit quality is high due to weather conditions and the yield depends on the intrinsic quality of the plant material, techniques and inputs applied to the crop. Activities of cutting transport and storage of strawberries should be carried out very carefully in order to avoid damages in the fruit (Figure 14 and 15).

Figure 14. Factors that impact on the quality product



The quality of the fruit depends on the size, shape, consistency, color, maturity, brix levels, and season of harvest. The first bloom provides the highest quality and the fruit is used in confectionary, basis for yogurt and frozen strawberries. The second bloom provides fruit to supply national markets, although the quality is lower, the fruit is consumed as fresh fruit or dehydrated fruit. The third and subsequent blooms generate fruit to produce marmalades and purees (UARPFHVZ, 2009).

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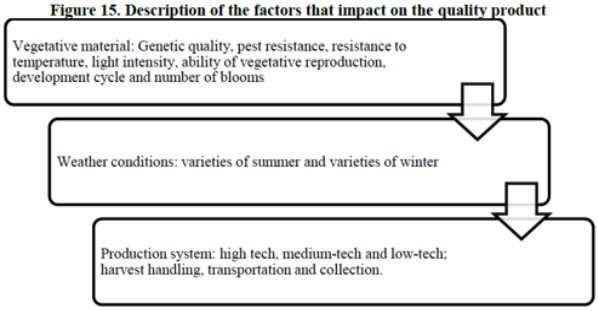
Figure 15. Description of the factors that impact on the quality product



The strawberry consumption criteria in confectionary are given by the shape, size, color, and consistency. Restaurants and hotels use strawberries in desserts and salads, given the size, smell, color, and consistency; whereas industries of juices, ice creams and candies, select the strawberries because of the smell, flavor, and yield.

Strawberry has different consumption forms, which include: fresh fruit, frozen fruit, semi-processed fruit, and processed fruit. The fresh fruit with the highest quality, and which is used in confectionary, should have a proper size, color, consistency and flavor.

This type of fruit is also required by restaurants and hotels to be offered as dessert or salad. The ice cream production requires strawberries with good quality in the same way that in domestic markets.

The frozen strawberry represents an advantage due to its capacity of being storage during large periods of time. The frozen strawberry guarantees a constant supply; in addition, it can be used in the production of soft drinks, juices and candies. There is a high demand of this type of strawberry to produce yogurt and flavored milk. However, the main disadvantage is given by the expenses for congelation and storage for large periods of time.

The semi-processed strawberry is used as a base for yogurts and dairy desserts; it is also used in cereals. The semi-processed strawberry is more expensive than the fresh one due to the necessity of special treatments which implies an added value.

The processed strawberry is used as dehydrated fruit to be used in candies and confectionery. This fruit is combined with chocolate, sugar, salt and chili, strawberry covered in chocolate, candied fruit and chamoy. Strawberries sold in the United States can be qualified or not qualified. Qualified strawberries have a higher price in the market; the qualified strawberries are classified into US No. 1 and US No. 2. The US No. 1 includes firm fruits with a medium degree of maturity, without mold, without damage, without damage caused by dirt, moisture, foreign matter, diseases, insects or mechanical damage. Each fruit has to have three quarters of surface pink or red (Table 2).

The US No. 2 includes strawberries which are free of decay, severe damage caused by dirt, disease, insects, mechanical or other means. Each fruit has at least half of the surface pink or red.

The combined US relates to the combination of No 1 and No 2, except for size, given that at least 80% of the fruit must meet the requirements of the US No 1.

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Table 2. Strawberry quality degrees

Degree	Size	Defects Allowance	Off-Size Allowance
US No. 1	The minimum diameter of each fruit is not less than 3/4	Up to 10% of the strawberry in each batch cannot meet the requirements. Up to 5% of strawberry with serious defects. Up to 2% of strawberries with deterioration.	No more than 5% in each batch can be off-size
US Combined	The minimum diameter of each fruit is not less than 3/4	Up to 10% of the strawberries with severe damage in each batch. Up to 20% of strawberry with lesser diameter in damaged strawberry Up to 35% of strawberries U No 2 in each batch	No more than 5% in each batch can be off-size
US No. 2	The minimum diameter of each fruit is not less than 5/8	Up to 10% of the strawberry with fruit badly damaged. Up to 30% of damaged fruit with smaller diameter. Up to 3% of strawberries with impaired	No more than 5% in each batch can be off-size

The harmless of the Mexican strawberry

According to the PAHO (Pan-American Health Organization), food harmlessness can be defined as the aptitude that food has to be consumed without causing any type of disease.

The lack of food harmlessness, results in significant health risks due to possible diseases generated (Rivero, 2004).

The lack of harmlessness represents severe affectations on developing economies due to, this lack involves: health risks in consumers, medical costs, loss of productivity. The lack of harmlessness also involves the possible destruction of the product in international docks which implies commercial losses and negative affectations on tourist activities (Rivero, 2004).

Food is considered to be harmless with there is not negative affectations when is consumed by human beings.

Harmlessness includes three main characteristics: 1) the food should meet standards of hygienic quality, 2) the food must be nutritive, 3) it must be sensually and culturally accepted (Téllez, 2009).

Activities to ensure the food harmlessness are fundamental factor to produce quality products, nevertheless, if the product is harmful regardless the quality, it has to be withdrawn from the production and distribution system.

Consumers point out that the main threat to the food security is of microbiological nature. There have been disease epidemics caused by food in which, specifically the food has been identified as the source of the pathogen (Kader, 2002). The Mexican strawberry has achieved a significant presence in international markets due to quality and the fulfilment of requirements in harmlessness tests. When problems related to harmfulness appear in an specific region or locality, local governments control the situation by the prohibition of commercialization.

Conclusions

Strawberry production has increased worldwide, over the past 20 years has almost doubled from 2.4 million tons to almost 4.5 million tons, the physical yield per hectare also doubled from 30 ton/ha in the decade of the nineties to 60 ton/ha in the first decade of XXI century.

Strawberry production in Mexico has also increased in volume, physical yield, sown and harvested area, and strawberry producing states. In volume, the production nearly doubled from 100 000 tons per year to 180 thousand tons, yield terms.

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The production increased from 20 ton/ha to 40 ton/ha on average, in area terms the production increased from 2000 hectares to 7400 hectares and from only two producing States, nowadays there six producing States.

There was a significant increase in the production indicators of Strawberry in a national and international context; such an increase was given by: the economic globalization, the NAFTA, the changes in eating habits of the population, the standards of quality and harmlessness of the product, the costs and competitive prices.

Mexican strawberry has maintained its standards of quality and safety in the international market, which is reflected in its acceptance and the increasing production, area and physical yield per hectare. Currently, a production process of vegetative varieties has started. These varieties are based on specific conditions of each producing region; in addition these varieties can favorably affect competitiveness in the global market by reducing costs, improving the yield and the quality of strawberries.

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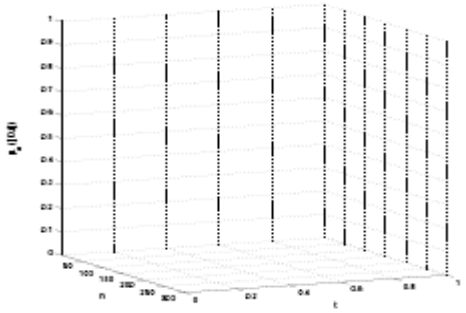

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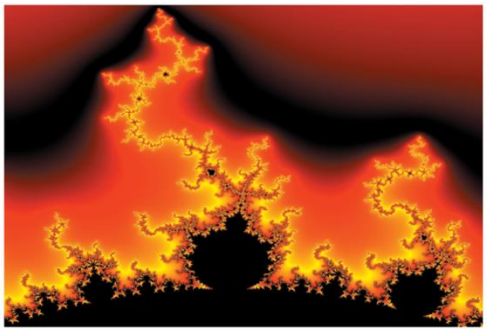

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