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Knowledge Area

The works must be unpublished and refer to topics of Economy, Regional Development, Business, Management of SMEs and other topics related to Social Sciences.

Presentation of the Content

In the first article we present, *The importance of information and communication technologies (ICTs) for SMEs in the State of Guanajuato*, by LAGUNA-CORDOBA, Perla Cristina, GUTIERREZ-RANGEL, Hector Fabian and JIMENEZ-RICO, Artemio, with ascription in the Universidad de Guanajuato, as following article we present, *Determining factors of business growth: a new scale based on the context of micro and small businesses*, by BERNAL-DOMINGUEZ, Deyanira & LANDAZURI-AGUILERA, Yara, with adscription in the Universidad Autónoma de Sinaloa and the Instituto Tecnológico de Sonora, as a following article we present, *Develop a successful methodology for a proposal in stimulus programs innovation in Mexico*, by BERMÚDEZ-PEÑA, Carla Patricia & DÍAZ-NIETO, Elia Socorro, as the last article we present, *Sensory acceptance of a non-dairy probiotic fermented drink with mesquite pod*, by DE LA FUENTE-SALCIDO, Norma Margarita, PIMENTEL ZAPATA, Alexander, VALENZUELA-BALDERAS, Alejandra, GUTIÉRREZ-REYES , Edgar, CASTAÑEDA RAMÍREZ, José Cristobal, with adscription at the Universidad Autónoma de Coahuila and the Universidad Tecnológica del Suroeste de Guanajuato.

Content

Article **ECORFAN Journal- Republic of Cameroon**
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The importance of information and communication technologies (ICTs) for SMEs in the State of Guanajuato

La importancia de las tecnologías de información y comunicación (ICT's) para las Pymes en el Estado de Guanajuato

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Abstract

Objectives, methodology Learn the basic concepts and evolution of Information and Communication Technologies, as well as on the impact of These Organizations. Know the new methods to deliver information services to clients. Companies must Recognize That contribution it is difficult to work without help of the instruments and tools: such as Information and Communication Technologies (ICTs). These are a tool in Which companies are supported for sustained growth, as They Improve Their Processes in all areas of the company and optimize the information THEREFORE delivered to decision makers. However, access to ICT is limited by the human, technical and financial resources That the company Possesses. In Mexico, ITS impact as a trigger is greater in competitive companies are using ICT That, HENCE the Importance of studying at a state level the situation of companies in relation to the adoption of ICT. THEREFORE, the objective is to analyze the vision of SMEs in the state of Guanajuato on the adoption and use of ICT as a strategic tool for Competitiveness.

Technology, Information, Communication, System, SMEs

Resumen

Objetivos, metodología Aprender los conceptos básicos y la evolución de las Tecnologías de Información y Comunicación, así como el impacto de éstas en las organizaciones. Conocer los nuevos métodos para entregar servicios de información a clientes. Contribución Hoy en día es imposible concebir una empresa exitosa sin el apoyo de tecnologías de información y comunicación (TIC) para administrar sus procesos de negocio. Por ello, proveedores mundiales de software Empresarial de Planeación de Recursos ERP3 se han asociado con firmas de consultoría para ofrecer distintas soluciones de negocios a sus clientes. A partir del año 2007, tales proveedores de ERP, antes enfocados únicamente a la administración de procesos de negocios BPM4, han comenzado a utilizar mapas de creación de valor a fin de que las necesidades del negocio sean las que determinen la solución a implementar. Inclusive, han incorporado una nueva solución conocida como Business Intelligence, la cual se enfoca en la medición y toma de decisiones con base en indicadores de creación de valor para el negocio.

Tecnología, Información, Comunicación, Sistema

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Introduction

Computer today is fully involved with the comprehensive management of a company, and therefore, rules and computing standards should be subject to the generals of this. Computer obviously not properly managed by the company, however, aid decision-making. Its purpose is to detect errors, point out flaws, evaluate and improve the effectiveness and efficiency of each section or body.

Today it is impossible to imagine a successful business without the support of information and communication technologies (ICT) to manage their business processes. Therefore, global provider of Enterprise Resource Planning software ERP3 have partnered with consulting firms to provide various business solutions to its customers.

From 2007, these ERP vendors, previously focused solely managing business processes BPM4, have begun to use maps to create value so that business needs are those that determine the solution to be implemented.

Even, they have added a new solution known as Business Intelligence, which focuses on measuring and making decisions based on indicators of value creation for the business.

It is clear that management systems based on value are increasingly present in information technology, and certainly here to stay in the business world as a solution to achieve the maximization of shareholder wealth.

For 2007 (IESE, CELA, 2008) annual expenditure on Information Technology to gross domestic product GDP in Mexico was 3%, which is quite low compared to the average of Latin American countries, which is 6.8% and the US with 8.3%, which would show the great lag that has Mexico in this area.

The MSMEs are of vital importance in Mexico since the last economic census conducted by National Institute of Statistics and Geography (INEGI) in 2009 states that this business sector reached 99.8% of total enterprises, contribute 52% to GDP and generate 78.5% of employment (INEGI 2010).

Also, in Latin America the MI SMEs account for 99.12% of all businesses and generate 64.6% of employment (Saavedra and Hernandez, 2008). Hence the importance of their study, structured in two parts, first, its theoretical foundation based on the importance of ICT and its application in the MI Small Business and secondly, its methodological approach, development, analysis and conclusions.

Guanajuato is located in the Central Mesa, in the southern part of the Mexican tableland; It limits the north with the state of San Luis Potosi, Queretaro east, south and west with Michoacan Jalisco. With an area of 30.768 km, with a population of 5,486, 372 inhabitants and a gross domestic product of $ 344, 323,191,000 (INEGI, 2009).

Comprising 46 municipalities, ranks sixth (see Figure 1) with 210.813 economic units, of which 12, 374 correspond to SMEs, one of the most productive states of Mexico.

Methodology to develop

This research is descriptive and correlational.

Characterization of SMEs

Companies in Mexico can be determined by the number of establishments, employed personnel, sector, size, economic activities, among others. By size and occupied in 2014 staff: 94.3% are micro enterprises (up to 10 people), 0.8% smaller (11 to 50), 4.7% medium (51 to 250), and 2% large (more than 251 persons employed) (INEGI, 2015). In Table 1, the classification of companies by size, sector, number of employees and annual sales range, according to the Official Journal of the Federation (2009) is shown. SMEs have different characteristics that favor their growth, they react quickly and adapt to market changes, have a great capacity to generate jobs and adopt technologies easily (Marsch, 2000 and Zorrilla, 2003), the latter always have the resources financial, technical and are digitally prepared. However, it faces a number of difficulties such as high operating costs, so their benefits are reduced; Insufficient financial resources, which causes the human capital training is not adequate, hiring low-profile, quality problems in the product, lack of service and customer support.

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Consequently they have problems of competitiveness, higher selling prices, reduced sales. Other aspects are the wrong location business, poor inventory control, difficulty in accessing financing (Marsch, 2000 and Zorrilla, 2003). Therefore they require tools to support them in their internal and external needs, such as ICT.

SMEs are entities or organizations engaged in various activities such as service, industry, trade. They generate employment and economic drivers of any country. In Mexico according to the National Institute of Statistics and Geography (INEGI, 2015), representing 5.89% (289.964, between 11 to 250 employees) of all economic units (4926.061), of which 13,762 are located in Guanajuato.

Nationally and considering all sizes of business level, Guanajuato ranks fifth in total gross production, is also the state that has had better growth in economic units during the period 2008 to 2013 (4.4%), especially in the industrial sector, with an annual average growth in employment of 3.3%.

Hence the importance of using ICT in SMEs to enable them to be more competitive, boosting its market nationally and internationally.

Guanajuato is very competitive, prosperous, with sustained growth, attractive for investors and is one of the main generators of jobs nationwide, considered as the fifth fastest growing state (Villafranco, 2015).

In fact, the state government, indicates that SMEs My trade and services (Márquez, 2014) in the 2012-2018 sector consolidated. Leader in the automotive industry with automakers like Volkswagen, Mazda, General Motors, Honda and Toyota, with growth in production 66% and employment by 36% in 2014 (Horta and Millán, 2015), predicting that 2015 will grow 6.1% annual GDP while that nationwide growth of 3% (Colin, 2015) is expected.

In addition, Guanajuato is the fifth state to have greater growth between 2015 to 2017 (4.2% annual average), while the annual average at country level will be 3.1% (Morales, 2015).

Regarding the use of ICT, the Global Information Technology and Information 2015 indicates that Mexico ranks 69 of 143 countries (World Economic Forum, 2015), 63 ICT impact on new business models, 74 in business Internet, 72 in implementation of ICT among companies and ranks 58 in the preparation subindex measuring digital infrastructure, affordability and ICT skills.

According to CEPAL (2010), allocated investment companies mainly two areas, first, machinery, equipment and facilities and, second, the commercial area. In particular, almost 40% of companies that invested in machinery and equipment in the manufacturing sector made it to expand its production plant, while 30% planned to reduce costs.

Moreover, 20% of invested companies to automate their production process. Into the manufacturing sector, 60% of companies considered operating modern machinery, although also significant percentage (38%) felt that their equipment was outdated.

This polarity among manufacturing SMEs in technology is evident that they integrate into their production process, including certifications, policies to improve quality and productivity as well as the use of patents and licenses.

Noting that the level of ICT adoption

Mexico is low, which should establish strategies to improve their PD, being important to do research on this issue, especially at state and Guanajuato, which is growing steadily and is one of the main generators of jobs, contributing so significantly to the development of the country.

Hence, one objective of this study is to determine whether SMEs in the state of Guanajuato, Mexico are digitally prepared to deal with the changes imposed by a world of globalized business.

ICT situation in Mexico.

Porter and Millar (1985) point out that the information revolution is affecting competition from three aspects:

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1. Changing industry structure and alters the rules of competition.

2. Creates competitive advantages, giving companies new ways to beat their rivals.

3. Creates new businesses within existing, often within their own company operations.

There are many problems that SMEs face in adopting ICT, such as lack of financial, technical and human resources.

But one fact is that regardless of the problems which face the SME entrepreneurs should establish clear strategies for improvement in the development of ICT.

ICT is a strategic tool for competitiveness, hence the importance of studying at state level the situation that companies in relation to the adoption of ICT.

It is therefore aims to analyze the vision of SMEs in the state of Guanajuato on the adoption and use of ICT as a strategic tool for competitiveness.

In Business Information Technology and communication have changed the way they relate to customers-suppliers quickly and efficiently through online services such as online purchases-sales, e-banking, mobile devices, networks, etc.

Offering customers new channels (Liljander, Gillberg, Gummerus and Riel, 2006) communication and how to conduct their transactions. Definitions found in the literature, Cobo (2009: 313) conducted an investigation into the concept of ICT proposing the following "technological devices (hardware and software) that allow you to edit, produce, store, share and transmit data in different information systems ".

Defining them from the realm of business, they are devices that transmit electronic information that supports the growth and development of enterprises (OECD, 2002) or established tools on computers to support the gathering of information (Haag, Cummings and McCubbrey 2004).

From the above definitions we can point out some features of the virtual organization:

- They are supported in the information and communications technology
- Cooperation and partnerships are a key factor.
- They are supported in real organizations
- They can develop between organizations and within organizations.
- Through electronic interaction between real markets companies it is provided to generate virtual companies along the value chain (Travica, 2005).
- They have great flexibility
- Overcome barriers of space and time and thanks to the Internet can be in several places at once.

Analysis of the definitions and characteristics we might find three groups of virtual organizations, in a first group which meet the definition of virtual organization as a network, the second group from the degree of virtuality of companies in their value chain and the third considering whether they operate only through virtual or electronic markets.

In the first group includes companies like Rosenbluth International Inc, a consortium of travel agencies with global reach, based on intensive use of ICT, with a large database, you cooperate and not compete among members, as well as negotiate as a bloc with suppliers (Travica, 2005), we could also include in this group franchise systems.

The second group could locate companies like Dell, Wal-Mart, HP among others that end up including a large percentage of virtuality along its value chain in order to take advantage of niche markets quickly. In the third group we can locate companies like Amazon, E-bay, E-Dreams, Napster and others.

ICT has played multiple roles in organizations, some of which were considered strategic, have become basic functions to stay in the market. They have influenced the evolution of organizational forms in a first stage, facilitating the passage of functional and divisional structures to these matrix organizations, also changing the relationship centralization / decentralization and verticality / horizontality.

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In the same vein have allowed the inclusion of information not only as a support for decision-making, but as a strategic asset that must be continuously improved to protect it and keep it as such.

The emergence of new organizational forms has been possible thanks to the development of ICT and the Internet, enabling remote coordination, interaction, synchronous and asynchronous collaborative work, breaking the barriers of space and time.

It is then required to be digitally prepared to deal with the changes imposed by choosing the most suitable to the needs of the company and successfully implement them and use ICT.

The process of emergence of these new organizational forms has not been a disruptive process, has been rather a continuous process in which each new form incorporating the principal features of the above forms value and adds new capabilities to them.

Thus, cell shape, includes dispersion of entrepreneurship form of division, customer responsiveness of the matrix organization and flexibility of the virtual organization and network.

It is worth noting that these likewise organizational forms pose alternative schemes to traditional forms of ownership concentration, by common forms, as well as control systems, compensation, incentive and profile and capabilities of employees.

The truth is that radically new or organizations today are neither will be the same who knew the pioneers of the science of business management and all due to the development of ICT and the Internet.

In the field of business it mentioned that you have to be competitive, conducting studies on aspects that detonate competitiveness, proposing strategies such as cost leadership, differentiation, customer focus (Porter, 1999), mergers and acquisitions, knowledge management , intellectual capital, partnerships, sustainable development, business strategy, marketing strategy, distribution strategy and logistics, economies of scale and innovation and technologies (Rivers, 2010).

It is then that ICT is considered a tool that promotes and strengthens competitiveness, increasing productivity, lowering costs and thus increases the growth of enterprises to adopt technologies. ICT support the competitiveness of business in the following key aspects (Schereyer, 2000, Bocanegra and Vásquez, 2010):

1. Strategic efficiency.
2. Flexibility in the organizational structure.
3. Synergies inter-organizational.
4. Product innovation.
5. Favors the relationship with partners, customers and suppliers.
6. Costs reduction
7. Differentiation
8. Favors access to new revenue streams and markets.

Therefore, the information provided by ICT, leading to decrease time and costs in the value chain, gaining a competitive advantage. In Mexico, the impact of ICT as a competitive strategy in companies is greater in those who are using TIC (AMITI- CANIETI-FMD, 2006), hence the importance of studying at state level the situation that companies in relation to the adoption of ICT. There are many problems that SMEs face in adopting ICT, such as lack of financial, technical and human resources.

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2. Flexibility in the organizational structure.
3. Synergies inter-organizational.
4. Product innovation.
5. Favors the relationship with partners, customers and suppliers.
6. Costs reduction
7. Differentiation
8. Favors access to new revenue streams and markets.

Therefore, the information provided by ICT, leading to decrease time and costs in the value chain, gaining a competitive advantage.

In Mexico, the impact of ICT as a competitive strategy in companies is greater in those who are using TIC (AMITI- CANIETI-FMD, 2006), hence the importance of studying at state level the situation that companies in relation to the adoption of ICT.

Factor	authors
direct and explicit support for senior management to adopt ICT's	Damanpour 1991
The existence of technology leaders that support technological change	Sharma and Rai 2003
The technological level of education of workers in technical departments	Pemkumar 1994
The level of technological education of other workers	Pemkumar 1994
The chosen strategy regarding implementation (proactive, reactive, technology leadership, follower, etc.)	Swanson and Ramiller 1997
The level of system integration information technology to business strategy	Fletcher and Wrigth 1995
The size of the company	Young 1999
Organizational culture	Fink 1998

Table 1 definition of factors authors (García, 2013)

ICT currently have a high level of recognition as an instrument for finding solutions in economic activities and as a central force in the transition to a new economic system (Damaskopoulos and Evgeniou, 2003).

However, preparation technologies is very low in Mexican companies, as only 20% of workers have access to a PC "(Phillippe, 2008). Therefore, requires the use of ICT in SMEs is recognized as a means to enhance their competitiveness at the micro and macro levels.

As indicated by Sánchez (2010: 105): It is extremely important that SMEs understand the need for appropriate tools such as e-business information and communication technologies (ICT), electronic-business, large information systems and communication They allow them to maintain an updated global environment, as new trends, new products and raw materials, threats and opportunities that give them power managers to make better decisions that influence the growth of their business knowledge.

ICT integration brings important benefits that help maintain a sustainable competitive advantage; ie companies that adopt ICT can achieve sustainable competitive advantages and achieve differentiation from other companies in their environment.

In this regard, SMEs need to incorporate technology into their business strategies to be more productive and increase their efficiency. The importance of these businesses is that they constitute about 50% of revenues from Mexico, which puts them in a position of considerable importance since, making updating, modernizing the state is achieved.

There are several obstacles to the development of technology projects in enterprises, among which resistance to change and poor definition of them. Therefore, the contribution of ICT in SMEs focuses on:

- Improve communication with employees and partners.
- The relationship with its customers and suppliers.
- Lower costs and operating expenses.
- Increase profitability.

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– Improve efficiency in their production processes, recruitment, credit and collection processes, among others.
– Supports achieving the strategic set by the company
– Flexibility in the organizational structure.
– Product innovation, promoting differentiation
– Favors access to new revenue streams and markets.

Factor	Description
Role of administration	Implementation of more streamlined TIC's when performed in conjunction with the total quality system
Training and socialization	Updating staff is the primary means of socialization of workers in terms of technological change, rather than the actions aimed at changing the attitudes of older workers. Job rotation is a key aspect during training and IT training. Workers who do not adapt successfully return to their original positions. Worker's age as a factor explaining the lack of adaptation, especially in extreme cases. Middle-aged employees have no trouble adapting to technological innovation. A great involvement and business knowledge and use of IT in customer / supplier relationship
The impact of power / hierarchical structure	Fear of administrators or employees of losing part of their responsibilities, powers and recognition at work.

Table 2 Roles deployment of ICT (Manriquez, SMES AND DIGITAL PREPARATION: THE CASE OF GUANAJUATO MEXICO, 2016)

The above issues have been little studied in Mexico and even to a lesser extent in Guanajuato and much less in the sector exporting companies.

On the other hand, there are discrepancies in the results regarding the relationship research between ICT and business performance.

He further emphasized that ICT should relate to other aspects such as management skills or leadership or management knowledge and not in isolation, therefore this study seeks to establish a relationship between the four variables.

As is known, ICT is a technology general and therefore can affect all parts of the company and all business processes.

Tools and applications are many, so if you want to conduct an investigation of its impact, it is necessary to study its effect on business performance in order to come to understand its scope, but considering relationships with other organizational factors.

Additionally, knowledge management is a competitive advantage for organizations that may be generating better business practices.

Therefore, for this research, leadership is also essential for drifting skills to generate a unique view from which to effectively interpret the organizational environment for more efficient management processes.

In addition, it is necessary to analyze exporters Guanajuato state, first, in order to identify a socio-demographic profile of them.

ICT, knowledge management and leadership seem to be related to business performance. To the extent it can be proven or not that assumption, one could identify which companies are doing better. Information that can be of great value for future training plans of such companies.

In addition, institutions such as the Development Coordinator Foreign Trade of the State of Guanajuato (COFOCE), the Ministry of Economy, State and Federal Government can take advantage of such studies.

It is therefore a research project, but also linking the university to its environment. The same companies may also be benefited because the project involves conducting its profile in ICT skills, management skills and profile of their leaders what improvements may affect their organizations.

For these reasons, this study is to interest the effect of ICT, knowledge management and leadership in business performance because it is necessary to study their dependence and relationship exporters of Guanajuato as a priority.

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Companies must recognize that it is difficult to work without the help of technology, from the use of internet and email as a communication tool to use integrated with suppliers and customers web, accessing most business transactions are made electronically. Why should act with a strategic approach that supports them increase their productivity, efficiency and competitiveness, the results will be reflected in income and better welfare for those who work within the organization, achieved through the adoption tools such as the use of information and communications technologies.

It is then that the Information Technology and Communications are a tool that improves the productivity of a company, making it more efficient in all its activities in the value chain, and enhancing internal and external communication, customer service, activities production, internal and external logistics, administration of human resources and procurement, among others.

The adoption of ICT as a tool for competitiveness

The adoption of ICT, companies must be prepared to choose them, implement them and use them, taking advantage of its benefits, such as improving productivity, sales and profitability (Florean, 2002), product quality, business processes and reduction cost. Finding himself largely benefited from its structure, large companies.

However, companies are not always ready for use ICT, especially MSMEs for lack of resources to implement these tools. Defining the PD as the ability of the company to take advantage of ICT (Jones, Alderete and Motta, 2013; Alderete, 2012; Novick and Rotondo, 2011; Nahirñak, et al, 2007; Mutula and Brakel, 2006; Peirano and Suarez 2006).

Therefore, investigations are conducted around the world by applying different models to determine the digital preparation (PD) of SMEs, such as Stope Model (Strategy Technology Organization People Environment) developed by Al-Osaimi, Alheraish and Bakry (2008) that evaluates the PD at country level and businesses. Jutla (2002), design a partnership model to promote a climate of digital training in SMEs.

Other methods assess the level of preparedness digital e-commerce in SMEs (Tornatzky and Fleischer, 1990; Molla and Licker, 2005; Sparling, Toleman, and Carter-Steel, 2007; Fathian, Akhavan and Hoorali, 2008). In the field of business it mentioned that you have to be competitive, conducting studies on aspects that detonate competitiveness, proposing strategies such as cost leadership, differentiation, customer focus (Porter, 1999), mergers and acquisitions, knowledge management , intellectual capital, partnerships, sustainable development, business strategy, marketing strategy, distribution strategy and logistics, economies of scale and innovation and technologies (Rivers, 2010).

There is little less than 10% of small and medium enterprises that are not connected to internet without email, indicating that in their struggle for survival also lack the resources to adhere to your company's core technologies or do not consider that ICT will help growth.

Although the reality is that the lack of information technologies and gaps in their internal and external communication can take them to be very efficient and effective processes to be limited to the sale in your local and therefore not to expand their business, which will affect its position in the market.

Perceiving that there is a digital divide in the adoption of ICT in Guanajuato SMEs for which the state government to meet their expectations of positioning SMEs, it faces the challenge that you achieve the degree of consolidation in PD, for who are able to cope with the changes imposed interact in a globalized world.

It is then that ICT is considered a tool that promotes and strengthens competitiveness, increasing productivity, lowering costs and thus increases the growth of enterprises to adopt technologies.

ICT support the competitiveness of business in the following key aspects (Schereyer, 2000, Bocanegra and Vásquez, 2010):

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5. Favors the relationship with partners, customers and suppliers.
6. Costs reduction
7. Differentiation
8. Favors access to new revenue streams and markets.

Joint company	digitizable tasks	Benefits
customers	Orders management Billing Customer Control Orders history Product Information available Location of potential customers	More communication channels Less transaction costs Extend business hours Factoring cost reduction Share information constant interaction Status of operations in real time Better inventory management
Between areas or departments	Communication among other areas Monitoring of the production cycle Design area Production planning Inventory control Maintenance management machinery and equipment Staff reports QA Accounting Roster	Greater fluidity of information permanent contact Reduce transaction costs Increased use of the knowledge base Status of operations in real time
providers	Orders management Billing Control of suppliers Orders history Product Information available Locating new suppliers	More communication channels Lower transaction costs Office Hours greater management Factoring cost reduction Share information constant interaction NaS state real-time operations Better inventory management
Financial sector	Postulation credits transfers Capital management	Find better ways of financing
government	one stop shop Support programs advisories Sector regulations Taxes Information on procedures	Windows of opportunity faster care Information on procedures

Table 3 Areas for the implementation of information technologies *(Salazar, 2011)*

Companies are using robotics, information technology, telecommunications and telematics. How technologies are embedded and influencing the business sector and, therefore, is changing the way they work, posts, tasks and structure of organizations and their relationships with the environment.

Results

For barriers to ICT adoption Rios et al. (2009) have identified the following barriers to the use of ICT by enterprises:

1. ICT costs and implementation times higher that result in uneconomic projects.
2. Schemes nonexistent or inadequate funding.
3. Results lower than expected and unpredictable.
4. Rapid obsolescence level ICT resulting in the need for continued investments to lose value quickly.
5. Technology inflexible and unsuitable for the needs of the company.
6. Process integration with other complicated, time consuming and costly solutions.
7. Greater need for specialization with greater difficulty in finding and keeping skilled people.
8. Resistance to change resulting in poor and low intensity use of ICT.
9. Fashion technology adoption rather than business need.
10. Lack of impetus to ICT projects by senior management.
11. insufficient to support new applications existing infrastructure.
12. Difficulty in justifying the ICT budget before the main directorate.

It is necessary to consider that ICT are present in each stage of the chain value generation. Generating activities modified value in two dimensions, first, in the way these are made, and second, in the way they relate to each other such activities (Hernandez, 2008). Although as pointed Rivers, Toledo, Campos and Alejos (2009), ICT as they do not provide competitive advantages.

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– Automation: Influences routine processes. The more than proportional increase in efficiency would respond to the relationship that arises from the possibility of reducing the direct human labor, while records are generated.

– Accessibility to information: The ability to access relevant and accurate information at low cost and in real time allows decisions with the help of a variety of data.

– Transaction costs: The information can be transmitted instantly and inexpensively, reducing coordination costs both inside and outside the company.
– Learning processes: Virtual environments and simulation models facilitate learning and reduce costs.

You can make an investment in advanced ICT and not use them to position themselves strategically or obtain operational efficiency. Remember that to have a higher performance of competing organizations should use their resources strategically, including ICT, and this requires defining clear objectives.

Conclusions

The aim of this study was to analyze the vision that SMEs Guanajuato State on adoption and use of ICT as a strategic tool for competitiveness.

Through a study of 677 companies in the state of Guanajuato about the opportunities and threats posed, the impact on the business model and activities, the benefits, the degree of utilization and adoption, as well as strategies was obtained develop ICT.

In this sense, we can conclude that a high percentage of companies in the state of Guanajuato are aware of the potential benefits and opportunities and threats in the environment that can generate adopt information technologies, as well as changes in the structure, organization of functions, activities and organizational routines that are generated when ICTs are used in the operation thereof.

The use of information technology in SMEs becomes vitally important if we consider that today represent a fundamental element for increasing the competitiveness of such enterprises.

These technologies improve business performance through automation, access to information, lower transaction costs and incorporating learning processes.

Within the constraints faced by SMEs to use ICT are the prevailing culture that shows the impact of its benefits. It is considered that investment is very high and that the benefits will be obtained in the long run.

The main findings can determine that industrial SMEs in Mexico have low chances of survival in the long term, generally produce low specific order and manufacturing processes rather than assembly.

Well, mainly serve the local market, its export level is minimal and have not been incorporated into the productive linkages with companies that export.

In addition, there are very few implementing a formal process of continuous improvement in its plant.

As for the technologies used in plants, of the 19 that were considered merely setting out the application of internet connections with 33.5%, resource planning with 30.5%, activity-based costing with 28.4%, electronic data exchange with suppliers 19% and EDI customer with 18%.

However, as we can see, these percentages are very low, indicating that most industrial SMEs do not apply ICT in their production process, which would be subtracting competitiveness.

This implies that SMEs have realized the advantages of this tool. However, although about 90% of companies know the benefits, only 68% have adopted ICT in their organization, which means that there are factors (unidentifiable in this project) that limit access to ICT.

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In a study of top Mexican executives, it found that the low perception of practical value and usefulness of ICT is one of the reasons for low adoption (AMITI, CANIETI and WDF, 2006).

Also, if it relates to the results found with respect to the knowledge that 93% of companies recognize the impact of ICT in the business model and how to carry out their activities, low adoption of ICT may be due to lack of skills to generate changes in the company, fear to make changes in their operations and loss of control (temporary as the organization learns to generate new control mechanisms). On the other hand, it points out that one third of the companies does not formulate strategies to develop ICT in the company in order to support and improve business operations, which means that even though two-thirds of companies use technologies information. Only half conducts integrated and coordinated actions to support its strategic competitiveness in ICTs. Medium enterprises and industry in each of the factors analyzed, show a greater degree of maturity in:

1. La identifying opportunities and threats in the environment when adopting ICT.

2. In recognition of the impact of ICT in the activities of the company and the business model.

3. In the development of ICT strategies.

As for the variables of recognition and commitment, we can conclude the following:

1. In recognition of ICT, most SMEs in the state of Guanajuato are convinced that ICT is a support tool to increase competitiveness, and the sector that best understands this situation are industrial enterprises. However, there is a minority that is indifferent to recognition and less than 10% do not recognize ICT as a tool in the way of doing business. This result is significant for a state that has a projected business growth.
2. Regarding the commitment, just over 60% of SME entrepreneurs support the technological preparation in all areas of your company and 70% agree on the importance of establishing and developing strategies to incorporate ICT.

The commitment of employers in some SMEs is relative, because if properly according to design strategies do not all have adopted ICT or are indifferent to their implementation, in addition to just under 40% of SMEs in the state of Guanajuato are not committed to the implementation of ICT, indicating that they are at a competitive disadvantage, which is why it is necessary to extend the study to analyze the reasons that lead companies to lack of incorporation of ICT in your organization. These findings have several implications for business, academic and government sector. The business sector should be recognized and incorporated in the short term to the age of information and use of ICT to enhance their organizational capacities in order to maintain or improve their competitive position.

Academia should generate further studies on the causes that limit or potentiate the full integration of ICT in business, and the factors that impact the design of ICT strategies focused on business growth.

Finally, for the government, public policy should focus on promoting digital inclusion of all people, especially in the micro and small enterprises.

An important part is to provide training to companies, in connection with the universities to take advantage of ICT in strengthening competitive position, and generally should establish mechanisms to accelerate the adoption of ICT as tax incentives, use of electronic signatures, legal certainty of information and promotion of electronic commerce, among others.

That is, there are several strategies that should be implemented to increase the use of ICT in organizations.

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Determining factors of business growth: a new scale based on the context of micro and small businesses

Factores determinantes del crecimiento empresarial: una nueva escala basada en el contexto de las micro y pequeñas empresas

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Abstract

The main objective of This work is to design an instrument to statistically measure the internal and external factors intervene in the business That growth of micro and small businesses. The variables of the questionnaire are theoretically based on the literature of Blazquez, Dorta and Verona (2006), and Amat and Lloret (2014) That there are state WHO internal and external factors determine growth strategies That in companies. The variables Considered For This publication are the financial dimension; Measured through income, costs, profitability and investment, the technological dimension; Measured by technology adoption and updating systems, the competitive environment dimension; With the relationship environment, growth planning and competition in the market, finally the human resource dimension will be Measured by the specialization of human resources, employee training and growth of key employees. The questionnaire will be Measured through a Likert-type scale with 5 response options. As part of the results of esta research, a structured questionnaire is presented in three sections, Which is Considered an input for future research in the field of business growth.

Business Growth, Competitive Environment, Strategy, Scale

Resumen

Este trabajo tiene como principal objetivo diseñar un instrumento que permita medir estadísticamente los factores internos y externos que intervienen en el crecimiento empresarial de las micro y pequeñas empresas. Las variables del cuestionario se encuentran fundamentadas teóricamente en la literatura de Blazquez, Dorta y Verona (2006), y Amat y Lloret, (2014), quienes afirman que existen factores internos y externos que determinan las estrategias de crecimiento en las empresas. Las variables consideradas para esta publicación son la dimensión financiera; medida a través ingresos, costos, rentabilidad e inversión, la dimensión tecnológica; medida por adopción de tecnología y actualización de sistemas, la dimensión entorno competitivo; relación con el entorno, planeación de crecimiento y competencia en el mercado, por último la dimensión recurso humano será medida por la especialización del recurso humano, capacitación de los empleados y crecimiento de empleados clave. La medición del cuestionario será a través de una escala de tipo Likert con 5 opciones de respuesta. Como parte de los resultados de esta investigación se presenta un cuestionario estructurado en tres secciones, el cual se considera un insumo para futuras investigaciones en el ámbito del crecimiento empresarial.

Crecimiento Empresarial, Entorno Competitivo, Estrategia, Escala

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Introduction

Business growth is a matter of public agenda since, in Mexico 97.6% of companies are micro size and occupy 75.4% of employed personnel; 2% are small size and medium sized 0.4%. The latter employ 13.5% and 11.1% respectively of total employed persons. According to the National Survey on Productivity and Competitiveness of Small and Medium Enterprises (ENAPROCE, 2015).

According to the above, it is seen as the problem studied in local companies is important to identify proven strategies that enable entrepreneurs to make decisions focused growth and consolidation of their business. Churchill and Lewis (1983), proposed a model of 5 stages of growth of small businesses. They are studying the transition from one stage to another which require regular changes and are accompanied by a crisis. Changes problems can be solved when administered are proactive.

The model of the five stages proposed by Churchill and Lewis (1983), applies today to plan for future growth of small businesses, based on the diagnosis of the current situation and planning what will be needed to the extent advance in each stage. It is noteworthy that the 5 stages of growth of small proposals firms are: 1) existence, 2) survival, 3) successful, 4) take-off, ie, begins to succeed, or stays at that stage or exit the market at this stage as key problems grow rapidly, and financing of that growth are resolved, and 5) is the stage of maturity of resources.

Blazquez, Dorta and Verona (2006a) in their research results confirm that the variables that measure business growth are total assets, number of employees, sales volume, net investment difference between the book value and market value, added value and equity. Business growth is influenced by factors both internal and external. Among the internal factors refers to the age and size, motivation, ownership structure, knowledge management, and within external factors subdivide their classification in external factors relating to the industry environment and external factors higher level or macro environment; the first includes competitors, customers and suppliers, and the second demand, technological improvements,

Moreover, Amat and Lloret (2014) argue that business growth is explained by factors such as leadership, company culture, strategy, business model such as income, expenses, investments and financing. Accordingly, Rupasingha and Wang (2017), studying access to capital in the growth of small businesses in the United States on a panel of 3,050 counties during the period 1996-2010, and find that the loans granted by Reinvestment Act Community have a statistically significant positive effect on the growth of small businesses in the study. Daza (2016) states that the presence of the founder in group decision-making increases the intentions of growth of the firm.

Overall objective

The overall objective of this research is to design an instrument to statistically measure the internal and external factors affecting business growth of micro and small enterprises.

Specific objectives

– Analyze literature preliminarily business growth.
– Develop a list of items to statistically measure the internal and external factors determining growth strategies in companies.

Literature review

Business growth is the way a company evolving from a local competitor to one worldwide. According to Fernandez Garcia and Ventura (1988), business growth allows a company to compare its level of competitiveness in the market to determine a reference point around which the policies that make up the competitive strategies will be established. To move forward, companies have to go making decisions that enable them to find, maintain and expand their market space.

The importance of business growth comes from generating and maintaining jobs, coupled thereby creating an economic climate that fosters competitiveness and reduce the mortality rate of SMEs, (Gonzalez and Correa, 1998). Another important aspect and that companies, mostly considered to define their strategies, is profitability.

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As noted, the market is not stable in all sectors, there are some measuring growth through their utilities, however not all sectors can be considered viable to be stable. Among the most widely used measurement of growth, according to Garcia and Romero (2010), indicators highlight the market value, number of employees, sales, production value or added value. For his part, Hernandez (2001) links business growth with the modification of the company at the structural level or increase its size. Aguilera (2010) attributes the growth of the company's strategic direction, considered as a guide to compliance with the necessary organizational goals that drive and guide this to evolve. On the other Lopez and Contreras side (2009) argue that growth is due to an entrepreneurial orientation because, through proactive environmental analysis, the company may have an advantage for opportunities that competition has not perceived, and this so consistently generate innovations.

According Vallés (2005) and in accordance with the above authors, SMEs are the most vulnerable in the pursuit of growth, since they are more restricted when seeking financing for their operations, staying in your comfort zone. The not risk investing for fear of losing their capital avoids the use of growth opportunities and market expansion. In the words of the author "economic growth is meaningless without business growth," he cites that refers to the reality of growing businesses afraid to capitalize on opportunities. Mostly different authors use to measure business growth variables; however, they agree that are both economic factors and financial determinants of business growth.

One of the economic variables are sales revenues, as the most suitable to measure the growth of a business indicator, because in the annual reports this indicator is the most commonly used by managers as they serve as a basis for explaining other. As is true of benefits, the number of employees or market share, (Garcia and Romero, 2010). Also, knowledge of economic resources available to the company for investment operations to short or long term, or coverage obligations. And the time required for such operations.

Costs is the second economic variable determining; play an important role in the growth of the company over these role as a profit margin determined, clear after taxes and financing. On the other Horngren, Datar, and Foster (2007.: P 386) hand, they argue that as a company depends on a vendor complies with the prices imposed this affecting their performance and decreasing quality.

Moreover, a financial variable is profitability is one of the most important factors in determining whether a company is growing or if you have low in any branch or subsidiary, information which investment decisions are made on new projects or upgrade removal of production facilities in the market. Ferrer and Medina (2014) located income and net sales as a substantial variable in order to succeed, because it derived from an internal analyst can determine whether a company is profitable, solid and stable.

Another variable is the financial investment whenever investing in a project, the company expects a profit in the future and is not limited to that, rather it will ensure that your investment is profitable. Therefore, the decision to choose a suitable project is crucial for achieving financial goals, (Neighbor, Rojas and Munoz, 2014).

Garcia and Romero (2010) argue that there is a direct relationship between growth and investment for implementing new technologies, research, upgrading plants in manufacturing companies, notably benefiting production and increased sales, resulting in profitable growth for the company. Undoubtedly the success of any business depends on its investment to expand its marketing territory.

Funding is another variable that determines the growth of enterprises; Aragon and Rubio (2005) proper and thorough financial planning short term considered necessary to avoid illiquidity. Since bargaining power with banks is inversely proportional to the size, SMEs are the least benefited since a smaller less access to external sources of funding. It is therefore necessary to establish reserves or funds to a decrease in financial costs, to increase the chances of making the necessary investments for the development of the organization and create a stronger financial base, with the company to grow substantially.

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Moreover, qualitative variables are, for example, quality products to maintain growth through sales. To implement this inventory control systems depending on the sector. In this globalized market competitiveness, continuous improvement, total quality control and oriented to the needs of production customers were the pattern that marked the managerial styles of the company, (Cuevas, 2001).

Leadership is the ability to convince others to look forward to the achievement of defined objectives according to Gomez (2009). The administrative process such as planning, organization and decision making are not effective until the leader stimulates motivation in people and directs them towards the objectives set by the company. As for growth, leadership is reflected in the increased competitiveness in the market resulting from customer identification branded products or services that are offered. This growth, even when directly linked with this factor, not only depends on position as market leader rather encompasses strategies that lead the company to take that position and hold it over the years.

Ynzunza and Izar, (2013) assert that in a dynamic and changing environment, where globalization creates opportunities for both SMEs and large enterprises, increased competition, new technologies and consumer demands for new products are a constant. Organizations must be aware of the opportunities and external threats to the industry and devise strategies to cope with each problem and give them competitive advantages when implementing them. These macro variables are added according Escobar Arias et al. (2013), the exchange rate, supply and cost of raw materials and in addition to the lack of demand from customers and consumers.

Finally, the variables that affect the sales growth are among others: macroeconomic analysis based on the neoclassical model, size, firm age, industry, nature of the property, capacities and resources, the sex of their owners or managers, market financing equity and private debt of small businesses as well as optimal capital structure in different parts of the cycle, external business advice, high-tech, innovation, skill level of the workforce, export (King, RG, CI Plosser, et al 1988;. Cliff, 1998; Berger and Udell, 1998; Robson and Bennett, 2000).

Other investigations are related to the construction of an integrated model for small business growth (Wiklund, Patzelt, et al., 2009). The causes that give rise to the development of this research, in order to determine the factors that affect business growth and in accordance with the debate between Gibrat (1931), which ensures that business growth is a stochastic process caused by the action countless random and insignificant factors that act in proportion to the size of companies.

For its part Albach (1967, p. 127) concludes that "the growth of the company is the result not of random factors, but an intention and determination on the part of entrepreneurs and managers who determine their behavior" cited by Blazquez, dorta and Verona (2006b). These arguments allow us to propose the following research hypothesis:

Hi: The financial, technological dimensions, competitive environment, human resources have a direct and positive impact on business growth.

Methodology

This research is exploratory type, among its purposes of such research is to cite the possibility of formulating the problem, to extract data and terms that will generate the questions necessary for the overall objective of this research is to design an instrument to measure statistically internal and external factors affecting business growth of micro and small enterprises. In addition, such research through the exhausted exploration of the literature provides sufficient elements to formulate hypotheses on the subject to explore, serving to support descriptive research and using the Smart-PLS statistical tool for testing hypotheses.

Generating a list of items that will be used to determine the correlation between variables, it is specified in the research design for the construction of the instrument, so it is important to consider the suggestions of the experts, who say it is essential to generate number of sufficiently large which items which permanently conform Vila, Kuster, and Aldás (2000) scale arising because the list will be subject to removal processes based items, either by expert judgment or using quantitative techniques.

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The list of items was classified according to the order assigned to each variable in the model proposed. The first section contains general information 5 questions to characterize companies. The second section comprises internal and external factors affecting business growth by items related to independent variables: the financial dimension, the technology, the competitive environment and human resource. The third section corresponds to the dependent variable, business growth, which is measured by growth indicators such as number of employees, total assets and sales.

The definition of the dimensions is as follows:

*Financial dimension:*in this dimension evidence on the ability of the company to increase sales and market share by increasing assets to create value and profitability it will be sought. Also decreasing unit costs to increase profit margins per unit.

Technological Dimension: To measure this dimension is necessary to verify that the company adopt technology to facilitate operational work, meet the needs of customers and / or suppliers, as well as leveraging opportunities to generate economic growth of the company.

Dimensioncompetitive environment: This dimension is made up of a set of economic relations and trade between, customers, competitors, suppliers, technological improvements, industry strengths, accessibility to bank loans and government support.

Human resource dimension: This dimension shall seek the values that make up the company, knowledge management, relationship with workers, as well as training of employees to improve performance and key employees.

Meanwhile the variable business growth. This variable has been identified as the dependent variable proposed as part of the results of this research model.

There are different theories or approaches that try to explain the reasons why firms increase in size:

The first is the theory of the firm, it said that the increase in size and therefore the growth of the company, explained based on obtaining economies of scale and optimal minimum size.

From a sociological point of view, the growth is to increase the value or prestige of the directors of the company, job creation and improving organizational status.

From an economic perspective, growth is an increase in sales and thus in performance; decreased risk and increased market power.

Therefore, growth is an index of the dynamic economic activity of the company which can be measured by determining indicators such as sales, employment generation, increased assets and growth compared with competitors.

For purposes of this investigation it has been determined that this will be measured by the increase in sales, total assets and number of new employees.

Population and sample size

The study population will be the subject of micro and small enterprises classified according to the sector they belong. To perform the validation of a pilot test instrument is made by applying the questionnaire to the companies located in Culiacan, Sinaloa, Mexico. The sample size to apply micro-sized enterprises are 90 and 87 in small to generalize the results with a probability of occurrence of 0.90 and standard error of 0.10. It presented below calculations:

Stratified probability sample for micro enterprises.

N = The size of the population of micro-enterprises is 33.949.
Y = average value of the variable = 1.0000
= Standard error is proposed = 0.10
se^2 = population variance = 0.01
s^2 = Likelihood = 0.9
n 'unadjusted = Sample size unadjusted = s^2 / se^2 = 90
n = sample size = 90 / (1+ (90 / 33.949)) = 89.7620372

Stratified probability sample for small businesses.

N = The population size is 2,917 small businesses
Y = average value of the variable = 1.0000
= Standard error is proposed = 0.10
se^2 = population variance = 0.01
s^2 = Likelihood = 0.9
n 'unadjusted = Sample size unadjusted = s^2 / se^2 = 90
n = sample size = 90 / (1+ (90 / 2.917)) = 87.3062851

Results

As part of the results of this research proposal is the following:

1. Items that make up the dimensions for the measurement of independent variables subject to study was designed.
2. The design of the graphical model.

3. The determination of the operational model assumptions. Which will be checked via the PLS Smart- statistical tool.

4. The design of the mathematical model to test the general hypothesis and specific model assumptions.

Items that will measure each independent variable are classified according to the dimension assessed in each of these. For each dimension 7 items which are identified with the letter of the dimension which are part designed. The response options are Likert scale: 1. Never 2. Rarely 3. None 4. and 5. Always Almost always.

Financial dimension:

F1. The company develops and evaluates expansion plans (investment) for funding by business bank loans.
F2. The company leverages credit from suppliers.
F3. The company has procedures to control inventory.
F4. Unit costs tend to decrease to increase profit margins.
F5. The company has received government support to increase their competitiveness.
F6. They increase total assets to increase their market share.
F7. The company reinvests a portion of its profits in the business.

Technological Dimension:

T8. The company has specialized software for sales, management, or inventory costs.
T9. The company has bank terminal cash sales.
T10. The company has a website to promote their products / services.
T11. The company invests in technology to increase sales and competitiveness through social networks like facebook, instagram, twitter, telemarketing.
T12. The company requires more than one computer equipment for their operations.
T13. The company issues its tax receipts to customers immediately.
T14. The company contacts and / or responds to your customers or suppliers through official email of the company.

Dimension competitive environment:

C15. The company offers differentiated competitive products.
C16. The company values its customers' needs for timely and personalized attention.
C17. The company maintains a significant advantage with its competitors.
C18. The company considers the opinion of its customers to provide a service or product with competitive differentiation and branding.
C19. The company has evaluated more than once expansion possibilities.
C20. The company identifies a positive impact on sales if the economy is stable, ie, controlled inflation, the price of stable dollar, low interest rates.
C21. The company has strategies to retain customers, ie they do not change their competition.

Human resource dimension:

RH22. It dominates staff and recognizes the position held, that is considered to have specialized staff in the post.
RH23. The company invests in training its staff at least once a year.
RH24. It considers that the company has key employees.
RH25. The company recognizes employees who have work identity.
RH26. The staff is motivated and positive environments conducive organizational climate.
RH27. The company staff is involved to meet sales goals.
RH28. The company staff proposes ideas to improve their work.

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Business Growth

CE1. How many employees were in the company to start operations?
CE2. How many employees have in the company today?
CE3. Has the company invested in new equipment from 2016 to date?
EC4. Did the company recognize an increase in sales compared to the competition?
CE5. Does the company get higher sales revenue steadily year after year?

The graphic design model proposed for this research was composed as follows (see Figure 1):

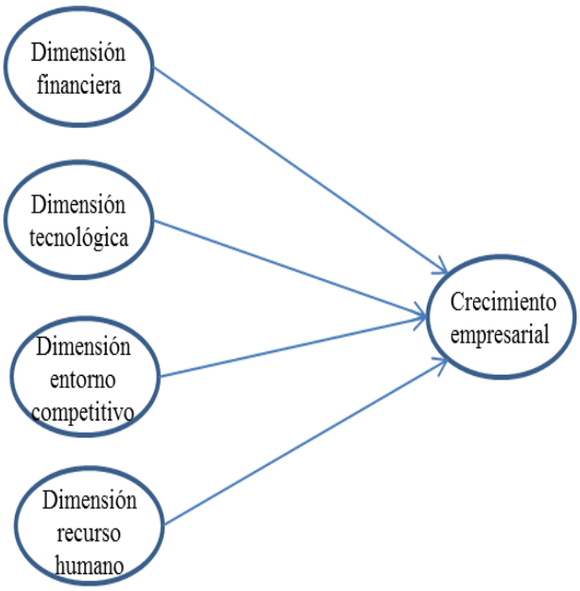

Figure 1 Model of dimensions that affect business growth
Source: Self Made

The third part of the results in this document is determined operational model assumptions. a hypothesis was designed for each ratio of variables being as follows:

H1: The financial dimension has a positive and significant impact on business growth.

H2: The technological dimension has a positive and significant impact on business growth.

H3: The size of competitive environment has a positive and significant impact on business growth.

H4: The human resources dimension has a positive and significant impact on business growth.

To check each of the operating assumptions the mathematical formula, which is checked as follows determined:

$$Y = \beta o + \beta 2X2\ \beta 1X1 + + + \beta 4X4\mu\ \beta 3X3$$

There is the possibility of improving the methodological process during the implementation of this research. So far, the results are a breakthrough for measuring business growth and as a contribution to the literature of this country in micro and small businesses where the empirical results are still insufficient and poorly measured through reliable statistical data.

Conclusions

As part of the conclusions it can be established that it met the stated objective which was to design an instrument to statistically measure the internal and external factors affecting business growth of micro and small enterprises.

The four dimensions that explain the variability of business growth through the items prepared based on the literature and will be a contribution to the empirical study of micro and small businesses in this country were determined.

This study's main contribution to design a methodology for the development of an empirical study that will serve as input for data collection and can be replicated in different settings and sectors to take a picture as accurate as possible about growth they are having the micro and small enterprises as well as the dimensions of greatest impact on business growth.

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Develop a successful methodology for proposal in stimulus programs innovation in Mexico

Metodologìa para elaborar una propuesta exitosa en programas de estimulos a la innovaciòn en México

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Abstract

Derived from the phenomenon of globalization in Which companies are current Immersed, Where the market context is dynamic and highly competitive, a decisive factor for success and permanence in the market is the creation of a competitive advantage through innovation. The objective of esta paper was to Provide the reader with a methodology and guidelines to be able to compete Within the main program encourages innovation in Mexico That: PEI, with the expectation of being able to improve increase the probabilities of being beneficiaries. The structure of esta methodological guide was divided into three sections: 1. Application registration, Which details the dynamics to follow to register an application; 2. The filling of the application That Explains the way to do it, and 3. Process of evaluation of the Proposals submitted in the call.

Innovation, Stimuli, Competitive Advantage, Project, R & D, Methodolog

Resumen

Derivado del fenómeno de la globalización en la que se encuentran sumergidas las empresas actuales, donde el contexto del mercado es dinámico y altamente competitivo, un factor decisivo para el éxito y permanencia en el mercado es la creación de una ventaja competitiva mediante la innovación. El objetivo del presente trabajo fue proporcionar al lector una metodología y lineamientos para poder concursar dentro del principal programa que incentiva la innovación en México: PEI, con la expectativa de poder mejorar las probabilidades de ser sujetos beneficiados. La estructura de esta guía metodológica se dividió en tres apartados: 1. Registro de solicitud, en el cual se detalla la dinámica a seguir para registrar una solicitud; 2. El llenado de la solicitud que explica la forma de hacerlo, y 3. Proceso de evaluación de las propuestas sometidas en la convocatoria. Todo lo anterior enfatizó la importancia de brindar apoyos gubernamentales a las empresas.

Innovación, Estímulos, Ventaja Competitiva, Proyecto, I+D, Metodología

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Introduction

Current and comprehensive in the world times, a topic hotly debated in the literature is the role of government support in the performance of companies. Examples of this are: the provision of knowledge, trade, interconnections between bribes, political network, just asitencia, distributor search, export insurance and training, he said(Durmusoglu SS, Apfelthaler G. Nayit, 2012); In this context the Productivity Project World Bank seeks those responsible for global policies focus on the measurement and determinants of productivity, as it is represents half of the differences in per capita GDP among countries. In the first volume of the series, The paradox of innovation capacities of developing countries and the promise unrealized technological recovery, focuses on about half of overall productivity growth driven by companies adopting new technologies, products and processes explained(W. Maloney, 2017).

This research was central question what are the steps to follow in order to compete successfully in the PEI program that encourages innovation in Mexico? Is derived from, the goal was to design a methodology and guidelines to compete in the main program, which encourages innovation in Mexico: PEI, with the expectation to improve the odds of being subject beneficiaries.

The main issue identified for this study focused on how to access the resources of PEI program (government support for innovation) by applicants entrepreneurs, lack of knowledge to enter their projects to the appropriate platform and collect necessary requirements. In addition to this problem is the lack of innovation in Mexico reflecting a low capacity to absorb technology by companies, a culture of innovation and poor short-term vision that prevents conceptualizing the importance of generating own technology.The private sector is one of the weakest links in the chain of joint innovation system. Mexico's industrial ecosystem is mainly dominated by companies employing up to 10 people, there are more than 4.5 million are in the formal economy, while the number of companies employing more than 51 people is extremely small.

These companies employing up to 10 people in general are not innovative, they use infrastructure that is sometimes outdated and of poor quality, its contribution to total production value is low, particularly in the manufacturing and services sectors.
(Http://www.economia.gob.mx/files/comunidad_negocios/innovacion/Programa_Nacional_de_Innovacion.pdf, 2011)

Theoretical Framework

According to studies by the Organization for Economic Cooperation and Development (OECD, 2012) it has found that there is a close relationship between innovation and spending on research and development (R & D) as well as levels of productivity in Mexico and their integration into global value chains. However, despite recent changes in public policies that promote investment in R & D by the actors of the National Innovation System (SNI), the private sector remains the actor with major constraint to allocate resources to innovation . This restriction is due more to the industrial structure, ie the low and medium technology which has translated into a weak productivity and limited opportunities for new sources of growth.

In Mexico, the establishment of public policies that promote and strengthen innovation in production processes and services to leverage the competitiveness of the national economy over time, is in charge of the National (SE, 2011 Innovation Program (NIP)) whose efforts initiated since the nineties through the implementation of various programs and projects that promote science and technology in the country.

These include: national programs to promote innovation programs promoting innovation statewide programs promoting innovation through development banks, programs for human resource training high-level funds private equity, programs to promote university-industry linkage, programs to promote intellectual property and programs promoting innovation internationally (FCCyT, 2016). For this work we worked with the main program to encourage innovation offered by the CONACYT: Incentives Program Innovation (PEI).

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The PEI is the program to support companies operating on Research, Technological Development and Innovation (RTDI) and invest in projects aimed at developing new products, processes or services whose aim is to encourage, at the national level, investment companies in activities and projects of this nature by granting complementary to develop stimuli, individually or in association with public institutions of higher education or private national (IES) and / or Centers and Institutes national public Research (CI) business opportunities that will significantly impact on the competitiveness of the national economy. Aimed at companies with National Register of Institutions and Scientific and Technological Enterprises (RENIECYT)

Modality	Addressed	Maximum Linking Amount (Pesos)	
Technological Innovation for Small and Medium Enterprises (Innovapyme)	Dedicated only to proposals and projects whose proponent is MSMEs	15 million	Single or linked to at least one IES / CI.
Technological Innovation for Large Companies (INNOVATEC)	Dedicated only to proposals and projects whose proponent is big business.	25 million	Single or linked to at least one IES / CI.
Oriented network projects Innovation (PROINNOVA)	Companies of any size	19 million	Linked to at least two or more IES / CI.

Table 1 Method PEI
Source: Prepared based on CONACYT (2017)

Methodology

This study aimed to provide the reader with detailed methodological guide relevant information to be provided in a proposal submitted within PEI, in order to thereby increase the chances of being beneficial. The structure of this guide is divided into three sections, the first of which details the dynamics to follow to file an application; After filling this detailed, to finally add some recommendations. Finally, the evaluation of proposals submitted in the call explained.

Results

Registration of an application. To register an application, you need to be accessed PEI platform system from the CONACYT website, under the heading of funding and support. You must first log the Legal Representative (RL) with your username and password (if you do not have one, the user can be generated right there); you need to select the call which is to participate (PEI-year), the number of RENIECYT of the company, the profile (role) user and click the Request button. The system displays a pop-up window, release of liability statement, which must accept the legal representative; once accepted will be filled three tabs presenting platform, as shown in Table 2:

Eyelash	Content	Detail
Contextualización	general	Application title
		Modality
		Type of proposal
	Project Headquarters	Federal entity
		Delegation or municipality
		Location
	Proposal supported by another call **	
	Industrial project area **	Area
		Division
	Knowledge Area **	Area
		Discipline
		subdiscipline
		Specialty
	Keywords	
Description	Type of innovation	Dude innovation posed by the proposal? **
		Degree of innovation posed **
		Market that cater **
		Brief description of the proposal
		Main activities to be developed
		Committed major deliverables
		Overall objective
		Expected results
		Description of how framed with technology strategy
Technical Feasibility	Background	
	State of the Art 1	monitoring Technology
	State of technique 2	Patent applications and patents
	State of the art 3	Research papers and publications
	State of the art 4	available technologies
	State of the art 5	Products, processes or services on the market
	Original source of technology	
commercial viability	Company / Team	origins
		Structure
		goals
		competences
		Compliance with critical management functions
		Experience technical manager, key staff and consultants hired
		Record of successful marketing or research projects of the company and / or members of the project team
	Draft	Level Technology Development (NDT) **
		Level of product innovation, process or service **
		technical risk of the project **
		Budget overview
		Project general description
		Availability of the company or network
		Industrial protection plan
		Specify the means of generating income
	Market	Market Overview
		Business model and market acceptance **
		Price of the product
		Market projections
		Approach market insertion
		Target customer
		social, educational or scientific benefits
		Groups or companies outside the project that offer the same product or are developing
		Existing products or services in the patent literature or are emerging from research
		Describe the barriers to market entry
	Linking / strategic alliances	Reasons for the association **
		Company or some members of the Network have experience in marketing synergies **
		Company or some of the Network members have expertise in technological synergies **
		Company or some members of the Network synergies experienced in production / processing **
Participating institutions	Registry	
	Type of bonding	Does the linkage contemplates the use of laboratory infrastructure or other equipment related institution? **
		Does the linkage includes design and prototyping activities? **
		Does the link requires the completion of tests, assessments, characterizations, validation, functional testing, etc.? **

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		Does the linkage involves a pilot plant escalations? **
		Does the linkage considers the creation of a joint working group between company staff and the institution linked? **
		Does the link considered a transfer scheme or commercialization of technology developed? **
	Main activities to be developed	
	Committed major deliverables	
	Description of participation	
	Responsible for the proposal of the institution	
Group project work	User*	
	Academic degree*	
	Product generated	
	relevant participant information	
	Specific activities developed within the project	
Human resources specialist ***	Program linking the company with academia **	If he is a graduate in industry, indicate the PNPC **
	CVU student who participate *	
Detailed work plan	Start and end date	
	Overview of the work plan for the fiscal cycle	
	Description and justification of activities	
	Products of step	
	Description of the later stages	
Budget	Current expenditure	
	Investment spending	
	Linking spending	
Advisory / consultancy	Question 1**	
	Question 2 **	
	Question 3 **	
	Question 4 **	
Responsible	Technical	
	Legal	
	Administrative	
Attachments ***		

* Information loading platform CONACYT directly from your database
** Select an option
*** Optional

Table 2 Registration Project
Source: Prepared based on CONACYT (2017)

As shown in Table 2, the requested information platform, there is information that is loaded directly into the tabs on the database CONACYT, one that must be captured according to information from the company and finally another must selected according to the preset option that most closely matches the company and its situation. In paragraph Registration of the company, in the section founding date of the company, it must correspond to the date of commencement of operations specified in the Certificate of Tax Status issued by the SAT with higher 1 year old.

With regard to paragraph Drawing of the company, must be selected industry according to the catalog NAICS (Industry Classification System North America) loaded into the system and the industrial subsector will be compared with the strategic priority sub-sectors of each state (CONACYT, 2017B). For the section Calculation of company size, the RL shall provide information (fields) required and the system automatically classify the company in Small, Medium or Large Company according to the classification of the Ministry of Economy (SE, 2017). Then it passed to empty in the section Financial Information The breakdown of expenditures, investment and income of the current fiscal year, in national currency.

For the section Calculation of company size, the RL shall provide information (fields) required and the system automatically classify the company in Small, Medium or Large Company according to the classification of the Ministry of Economy (SE, 2017). Then it passed to empty in the section Financial Information The breakdown of expenditures, investment and income of the current fiscal year, in national currency.

In characterizing part of the company, the RL should respond to each section or question, select the option that describes the current situation of the company. For the following sections, brief description of the technology strategy of the company, should be explained what is the program used to manage technical change within the company, negotiation and absorption of technology transferred and practice activities to develop innovation; in paragraph brief description of the main lines of products, processes and / or services must provide information concerning these lines.

Finally for the section brief description of the main technological heritage of the company, it refers to the technological heritage of the company, Once filled and stored the information in the first tab, General Data Company, proceed to the registration of project managers, second tab. In this part of the RL shall discharge the Technical Manager (RT) entering the caller, which is linked to the Curriculum Vitae Unique (CVU) and then save the record; Importantly, you can register as many RT necessary, remembering that project can only be one.

Finally, on the third tab, Summary of projects the number of projects registered for the company and its status is displayed. This section can not enter any information other than display the total proposals. Once the RL finishes to register the company, you must leave the PEI system. 2. Filling application.

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To register a proposal as making filling and capture of information, the RT must enter the PEI system in the same way it did the RL, by login with your username and password and identifying their profile or role as such. Once inside the system IEP platform screen displays three tabs, 1) General Company, 2) project registration and 3) sending information. The first tab is read only, because the only person authorized to modify such information is the RL. On the second tab of the RT should enlist and record the project to be submitted in the PEI call; You click on the Add button new project, the statement Harmless that appears after the registration is accepted and proceeds to fill the registration information for the project, Table 3.

Eyelash	Content	Detail
CONTEXTUALIZACIÓN	general	Application title
		Modality
		Type of proposal
	Project Headquarters	Federal entity
		Delegation or municipality
		Location
	Proposal supported by another call **	
	Industrial project area **	Area
		Division
	Knowledge Area **	Area
		Discipline
		subdiscipline
		Specialty
	Keywords	
DESCRIPTION	Type of innovation	Dude innovation posed by the proposal? **
		Degree of innovation posed **
		Market that cater **
		Brief description of the proposal
		Main activities to be developed
		Committed major deliverables
		Overall objective
		Expected results
		Description of how framed with technology strategy
TECHNICAL FEASIBILITY	Background	
	State of the Art 1	monitoring Technology
	State of technique 2	Patent applications and patents
	State of the art 3	Research papers and publications
	State of the art 4	available technologies
	State of the art 5	Products, processes or services on the market
	Original source of technology	
commercial viability	Company / Team	origins
		Structure
		goals
		competences
		Compliance with critical management functions
		Experience technical manager, key staff and consultants hired
		Record of successful marketing or research projects of the company and / or members of the project team
	Draft	Level Technology Development (NDT) **
		Level of product innovation, process or service **
		technical risk of the project **
		Budget overview
		Project general description
		Availability of the company or network
		Industrial protection plan
		Specify the means of generating income
	Market	Market Overview
		Business model and market acceptance **
		Price of the product
		Market projections
		Approach market insertion
		Target customer
		social, educational or scientific benefits
		Groups or companies outside the project that offer the same product or are developing
		Existing products or services in the patent literature or are emerging from research
		Describe the barriers to market entry
	Linking / strategic alliances	Reasons for the association **
		Company or some members of the Network have experience in marketing synergies **
		Company or some of the Network members have expertise in technological synergies **
		Company or some members of the Network synergies experienced in production / processing **
PARTICIPATING INSTITUTIONS	Registry	
	Type of bonding	Does the linkage contemplates the use of laboratory infrastructure or other equipment related institution? **
		Does the linkage includes design and prototyping activities? **
		Does the link requires the completion of tests, assessments, characterizations, validation, functional testing, etc.? **
		Does the linkage involves a pilot plant escalations? **
		Does the linkage considers the creation of a joint working group between company staff and the institution linked? **
		Does the link considered a transfer scheme or commercialization of technology developed? **
	Main activities to be developed	
	Committed major deliverables	
	Description of participation	
	Responsible for the proposal of the institution	
GROUP PROJECT WORK	User*	
	Academic degree*	
	Product generated	
	relevant participant information	
	Specific activities developed within the project	
HUMAN RESOURCES SPECIALIST ***	Program linking the company with academia **	If he is a graduate in industry, indicate the PNPC **
	CVU student who participate *	
DETAILED WORK PLAN	Start and end date	
	Overview of the work plan for the fiscal cycle	
	Description and justification of activities	
	Products of step	
	Description of the later stages	
BUDGET	Current expenditure	
	Investment spending	
	Linking spending	
ADVISORY / CONSULTANCY	Question 1**	
	Question 2 **	
	Question 3 **	
	Question 4 **	
RESPONSIBLE	Technical	
	Legal	
	Administrative	
ATTACHMENTS ***		

* Information loading platform CONACYT directly from your database
** Select an option
*** Optional

Table 3 Registration Project
Source: Prepared based on CONACYT (2017)

As mentioned in the previous section, the filling of the proposal on the platform is by recording specific information, select any of the options provided by the platform and autofill database of CONACYT. It should be noted that in paragraph contextualization, the section Key as an area of knowledge word is essential to select the three words and the area that best describe the project because based on this CONACYT looking and forward proposals to evaluators, people specialized in the area; not rank well area of knowledge or generic keywords register the project in its final impact assessment can be evaluated by a person with knowledge in other areas.

Knowledge is important to the reader, that everything described in the proposal should be well substantiated and correlated; ie activities to develop as committed deliverables must correspond (be the same) with those raised in the description of the proposal, Participating Institutions, the Working Group Budget and the detailed work plan.

In the section of Technical Feasibility, in the state of technique 1 Technological Monitoring procedures should be included for information on technologies that are being developed or patented in a certain area, technical standards and relevant regulations for the organization, emerging technologies that are appearing, analysis of technology trends, among other issues (FPNTi, 2015). In the other states of the art should refer to similar or technologies related to the proposed project.

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Regarding the Participating Institution, shall be a record for each of the CIES / IES ú OTT (according to the mode in which it is participating). It is important once captured the proposal, each of the participating institutions accept the collaboration through the entrance to the platform, in the same way it does the RL and RT, choosing his role as technical manager of the institution. No validation (acceptance) of any of the institutions linked to the proposal will not be finalized so it can not be sent the proposal for evaluation.

For the Working Group, you must register all participants who will be on the development of the proposal, both the company and the related institutions, entering user of each and detailing the information requested (see Table 2) for each; in this section the wage or salary to be received or working group be appointed, which should correspond with the amount recorded in the Budget section. Tab of specialized human resources should be filled belong to one of the two programs CONACYT: Graduate Studies in the industry and incorporation of teachers and doctors in the industry.

Finally, the tab Responsible, it will register the administrative manager (RA) and corresponding information be provided (see Table 3); the RL and RT will find recorded in the proposal for the above steps. It should be noted that a person may not have the profile or role of the three responsible for the proposal; however, you can have the profile of two of them, as long as their functions do not create conflict of interest, ie, a person may not have the role of technical and administrative officer. Any other combination provided they do not exceed two roles can be done.

Once filled the application in its entirety as validation of each of the participating institutions may be sent of the proposal. In case of missing any information or validation of the proposal, the platform will generate a detail missing or inconsistencies within it, and can not be sent until the errors are amended. 3. Evaluation process.

According to CONACYT (2017) will be committed to evaluating the proposals that meet the regulatory requirements (at least 3 accredited appraisers and registered in the QSAR) where the probability of the proposal to achieve the objectives and goals as well as establish consistency between technical and commercial feasibility, desired objectives and economic proposal. The minimum passing score is 75 points;

	Innovapyme		Innovatec		Proinnova
	untied	related	untied	related	
Technical Feasibility	40%	35%	40%	35%	35%
Commercial Viability	40%	35%	40%	35%	35%
Feasibility Of Implementation	twenty%	10%	twenty%	10%	10%
Linking	Does not apply	twenty%	Does not apply	twenty%	twenty%
Additional Items	15 pts	15 pts	15 pts	15 pts	15 pts

Table 4 Evaluation Proposal
Source: Prepared based on CONACYT (2017)

Alignment with priority economic sectors, SEZs as a continuation of previously supported projects are some of the additional items that can add 15 extra points to the final grade obtained. Proposals whose final score is 75 points or more, pass to the next stage; proposals that are aligned to priority sectors proposed by CONACYT be beneficiaries of the National Stock Exchange (federal). Those who have reached the minimum qualification but have not been subject to support from the national stock exchange and have not been beneficiaries of some last call, pass state bags. Notably, both national and state bag bag, proposals may be approved or approved with funding in reserve; that is to say,

Discussion

This study was conducted in order to design a methodological guide to identify the steps to be followed in order to increase the chances of being beneficiary on a proposal submitted within PEI. Had its main limitations to find other related design a methodology similar studies, however, this limitation filed the relevance and principal rationale for this research. thorough theoretical exploration and practice first performed to identify steps that can lead to success is proposed and subsequently present a detailed description or methodological guide was presented in the results.

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Among the main competing theories are(Li and Zhang, 2007)They noted that "In emerging economies, the extent of the political network that set entrepreneurs is also a factor that increases the chances that companies receive more government support" (P.792). In this pointIt should be noted that to diversify the productive matrix and transforming economies, it requires companies to innovate. In developing countries, innovations that have these effects need not be something new for the world. Although its scope is the market can have a significant impact associated with firm-level performance and increases in total factor productivity at the national level, so they said. (Jung, and Karsaclian, 2017).

Also innovation policies can not be insulated must be coordinated with others, aimed at promoting business competitiveness and improve the complex environment in which companies develop their activity.(Duràn, C, Camacho, M., Jung, A., & Karsaclian, D., 2016)However, the interaction between policies can generate unintended effects, since new instruments are introduced in contexts where there are already other policies (P. Cunningham, E. Jakob, Kieron F., and L. Philippe, 2013).

There is a positive relationship between innovation and economic growth. In most developed countries, innovation is impacting two-thirds and three-quarters of the observed growth rates for GDP between 1995 and 2006. A country with strengths in the field of innovation will be better able to increase their productivity and face the uncertainties generated by the current environment of global competition.(Ministry of Economy, 2015).

All the above emphasizes the importance of providing government support to enterprises, but also the need to provide the necessary resources to entrepreneurs to access them.

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Sensory acceptance of a non-dairy probiotic fermented drink with mesquite pod

Aceptación sensorial de una bebida fermentada probiótica no láctea con vaina de mezquite

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Abstarct

The world market of functional and / or nutraceutical beverages is a growing health conscious food industry Because Consumers demand Foods That Improve well-being, reduces the risk of diseases and also, free of the animal proteins (vegans). Mesquite pod extract (legume) can be incorporated into non-dairy beverages as a source of antioxidants and add probiotic cultures for fermentation. The aim was Formulated to functional beverage With Lactobacillus acidophilus CDBB 1041 (20%) isolated from Tepache and Identified by PCR, aqueous extract of Prosopis glandulosa seed (500 mg / mL) (15%), agave honey (15%) and fermented at 42 oC / 72 hours in microaerobic. Bacterial growth (optical density 600 nm), pH, glucose, ªBrix, antioxidant capacity and sensory acceptance Were determined. Were Obtained beverages plus nut, mint or coconut flavor (3%) With 8.

Fermented Beverages, Antioxidants, Prosopis

Resumen

El mercado mundial de bebidas funcionales y/o nutracéuticas es un sector alimentario en crecimiento pues los consumidores conscientes de la salud exigen alimentos que mejoren el bienestar, reduzcan el riesgo de enfermedades y además, libres de proteínas animales (veganos). El extracto de vaina de mesquite (leguminosa) puede incorporarse en bebidas femrentadas no lácteas como fuente de antioxidantes y adicionar cultivos probióticos para la fermentación. El objetivo fue formular una bebida funcional con *Lactobacillus acidophilus* CDBB 1041 (20%) aislado de Tepache e identificado por PCR, extracto acuoso de semilla de *Prosopis glandulosa* (500 mg/mL) (15%), miel de agave (15%) y se fermentó a 42 ºC/72 horas en microaerobiosis. Se determinaron el crecimiento bacteriano (densidad óptica (600) nm), pH, glucosa (g.L-1), ªBrix, capacidad antioxidante (%) y aceptación sensorial. La bebida mostró amargor y se adicionó saborizante de nuez menta o de coco (3%), obteniendo un producto final con 8.5 x 10^7 cel/mL de *L. acidophilus*, pH 5.4 a 5,5, glucosa de 10.29 a 19.53 gL^{-1}, 6.6 a 7.6 ºBx y capacidad antioxidante de 42.26 a 49.41 %). La aceptación sensorial de los consumidores fue moderada y se diseñaran nuevas formulaciones para proveer una alternativa funcional con efectos beneficios para la salud humana, proporcionados por el cultivo probiótico y los antioxidantes de mezquite.

Bebidas Fermentadas, Antioxidantes, *Prosopis*

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Introduction

In the last decade, the demand for food and "healthy" drinks has increased in many parts of the world and spreading throughout the functional foods market has changed differentiation between pharmacy and nutrition (Eussen et al., 2011). This leads consumers to the constant search for products that provide improved health, and recognition of the key role of food and beverages in the prevention and treatment of various diseases (Corbo et al., 2014). In the categories of functional foods include drinks by high demand primarily because of easy to incorporate into various formulations nutrients and bioactive compounds (Wootton and Ryan-Beard 2011).

Nondairy fermented beverages are a very important class based beverages juice and / or fruit extracts and vegetable (juices, purees, pulps, juices, extracts, pieces or powder), cereals, legumes, sprouts and also with added probiotic cultures (Ranadheera et al, 2017;.. Marsh et al, 2014), and the main genres indicated as sources of probiotics are Lactobacillus and Bifidobacterium (Gawkowski and Chikindas 2013) that can be isolated from traditional fermented beverages as tuba and Mexican tepache (De la Fuente-Salcido, et al 2015).

Probiotic drinks are classified as dairy and non-dairy (Vijaya Kumar et al.,2015), and it is important to mention that there is an increasing demand for formulations without milk in order to reduce health risks, mainly lactose intolerance, diseases caused by high fat and cholesterol content in standard products, various allergies due to milk proteins (atopic dermatitis) and prevent diseases associated with a high intake of animal proteins such as obesity andthe Oxidative stress (Ricci et al., 2006; Gu and Xu et al, 2010;. Tang et al, 2018.). This has resulted in the development of non-milk fermented beverages, it has been strongly driven by the increasing number of people withto avoid consume animal products (vegans), and is expected to market sales of soft drinks Fermented exceed $ 2.5 billion by the end of 2025 (https://www.plantbasednews.org).

With respect to antioxidants, these plant secondary metabolites have become one preferred by people who want to preserve health through the consumption of beverages containing high concentrations of phenolic compounds possessing anticancer activity ingredient (Roleira et al., 2015), as shown by epidemiological studies of populations with a diet rich in fruits and vegetables (herbs and spices) with high content of phenols and therefore, high potential biopharmaceutical (Sepahpour et al, 2018;. Henciya et al, 2017; Wang et al, 2013;. Kushi et al, 2012.).

In this context, the idea was generated to develop a fermented non-dairy beverage using functional probiotic Lactobacillus acidophilus, agave nectar and fermentable substrate and seed extract glandulosa Prosopis (mesquite) as a source of antioxidant compounds. Therefore, the main objective was to evaluate the sensory acceptance of mesquite functional drink with regular users of non-milk fermented products.

Materials and methods

Isolation and identification of probiotic culture. Lactic acid bacteria tepache (fermented beverage mexicana) was isolated by serial dilutions (10 -1 to 10 -6) And plated on MRS agar (BL Bioxon) Incubated at 42oC / 48 h under aerobic and anaerobic conditions (aerobic and anaerobic conditions (BD GasPak EZ Anaerobe Container System). The genus and species of the strain was determined preliminarily with system API 50 CH (API systems, BioMéreux) (Source-Salcido, et al 2015 and later by amplification with the polymerase chain reaction (PCR) of the 16S rDNA region with universal oligonucleotides 3'UBF5- AGAGTTTGATCCTGGCTGAG- (direct) and 1492 R5- reverse GGTTACCTTGTTACGACTT- 3 . (. Leon-Galvan et al 2009) DNA amplification with high fidelity polymerase (BioRad) was performed at 5 min at 95 ° C; 30 cicles of 30 sec 95 ° C, 30 s at 55 ° C, and 1:40 min at 68 ° C and final 5 min keeping at 72 ° C. Lactobacillus acidophilus strain collection CDBB 1041 Micro 500 CDBB CINVESTAV Mexico was used, DF

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Obtaining extract Mezquite

The entire pod (pod and seed) dehydrated (7 days / 70 ° C) of Prosopis glandulosa Coahuila (pulverisette 2) was milled, the flour diluted in water and decoction (95 ° C / 3 min) an extract was obtained (500 mg / mL) was filtraró with Whatman, centrifuged and sterilized by filtration (0.45 .mu.m Millipore). the amount of phenols was quantified in extract (1 mL) byCiocalteu method Foling-using gallic acid as a standard (Balderas et al., 2017).

Batch fermentation process probiotic drink.

Fermentation was carried out for 72 h 42ªC stirring at 150 rpm in triplicate, using a formulation mesquite extract (500mg / mL) added with 20% lactic culture (L. acidophilus) and 15% agave syrup as fermentable substrate.

During the time course of the fermentation the optical density of the culture at 600 nm by espectrofotmetría (CECIL), the pH, the amount of glucose (g L-1) by the validated method of 3,5-dinitrosalicylic acid (DNS) were monitored (Canseco et al, 2015.) and antioxidant capacity by elimination of DPPH radical (2,2-diphenyl-1-picryl hidrazilo) (Ramadan et al., 2003; Clarke et al, 2013;. Les et al, 2015.).

Sensory evaluation of the functional beverage.

The functional beverage was added with nuts, coconut mint (3%) and subjected to sensory evaluation by judges not trained (> 30) using a hedonic scale of nine points and responses analysis of simple variance (ANOVA) using the program STATGRAPHICS Version 5.

Results

Isolation and identification of probiotic culture
The obtained PCR amplicon sequenced National Laboratory Genomics for Biodiversity (Langebio), CINVESTAV Irapuato was analyzed in BLAST (Basic Local Alignment Search Tool) program providing 99% identity with L. acidophilus.

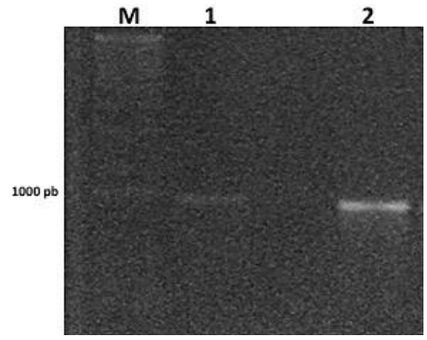

Figure 1. PCR amplification of 16S rDNA region of strain identified as Lactobacillus acidophilus preliminarily isolated Tepache (agarose gels stained with 1% GelRed Biotium) Lane M, marker 1 Kb (Invitrogen); Lane 2 positive control amplicon L. acidophilus CDBB 1041; Lane 3 amplicon L. acidophilus isolated from tepache.

Mezquite extract

It has reported the large biopharmaceutical potential mesquite because components as flavonoids, tannins, alkaloids, quinones or phenolic compounds demonstrate potential in biological functions (analgesic, anthelmintic, antibiotic, antiemetic, microbial antioxidant, antimalarial, anticoccidial, oral disinfectant, plus probiotics and nutritional effects (Henciya, et al., 2017). The proportion of polyphenols obtained for P. glandulosa (Table 1) confriman antioxidant potential to use the extract as functional / nutraceutical ingredient functional beverage.

Abstract	Phenols (gL-1)
Sheet	179.58 + 0.37
Sheath	51.89 + 0.29
Seed	42.32 + 0.85
Carozo	35.22 + 0.20

Table 1 Determination of phenols extracts P. glandulosa

It has been reported that polyphenolic compounds show high antioxidant activity Prosopis (Henciya, et al., 2017) with an elimination of 60.48 and 47.82 radicals%, for P. juliflora and P. cineraria respectively, values very close to those obtained in this study, values which may be dose dependent (Siahpoosh and Mehrpeyma 2014; Napar et al, 2012.).

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Fermentation Process

Figure 2 shows the time course of fermentation of a batch of functional beverage monitored for 72 h is shown. The drink was formulated with mesquite extract (500mg / ml) supplemented with L. acidophilus (20%) and agave syrup (15%).

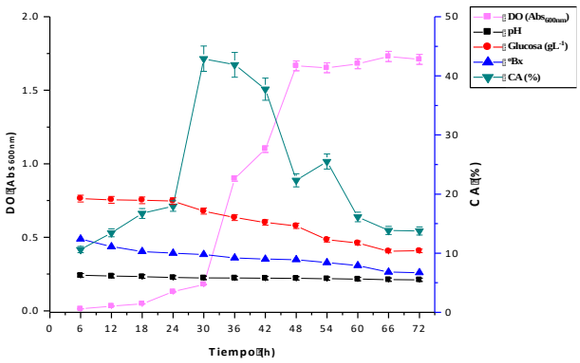

Figure 2 Time course of fermentation of functional beverage 72 h monitored by determining optical density (OD), pH, glucose (g L-1), oBrix and antioxidant capacity (CA%)

In determination glucose drinks 1, 2 and 3 minimal degradation (19.24 to 10.37, 19.53 to 10.16 and 19.39 to 10.29 gL-1) was observed, and it would be important to modify the carbohydrate source (agave syrup) and / or its percentage, likewise find a source of sugars that promotes growth of probiotic culture (L. acidophilus) that reached very low optical density (1.71, 1.94 and 1.74). PH values drinks were acidic (5.5, 5.5 and 5.4) and then provided the bitter so it was decided to add flavorings of nut, mint and coconut (3%) at the end product before sensory evaluation.

Regarding the antiradical action towards DPPH the obtained value was only slightly lower (42.91, 42.26 and 49.41%) than other antioxidant drinks, such as drinks, and definitely showed a wide, slightly lower than the tea antioxidant capacity lemon, green tea, black tea, soluble coffee (Altamirano, 2013). Also, it has developed a beverage, named "anapa" mixing mesquite pods in water and then fermented alcoholic beverage produced "chichi" (Vilela et al., 2009).

Tiempo (h)	Bebida 1					Bebida 2					Bebida 3				
	DO 600 nm	pH	Glucosa (g L⁻¹)	°Brix	CA (%)	DO 600 nm	pH	Glucosa (g L⁻¹)	°Brix	CA (%)	DO 600 nm	pH	Glucosa (g L⁻¹)	°Brix	CA (%)
0	0.014	6.2	19.24	12.4	10.62	0.06	6.2	19.53	13	10.27	0.05	6.2	19.39	12.6	9.54
6	0.033	6.1	19.03	11.1	13.44	0.08	6.2	19.35	12	10.89	0.09	6.2	19.10	12.5	12.24
12	0.048	6.0	18.95	10.3	16.73	0.09	6.0	19.28	10.6	15.33	0.059	6.0	19.00	10.2	19.27
18	0.13	5.8	18.87	10	17.98	0.15	5.8	18.98	10.5	16.20	0.57	5.8	18.95	10.1	21.11
24	0.18	5.8	17.12	9.8	42.91	0.21	5.8	18.14	9.6	39.64	0.99	5.7	18.06	9.6	49.41
30	0.9	5.8	16.02	9.2	11.88	0.99	5.9	17.45	9.0	42.16	1.0	5.8	17.77	9.5	46.26
36	1.1	5.7	15.20	9.0	17.75	1.3	5.7	16.10	9.0	28.06	1.22	5.7	16.70	9.6	36.72
42	1.666	5.7	14.63	8.9	12.23	1.78	5.7	15.64	9.0	23.93	1.65	5.8	15.91	9.5	31.66
48	1.653	5.7	12.27	8.4	25.50	1.80	5.7	13.88	8.6	24.94	1.68	5.8	14.72	9.1	28.43
54	1.68	5.6	11.71	7.9	16.14	1.83	5.6	12.45	8.0	17.76	1.7	5.6	13.88	8.7	22.28
60	1.73	5.5	10.35	8.8	13.84	1.85	5.5	11.81	7.8	14.01	1.70	5.6	13.93	8.3	19.71
66	1.71	5.5	10.40	8.7	13.77	1.89	5.4	10.57	7.5	12.55	1.74	5.4	10.71	7.9	15.44
72	1.71	5.5	10.37	8.6	13.77	1.94	5.5	10.16	7.5	12.18	1.74	5.4	10.29	7.6	14.63

Table 2 Parameters determined during fermentation of functional beverage

Sensory evaluation.

Drinks obtained had a dark appearance and taste perceived bitter, and before sensory evaluation flavors nuttiness (1), mint (2) and coconut (3) were added. In Figure 3 the analysis of variance parameters acidity, sweetness, astringency, aftertaste, salt, color, transparency, and precipitation can be observed.

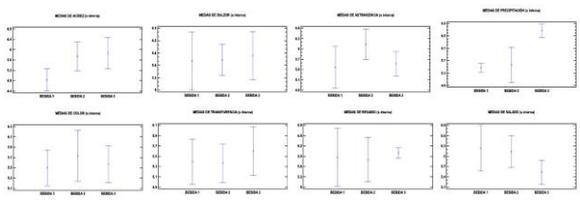

Figure 3 Results of sensory evaluation nondairy fermented beverages nut (1), mint (2) and coconut (3) made with mesquite pod extract, agave nectar and probiotic culture (L. acidophilus)

Medium scale acceptance provided for mint and coconut flavors, and nutty flavor drink showed greater acceptance by judges who tasted samples.

With respect to the above other beverages are formulated currently modifying extract concentrations and source of sugars in order to increase consumer acceptance.

Conclusions

This work provides powerful and useful information about the antioxidant activities mesquite both the extract and the formula of the functional beverage. A pop variety of nondairy fermented drinks containing probiotics and extract mesquite, whose purpose is to provide an alternative way desirable to improve and / or maintain health of ordinary consumers of these food products are developed.

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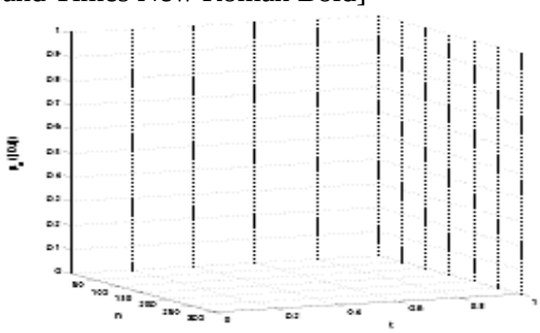

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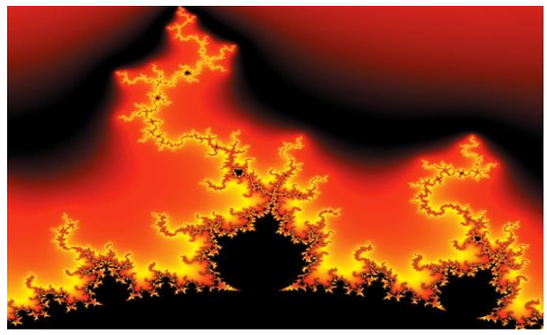

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